

Chapter 1: Menomonee 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 Menomonee 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 Menomonee 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 (RWQMUP) and Milwaukee Metropolitan Sewerage District (MMSD) 2020 Facilities Plan and incorporates the input from members of the SWWT and its associated Menomonee River Watershed Action Team (WAT) and Science Committee.

1.2 Key Elements of the Menomonee River Watershed Restoration Plan

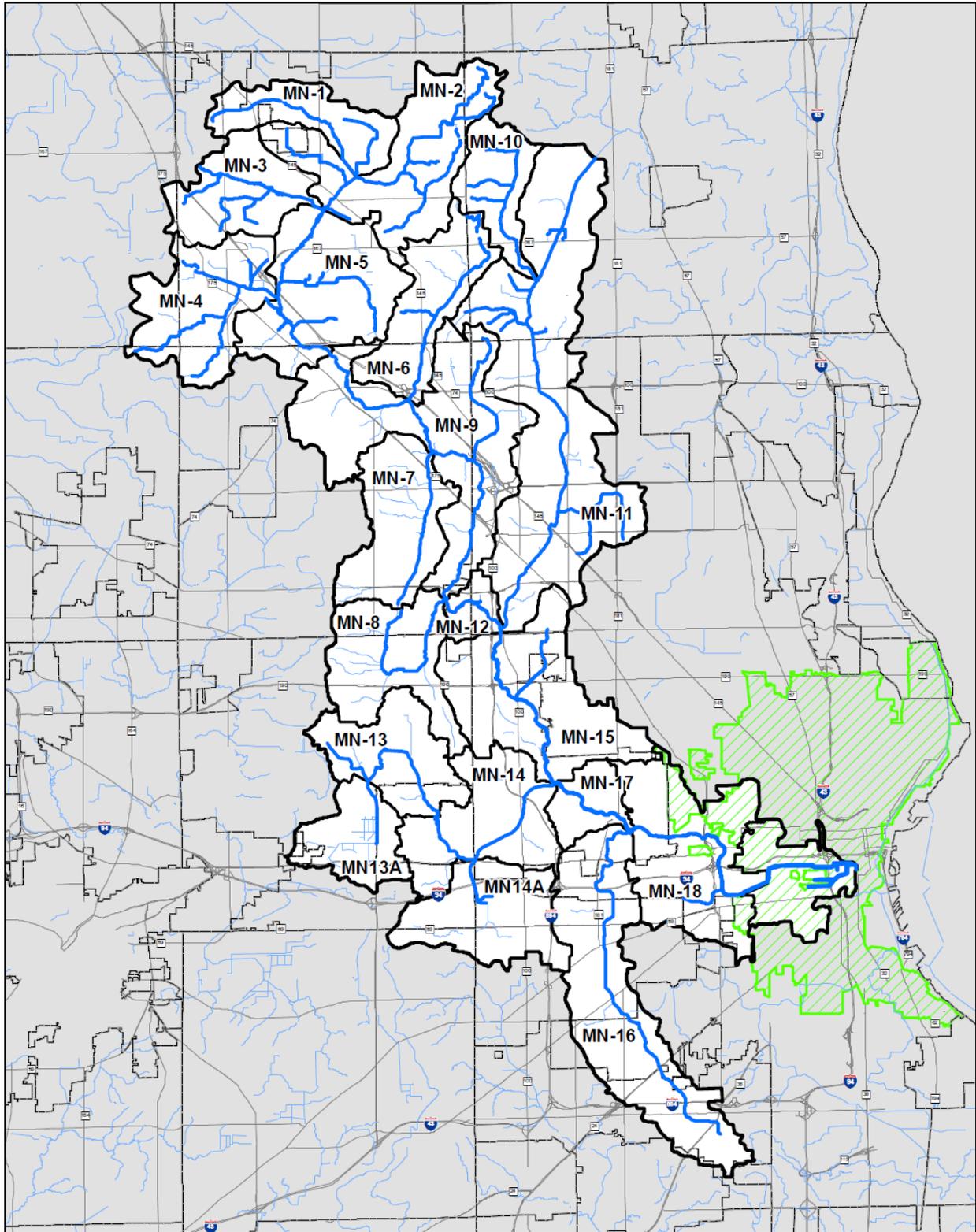
This WRP follows the Clean Water Act guidelines for developing effective watershed plans. As such, this WRP includes the U.S. Environmental Protection Agency's (USEPA) nine elements required to be addressed in watershed plans, described in the USEPA's *Handbook for Developing Watershed Plans to Restore 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 Menomonee River watershed. The chapter's maps, descriptions, and tables provide data on the Menomonee 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)





LEGEND
■ Assessment Point Boundaries
■ Combined Sewer Service Areas

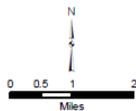


FIGURE 1-1
HABITAT ASSESSMENT POINT AREAS
WITHIN THE MEMONEE RIVER
WATERSHED
MN WATERSHED RESTORATION PLAN



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 Menomonee 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 Menomonee 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 RWQMPU and prioritizes actions and identifies land uses and assessment point areas that should be targeted to meet the goals of this WRP. Note that the Menomonee 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 included an assessment of habitat conditions in the Menomonee 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 Menomonee River watershed. The factsheets were developed to enhance the

public's understanding of and connection to the Menomonee 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 Menomonee 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 Menomonee 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 refinement.

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 RWQMPS. 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 Menomonee 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 Menomonee 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 (including specific reaches). Other suggestions include removing streams from enclosed conduit (stream daylighting) and re-introduction of stream meanders. While daylighting streams and introducing meanders would immediately improve habitat along the stream, potential impacts to public safety and flooding 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)
- ◆ Free of trash
- ◆ Increase pools and riffles
- ◆ Decrease flashiness and thermal discharges



- ◆ No fish advisories
- ◆ Reduce unnatural solids in streambed and improve clarity of water
- ◆ Less salt
- ◆ Seawalls/fish condos – look at the lower portion of the Menomonee River to create habitat
- ◆ Plant wild rice in the Burnham Canal (Milwaukee Riverkeeper is undertaking a pilot project)
- ◆ Restore original meanders upstream of 115th Street
- ◆ No fecal coliforms
- ◆ Increase levels of DO
- ◆ Decrease nutrient loads
- ◆ Remove invasive species
- ◆ Clean up Superfund sites such as Little Menomonee River

Riparian areas – The lands adjacent to the Menomonee River stream banks protect and buffer the stream from pollutants. To maximize their protective benefits, the WAT suggested that riparian areas be kept vegetated. Natural vegetation should be managed to enhance biological diversity and support recreational use needs. Riparian areas should be expanded to a minimum of 75 feet and structures should be removed from riparian areas that are located within the floodplain. Other WAT suggestions for improving riparian areas along the Menomonee River include the following:

- ◆ Construct and restore wetlands
- ◆ Improve public access to river (indirect improvement through increased recreational use and awareness of the river)
- ◆ Remove invasive species and improve diversity
- ◆ Reduce or eliminate nutrient inputs from manure spreading in rural areas

In-stream and riparian areas:

- ◆ For projects, start at the headwaters and work progressively downstream
- ◆ More aquatic life diversity, plants and animals that would use the waters in a safe manner

c. Nutrients/Phosphorus

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

1.3.2 Baseline Year 2000 Conditions

The characterization of the Baseline Year 2000 conditions within the Menomonee River watershed was a crucial step in this WRP planning process. A large amount of data was



compiled for each of the 18 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 rural and 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 Menomonee 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 RWQMPSU, 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 RWQMPSU, 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:

- ◆ Total phosphorus and BOD loads decrease from Baseline Year 2000 to the Year 2020 with planned growth condition whereas TSS and fecal coliform loads slightly increase.
- ◆ Implementation of Wis. Admin. Code NR 151 *Runoff Management* (non-Agriculture [Ag] only), recommended in the RWQMPU, results in an 11% decrease in TP loads, a 24% decrease in TSS loads, a 14% decrease in BOD loads, and an 18% decrease in fecal coliform loads, relative to the Year 2020 with planned growth condition.
- ◆ Building on the load reductions due to NR 151 (non-Ag only), the implementation of the Point Source Plan, as called for under the RWQMPU, results in additional load reductions of 1% for TP, 0.3% for TSS, 1% for BOD, and 3% for fecal coliform, relative to the Year 2020 with NR 151 (non-Ag only) condition.
- ◆ Building on the load reductions due to NR 151 (non-Ag only) and the Point Source Plan, implementation of the remaining measures in the recommended RWQMPU results in additional load reductions of 4% for TP, 2% for TSS and BOD, and 29% for fecal coliform relative to the Year 2020 with NR 151 (non-Ag only) and Point Source Plan (5-Year LOP) conditions.

The expected load reductions for the Menomonee 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. The most pronounced change to the assessment of year 2020 water quality within the Menomonee River watershed is the improved score for TSS within about half of the assessment point areas.

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 Menomonee 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 Menomonee River. Table 1-1 presents the Menomonee River WRP's foundation actions to improve and address public health with respect to water quality in the Menomonee 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	3a. Identify where public ownership of land can serve as a starting point to increase riparian buffers
	3b. Develop focused programs to assess the impacts of older septic systems on water quality
	3c. Manage pet litter
	3d. Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features - identify areas and take action to discourage waterfowl feeding
	3e. 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)
	3f. Initiate municipal, county and SWWT education programs to educate public on sources of bacteria and actions they can implement to reduce loads to streams
	3g. Provide 6 months manure storage
	3h. Prevent cattle from directly accessing streams
	3i. Convert marginal crop land to wetland or prairie
	3j. Preserve highly productive agriculture land
	3k. Control barnyard runoff
	3l. Maintain and preserve Environmentally Significant Lands



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 Menomonee 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 bacteria sources from land-based sources

This WRP recommends actions identified to address agricultural sources of fecal coliform bacteria such as manure and barnyard runoff and other livestock management strategies. Actions also include enhancing riparian buffers and assessing the impacts of older septic systems. Recommended actions also include those to address urban sources of fecal coliform, including pet waste and waterfowl as well as projects that 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 Menomonee 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
<i>Land-based</i> 1. Reduce water quality impacts from nonpoint runoff (focus on chlorides)	1a. Evaluate existing road salt reduction programs
	1b. Implement new pilot road salt reduction programs
	1c. Implement road salt reduction program education
2. Reduce water quality and quantity impacts using green infrastructure	2a. Implement green infrastructure to reduce runoff
<i>In-stream based</i> 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 and/or retrofitting of five low-gradient structures on the North Menomonee River Parkway between Swan Boulevard and Harmonee Avenue and implement the plans
	1c. Develop plans for removal of additional obstructions on the mainstem or tributaries and implement the plans
	1d. Develop detailed assessments to expand passage restoration efforts beyond the mainstem to the tributaries, prioritize them, and implement them

Reduce nonpoint water quality impacts (focus on chlorides)

This is one of two foundation targets that address land-based habitat and aesthetics within the Menomonee River watershed. This WRP’s analysis of habitat impairments revealed the important role of chlorides in the Menomonee 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.

Reduce impacts through green infrastructure

The other land-based target to address habitat and aesthetics within the Menomonee 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.

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 watershed. 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 Menomonee 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 (actions were ranked low to high in the SEWRPC Regional Plan)	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 RWQMPSU indicates that other pollutants, such as (polychlorinated biphenyls) PCBs, polyaromatic hydrocarbons (PAHs), nitrogen, copper, and pharmaceutical and personal care products (PPCPs), also affect water quality within the



Menomonee 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.

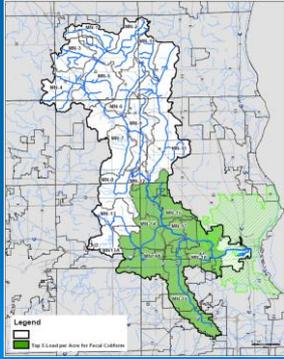
1.3.8 Policy Issues

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.



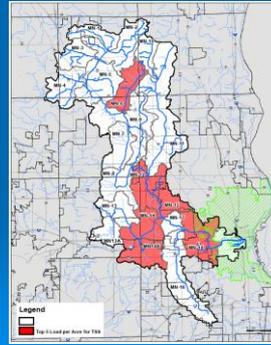
Location of Priority Areas to address Fecal Coliform Concerns



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



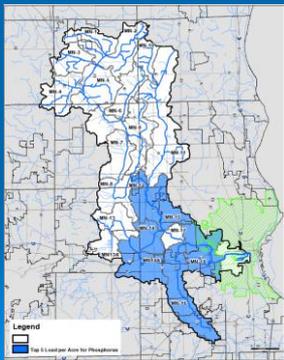
Location of Priority Areas to address Total Suspended Solids (TSS)



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



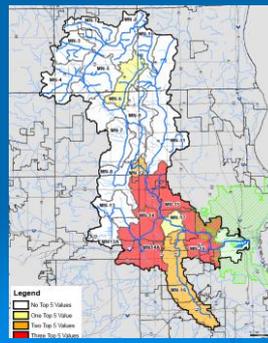
Location of Priority Areas to address Phosphorus



- Top 5 areas generating Phosphorus per acre of land
- Based on historical data



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 upstream of Swan Boulevard can never be fully realized until a better connection with Lake Michigan is created by removing the five low-head structures downstream of Swan Boulevard and fish passage through the concrete-lined channel section is provided in the lower reaches of the Menomonee 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
Menomonee River Watershed**

Watershed Targets to be Achieved by 2015	Actions
PUBLIC HEALTH/BACTERIA	
1. Identify unknown sources of bacteria, and correct/remove/disconnect them (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. Develop focused programs to assess the impacts of older septic systems on water quality 3c. Manage pet litter 3d. Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features - identify areas and take action to discourage waterfowl feeding 3e. 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) 3f. Initiate municipal, county and SWWT education programs to educate public on sources of bacteria and actions they can implement to reduce loads to streams 3g. Provide 6 months manure storage 3h. Prevent cattle from directly accessing streams 3i. Convert marginal crop land to wetland or prairie 3j. Preserve highly productive agriculture land 3k. Control barnyard runoff 3l. Maintain and preserve Environmentally Significant Lands
HABITAT - LAND-BASED	
1. Reduce water quality impacts from nonpoint runoff (focus on chlorides)	1a. Evaluate existing road salt reduction programs 1b. Implement new pilot road salt reduction programs 1c. Implement road salt reduction program education
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)
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 and/or retrofitting of five low-gradient structures on the North Menomonee River Parkway between Swan Boulevard and Harmonie Avenue and implement the plans 1c. Develop plans for removal of additional obstructions on the mainstem or tributaries and implement the plans 1d. 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.

Menomonee River WAT Project List with Priorities (bolded)

Bacteria (HUMAN)

Criteria used:

Are people recreating in the river?

Is the area high for human bacteria?

-Existing Recreation Access/Access sites to Maintain/Improve

- **Most paddlers put in the river downstream of Currie Park (below Capitol Dr.) and down to Wauwatosa—no more formal access points downstream until MMSD site near Miller Brewery and 37th Street access. Many people do not paddle downstream of 60th (due to bedrock bed of river), and Jacobus Park access to river is difficult.**
- **Downtown Wauwatosa has heavy use, including many kids playing in streams throughout Hart Park, Hoyt Park, downstream of North Ave, and further upstream. Sense that this area is the highest priority for bacteria testing/fixing.**
- **Menomonee Valley is another area with a lot of recreation; some paddling – lots of fishing. Concern in particular if the canoe launch at 37th Street has body contact threat.**
- **Entire area downstream of I-94 is used heavily by fishermen – posing body contact threat; some fishermen use the concrete channelized area upstream of Miller Park as well—priority for bacteria testing/fixing.**
- **Waukesha County/Milwaukee County line is pretty clear dividing line where further upstream there is less public access. Butler area needs better river and riverfront access, and to connect Oak Leaf Trail with trails above! Long-term project but best to begin planning now.**
- River's edge park, Lime Kiln Park, and other riverfront parks in Menomonee Falls are used recreationally—not a lot of people recreation in the river but many using parkland.
- Bike trails along river in Menomonee Falls are used. Off of Lily Rd, detention basin where lots of fishing occurs.
- Frontier Park in Butler at big bend in the river could be improved, especially riparian buffer and river access; most recreation is active (ball fields, etc), some fishing
- Oak Leaf Trail bike path all through Milwaukee County—from Wauwatosa to the confluence of Little Menomonee and Menomonee Rivers—heavily used, especially trails along Menomonee River Parkway—reach out to bike groups for help improving trails/access
- New amphitheater at Hart Park but banks steep and not good river access
- Golfing at Doyne Park but is high above river (poor river access); need better connections across river here to new MMSD stormwater management areas
- Existing Hank Aaron Trail use growing in area
- Downstream of 25th, river is used more heavily by paddlers and crew teams

- (Paddling) Address low foot bridge at Currie Park—major hazard for paddlers (need to address with Milwaukee County). Debris jams along the river are also impediment to paddling—need to start an ‘adopt the river’ system to keep river open during high water.

-Potential Recreation/Access Opportunities

B Priority--Sense that these potential projects could be implemented given opportunity but should be reviewed in light of bacteria data to eliminate any human exposure

- **Two new canoe launches planned for near 33rd St in future for 2012 (behind Palermos)—need to start monitoring here as well as existing canoe access at 37th.**
- Potential for fishing in existing parks in Menomonee Falls, not a lot of fishing going on (some fishing by Badger Fishermen and in streams upstream of the Village)
- Private golf course and homes limit access to river in many areas of Menomonee Falls
- Behind Best Buy: big floodplain, grassy, not easily accessible...lots of litter here (there is also a citizen monitor here). Opportunities for clean-ups, improvements
- End of flint drive: improve access to river
- Possible to improve access to tamarack swamp area in western edge of the subwatershed; implement nature center; “Friends group” for the tamarack swamp
- Rotary Park (#1): Good bike paths and walking paths—could use improved access to the water.
- Mill pond park downtown (#4) could be potential quiet paddling / paddleboat place in Menomonee Falls.
- Frontier Park in Butler could be improved as far as river access—river trails end at Milwaukee/Waukesha County line; very limited public access.
- Sense that some private landowners upstream of Butler/downstream of Menomonee Falls may be amenable to providing public access? RRF should check out.
- Need better access near the confluence of Little Menomonee and Menomonee – Discuss with the County.
- MMSD maybe still owns land near confluence of Little Menomonee and upstream from there—could that land fit in to doing something for access there?
- Cheryl thinks that paddling could potentially be good here in the lower portions of Menomonee Falls/Butler area.
 - Are there areas here that need trees and other impediments to paddling removed?
 - Whose jurisdiction is this area? Appears to cross multiple counties.
 - Could projects like that that were volunteer-led, etc. be good candidates here?
YES.
- Will be a new bridge over RR line at about 26th St from Mitchell Park in 2012
- Will be new bridge at 37th St this year (2010)
- Public Access needs to be in MMSD Plan - In former Sears industrial area at 60th-ish and State, City of Tosa trying to improve public access w/ riverbank work/trails
- Hank Aaron Trail to be expanded to RR corridor west past VA Hospital and St Fair Park to 124th and Blue Mound

- Canoeing through area where concrete removal to occur needs to be improved. Poses major safety concerns, especially where several railroad bridges cross river (2 of 3 may be replaced as part of high speed rail project (see map).
- Opportunities to improve MMSD's overgrown canoe launch near Miller Brewery
- New canoe launch downstream of this area at 13th St/Emmber Lane.
- MRK working on Harley Davidson museum boat access
- City has a stormwater wetland with pilings for boardwalk but boardwalk never built underneath I94 upstream of Miller Park. Could be an opportunity.
- Airline Yards park redevelopment ongoing over next several years on southbank of river in Menomonee Valley. There will be bank stabilization projects, improved trails, pedestrian bridges, and river access, as well as better connections to neighborhoods. Work to support MVP.
- Possible to relocate bike trail from on-street on S bank of Menomonee along Honey Creek Parkway to N bank on MMSD property (Central Ready Mixed/Sears) – work with WORBA, Bike Fed, etc.

--Reduce Bacteria Sources/Monitoring for Bacteria

MRK/GLWI currently testing from Burleigh to Hawley as well as portions of Underwood and Honey Creeks due to bacteria modeling results and high unknown sources of bacteria. Sense is that we need to make sure that we are also monitoring areas where there is heavy use, which could mean expanding upstream of Burleigh to at least Capitol and downstream through the Menomonee Valley. DNR also needs to stress need that municipalities do more to find/fix sources, and to test for bacteria as part of required monitoring.

- Ongoing work by MRK and GLWI from Burleigh to Hawley—MRK and MMSD testing some problem outfalls in Valley (some permitted discharges here from P&H, Masterson, etc that also need to be better identified)
- **Use DNR info on outfalls as gathered in NR 151 process to determine who can 'claim' each outfall or especially the problem outfalls. Should help w/ ownership and subsequent remediation or fix issues. Need to determine each outfall ownership or claim to find and talk to owners about problems w/ outfall test results (Ted Bosch project – created layer of who owns all outfalls for Milwaukee County)**
- **Get stormwater pipe sewershed maps from MMSD and/or municipalities – use ifno to find/fix. Prioritize fixing of “bad” pipes in areas of high recreational use as a strategy/project moving forward.**
- **Hartung area residential neighborhood needs attention for bacterial sources.**
- **Continue to work with Science Committee to prioritize bacteria monitoring/finding/fixing.**
- GPS and map all outfall locations in problem areas as project – work with MMSD and municipalities.
- Some hot spots right near Miller Park and where Woods Creek comes in still (series of 4 outfalls with periodic discharges and some remaining bacteria issues)
- Continuing issues along Honey Creek/downstream from State Fair

- Prioritize outfall testing for bacteria loading: 90th St, 70th Street, along south bank, storm outfall into/out of the MMSD detention basin at County Grounds (note testing currently downstream of Burleigh mostly—90th Street area not tested nor basins)

- Riparian Buffer Opportunities

This list is very long and encompasses a large portion of riparian property from Menomonee Falls to the Menomonee Valley. Sense that more evaluation needs to be done before we can prioritize projects. Some possible suggested criteria are below.

Create Matrix with following Criteria:

1. Bacteria loading
2. TSS loading
3. Phosphorus loading
4. Use biodiversity layer/Look at existing biotic information including SEWRPC Natural Areas Plan – Convene meeting with County, Casper, SEWRPC (Reed), DNR – to get recommendations as to where the best place to start is to enhance biological habitat values until we can get better study
5. MS 4/County interest (Milwaukee, Waukesha, Washington)
6. Funding opportunities (cost-benefit)
7. Use - RRF Land Protection plan priorities
8. Slope / soils possibly

Target areas:

Downtown Wauwatosa, Menomonee Falls, Menomonee Valley & Nor-X-Way
Phosphorus – 18, 15, 16, 12, 14
Fecal – 18, 16, 17, 15, 14
Sediment – 12 (Butler), 18 (Valley), 6 (Nor-X-Way), 15, 14;

- Menomonee Falls industrial park – Lots of parking lots – need buffers on the river.
- Undeveloped Germantown Industrial Park – little/no use/ lots of runoff into stormwater pond has potential for impacts on the river, some SSO points; buffers needed; opportunity for green infrastructure or better pond design?
- Work with village to improve buffers in almost all parks in Menomonee Falls (except Lime Kiln?). Lots of parks w/ no/ very few trees, but almost all mowed to the edge of river
- Rotary Park (#1) a possibility to expand riparian buffer, but stopping mowing might upset some users and limit access; #7: along Lilly Creek north of Mill Rd another opportunity.
- Milwaukee County land north and South of Good Hope Rd. along Menomonee R. mainstem (#11)-good opportunity for improving buffers.
- Potential to improve riparian corridor at “River Park Pond”?
- City of Menomonee Falls doing invasive plant removal/replanting project at Lime Kiln Park, part of bigger effort, have gotten funding help from MKE Riverkeeper
- Strong Funds/Wells Fargo operation owns very large parcels w/ riparian corridor – any potential for protection/repair/green infrastructure?
- Golf courses (Dretzka, North Hills) in area could expand riverside buffers area for riparian improvement

- Dousman Ditch does not have much of a buffer. Pilgrim Road borders right along the east side of the ditch and Brookfield owns the land immediately to the west of the ditch. Flooding of Pilgrim Road is a major concern here. Farming buffers could be extended up to 75 ft here
- Bike route along Underwood Pkwy could be improved with better buffers
- West Allis - 120th – Rainbow & Schlinger – better vegetation would benefit the buffers.
- Garfield to Tonawanda in Elm Grove needs better buffers
- Potential erosion problems near and downstream of #1 (Elm Grove)
- Potential for erosion repair at sites where outfalls come into river and are eroding, especially where buffer is publicly-owned upstream of Elm Grove Village Hall—see map and Milwaukee County Interfluvium report for badly eroding areas
- Does Waukesha County own parkland near Butler’s park (at #1)? This could provide opportunity to expand/improve access. Cindi Debruine will check on that (she works for Butler)
- Maybe expand Riparian Buffer at Harnischfeger – P&H is open to this. Also some serious runoff problems from P&H, causing gully erosion.
- Monitor impacts of Falk \$2M wall project and impacts – e.g. must there be a loss of the current wall-side trees and shrubbery? Opportunities to improve buffer.
- There is a lot of city/county-owned land in Valley that might be part of additional riparian buffers
- Soldiers’ Home / VA hospital area along Woods Creek—riparian buffer improved and Woods Creek daylighted as potential projects
- MMSD West Milwaukee flood management work upstream of Doyne Park and down to 53rd St.—opportunity for improvements to riparian areas and stream access (some issues with RR)
- Jacobus Park and Doyne Park buffers could be improved/need restoration. Friends of Jacobus Park could be partner in this effort—already doing a lot there.
- Airline Yards area in the Valley – Future Hank Aaron State Trail site with better river access and restoration planned—Army Corps may be able to fund some riparian and in-stream work (likely MMSD, RACM, NGO partners)
- Evaluate MMSD’s plan for concrete removal along Underwood Creek to target opportunities for riparian buffer installation (how far along is this?)
- Assess opportunity for conservation rezoning at County Grounds and WE Energies/Ronald McDonald House properties that adjoin the Grounds
- Area of Hoyt Park is mowed very closely to the river—could be improved. Likewise with Hanson Golf Course, Swan Blvd to Jackson Park St., and along flood structure/berm behind Western Molding industrial area
- Possible opportunity north of Capital Drive for Milwaukee County to improve eroding banks
- Meet with MKE County Parks about pulling grass cut lines further back from river’s edge
- Talk with Blue Mound Country Club about expanding/restoring riparian buffer; conservation easement---RRF LPP priority #7

- **Create a biodiversity plan – to provide an additional layer of information to help prioritize areas where we should start with riparian restoration projects (involve Gary Casper—MRK submitted grant for this to SOGL that was not funded but could be sent out again) (LONG TERM GOAL)**

-Reduce Waterfowl congregation – Priority B

- **Education seems to be the key, especially how buffers limit waterfowl (e.g. use Washington Park or Elm Grove ponds as good examples). Find partner(s) to begin this work since it's a priority B – most issues are on Golf Courses/County property & Valley stormwater park.**
- Germantown Industrial Park pond? If so, create better pond design – work with the village to retrofit/improve
- Maybe Riversbend (non-county) golf course in Germantown (just outside of this assessment area)
- Pond (#6) at corner of Mill Rd. and Lilly Rd. / Lilly Creek
- There is a rookery (turkey vultures? heron?) north of Brown Deer Rd and Esquire
- Thought to have some geese issues at Dretzka Park ponds
- Country club off of Silver Spring has some issues
- Heavy bacteria loadings on west bank of river at Burleigh—probably due to Golf Course there
- Oakwood Park has geese issues
- Lots of geese along dry basin area in Lily Creek area
- At park in Butler at #1 (ponds)
- Some areas in the ponds near Taylor Dynamometer in Valley have waterfowl problems—occasionally geese in stormwater park areas
- Park/pond at Mitchell Park Domes could be improved to minimize waterfowl with better native plant buffer (look at Washington Park work)
- MMSD detention basin at 26th & Canal are an issue—vegetation needs to be improved, has largely died.
- Lagoon – people are feeding geese – signage – off of Burleigh / Concordia; golf course
- Establish new or renewed Canadian goose egg ‘addling’ program to cut breeding numbers or just improve buffers along rivers and ponds to discourage geese

--Dog Waste issues (Priority B)

Education / Poop Stations – targeting Wauwatosa and Valley; working with partners such as scouts and neighborhood associations to adopt as projects.

- Dog walkers might increase w/ new trails, bridges in Airline Yards/Valley/HAST – maybe need additional signage and bag dispensers
- Lots of dog walkers at Jacobus and Hart Parks, also Hoyt Park, Doyne Park, County Grounds, downtown Tosa, and parkways upstream—opportunities for pet waste education and bag stations/containers relating to dog waste (county knows about these)
- Mt. Mary parkway and then thru campus could use education.
- Get neighborhood associations to sponsor doggie pots; pet owners could support through fundraisers;

- Dog park (in Curry / Currie Park) a potential problem area—major runoff, also put in a bad location—very wet
- Map where pet poop dispensers/signage is now for future use
- Remount Scout or other civic group stenciling of sewer drain campaign – signage like “Flows right to the Menomonee River” or similar (MRK already has a campaign—so does MMSD, we just need labor and some funding for storm drain markers)

-Ag Land

Nor-X-way is priority

Talk to OWLT, Wash County, Conservation Fund, etc. as first steps

- **Riverbank survey needed to identify worst areas of agricultural land runoff in upstream portions of watershed (Menomonee Falls, Germantown, Mequon)**
- **River improvements needed along Nor-X-Way Channel, upper Menomonee, Little Menomonee—additional scour pools, restore wetlands (break ag tiles) - Work with Ozaukee Washington Land Trust – PieperPower Education Center.**
- Ag areas - tall buffers need to discourage? From RR to Friestadt Rd – corridor needing buffers, especially wider buffers for greater slopes.
- Along 145 – hill eroding (see red arrows on map) – flows to river.

Land Based Impacts

-Green Infrastructure Projects

Again, this is a very long list. We separated into three categories: specific actions, general strategies, and policy projects. Suggested using criteria below develop a Matrix for better prioritization:

- 1. Where is the biggest impact – look at pollutant loadings (water quality) and water quantity/conveyance issues**
- 2. What projects are most feasible based on ownership, funding/partnerships, current plans/programs, policy/ordinances conducive to retrofits, etc. Look at SW utility fee use studies done by River Alliance & MRK**
- 3. Talk to muni’s & DNR regarding “hot spot” areas to target for BMPs (SLAMM modeling?)**
- 4. Policy change issues should also be prioritized for Policy Cmte**

SPECIFIC ACTIONS

- Men. Falls & Germantown Industrial Parks – huge opportunities for green roofs, pervious pavement, swales, etc... Can an incentive program be developed to encourage commercial property owners to install GI? Similar to Milwaukee’s effort (Simon Landscaping as an example)
- Farm just outside of assessment point area, right along Lilly Creek (adjacent to #6) (#8)
- Dickinson parcel on west shore of Menomonee R. mainstem just north of the railroad (#9)

- Open land North of the Grace Cocoa site along 124th St. (#10)—**this property adjacent to site identified in RRF's LPP**
- New Woodman's under construction off Hwy 41 in Menomonee Falls south of Waste Management
- Tank farm area options/control? Is also concrete contractor/scrap recyclers near that location where there might be opportunities, looks like a creek flows thru their property
- Large Coca Cola bottling plan on Brown Deer Rd could be opportunity
- Kohl's Corporate office and new Quad Graphics plant on Brown Deer Rd at Pilgrim Rd. Kohl's also has warehousing and credit card operations in the area and they are a "green" company
- Large Compost recycling operation and a green house on County Line Rd
- Ernie von Schleidorn (sp?) parking lots – is a creek/drainage near there – what is impact?
- Proposed green roof for Good Hope garage, but has since stopped due to cost—can this project be started again??
- Pick 'N Save on Appleton Ave: reduce impervious parking lot area
- Bishop Woods-opp for permeable pavement, native plantings,
- West Allis - asphalt – lined ditches – wanting to change to vegetative ditches.
- Elm Grove - Reinders is opp. for Green Infrastructure – former Tapco Building.
- Elm Grove Underwood Creek daylighting – downtown. Need to bundle with other project for funding. DNR says they will not re-permit that box culvert. There is also new ownership of the grocery store that should be approached.
- Other Opps: 116th to Hwy 100 on Orchard in West Allis; Interchange /Quad Graphics;
- Brookfield –Robinwood and south – re-ditching and culverts under the driveways for better flow. Redoing the Water main up to Sunnyslope (from the east). Could be opps.
- GI potential at industrial area directly west of the Zoo
- School Sisters of Notre Dame: They have an educational program concerning the environment. They might be amenable to activities / projects on their property.
- Mayfair Mall and the commercial area along Mayfair Ave huge need for improvements.
- The old Queb-Core property
- #6 (from MN12—look at map—Ezra group)
- #7: soldiers' home
- #8? (asphalt recycling plant)--do they have a stormwater plan?
- #9: Industrial land along 124th St.
- #11: Ambrosia Chocolate property could have potential (to the north, outside of this assessment area)
- P & H / Harnishfeger property has a lot of run off going straight into the river, and can be an erosion problem if not dealt with—already causing some gully erosion. Dave Kurtz – facilities manager who attended said there are plans for improvements in near future. Opportunity for outreach re: green infrastructure. Dave Miske (RACM) is working with them.
- Falk property too has potential for stormwater BMPs

- Stormwater pond that seems to need some love upstream of I94--HNTB may be looking into this (they were original designers)
- Big rain barrel to capture water from 35th St. viaduct being planned
- DPW maintenance facility at 26th leaks oil into the river and could have GI potential—filtrexx socks along fence??
- Layton BLvd West Neighbors – 5-family townhome project with green roofs on 35th and Pierce—could be great demo project.
- City of Milwaukee/Tosa – along Center Street– implement rain garden program; make sure all are disconnected from the sewers.
- Milwaukee County road improvement along parkways – Burleigh – repair with pervious surfaces – add bioswales; stormdrain stencils; etc
- Lagoon maintenance / restoration needed at Jacobus
- Big building industrial areas in this assessment point area could be targets (specifics on the maps here)
- Green roofs – Briggs & Stratton – remove 5 A of impervious surface (off of Wirth St.), Lowes, etc.; Burleigh triangle is an opportunity; Harley Davidson
- Mount Mary College identified in RRF’s LPP as having high conservation value and potential for restoration and green infrastructure

GENERAL

- Faith Communities – see map for identified church to work with on parking lot runoff.
- Target schools that can have rain gardens
- Set up talks with San Camilla’s, the Heart Hospital, Lutheran College, Sarafino Square Senior Residence as to GI opps.
- Area near Hart Park badly flooded in 86, 97, 98—led to large flood management project that removed most of the vegetation. Some opps. for improvements. Some pervious pavement/BMPs at Hart Park that could be used as examples—but need major maintenance or could be bad example
- Stormwater retrofit opportunities in major commercial/industrial areas like Harnischfeger/Allis Chalmers
- Look for ways to ID green infrastructure efforts at area commercial districts, perhaps working thru business orgs/MN Valley BID/TOSA BIDs
- Assess opportunities for green infrastructure development at following locations in Tosa:
 - i. Medical College of Wisconsin campus
 - ii. Planned UW-Milwaukee development on County Grounds
 - iii. County psychiatric hospital and surrounding commercial district on Dewey, Chestnut, and Kavanaugh
 - iv. “Green boulevards”
 - v. Wauwatosa East High School
 - vi. UW – Extension campus
- Reduce permeable surfaces on downtown Tosa parking lots
- Survey underutilized parking lots (as potential opportunities) throughout watershed

POLICY

- Impervious-surface based stormwater utility charges— currently the utility works on property value-based approach, due to political will at the time of the passage of the ordinance
- (*Hard for citizens to point to specific practices / sites → need to look at this more technically*) – Science committee
- City is seeing more projects using permeable pavement: ordinance currently requires more parking stalls than needed—maybe look into changing ordinance for new parking lots
- #10: Railroad land: Does it have a stormwater prevention plan?
 - Same question re: other industrial properties in the area
- Miller Park must add some facilities to get to compliance 40% TSS removal by 2013— could be some opportunities there. Can Miller Park be retrofitted with stormwater BMPS and used for education purposes? Have huge parking lots. Also issues with maintenance crews blowing trash into rivers. (**Sense that large permit compliance should come into play**)
- Based on sewershed mapping, surface drainage, and parcel data, determine priority locations for clustered green infrastructure applications to manage storm water quantity and quality—need more tools to help prioritize work
- Expand Wauwatosa rain garden program (initial program ran out of funding). Promote this type of program in other areas.

--Reducing Salt Use

- **Highlight successes (Brookfield, Tosa, Valley businesses) – encourage collaboration**
- **Provide workshops to better educate public and private applicators**
- **Ask MS4 municipalities about salt use plans and get them coordinating**
- Work w/ City County to encourage less salt/salt spray on roadways/expressways
- Menomonee Valley business parks use non-salt options already – are a possible source of education for other areas/cities
- Try to get businesses to apply less salt in parking lots, especially in larger commercial areas like Tosa Village. Tosa concentrates on salting hills and intersections after January.
- Miller Park salt use needs investigating
- Canal St., 35th, and 27th Streets all suffer native plant damage from salt spray— opportunity to work with the City on salt spreading in the Valley.
- Demonstration project opportunity planned by MVP for salt reduction via perched wetlands to manage viaduct stormwater. Viaducts also a major garbage source.
- Canal street –public education opportunity regarding salt usage. Beet Juice being used at Tower Automotive - Need more info.

- Brookfield and Wauwatosa have decent salt reduction programs—could elevate that activity further

--Reducing nutrients

Sense that much is already being done with P ban on residential fertilizers, new P rules, etc.

Criteria: assess areas that have most impact on resource. Most of discussion focused on improving golf course management, county park management, and also working to deal with non-contact cooling water as P source.

- **Golf courses – Dretzka, North Hills, Westmoor Country Club, Bluemound**
- **Milwaukee County Parks—use Milorganite? Investigate opportunities to minimize fertilizer and increase buffers. Timmerman also mentioned.**
- **Are there options to reduce industrial cooling water impacts in area? Seem like there are a lot in the area that are discharging P through orthophosphate that is added as anti-corrosion inhibitor. Can DNR regulate that P-free alternative should be used? Can something else be added (silicates?) to avoid the phosphates in water treatment process?**
- What kind of street cleaning occurs in Elm Grove, Tosa, Brookfield to reduce TSS, etc.?
- Phosphorus reduction opportunities
 - Increase the riparian buffer on the north end of the Elm Grove Village Hall detention basin.
 - Possible opportunity at the large dry detention area in Brookfield (northwest MN 14)
 - There are many areas where the grass along the creek is mown, from northwest MN 14 downstream to Elm Grove Village Hall.
 - Big industrial area on corner of 124 and Main St. could reduce fertilizers.
- More needs to be done to reduce Municipal sediment / construction site erosion
- Check if Timmerman fertilizes grass; how about cemetery

MONITORING/ADAPTIVE MANAGEMENT:

- What are the impacts of CSOs/SSOs on P issues? Thermal issues with P problems?
- What will the impact of the new DNR phosphorus rules on the water quality in this part of the Menomonee?
- Can monitoring of P levels be done to measure impact of P ban in fertilizers/detergents? If we don't see measurable improvements due to new regulations, need to figure out new strategy.

-Monitoring & Education

SWAN Recreational Use Survey

Continue & enhance Citizen monitoring and cleanups–

- Extension of the current river cleanups; could be part of a service learning as a requirement for graduation. JR/SR high schools; Carol Doebler (parent attended and was interested in getting involved)
- Work with Mequon Nature Preserve PieperPower Education Center

Citizen monitoring needed/wanted in these areas (MN9):

- Right at Northhills Golf Course: access is an issue
- Day lily and Manner Hills Blvd
- Immediately downstream of Granville dog park: educate about erosion, causes, solutions, etc.
- Brownfiled at Stouper: has known contamination
- Monitor at County Line, near Kohls store
- West Allis to 115th & Burleigh & Elm Grove. – follow up with Nicole Hewitt in W. Allis
- Best to test at Schlinger
- Expand citizen monitoring in the Valley (already two sites being monitored in the Valley and additional site at Jacobus Park)

General Education:

- **Education for Pet waste – on boundary of Elm Grove & Tosa**
- **Storm Drain Stenciling needs to be continued (Wauwatosa now places stencils/stickers on all new drains—good example)**
- **Promote current educational efforts and opportunities. Facilitate more citizen action leaders in communities to encourage participation in local areas. Create database of projects to do for scouts and community groups looking for involvement.**
- **Ensure MS4s are implementing educational and outreach requirements in their stormwater permit, e.g. Miller Park -- What are they doing? What more could they do?**
- **Target houses built before 1956 for downspout disconnections (Tosa)**
- **Outreach to private properties without buffers watershed wide**
- Provide info sessions re: disconnecting of downspouts in MN14
- Renew and create outreach to area schools.
- Leaves in ditches – problems in West Allis.– door hangers to instruct on proper disposal since no pick up in these areas
- Storm drain stenciling in Butler’s residential area
- New Urban Ecology Center South will be a new education opportunity—could also help with monitoring efforts, stormdrain marking, etc.
- Community outreach at West Allis and Wauwatosa Farmers Market
- NOR-X-Way – what’s the historical significance – use ties to the land to get public interested/engaged?
- Outreach needed to open people’s eyes about bacteria in the creek following heavy rains and bypasses.
- More could be done with Hawley Environmental School and Friends of the Hank Aaron State Trail.
- Do outreach to real estate agents and developers re. green infrastructure
- More outreach could be done to: Wauwatosa East High School, two schools along Honey Creek, Medical College of Wisconsin campus, Serafino Square apartments at North Ave. and the river, and with Master gardeners

- Revisit storm drain stenciling in Wauwatosa—some areas need to be re-done after road construction downtown
 - Hoyt Park environmental committee (Denise Lindberg) should be more engaged
 - Wherever raingardens occur—should be used as education opportunity: info kiosk, outdoor classroom, etc
 - Educate local govts about impacts/alternatives/cost-effective solutions
 - We need to educate municipalities on their “trading” opportunities under current MS4 law
- (co-chairs to do: combine the general list of who to reach out to...)

Habitat Improvement Projects

-Aesthetic improvement opportunities

- **Address failing dock walls – e.g., Red Star Yeast...**
- **Continue & enhance cleanups**
- Target businesses in area south of Elm Grove Village Park for clean-ups, plantings, etc.
- Parkways here seems to be quite nice—are they in good shape, or do they need work?
- Seems like this whole area has a lot of potential to connect through to upstream (M. Falls) for good buffer / access / recreation opportunities

--Fish Passage Barriers

Continue with overall strategy to remove obstructions from downstream to upstream, as well as commission study to look for other fish passage impediment/obstructions

- Identify if there is blockage upstream of Dam in Menomonee Falls??
 - Just north of Multiple Owens there is something restricting flow, water from Grand Avenue —need to investigate under fish barriers
- Menomonee Falls itself is a major fish barrier – could diversion channel now used during dredging make a good fish ladder site? Would this be possible?
- Center-pier bridge just above golf course at #12, and possible golf-course cart-pat bridges at Currie Park that may serve as barriers
- Check 120th for possible drop structures – not sure.
- Elm Grove Box Culvert – small (less than a foot drop) – 900 ft long – downtown is impediment to fish and danger to children.
- 116th & Orchard in W. Allis – concrete lined. - 3 obstructions in Greenfield Park (see notes on map)
- There may be some trouble spots downstream (MN12), where the stream braids and maybe creates drops that could block fish
- Rail bridge at 26th St. acts like a dam almost – needs replacing. Drop there as well in water levels causes major issues with garbage as well as paddling danger
- Concrete removal project planned from I94 to Miller Brewery (downstream extent of past MMSD removal project)—this should be major improvement

- 5 low flow fish barriers identified between Swan and Harmoniee. Both MMSD and MRK have applied for funding to address these, but have been unsuccessful
- ID all fish passage impediments in Watershed—we know of major ones but not smaller ones caused by debris, perched culverts, sedimentation, etc.
- Only one drop structure identified in MN15 meeting (is this accurate?) --need better info on this: either get more info now for our process, or make looking into fish passage needs watershed-wide a recommended action.

--Invasive Species & Habitat Restoration

There is a lot of overlap between this and riparian restoration. In general, sense that prioritization could be done together, and that in short-term, erosion issues and “opportunities to partner” should be priority.

- **Granville dog park: major erosion, need stabilization**
- **erosion : big issue post 7/22 flooding: just east of North Hills County Club, north of Silver Spring Rd at the RR tracks.**
- **South Branch – W. Allis is clearing the floodplain & restoring with native prairie plants...partner with West Allis**
- **HIPPEE project of Groundworks planned for Menomonee Valley (like Cuyahoga-version but better) – looking for opportunities now like possibility for Sigma site at 13th and Canal. Will include hanging habitat baskets along seawalls and some fish condos.**
- Farm on Mequon west of Wausaukee Rd. has lots of potential to plant prairie – could be option for CRP funding– good possibility for OWLT to turn land into trust – wetland restoration. Talk to Conservation Fund as well.
- Reed canary grass invasive problem all along Menomonee River
- Just past Appleton Ave, near Duke’s dentists (south) there are concrete slabs left from 10+ years
- Good buckthorn removal in Elm Grove. Use Boy Scouts, etc...
- Private property owners can be targeted with invasive education – Elm Grove
- Habitat restoration all along Underwood Creek needed between 124th and Hwy 100 – both concrete removal and invasive removal needed.
- Continue concrete removal efforts now underway w/ GLRI and MMSD investments
- Reforestation efforts at Falk location along river?
- Try to improve vegetation on RR right of ways – low greenery not impacting RR operations
- Upstream of Jacobus Park where MMSD took out homes in Tosa there is good opportunity for improvements (need to check whether plants increase flood stage?)
- Burnham Canal has some good aquatic restoration opportunities if contamination can be dealt with (Miller Compressing is alternative Superfund site right now).

--Improving River Access

Sense that priorities should be opportunity driven and based on bacteria data (overlap with recreational foundation actions above)

- Lots of interest in the community to improve access for the public (Men. Falls) – need to identify potential areas and groups to assist.
- Staff on lunch/ break at Men. Falls Industrial park – trail system would be good amenity.
- Rotary Park in Menomonee Falls: access to water could be improved

- Are there some strong efforts to improve human access to river in the Valley, might be more in area of Jacobus Park area where banks are steep, best now is at 68th St or from Park Pavilion—really great area of bedrock bed in that section
- Issues with sunken barge owned by Basil Ryan—boating hazard. DNR won lawsuit but nothing has been done to remove it
- Create a riverwalk along the Menomonee? Consider this on MMSD property such as western Milwaukee Flood Management property, “City Lights” property 24th & St Paul, as well as Reed Street Yards, or essentially as development occurs?
- Ensure HAST connections are made at Reed Street and other areas.
- Improve access at Hoyt Park and new Harwood Pedestrian Bridge may provide opportunity for better access down to river at that location? Very hard to get down in that section for monitoring, etc.