MINUTES

SEWRPC ADVISORY COMMITTEE ON REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE FOR THE GREATER MILWAUKEE WATERSHEDS

DATE: August 3, 2005

TIME: 1:30 p.m.

PLACE: City of Mequon City Hall
Upper Level Council Chambers
11333 N. Cedarburg Road
Mequon, Wisconsin

<u>Committee Members Present</u>

Daniel S. Schmidt, Chairman	Administrator, Village of Kewaskum, SEWRPC Commissioner
Michael G. Hahn, Secretary	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
John R. Behrens	Commissioner-Secretary, Silver Lake Protection and Rehabilitation District
John M. Bennett	City Engineer, City of Franklin
Marsha Burzynski (for Charles J. Krohn)	Wisconsin Department of Natural Resources
Shannon Haydin	Director of Planning and Resources, Sheboygan County
Judy Jooss (for Diane M. Georgetta)	Town and Country Resource Conservation and Development. Inc.
James Lubner	Sea Grant Advisory Services Specialist, UW Sea Grant Institute
Daniel J. Lynch	District Conservationist, Natural Resources Conservation Service, Ozaukee County
Charles S. Melching	Associate Professor, Civil & Environmental Engineering, Marquette University
Matthew Moroney	Executive Director, Metropolitan Builders Association of Greater Milwaukee
Paul E. Mueller	Administrator, Washington County Planning and Parks Department
Cheryl Nenn	Riverkeeper/Project Director, Friends of Milwaukee's Rivers
Jeffrey S. Nettesheim	Senior Utility Engineer, Village of Menomonee Falls
Stephen Poloncsik (for Peter G. Swenson)	Senior Staff Engineer, U.S. Environmental Protection Agency
Karen L. Sands (for Kevin L. Shafer)	Watershed Planning Manager, Milwaukee Metropolitan Sewerage District
Thomas A. Wiza	Director of Engineering and Public Works, City of Cedarburg

<u>Staff Members and Guests</u>

Robert P. Biebel	Special Projects Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Troy E. Deibert (for William Krill)	Water Resources Engineer, HNTB Corporation
Thomas M. Slawski	Principal Planner, Southeastern Wisconsin Regional Planning Commission

WELCOME AND INTRODUCTIONS

Mr. Schmidt thanked the Advisory Committee members for attending this meeting. He indicated that roll call would be accomplished with a sign-in sheet circulated by Commission staff.

APPROVAL OF MINUTES OF THE MEETING OF MAY 25, 2005

Mr. Schmidt asked if there were any additions or revisions to be made to the minutes of the May 25, 2005, meeting of the Committee.

There being no additions or revisions, the minutes were approved, on a motion by Mr. Bennett, seconded by Mr. Lubner, and carried unanimously.

CONSIDERATION OF CHAPTER VI, "SURFACE WATER QUALITY CONDITIONS AND SOURCES OF POLLUTION IN THE MENOMONEE RIVER WATERSHED," OF SEWRPC TECHNICAL REPORT NO. 39, *WATER QUALITY CONDITIONS AND SOURCES OF POLLUTION IN THE GREATER MILWAUKEE WATERSHEDS*

Mr. Schmidt asked Mr. Hahn to review the preliminary draft of the chapter.

Mr. Hahn began by explaining that the chapter will be presented in separate sections by Mr. Thomas M. Slawski, Mr. Joseph E. Boxhorn, and himself. Mr. Hahn also indicated that each of the presenters would highlight selected portions of the chapter and he encouraged the Committee members to raise comments and questions on a page-by-page basis, as had been done at the previous meetings.

Mr. Boxhorn began summarizing the introduction, description of the watershed, land use, quantity and quality of surface water sections for the Menomonee River Watershed.

[Secretary's Note: It is important to note here that due to moving the **TOXICITY CONDITIONS OF THE MENOMONEE RIVER WATERSHED** section to just after the section titled **SURFACE WATER QUALITY OF THE MENOMONEE RIVER WATERSHED: 1975-2001** and various other modifications made to the chapter based upon reviewers comments below, the table, figure, and map numbers have been updated and may not match the numbers in the original text.]

Mr. Lubner said that Ozaukee County was omitted in the **DESCRIPTION OF THE WATERSHED** section on page 1.

[Secretary's Note: In response to this comment, the following sentence was added after the second sentence in the third paragraph on page 1:

"The Little Menomonee River originates in southwestern Ozaukee County and from there flows approximately 11 miles through the northwestern part of Milwaukee County to its confluence with the Menomonee River."]

Mr. Behrens requested that the page number on which each table, figure, and map be added when those features are referenced to make them easier to locate. He also suggested that the reference to Map VI-5 be moved from its current position on page 9 up to the bottom of page 5, so that it would be located closer to the reference to the 70th Street station on page 5. Ms. Jooss also asked if there was any way to move maps and figures closer to the references. In response to these comments, Mr. Hahn explained the SEWRPC style guide criteria for ordering maps, figures, and tables. He also went on to explain that due to the large number of maps, figures, and tables in this chapter it may not be possible to get Map VI-5 any closer than page 9, but he said that it would be considered.

[Secretary's Note: Map VI-5 presents water quality and sediment quality monitoring station locations, while the section of text referred to by Mr. Behrens is related to water quantity measurement locations. That map cannot be moved because there are several maps and tables that are referenced even before the first mention of streamflow stations on page 3. The title and legend of Map VI-5 on page 11 was changed to clarify at which monitoring locations streamflow is measured. In general, the locations of maps, tables, and figures will be considered to make them as easy to find as possible; however, as noted above because of the large number of such features the ability to advantageously move them within the report is limited. We will consider providing page references to clarify the locations of maps, tables, and figures, but that would not be done until the final stages of report preparation when the report contents are finalized.]

Mr. Behrens suggested that the period of record in years for which are data are presented be added to the title of Figure VI-1 and all subsequent similar figures in the chapter. Mr. Boxhorn indicated that we will update the titles to include the entire period of record for the aforementioned figures.

Ms. Jooss asked if the scales on Figure VI-1 should all be the same.

[Secretary's Note: Where feasible, the scales on multiple similar figures will be made the same.]

Mr. Bennett inquired how recent maximum and minimum values are different from historic maximum and minimum values in Figure VI-1. Mr. Boxhorn explained that recent maximum and minimum values are based upon years 1998 through 2001 and historic maximum and minimum values are based upon years 1975 through 1997. He went on to say that the legends will be modified to more clearly illustrate the differences in historic versus the recent base period on this and other similar figures throughout the chapter.

Ms. Nenn asked if the Figure VI-2 key to the box and whisker plot is located in a previous chapter.

[Secretary's Note: The first box and whisker plot in each chapter will include an explanatory legend. Each subsequent plot will have a note referring to the initial plot.]

Mr. Lubner along with Ms. Jooss suggested that we substitute the symbols in the Table VI-5 with either up and down arrows or plus and minus signs or some other appropriate symbol. Mr. Slawski indicated that we would look into this and come up with something that makes it clearer to the reader what the table is trying to convey.

[Secretary's Note: Table VI-5 was revised to better clarify the comparison between the estuary and the upstream reach of the Menomonee River and is attached hereto as Exhibit A.]

Mr. Lubner found it disconcerting for Figure VI-8 to have different temperature scales of Celsius and Fahrenheit on each y-axis within the same figure. He said the figure is difficult to read and could lead to confusion. Mr. Slawski said that the scales would be made consistent and these figures would be consolidated to make them more legible, if possible.

[Secretary's Note: The attached Figure VI-8 (Exhibit M) reflects the changes.]

Ms. Burzynski noted that the elevated water temperatures on Figure VI-8 may reflect the effects of the We Energies Valley Power Plant discharges.

Regarding Figure VI-7, Ms. Burzynski asked if the x-axis scale could be reversed to show the upstream sites on the left and the downstream sites on the right side of the axis. Mr. Slawski indicated that that change would be made.

[Secretary's Note: The attached Figure VI-7 (Exhibit J) reflects the suggested changes and other clarifying modifications to indicate temperature changes over time.]

Mr. Melching noted that in the ***Biochemical Oxygen Demand (BOD)*** section the decrease in BOD in the estuary, as shown in Figure VI-9, is attributed to the completion of the Inline Storage System (ISS) in 1994. He wanted to know what was responsible for the decrease in BOD in the upstream areas of the Menomonee River watershed not affected by the ISS. Specifically, he asked whether or not it could be due to the fact that there are no longer sewage treatment plants (STP) in the upstream areas of the watershed. Mr. Biebel noted that this decrease is most likely due to a combination of rural nonpoint source controls, implementation of urban stormwater best management practices, as well as abandonment of STP. Mr. Boxhorn also added that if the decreases in BOD throughout the watershed were due to the abandonment of STP, then this decrease should be evident in the time period of 1987-1993, but they are not, which suggests that this decrease is not solely due to the reduction in STP in this watershed.

Mr. Mueller indicated that the charts do not show standards and suggested that they be added where appropriate or indicate that there is no standard. Mr. Hahn noted that this change would be made.

Mr. Bennett suggested that we be consistent with the usage of Biochemical Oxygen Demand. Mr. Biebel noted that the title in Figure VI-9 would be changed to say “Biochemical” instead of “Biological”. Mr. Slawski also indicated that similar changes would be made elsewhere in the text, where necessary.

Mr. Melching indicated that the document does not address which recommendations from the original regional water quality management plan (RWQMP) were implemented and which were not. He also noted that there should be some discussion addressing the impacts of implementing the recommendations, so the reader can assess the effectiveness of these actions. Mr Biebel said that we will add a section on changes since the original RWQMP to support or put into perspective any observed water quality changes since that plan.

[Secretary’s Note: In response to these comments, the **SUMMARY AND STATUS OF ELEMENTS OF THE REGIONAL WATER QUALITY MANAGEMENT PLAN IN THE MENOMONEE RIVER WATERSHED** section was developed and attached hereto as Exhibit B.]

Mr. Lubner noted that on page 21 there is a reference to a maximum dissolved oxygen (DO) concentration of 20.2 mg/l, which is far beyond normal levels of saturation and he questioned the validity of the data. Mr. Slawski indicated that the data from MMSD and their laboratories is quality checked prior to providing it to us for analysis. Mr. Biebel indicated that we will strike the reference “range from undetectable to 20.2 mg/l” on page 21 and refer instead to the upper range of the box plot in Figure VI-9.

Mr. Melching asked if in Figure VI-12 the use of winter values in only one group of data, namely the earliest period of 1975-1986, indicates a false decrease in dissolved oxygen concentration. Mr. Slawski said that the MMSD changed their sampling protocol between 1986 and 1987 when they stopped sampling in the winter, which is why this approach was used to segregate the data analysis between these years. Mr. Slawski also noted that the winter samples were removed prior to all trend analyses for DO and all the other constituents reported in this document. We did not remove the winter data in any of the box plots either for DO or any other parameters in this document because this figure is intended to show all of the data for all years. Since DO is greatly affected by temperature, we agree that some additional text should be added to explain that the time period 1975-1986 does include winter samples and the apparent decrease in DO concentrations in the time period 1987-1993 is more likely due to a change in sampling protocol than actual improvement in water quality.

Mr. Melching noted that there are aspects of the ***Dissolved Oxygen*** section that are in his opinion confusing and incorrect and need clarification. Mr. Slawski said that we will revise this section to make it more readable.

[Secretary’s Note: In response to the comments by Mr. Lubner and Mr. Melching above, the ***Dissolved Oxygen*** section including Figure VI-12 were revised and attached hereto as Exhibit C.]

Mr. Lubner noted that in the second paragraph on page 27 there is a reference to orthophosphate, and he suggested that this is probably dissolved phosphorus. Mr. Boxhorn said that he is probably correct, but we will check to make sure and make the appropriate correction.

[Secretary's Note: After checking further, the reference to orthophosphate actually should have been a reference to dissolved phosphorus and this change was made in the text.]

Mr. Melching noted that on page 27 that we only have five years of arsenic data and he asked if that were enough time to be able to discuss this as a trend. Mr. Boxhorn said that we will look at this and make a decision.

[Secretary's Note: Given that statistically significant seasonal and annual correlations in arsenic concentrations were found among several stations in the Menomonee River watershed as shown in Appendix B of the chapter, SEWRPC staff agreed that five years is enough time to discuss these changes as trends during this five year period and no changes were made to this section of the report.]

Mr. Lubner suggested that in the second paragraph on page 28, in addition to mentioning the reduction in metal plating industry operations in this watershed as a reason for observed reductions in chromium concentrations, text be added indicating that treatment and pretreatment of industrial discharges is another likely source of reductions in metal concentrations. Mr. Biebel added that pretreatment requirements were largely instituted in the late 1970s.

[Secretary's Note: In response to this comment, the fifth sentence in the ***Chromium*** section on page 28 was revised to read as follows. (The revised and added text in this and all subsequent revisions indicated in these minutes is indicated in bold letters for clarification only. The report text will not be bold.)

"The decline in chromium concentration and the reduction in the amount of variability in chromium concentration may reflect **the loss of industry in some parts of the watershed and the decreasing importance of the metal plating industry in particular, as well as the establishment of mandatory treatment and pretreatment of discharges instituted for the remaining and new industries since the late 1970s, while industries with pretreatment and discharges to the public sewer system to not directly impact on the Menomonee River. The treatment/pretreatment requirements instituted did result in many discharges which previously were to the River being removed and connected to the public system**."]

Mr. Slawski then began a summary of the biological conditions, channel conditions, and habitat and riparian corridor condition sections for the Menomonee River watershed.

Mr. Slawski presented a revised version of Table VI-7 which assigns a tolerance classification for all fish species found in the Menomonee River watershed based upon U.S. Environmental Protection Agency (USEPA) standards, and he noted that the information in the revised table will be reflected in the text. Mr. Schmidt asked if there were any comments on this recommended revision. There were no comments, so the table will be revised as suggested.

Mr. Lubner asked if the reference to "bugs" could be eliminated on page 34. Mr. Slawski indicated that we will revise "bugs" to read "macroinvertebrates".

Mr. Slawski indicated that qualitative descriptors will be added to Figure VI-32 (formerly Figure VI-26) to make the figure easier to interpret.

Mr. Lubner suggested that there should be a couple of minor editing changes on pages 40 and 41 in the **Synthesis** and **Other Wildlife** sections. Mr. Slawski noted that these changes will be made.

Mr. Nettesheim asked why Tables VI-12 and VI-13 (formerly Tables VI-11 and VI-12) don't include data for Lilly Creek. Mr. Slawski said that these tables were taken from the MMSD Sediment Transport Study of the Menomonee River Watershed and that he would check to see why they did not include Lilly Creek information. Mr. Nettesheim suggested that if they did not include information on Lilly Creek, then a footnote should be added indicating that this watershed has channel and streambank erosion and scour problems as documented by the Village of Menomonee Falls. Mr. Biebel added that some information could be obtained from the Lilly Creek stormwater management plan prepared for the Village by SEWRPC. Mr. Slawski indicated that the issue would be looked into and the appropriate changes would be made.

[Secretary's Note: The information in Tables VI-12 and VI-13 were taken from the Sediment Transport Study of the Menomonee River Watershed Report prepared by Inter-Fluve, Inc. for MMSD dated February 2001. This study did not indicate any bed or bank instability problems in Lilly Creek. However, bank erosion was identified in several locations on Lilly Creek and associated tributaries within SEWRPC Community Assistance Planning Report No. 190, *A Stormwater Management and Flood Control Plan for the Lilly Creek Subwatershed*, 1993, that were not assessed in the Inter-Fluve, Inc report. Therefore, both stable and eroding streambank areas were added to Map VI-8 and Table VI-13 and attached hereto as Exhibit D.]

Mr. Behrens asked if the listed amphibians and reptiles in Table VI-9 were specific to the Menomonee River watershed. Mr. Slawski noted that these species are not specific to the watershed, but are more specific to the larger southeastern Wisconsin area, due to the scale at which the information was collected. It is the opinion of the SEWRPC staff that the species composition does not differ greatly among the watersheds in this study area. Ms. Jooss suggested that this list be placed in an appendix as was done for the bird species. Mr. Slawski indicated that both Table VI-8, which is the list of mammals in the southeastern Wisconsin area, and Table VI-9 would be moved to an appendix.

[Secretary's Note: The species list appendix was attached to the preliminary draft of SEWRPC TR No. 39, Chapter V, "Surface Water Quality Conditions and Sources of Pollution in the Kinnickinnic River Watershed," which was provided to the Committee.]

Mr. Melching asked that a description and definition of secondary environmental corridors be included within the **HABITAT AND RIPARIAN CORRIDOR CONDITIONS** section on pages 50 and 51. Mr. Slawski indicated that would be done.

[Secretary's Note: The description and definition that were added are consistent with similar information already in Chapter II of the Technical Report, which was already reviewed by the Committee.]

Mr. Melching indicated that he thinks the nitrate reductions attributed to riparian buffers (Table VI-16) are too high because groundwater nitrate is excluded from these reported estimates. Mr. Slawski indicated that he would check into this and add a footnote, if necessary, to clarify that the percent contaminant reductions in this table are limited to surface runoff (i.e. not groundwater) concentrations.

[Secretary's Note: After checking into this surface versus groundwater issue for nitrate, SEWRPC staff found that the reported pollutant removal effectiveness values in Table VI-16 are limited to surface runoff and so a footnote clarifying that will be added to the table. Table VI-16 will be moved to Chapter V (the first reference to the buffer information) and back-referenced in all subsequent chapters. However, SEWRPC staff also found additional information specifically addressing the effectiveness of nitrate removal from subsurface water and, therefore, the following note will be added to Table V-10:

“**NOTE: It is important to note the percent contaminant reductions in Table VI-16 are limited to surface runoff concentrations. However, researchers have observed that a large percentage of the nitrate in subsurface flows moving toward streams was removed from the water as it passed through the riparian areas. The percentage reductions in subsurface groundwater nitrate ranged from about 80 to 90 percent and were reported from various locations that include the Coastal Plain of North Carolina, Maryland, Canada, New Zealand, and Great Britain. Hence, these researchers concluded that riparian buffers are very effective in reducing nitrate in shallow subsurface water before the water enters the adjacent stream.**”]

Mr. Boxhorn began a summary of the toxic contamination section for the Menomonee River watershed.

Mr. Boxhorn said that the Commission staff decided that it would be appropriate to move that section and place it at the end of the section titled **SURFACE WATER QUALITY OF THE MENOMONEE RIVER WATERSHED: 1975-2001.**

Mr. Biebel noted that, similar to pollutant concentration figures presented earlier in the chapter, water quality standards would be added to Figures VI-23 through 25 (formerly Figures VI-29 through 31), if available.

[Secretary’s Note: Where appropriate standards were added to all figures throughout Chapter VI-6. In addition, where no standards exist an axis was added to the Figure indicating the direction of improving water quality. Examples of the modifications of the Figures in Chapter VI are attached hereto as Exhibit E.]

Mr. Nettesheim noted that sewage treatment plants listed in Table VI-17 (formerly Table VI-20) were incorrect. He suggested that we remove “Old Village” from the “Village of Germantown Plant”, change the “Pilgrim Road Plant” to ”Riverside Plant”, and change the “Lilly Road Plant” to “Parkview Plant”. Mr. Nettesheim also indicated that the WPDES Number MF 13 in Table VI-18 (formerly Table VI-22) may actually be located on St. Francis Street in Roosevelt and not on Greenview Court as shown in the table. Mr. Hahn indicated that this will be checked into and the appropriate changes will be made.

[Secretary’s Note: After checking previous reports, the SEWRPC staff found that the names for the sewage treatment plants given in Table VI-17 were consistent with the names used in earlier reports. The names in Table VI-17 were changed and a footnote was added to the table listing the names used in previous reports.

The SEWRPC staff is continuing to work with Mr. Nettesheim to resolve the location of the site indicated by WPDES Number MF 13 in Table VI-18.]

Mr. Melching suggested that we add a footnote to define the acronym CT used in Table VI-23. Mr. Boxhorn indicated that CT stands for Cross Town tunnel location and that an explanatory note would be added to the table.

Mr. Mueller suggested that on Map VI-15 the gold-colored area in the southeast corner of the Town of Germantown should perhaps be shown in blue to indicate that this area is served by a centralized sewerage system. He also suggested that we merge the data on Map VI-15 with the historic urban growth data on Map VI-4 to show areas pre- and post- 1980 to distinguish 25-year old septic system areas from newer septic system areas throughout the watershed. Mr. Hahn indicated that the map will be generated as suggested.

[Secretary’s Note: Map VI-15 was revised as suggested (see below). Map VI-17 was developed and attached hereto as Exhibit F.]

Mr. Nettesheim noted that on Map VI-15 there are areas shown as not being served by a centralized sewerage system in the Village of Menomonee Falls that should be changed to show that these areas are being served by sewers. Mr. Hahn indicated that the map will be revised.

[Secretary's Note: SEWRPC staff are continuing to work with Mr. Nettesheim to revise Map VI-15.]

Mr. Mueller asked if a map and description of known existing active, inactive, and abandoned landfill sites mapped by the Wisconsin Department of Natural Resources could be added to the ***Solid Waste Disposal Sites*** section on pages 85 and 86. Mr. Hahn said that the map and descriptive text will be added.

[Secretary's Note: In response to these comments, the section is being revised and Map VI-18 and Table VI-23 were attached hereto as Exhibit G.]

Mr. Melching asked what the white areas are shown on Maps VI-16-21. Mr. Hahn explained that these are the Combined Sewer Overflow (CSO) areas and that the map legends would be revised to clarify that.

Mr. Melching suggested that Tables VI-26 through 33 and on Maps VI-16 through 21 be revised to include nonpoint source loads from the combined sewer service area in order to demonstrate the effect of treatment of the stormwater runoff from that area.

[Secretary's Note: Because most of the stormwater runoff volume from the combined sewer service area (CSSA) is conveyed to MMSD treatment plants rather than to the streams of the watershed, nonpoint source loads from the CSSA are not significant contributors of pollutants to the Menomonee River and they were not computed by either the LSPC water quality model or the MMSD system conveyance model. Thus, this comparison will not be made.]

Mr. Melching also mentioned that the values in Tables VI-26 and VI-27 are much too precise and should be rounded to three significant digits. Mr. Melching also requested that we add a footnote to Table VI-34 to distinguish the variance waters from the nonvariance waters within the Menomonee River watershed.

[Secretary's Note: Those revisions and additions were made.]

Mr. Moroney requested that we add more evaluation to the **ACHIEVEMENT OF WATER USE OBJECTIVES** section on whether improvements have been made and the degree of attainment of the water quality standards. He also suggested that we remove the sixth sentence in the last paragraph on page 105. Mr. Hahn indicated that the requested revisions will be made.

Mr. Moroney also suggested that more evaluation be added in the **SUMMARY** section.

[Secretary's Note: In response to these comments, the **SUMMARY** section was revised. See the attached Exhibit H.]

There being no further discussion, a motion to approve preliminary draft Chapter VI, "Surface Water Quality Conditions and Sources of Pollution in the Menomonee River Watershed," as amended, was made by Mr. Moroney, seconded by Mr. Lubner, and carried unanimously by the Committee.

REVIEW OF DRAFT APPENDIX VII-1, "OBJECTIVE, PRINCIPLES, AND STANDARDS" OF PLANNING REPORT NO. 50

Mr. Schmidt recommended, in order to adjourn the meeting on time, review of this appendix be deferred until the next meeting.

UPDATE ON WATER QUALITY MODELING ACTIVITIES SUPPORTING THE PLANNING PROGRAM

At Mr. Schmidt's request, Mr. Hahn summarized the water quality modeling activities currently underway and gave an update on coordination efforts related to establishing procedures for modeling the agricultural standards of Chapter NR 151, "Runoff Management," of the *Wisconsin Administrative Code.*

[Secretary's Note: The water quality modeling status table provided to the committee is attached as Exhibit I.]

[Secretary's Note: Subsequent to the meeting, Mr. Melching, Ms. Sands, and Ms. Burzynski provided additional written comments on Chapter VI. A summary of these revisions is provided below.]

RESPONSES TO COMMENTS FROM MR. MELCHING

[Secretary's Note: A description of the functions and authority of the Milwaukee Metropolitan Sewerage District to the **SPECIAL-PURPOSE UNIT OF GOVERNMENT** section in Chapter I of the Technical Report.]

RESPONSES TO COMMENTS FROM MS. BURZYNSKI, MR. JAMES RITCHIE, AND MR. THEODORE BOSCH OF THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES STAFF

[Secretary's Note: The following sentence was added after the first sentence of the second full paragraph on page 83:

"**All construction sites that disturb one acre of land or more are required to obtain coverage under the General Permit. Permitted construction sites are required to implement a construction erosion control plan, and a post-construction stormwater management plan as required in Chapter NR 216.46 and Chapter NR 216.47 of the *Wisconsin Administrative Code*. Owners of permitted construction sites are also required to conduct inspections of their construction erosion control measures on a weekly basis, and within 24 hours of a precipitation event of 0.5 inch or more**."]

[Secretary's Note: The first full paragraph on page 73 was revised to read as follows.

"The number of known **industrial wastewater permitted dischargers** in the Menomonee River watershed has increased over time. In 1975, there were a total of 48 known industrial **wastewater permitted dischargers** identified in the watershed. These **permitted facilities** discharged cooling, process, rinse, and wash waters to surface waters. In 1990, 132 **permitted facilities** discharged wastewater to the Menomonee River, its tributaries, or the groundwater system."]

[Secretary's Note: Table VI-21 (formerly Table VI-24) on pages 79-82 was revised as follows:

The title was changed to "**Permitted Wastewater Dischargers** Under the WPDES General Permit and Individual Permit Programs in the Menomonee River Watershed: February 2003." In addition, WPDES permit numbers 0062138 and 0061379 were removed from Table VI-21.]

[Secretary's Note: The second full sentence on page 78 was revised to read as follows:

"Tier 3 permits **used to be** issued to facilities which have certified, with WDNR concurrence, that they have no discharges of contaminated storm water. **WDNR authority for Tier 3 permits no longer exists and the Tier 3 permits have been terminated. Facilities now submit a certificate of no exposure."**]

In addition, due to provision by Will Wawrzyn, WDNR staff, of year 2004 temperature data from multiple stations throughout the Menomonee River watershed the following revisions were made:

[Secretary's Note: The files provided temperature information from spring to fall 2004 for several sites within the Menomonee River watershed that include Goldenthal Creek at Freistadt Road, Lily Creek at Brentwood Road in Menomonee Falls, Little Menomonee Creek at Granville Road (north of Mequon Road.), Menomonee River at N. 127th Street, Menomonee River at W. Capitol Drive, Menomonee River at Grand Avenue in Menomonee Falls (above Lepper dam), Menomonee River at Miller Park (downstream of IH-94), Menomonee River at W. North Avenue in Wauwatosa, Menomonee River in Wauwatosa upstream of Honey Creek, and Willow Creek upstream of CTH Y. This updated temperature information will be incorporated into the ***Temperature*** section on pages 13 through 17 and in other areas of the of the draft chapter, where appropriate.]

RESPONSES TO WRITTEN COMMENTS FROM MS. SANDS, MR. THOMAS CHAPMAN AND MR. CHRISTOPHER MAGRUDER OF THE MILWAUKEE METROPOLITAN SEWERAGE DISTRICT STAFF

[Secretary's Note: The third sentence in the second paragraph on page 1 was revised to read as follows.

"More specifically, this chapter documents current surface water pollution problems in the watershed utilizing field data from a variety of water quality studies, most of which were conducted during the past 30 years; indicates the location and type of the numerous and varied sources of wastewater**, industrial, stormwater runoff,** and other potential pollutants discharged to the surface water system of the watershed; describes the characteristics of the discharges from those sources; and, to the extent feasible, **quantifies** the pollutant contribution of each source."]

[Secretary's Note: The fourth paragraph on page 3 was removed.]

[Secretary's Note: The last two sentences in the first paragraph on page 5 were revised to read as follows.

"Considerable variability is associated with these patterns, **but some of this variability is more likely attributed to sampling conditions rather than actual changes in discharge**. For example, during January and February of some years, no discharge was detected in Underwood Creek; **however, this may be related to freeze-up conditions when measurements cannot be made**."]

[Secretary's Note: A brief definition and short summary of the importance of each of the parameters listed in the **SURFACE WATER QUALITY OF THE MENOMONEE RIVER WATERSHED: 1975-2001** section on pages 9 through 31 in Chapter VI will be added to the **WATER QUALITY INDICATORS** section on page 13 of Chapter II. The **WATER QUALITY INDICATORS** section is currently being revised.]

[Secretary's Note: The first full paragraph on page 12 was revised to read as follows.

"A trend was also detected along the length of the River. Among the stations upstream from the estuary, Table VI-6 show a statistically significant trend toward increasing numbers of fecal coliform bacteria from upstream to downstream. Time-based trends were also detected. When analyzed on an annual basis, all four sites in the estuary (South 2nd Street, Burnham Canal, Muskego Avenue, and 25th Street) show statistically significant declines in fecal coliform concentrations. **These declines represent an improvement of water quality in the estuary.** Analysis of these trends by season suggests that the changes have occurred during the spring, summer, and fall and have occurred at all estuary sampling sites except for the sampling station at Burnham Canal. In the reaches upstream of the estuary, significant increases in fecal coliform concentrations occurred only during the summer at the 70th street and 124th Street stations. **These increases represent a reduction in water quality at these stations, at least during the summer.**]

[Secretary's Note: The second to last sentence in the first paragraph on page 17 was revised to read as follows.

"As shown in Figure VI-7, over the period 1985-2001, mean water temperatures generally **were warmer downstream**."]

[Secretary's Note: The last sentence in the second paragraph on page 17 was revised to read as follows:

"The highest annual summer monthly mean water temperature at this station increased from 23.5ºC **in the period of 1986-1993 to 30.3ºC in the baseline period of 1998-2001**. **It is important to note that the Muskego Avenue, Burnham Canal, and S. 2nd Street Stations along the main stem of the Menomonee River are all within the influence of We Energies power plant thermal discharge as well as from influx of Lake Michigan water from the outer harbor areas. Hence, this increase in temperatures in the downstream estuary stations is likely a result of multiple factors**."]

[Secretary's Note: Figure VI-7 on page 19 was revised and attached hereto at Exhibit J. In response to the revisions in this figure the first paragraph on page 17 was revised.

[Secretary's Note: The last sentence in the first paragraph on page 19 was revised to read as follows.

"These differences and trends may reflect changes in the relative importance of groundwater and surface runoff on the chemistry of water in the River from upstream to downstream with surface runoff becoming increasingly **influential** downstream. **It is important to note that like hardness, specific conductivity, and pH, alkalinity concentrations are greatly influenced by Lake Michigan water dilution in the estuary, which probably causes these concentrations to be lower than the upstream areas.**"]

[Secretary's Note: The following paragraphs were added to end of the first partial paragraph on page 21 ***Biochemical Oxygen Demand*** section:

"**Several other factors may influence BOD concentrations in the Menomonee River. BOD concentrations in the River are positively correlated with concentrations of fecal coliform bacteria and some nutrients such as ammonia and total phosphorus. These correlations reflect the fact that these pollutants, to some extent, share common sources and modes of transport into the River. In some parts of the River, decomposition of organic material in the sediment acts as a source of BOD to the overlying water. This is especially the case in the estuary downstream of 35th Street. This section of the estuary acts as a large settling basin for organic material. During the fall, leaf litter settles out in this reach. Decomposition of this material releases**

BOD to the water. The decreases in concentrations of BOD in the mainstem of the Menomonee River represent an improvement in water quality."

The following paragraph was added after the second full paragraph on page 21:

"**Chloride concentrations in the Menomonee River show strong positive correlations with alkalinity, hardness, and specific conductance, all parameters which, like chloride, measure amounts of material dissolved in water. The increase of chloride concentrations in the Menomonee River represents a decline in water quality.**"

[Secretary's Note: The following sentences were added to the end of the first full paragraph on page 22:

"**In addition to the reasons mentioned above, dissolved oxygen concentrations in water can also be affected by a variety of other factors including the presence of aquatic plants, sunlight, turbulence in the water, and the amount and type of sediment as summarized in the Water Quality Indicators section in Chapter II of this report**. **In summary, dissolved oxygen concentrations were generally shown to have remained unchanged in the areas upstream from the 70th Street station (RM 8.0) and to have improved (i.e. increase in concentration) in the estuary area downstream from the 25th Street station, during the time period examined from 1975 to 2001**."]

[Secretary's Note: The first partial paragraph on page 23 was revised to read as follows:

"**It is important to note that like alkalinity, specific conductivity, and pH, hardness concentrations are greatly influenced by Lake Michigan water dilution in the estuary, which probably causes these concentrations to be lower than the upstream areas.** At a limited number of sites a decreasing trend in hardness was evident during the summer, however, no other seasonal patterns in hardness were detected (Table B-1). **In summary, although hardness concentrations are lower in the estuary areas downstream of the 70th Street station (RM 8.0), hardness concentrations were generally shown to have remained unchanged among stations during the time period examined from 1975 to 2001**."]

[Secretary's Note: The end of the pH section on page 23 was revised to read as follows:

"**It is important to note that like alkalinity, specific conductivity, and hardness, pH concentrations are greatly influenced by Lake Michigan water dilution in the estuary, which probably causes these concentrations to be lower than the upstream areas. At most stations, pH shows positive correlations with concentrations of alkalinity, chloride, and hardness and with specific conductance. At all stations, dissolved oxygen concentrations are positively correlated with pH. This reflects the effect of photosynthesis on both of these parameters. During photosynthesis, algae and plants remove carbon dioxide from the water. This tends to raise the water's pH. At the same time, oxygen is released as a byproduct of photosynthesis.** On an annual basis, statistically significant declines in pH were detected at all of the stations upstream from the estuary except for the 70th Street station (Table B-1). Summer and fall values of pH in the Menomonee River tend to be lower than spring and winter values. **In summary, pH concentrations were generally shown to have decreased in the upstream areas above the Hampton Avenue Station (RM 12.5) and to have remained unchanged for the rest of the stations downstream from Hampton Avenue during the time period examined from 1975 to 2001**."]

[Secretary's Note: The end of the first ***Specific Conductance*** section on page 24 was revised to read as follows:

"**It is important to note that like alkalinity, pH, and hardness; specific conductance concentrations are greatly influenced by Lake Michigan water dilution in the estuary, which probably causes these concentrations to be lower than the upstream areas. Analysis results in the section of the River upstream from the estuary shows that specific conductance values have decreased in the upstream areas as shown in Table VI-6.** The data show a seasonal pattern of variation in specific conductance (Table B-1). For those years in which data were available, specific conductance was highest during the winter. It then declined during the spring to reach lower levels in the summer and fall. **In summary, specific conductance values were generally shown to have decreased in the upstream areas above the 124th Street Station (RM 13.5), increased downstream of the 70th Street Station (RM 8.0), and remained unchanged in the rest of the Menomonee River during the time period examined from 1975 to 2001**."]

The last sentence in the first full paragraph on page 24 was revised to read as follows:

"This is most apparent when examined on an annual basis. **TSS concentration showed strong positive correlations with alkalinity, chloride, hardness, and specific conductance, parameters which measure amounts of dissolved material in water. The correlation of these with TSS reflects the tendency of sediment to wash into streams at the same time, and by some of the same mechanisms, as dissolved material washes in. The trend toward increased TSS concentrations in the estuary represents a decline in water quality."**

The first paragraph of the section ***Nitrogen Compounds*** on pages 24 and 25 was revised to read as follows:

"The mean concentration of total nitrogen in the Menomonee River over the period of record was 1.68 mg/l as N. Concentrations varied over three orders of magnitude, ranging from 0.140 to 17.26 mg/l as N. As shown in Figure VI-15, mean total nitrogen concentrations were highest in the River during the period 1975-1986. Following this period, they declined. Depending on the station, they began to rise again either after 1993 or after 1997. The relationship between baseline period and **historical** monthly mean concentrations of total nitrogen varies along the length of the River. The baseline monthly mean concentrations at stations in the estuary are generally higher than the historical monthly mean concentrations, and the mean concentrations of total nitrogen were significantly higher at stations in the estuary than in stations along the reaches upstream from the estuary in all periods (Table VI-5). **Table VI-6** shows that there is a significant trend in the section of the River upstream from the estuary for total nitrogen to decline from upstream to downstream. **The concentration of total nitrogen at most stations in the Menomonee River is moderately positively correlated with the concentration of total phosphorus. This probably reflects the nitrogen and phosphorus contained in particulate organic material in the water, including live material such as plankton and detritus.**"

The last sentence in the second full paragraph on page 25 was added to read as follows:

"**While no correlations were detected between concentrations of ammonia and chlorophyll- a, ammonia is a nutrient for algal and plant growth. During periods of**

high algal productivity, algae remove ammonia from the water and incorporate it into cellular material."

The last sentence in the first partial paragraph on page 26 was added to read as follows:

"**At some stations, nitrate concentrations were negatively correlated with concentrations of chlorophyll-*a*. This reflects the role of nitrate as a nutrient for algal growth. During periods of high algal productivity, algae remove nitrate from the water and incorporate it into cellular material."**

The following paragraph was added after the second full paragraph on page 26:

"**Several processes can influence the concentrations of nitrogen compounds in a waterbody. As noted above, primary production by plants and algae will result in ammonia and nitrate being removed from the water and incorporated into cellular material. This effectively converts the nitrogen to forms which are detected only as total nitrogen. Decomposition of organic material in sediment can release nitrogen compounds to the overlying water. This may constitute a major source of nitrogen compounds in the estuary. Bacterial action may convert some nitrogen compounds into others.**"

The second from the last bullet point in the third full paragraph on page 26 was revised to read as follows:

"Several things emerge from this analysis of nitrogen chemistry in the Menomonee River:

- Throughout the River ammonia concentrations have been declining over time. **This represents an improvement in water quality**."

The second paragraph on page 27 was revised to read as follows:

"The mean concentration of total phosphorus in the Menomonee River over the period of record was 0.116 mg/l (Figure VI-17) and the mean concentration of dissolved phosphorus in the Menomonee River over the period of record was 0.044 mg/l. Phosphorus concentrations varied over four orders of magnitude, with concentrations of total phosphorus in the River ranging from 0.0015 to 3.000 mg/l, and of **dissolved phosphorus** ranging from 0.003 to 3.000 mg/l. At most sampling sites, the data showed moderate variability. Table VI-5 shows that the relationship between the mean concentrations of dissolved phosphorus at stations in the estuary and at stations in the section of the River upstream of the estuary had been changing over time. During the periods before 1994, Table VI-5 shows that mean concentrations of dissolved phosphorus were significantly lower in the estuary than in the section of the River upstream of the estuary. **At some stations, dissolved phosphorus concentrations were negatively correlated with concentrations of chlorophyll-*a*. This reflects the role of dissolved phosphorus as a nutrient for algal growth. During periods of high algal productivity, algae remove dissolved phosphorus from the water and incorporate it into cellular material."**

[Secretary's Note: SEWRPC staff is working with MMSD to clarify issues related to sources of pollution as well as a mercury source assessment that will be added to the **Metals** section on page 27]

[Secretary's Note: The second from the last sentence of the last paragraph on page 27 was revised to read as follows:

"This may reflect changes in the amount and types of industry within the Menomonee River watershed **such as the loss of tanneries which utilized arsenic in the processing of hides In addition, sodium arsenate has not been used in herbicides since the 1960s**."]

[Secretary's Note: The sentence was added to the end of the last paragraph on page 27:

"**The reductions in arsenic concentration in the Menomonee River represent an improvement in water quality.**"]

[Secretary's Note: The following sentence was added to the end of the first paragraph on page 28:

"**The reductions in cadmium concentration in the Menomonee River represent an improvement in water quality.**"]

[Secretary's Note: The second from the last sentence of the ***Chromium*** section on page 28 was revised to read as follows:

"The decline in chromium concentration and the reduction in the amount of variability in chromium concentration may reflect the decreasing importance of the metal plating industry in the Menomonee River watershed **as well as the loss of tanneries from the Menomonee Valley**."]

[Secretary's Note: The following sentence was added to the end of the second paragraph on page 28:

"**The reductions in chromium concentrations in the Menomonee River represent an improvement in water quality.**"]

[Secretary's Note: The following sentence was added to the end of the first paragraph on page 29:

"**The reductions in lead concentrations in the Menomonee River represent an improvement in water quality.**"]

[Secretary's Note: The following sentence was added to the end of the first full paragraph on page 30:

"**The reductions in nickel concentrations in the Menomonee River represent an improvement in water quality.**"]

[Secretary's Note: The following sentence was added to the end of the first partial paragraph on page 30:

"**The reductions in mercury concentrations in the estuary portion of the Menomonee River represent an improvement in water quality.**"]

[Secretary's Note: The following sentence was added to the end of the first partial paragraph on page 31:

"**The increases in zinc concentrations in the Menomonee River during spring and summer represent a decline in water quality.**"]

[Secretary's Note: The first and second paragraphs on page 32 were revised to read as follows:

"Review of the fishery data collected in the Menomonee River basin **over more than one-hundred years of sampling by the WDNR (known as the Wisconsin Conservation Department up until the early 1970s)** between 1900 and 2004 indicates an apparent gain of six species throughout the watershed during this time period. This increase does not seem to be due to increased sampling effort among each of the year break outs, at least not on an annual basis for the most recent years as shown in Table VI-7, **but this may reflect recent increased sampling efforts in the lower portions of the Menomonee River watershed (as shown in Map VI-6), as well as** improvements in fishing gear technologies and techniques. Nonetheless, most notable gains of species were the brook trout, brown trout, smallmouth bass, black crappie, walleye, and greater redhorse.

The aforementioned species were all observed in the lower portions of the Menomonee River and seem to be associated with the removal**s of 1)** the Falk Dam, **2) the drop structure at N. 45th Street, and 3) the North Avenue Dam on the Milwaukee River. The Falk Dam removal was completed in February 2001. Although this was a low head dam that was easily overtopped during high flow events, it was a significant barrier during low flow periods for many species of fishes**. **The N. 45th Street drop structure, which was also a significant fisheries migratory barrier, was removed and about 1,000 feet of concrete channel was removed and replaced with a rock channel in the early 2000s. Removal of the North Avenue Dam and major habitat improvements were completed** in the late 1990s on the Milwaukee River."]

[Secretary's Note: To avoid confusion between the fishery and macroinvertebrate sampling location and conditions these maps were divided into two separate maps, one for fisheries and one for macroinvertebrates.]

[Secretary's Note: The third sentence in the fourth paragraph on page 40 was revised to read as follows.

"Since water quality has generally been improving in the watershed, and habitat seems to potentially be adequate, it is most likely that **other factors are limiting this fishery, including but not limited to 1)** periodic stormwater loads; **2) decreased base flows; 3) continued fragmentation due to culverts, concrete lined channels, enclosed conduits, and drop structures; 4) past channelization; and/or 5) increased water temperatures due to urbanization**.]

[Secretary's Note: Table VI-9 has been modified to show species occurrences by County and placed into an Appendix, because this information was general enough to be relevant for each watershed. The Butler's Gartner snake is shown to occur in Milwaukee County in this new table. However, the Butler's Gartner snake observation will remain in the endangered and threatened species Table VI-11 (formerly Table VI-10).]

[Secretary's Note: The third sentence in the second paragraph on page 45 was revised to read as follows:

"**As a result of runoff being conveyed over impervious surfaces to storm sewers which discharge directly to streams,** peak flows become higher and more frequent and streams become "flashier" with flows increasing rapidly in response to rainfall events.]

[Secretary's Note: Map VI-9 has been revised to include drop structures and attached hereto as Exhibit K. A **Drop Structure** section is also being developed and will be included within the **Dams** section on page 50.]

[Secretary's Note: The following sentence was added after the second sentence in the last paragraph on page 51:

"**In the period from the initial inventory in 1985 through 2000, there was no appreciable loss in the amount of primary environmental corridors within the watershed**.]

[Secretary's Note: The following sentence was added after the second sentence in the first paragraph on page 56:

"**In the period from the initial inventory in 1985 through 2000, there was no appreciable loss in the amount of secondary environmental corridors within the watershed**.]

[Secretary's Note: The following sentence was added after the last sentence in the second paragraph on page 56:

"**In the period from the initial inventory in 1985 through 2000, there was a loss of about 8 percent of the isolated natural areas within the watershed**.]

[Secretary's Note: The third sentence in the first full paragraph on page 60 was revised as follows:

"Approximately **11** miles of the Menomonee River **stream** system concentrated **along** Honey Creek, **Underwood Creek, the South Branch of Underwood Creek, and Grantosa Creek,** are enclosed conduits **that in their current state** offer limited opportunity for installation of such buffers as shown on Map VI-12.]

[Secretary's Note: The SEWRPC staff will coordinate with the MMSD to obtain data on the average annual number of CSOs prior to 1994 and after 1994 in order to indicate the effect of the inline storage system on the frequency of CSOs. The ***Combined Sewer Overflows*** section on pages 72 and 73 will be revised to present that information.]

[Secretary's Note: Table VI-20 (formerly Table VI-23) on page 78 was revised based upon new information from MMSD and Triad Engineering and is attached hereto as Exhibit L. In addition, the second to last sentence on page 72 was revised to read as follows.

"Over the period August 1995 to August 2002, the mean number of days during which individual outfall discharged to the watershed was **13.5**.]

[Secretary's Note: The MMSD staff indicated that some additional water quality monitoring data were available for Honey Creek, Underwood Creek, and the South Branch of Underwood Creek. We have requested information from MMSD to update Table VI-32 (formerly Table VI-34) on page 100.]

[Secretary's Note: It is important to note that Table B-1 in Appendix B is a good assessment/test of the pre- versus post- Inline Storage System conditions and the effectiveness of the Inline Storage System. If two separate analyses were to be made, as requested by MMSD, one from 1975-1993 and another from 1994-2001. This would effectively remove the treatment effect and the results could not be attributed to the ISS coming online. Therefore, Table B-1 will not be changed because any improvement in water quality at stations RM 0.0, 0.8, 0.9, and 1.8 can be directly attributed to the ISS using the statistical analysis as currently designed.]

DETERMINATION OF NEXT MEETING DATE AND LOCATION

The next meeting of the Advisory Committee was tentatively scheduled for October 12, 2005, at 1:30 p.m. at the Mequon City Hall in the upstairs Council Chambers.

ADJOURNMENT

The August 3, 2005, meeting of the Advisory Committee on the regional water quality management plan update was adjourned at 3:44 p.m. on a motion by Mr. Moroney, seconded by Mr. Wiza, and carried unanimously by the Committee.

[Secretary's Note: Subsequent to the meeting, Mr. Lynch, from NRCS indicated that he was retiring in three weeks and would notify the Commission staff regarding his replacement on the committee.]

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Exhibit A

Table-VI-5

COMPARISON OF WATER QUALITY BETWEEN THE MENOMONEE RIVER AND THE MILWAUKEE RIVER ESTUARY: 1975-2001[a]

Parameters	Years			
	1975-1986[b]	1987-1993[b]	1994-1997[b]	1998-2001[b]
Biological/Bacteria				
Fecal Coliform[c]	Estuary	Estuary	River	River
E. coli [c]	- -	- -	- -	0
Chlorophyll-*a*[c]	0	Estuary	River	River
Chemical/Physical				
Alkalinity	River	River	River	River
Biochemical Oxygen Demand[c]	Estuary	Estuary	0	0
Dissolved Oxygen	River	River	River	River
Hardness	River	0	River	River
pH	River	River	River	River
Specific Conductance...........................	River	River	River	River
Total Suspended Solids.......................	River	River	River	River
Nutrients				
Ammonia, Dissolved[c]	Estuary	Estuary	Estuary	Estuary
Kjeldahl Nitrogen[c]...............................	Estuary	Estuary	Estuary	Estuary
Nitrate, Dissolved[c]	River	0	Estuary	Estuary
Nitrite, Dissolved[c]	0	Estuary	Estuary	Estuary
Organic Nitrogen[c]...............................	0	0	River	0
Phosphorus, Dissolved[c]	River	River	0	Estuary
Total Nitrogen[c]	0	Estuary	Estuary	Estuary
Total Phosphorus[c]	Estuary	Estuary	0	Estuary
Metals/Salts				
Arsenic[c]	- -	- -	0	0
Cadmium[c]	Estuary	0	0	0
Chloride[c]	River	River	River	River
Chromium[c]	Estuary	0	0	0
Copper[c]	Estuary	Estuary	Estuary	Estuary
Lead[c]	0	0	Estuary	0
Mercury[c]	- -	- -	River	River
Nickel[c]	- -	0	0	0
Zinc[c]	Estuary	Estuary	Estuary	Estuary

NOTE: The following symbols were used:

"Estuary" indicates that the mean value from the estuary is significantly higher than the mean value from upstream section
"River" indicates that the mean value from the estuary is significantly lower than the mean value from upstream section
0 indicates that no differences were detected
- - indicates that the data were insufficient for the analysis

[a]*The estuary sites used in this analysis were located within the Menomonee River portion the Milwaukee River estuary.*

[b]*Differences between means were assessed through analysis of variance (ANOVA). Means were considered significantly different at a probability of P = 0.05 or less.*

[c]*These data were log-transformed before being entered into ANOVA.*

Source: SEWRPC.

Exhibit B

TEXT TO BE ADDED TO SEWRPC TECHNICAL REPORT NO. 39, CHAPTER VI

SUMMARY AND STATUS OF ELEMENTS OF THE REGIONAL WATER QUALITY MANAGEMENT PLAN IN THE MENOMONEE RIVER WATERSHED

The initial regional water quality management plan for the Southeastern Wisconsin Region adopted in 1979 had five elements: a land use element, a point source pollution abatement element, a nonpoint source pollution abatement element, a sludge management element, and a water quality monitoring element.[1] For the purposes of documenting current conditions and trends in water quality conditions and pollution sources, it is deemed important to redocument the point source and nonpoint source pollution abatement elements of the regional water quality management plan as amended. This section provides that redocumentation and describes the action taken to implement that plan. Those two specific elements of the plan as they relate to the Menomonee River watershed and actions taken to implement them are described below for those components of the plan elements most directly related to water quality conditions.

Point Source Pollution Abatement Plan Element

The point source pollution abatement element of the initial plan made several recommendations regarding sanitary sewerage service in the Menomonee River watershed. The plan recommended the abandonment of the three public sewage treatment plants, one located in the Village of Germantown, and two located in the Village of Menomonee Falls, that were operating in the watershed in 1975. By 1986, these plants had been abandoned (see below). It also recommended abandonment of a privately owned sewage treatment plant at Brookfield Central High School. This plant was abandoned in 1980. The plan recommended that the attendant service areas for these plants be connected to the Milwaukee Metropolitan Sewerage District's sewerage system for treatment purposes. To facilitate that connection, the plan recommended the construction of two intercommunity trunk sewers to connect the City of Brookfield and the Villages of Germantown and Menomonee Falls to MMSD's system. In addition, the construction of two additional intercommunity trunk sewers was recommended to provide additional capacity to convey wastewater from the Cities of Brookfield and Wauwatosa and the Villages of Butler, Elm Grove, and Menomonee Falls to MMSD's system. These trunk sewers were completed over the period 1977 and 1986. Finally the initial plan recommended the refinement of sanitary sewer service areas for all sewer areas in the watershed. As of 2005, this had been done for all service areas in the watershed except for MMSD, which, in the Menomonee River watershed, is almost entirely served by sewers.

A preliminary recommendation to abate separate sewer overflows and combined sewer overflows through the provision of large subterranean conveyance and storage facilities to contain separate and combined sewer peak flows in excess of sewage system capacity was originally made in the comprehensive plan for the Milwaukee River watershed.[2] The initial regional water quality management plan deferred recommendation on adoption of this alternative pending completion of the facility planning related to MMSD's Water Pollution Abatement

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[1]*SEWRPC Planning Report No. 30,* A Regional Water Quality Management Plan for Southeastern Wisconsin—2000, *Volume One*, Inventory Findings, *September 1978; Volume Two*, Alternative Plans, *February 1979; Volume Three,* Recommended Plan, *June 1979.*

[2]*SEWRPC Planning Report No. 13,* A Comprehensive Plan for the Milwaukee River Watershed, *Volume One*, Inventory Findings and Forecasts, *December 1970; Volume Two,* Alternative Plans and Recommended Plan, *October 1971.*

Program. This planning effort, documented in a series of reports by MMSD,[3] recommended construction of a deep tunnel inline storage system in conjunction with construction of a shallow relief sewer system. These recommendations were adopted as an amendment to the regional water quality management plan as part of the water resources management plan for the Milwaukee Harbor estuary.[4] This system was subsequently constructed and began operation in 1994.

In 1975, there were 26 combined sewer outfalls and 140 known separate sewer overflow relief devices located in the Menomonee River watershed. Overflows typically occurred over 50 times per year. Currently combined sewer bypasses have been reduced to less than three per year. Likewise, the number of sanitary sewer overflows has been markedly reduced from the 1975 conditions.

In 1975, there were 48 point sources of wastewater other than public and private sewage treatment plants. These sources discharged industrial cooling, process, rinse, and wash waters through 78 outfalls directly, or indirectly, to the surface water system. The initial regional water quality management plan included a recommendation that these industrial point sources of wastewater be monitored, and discharges limited to levels which must be determined on a case-by-case basis under the Wisconsin Pollutant Discharge Elimination System permit process. Currently, this recommendation has been nearly fully implemented for such point sources as currently exist in the watershed, the only exception being an unplanned discharge or spill.

Due to the dynamic nature of permitted point sources, it is recognized that the number of wastewater source change as industries and other facilities change locations or processes and as decisions are made with regard to the connection of such sources to public sanitary sewer systems. Many of the historic dischargers are now connected to the public sanitary sewer system.

Nonpoint Source Pollution Abatement Plan Element

The nonpoint source element of the original plan described a variety of methods and practices for abatement of nonpoint source pollution in urban and rural areas and estimated the percent reduction of released pollutants that could be achieved through implementation of these methods and practices. It identified ammonia-nitrogen, phosphorus, and fecal coliform bacteria as pollutants requiring nonpoint source control in the Menomonee River watershed. For urban areas, it recommended septic system management, construction site erosion control, and implementation of urban land practices sufficient to produce a 25 percent reduction in pollutants released to the streams of the watershed. For rural areas, it recommended livestock waste control and conservation practices sufficient to produce a 25 percent reduction in pollutants released to the streams of the watershed. In addition, it recommended the remediation of PAH contamination within the channel of the Little Menomonee River that was initially recommended in the comprehensive plan for the Menomonee River watershed.[5] These remediation efforts began in 2001 and are ongoing (see below).

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[3]*Milwaukee Metropolitan Sewerage District,* Combined Sewer Overflows, *June 1980; Milwaukee Metropolitan Sewerage District,* Inline Storage Facilities Plan, *February 1982; Milwaukee Metropolitan Sewerage District,* Combined Sewer Overflows Advanced Facilities Plan, *December 1983.*

[4]*SEWRPC Planning Report No. 37,* A Water Resources Management Plan for the Milwaukee Harbor Estuary, *Volume One,* Inventory Findings, *March 1987; Volume Two,* Alternative and Recommended Plans, *December 1987.*

[5]*SEWRPC Planning Report No. 26,* A Comprehensive Plan for the Menomonee River Watershed, *October 1976.*

In 1984, the Menomonee River Watershed was designated a priority watershed under the Wisconsin Nonpoint Source Priority Watershed Pollution Abatement Program.[6] This plan identified the need for reductions in sediment loadings, phosphorus loadings, and heavy metal loadings to the streams of the watershed in order to meet water quality objectives. In addition, it recommended a number of management actions and practices to be implemented over the period 1991 to 1999 for both urban and rural lands and provided funding for a variety of activities related to abatement of nonpoint source pollution. The plan recommendations for nonpoint source pollution control for both rural and urban land were partially implemented as of 1995.

Several additional measures to abate nonpoint source pollution have been instituted since adoption of the initial plan. Facilities engaged in certain industrial activities have been required to apply and obtain stormwater discharge permits under the Wisconsin Pollution Discharge Elimination System (WPDES) and to develop and follow storm water pollution prevention plans. All the incorporated communities and two Towns in the watershed have applied for WPDES discharge permits, adopted stormwater management plans or ordinances, and construction site erosion control ordinances. In addition, these communities will be required to develop new or update existing stormwater management ordinances to be consistent with the standards of Chapter NR 151 of the *Wisconsin Administrative Code*. These measures are described more fully in the section on nonpoint source pollution in this chapter.

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[6]*Wisconsin Department of Natural Resources,* A Nonpoint Source Control Plan for the Menomonee River Priority Watershed Project, *Publication WR-244-92, March 1992.*

Exhibit C

TEXT TO BE ADDED TO SEWRPC TECHNICAL REPORT NO. 39, CHAPTER VI

Dissolved Oxygen

Over the period of record, the mean concentration of dissolved oxygen in the Menomonee River was 8.2 mg/l. The data ranged from concentrations that were undetectable to concentrations in excess of saturation. As shown in Figure VI-12, this variability is present at individual sample sites. Mean dissolved oxygen concentrations in the estuary are significantly lower than mean concentrations in the section of the River upstream from the estuary (Table VI-5). Some of this may be the result of lower oxygen solubility due to higher water temperatures related to discharges of cooling water from the Valley power plant at the stations at S. 2nd Street, Burnham Canal, and Muskego Avenue. In the section of the River upstream from the estuary, the mean concentration of dissolved oxygen increases from upstream to downstream. As shown in Table VI-6, this increase is statistically significant. In the estuary, mean dissolved oxygen concentrations are highest at the 25th Street station and generally decrease from upstream to downstream to reach a minimum at the Burnham Canal Station. Downstream of this station, they increase. Figure VI-12 shows that the range of dissolved oxygen concentrations decreased at most stations after 1986. Because the solubility of oxygen in water is dependent on water temperature (i.e. as water temperatures decrease dissolved oxygen concentrations increase, see below), this does not reflect any change in the range of dissolved oxygen concentrations in the River. Rather it reflects the fact that MMSD discontinued sampling during the winter after 1986. At most of the stations in the section of the River upstream from the estuary, dissolved oxygen concentrations have decreased slightly over time, especially at the station at 70th Street. In the estuary, dissolved oxygen concentrations have increased. This is most noticeable at the 25th Street station. Statistical analysis shows slight trends toward increasing mean dissolved oxygen concentrations at three stations in the estuary and at one station in the section of the River upstream from the estuary (see Table C-2 in Appendix C of this report). Comparison of the trends toward increasing dissolved oxygen concentrations over time in the estuary to trends toward decreasing BOD (see above) and decreasing ammonia (see below) suggests that a decrease in loadings of organic pollutants may be responsible for the increase in mean dissolved oxygen. This is likely a consequence of a reduction in loadings from combined sewer overflows since MMSD's Inline Storage System went on line.

It is important to note that the majority of the dissolved oxygen concentrations for the areas upstream of the 70th Street station on the Menomonee River are above the 5.0 mg/l standard and the downstream sites are generally above 2.0 mg/l as shown in Figure VI-12. However, a consistent portion of the samples at all sites continue to fall within the range between 5.0 mg/l and 2.0 mg/l, which may be contributing to the maintenance of the poor to very-poor fishery and macroinvertebrate communities throughout the Menomonee River watershed (see Fisheries and Macroinvertebrates sections below). Researchers have found that dissolved oxygen concentrations below 5.0 mg/1 adversely affect the functioning and survival of biological communities and that the optimum concentration of dissolved oxygen for fish and other aquatic life is 5 to 7 mg/l (see Water Quality Indicators section in Chapter II of this report).[7]

Figure VI-13 compares monthly baseline period concentrations of dissolved oxygen to historical concentrations At the Muskego Avenue station in the estuary, baseline period monthly mean dissolved oxygen concentrations are near or above historical monthly mean concentrations. The lowest concentrations detected at this station during the base period tend to be higher than the historical minima. Baseline period dissolved oxygen concentrations at other stations in the estuary follow this pattern. At the stations in the section of the River upstream from the estuary, such as the County Line Road station, baseline period monthly mean dissolved oxygen concentrations are

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[7]*D. Chapman, V. Kimstach,* The Selection of Water Quality Variable In: Water Quality Assessments, *(Chapman, D. Ed.) Chapman and Hall Ltd., London, 1992.*

generally near or below historical mean concentrations. The minimum concentrations of dissolved oxygen are within the historical range.

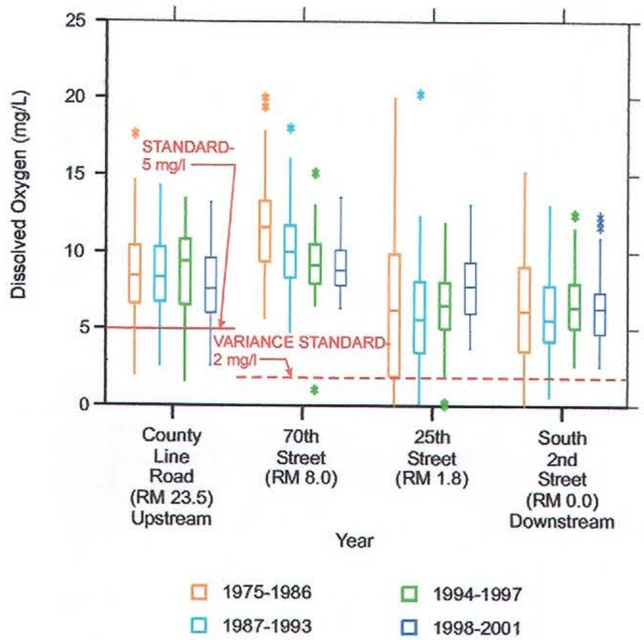
The data show strong seasonal patterns to the mean concentrations of dissolved oxygen (Figure VI-13). The mean concentration of dissolved oxygen is highest during the winter. It declines through spring to reach a minimum during the summer. It then rises though the fall to reach maximum values in winter. This seasonal pattern is driven by changes in water temperature. The solubility of oxygen in water decreases with increasing temperature. In addition, the metabolic demands and oxygen requirements of most aquatic organisms, including bacteria, tend to increase with increasing temperature. Higher rates of bacterial decomposition when the water is warm may contribute to the declines in the concentration of dissolved oxygen observed during the summer. In addition to the reasons mentioned above, dissolved oxygen concentrations can also be affected by a variety of other factors including the presence of aquatic plants, sunlight, turbulence in the water, and the amount and type of sediment as summarized in the Water Quality Indicators section in Chapter II of this report.

Several factors affect dissolved oxygen concentrations in the Menomonee River, especially in the estuary. First, portions of the estuary act as a settling basin in which material suspended in the water sink and fall out into the sediment. This is indicated by the lower concentrations of total suspended solids (TSS) in the estuary (Table VI-5 and see below). Decomposition of organic matter contained in this material, through chemical and especially biological processes, removes oxygen from the overlying water, lowering the dissolved oxygen concentration. Second, influxes of water from Lake Michigan and the Milwaukee River may influence dissolved oxygen concentrations in the downstream portions of the estuary. When dissolved oxygen concentrations in these waterbodies are higher than in the estuary, mixing may act to increase dissolved oxygen concentrations in the lower estuary. Third, WE Energies operates an electric power generating plant which discharges cooling water into the River near the Burnham Canal sampling station. These discharges can raise water temperatures in the estuary, resulting in lower oxygen solubility. Fourth, through much of the mainstem of the Menomonee River, dissolved oxygen concentrations are inversely correlated with ammonia and nitrite concentrations. This suggests that oxidation of ammonia and nitrite to nitrate through biologically mediated nitrification may also be acting to lower dissolved oxygen concentrations when concentrations of these compounds are high. Fifth, dissolved oxygen concentrations are positively correlated with pH. This reflects the effect of photosynthesis on both of these parameters. During photosynthesis, algae and plants remove carbon dioxide from the water. This tends to raise the water's pH. At the same time, oxygen is released as a byproduct of the photosynthetic reactions.

In addition to the reasons mentioned above, dissolved oxygen concentrations in water can also be affected by a variety of other factors including the presence of aquatic plants, sunlight, turbulence in the water, and the amount and type of sediment as summarized in the Water Quality Indicators section in Chapter II of this report. In summary, dissolved oxygen concentrations were generally shown to have remained unchanged from the 70th Street station (RM 8.0) to the areas upstream and to have improved (i.e. increase in concentration) in the estuary area downstream from the 25th Street station.

Figure VI-12

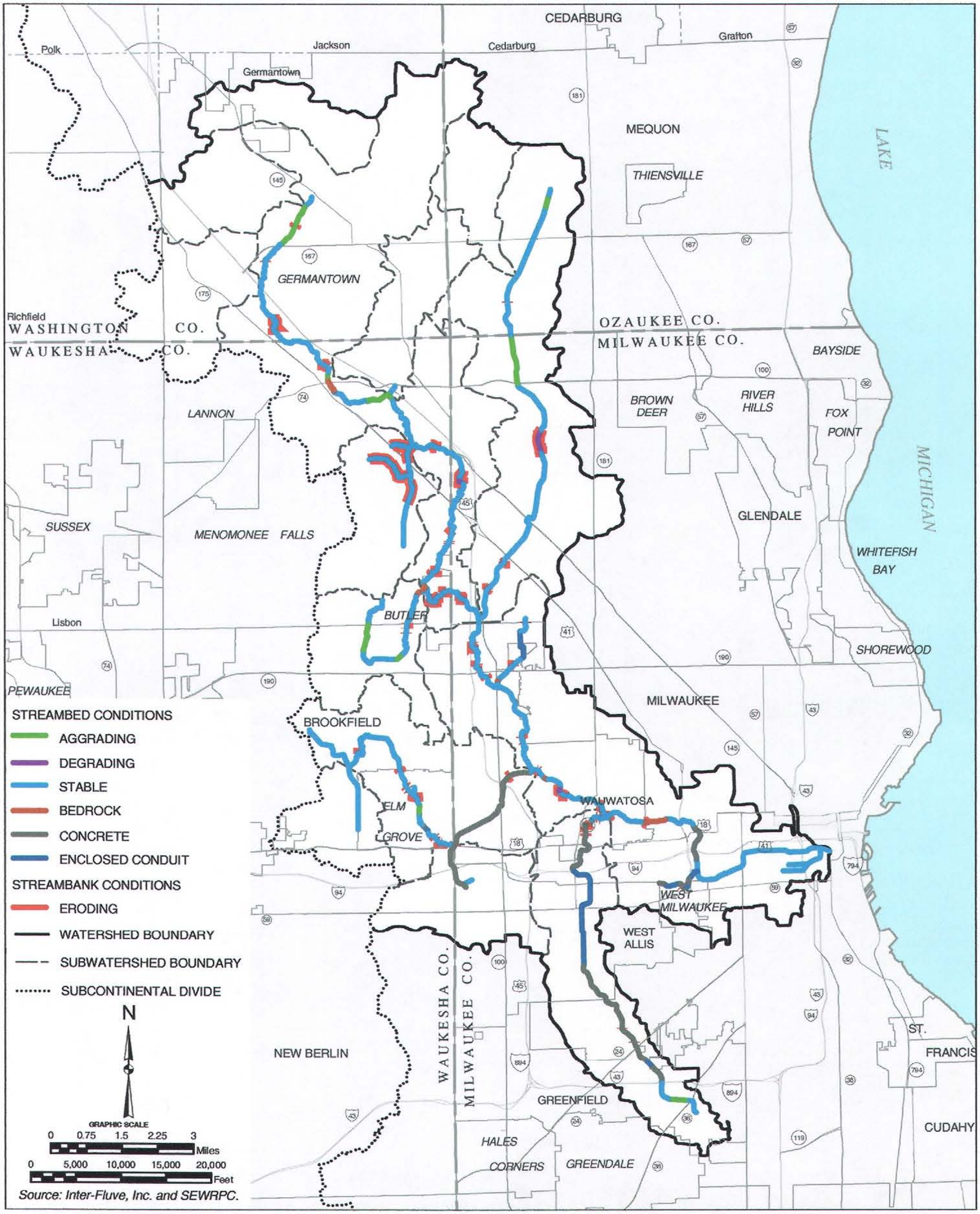
DISSOLVED OXYGEN CONCENTRATIONS AT SITES ALONG THE MAINSTEM OF THE MENOMONEE RIVER: 1975-2001



NOTE: See Surface Water Quality Analysis section in Chapter III of this report for description of symbols used in this plot.

Source: U.S. Geological Survey, Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage District, and SEWRPC.

STREAMBANK AND STREAMBED CHARACTERISTICS WITHIN THE MENOMONEE RIVER WATERSHED: 2000



Source: Inter-Fluve, Inc. and SEWRPC.

PRELIMINARY DRAFT

Exhibit D (continued)

Table VI-13

CHANNEL BANK CONDITIONS IN THE MENOMONEE RIVER WATERSHED

Subwatershed	Total Length (feet)	Left Bank				Right Bank			
		Unstable		Stable		Unstable		Stable	
		Length (feet)	Percent	Length (feet)	Percent	Length (feet)	Percent	Length (feet)	Percent
Butler Ditch	17,952	68	0.4	17,884	99.6	132	0.7	17,820	99.3
Dousman Ditch	5,808	0	0.0	5,808	100.0	0	0.0	5,808	100.0
Grantosa Creek	9,715	172	1.8	9,543	98.2	97	1.0	9,618	99.0
Honey Creek	46,622	380	0.8	46,242	99.2	938	2.0	45,684	98.0
Lilly Creek[a]	39,365	12,949	32.9	26,416	67.1	12,949	32.9	26,416	67.1
Little Menomonee River	54,278	2,364	4.4	51,914	95.6	2,086	3.8	52,192	96.2
Menomonee River	132,627	6,602	5.0	126,085	95.0	5,956	4.5	126,731	95.5
South Branch Underwood Creek	5,702	0	0.0	5,702	100.0	0	0.0	5,702	100.0
Underwood Creek	40,550	1,251	3.1	39,299	96.9	1,077	2.7	39,743	97.3
Woods Creek	5,782	20	0.4	5,762	99.6	0	0.0	5,782	100.0

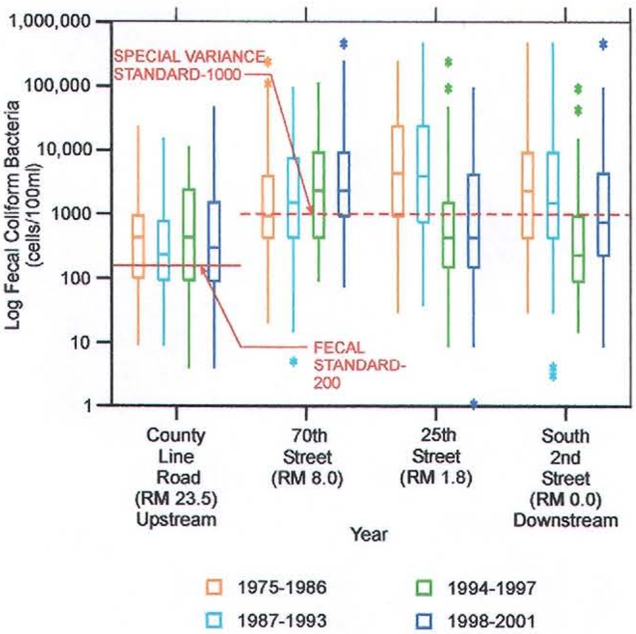
[a]*The assessment of the Lilly Creek subwatershed includes data on the mainstem and tributaries as documented in the SEWRPC Community Assistance Planning Report No. 190,* A Stormwater Management and Flood Control Plan for the Lilly Creek Subwatershed, *1993.*

Source: Inter-Fluve, Inc.

Exhibit E

Figure VI-2

FECAL COLIFORM BACTERIA CONCENTRATIONS ALONG THE MAINSTEM OF THE MENOMONEE RIVER: 1975-2001

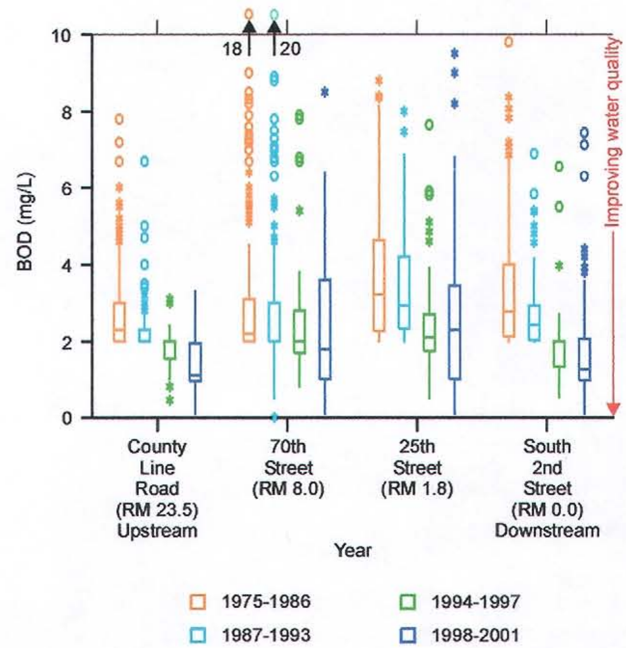


NOTE: See Surface Water Quality Analysis section in Chapter III of this report for description of symbols used in this plot.

Source: U.S. Geological Survey, Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage District, and SEWRPC.

Figure VI-9

BIOCHEMICAL OXYGEN DEMAND (BOD) AT SITES ALONG THE MAINSTEM OF THE MENOMONEE RIVER: 1975-2001

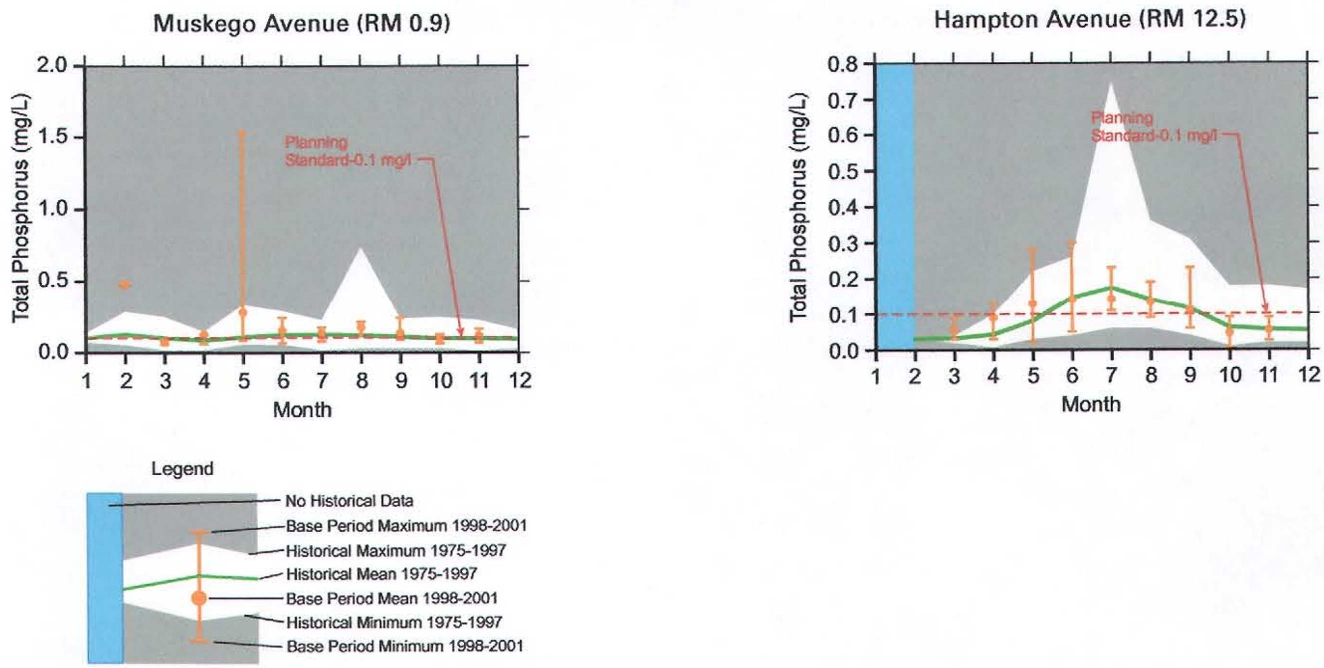


NOTE: See Surface Water Quality Analysis section in Chapter III of this report for description of symbols used in this plot.

Source: U.S. Geological Survey, Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage District, and SEWRPC.

Figure VI-18

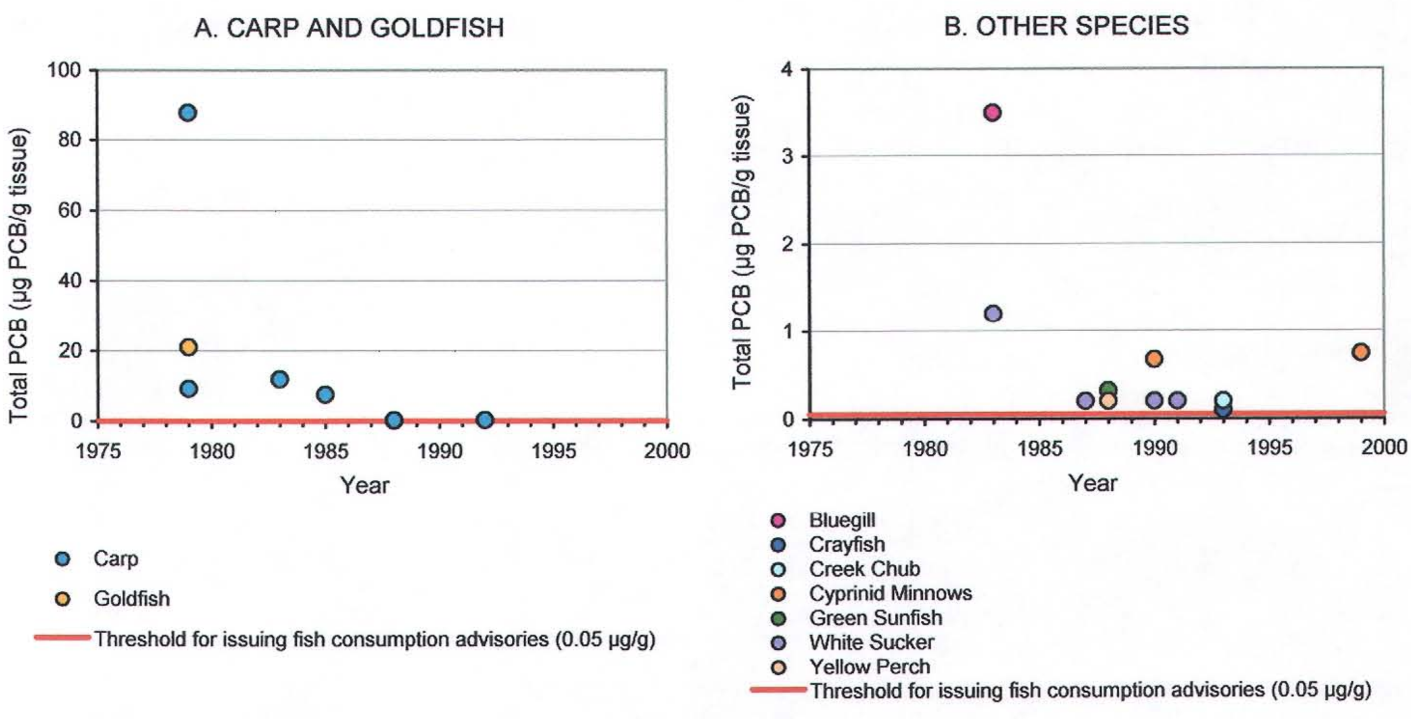
HISTORICAL AND BASE PERIOD CONCENTRATIONS OF TOTAL PHOSPHORUS IN THE MENOMONEE RIVER: 1975-2001



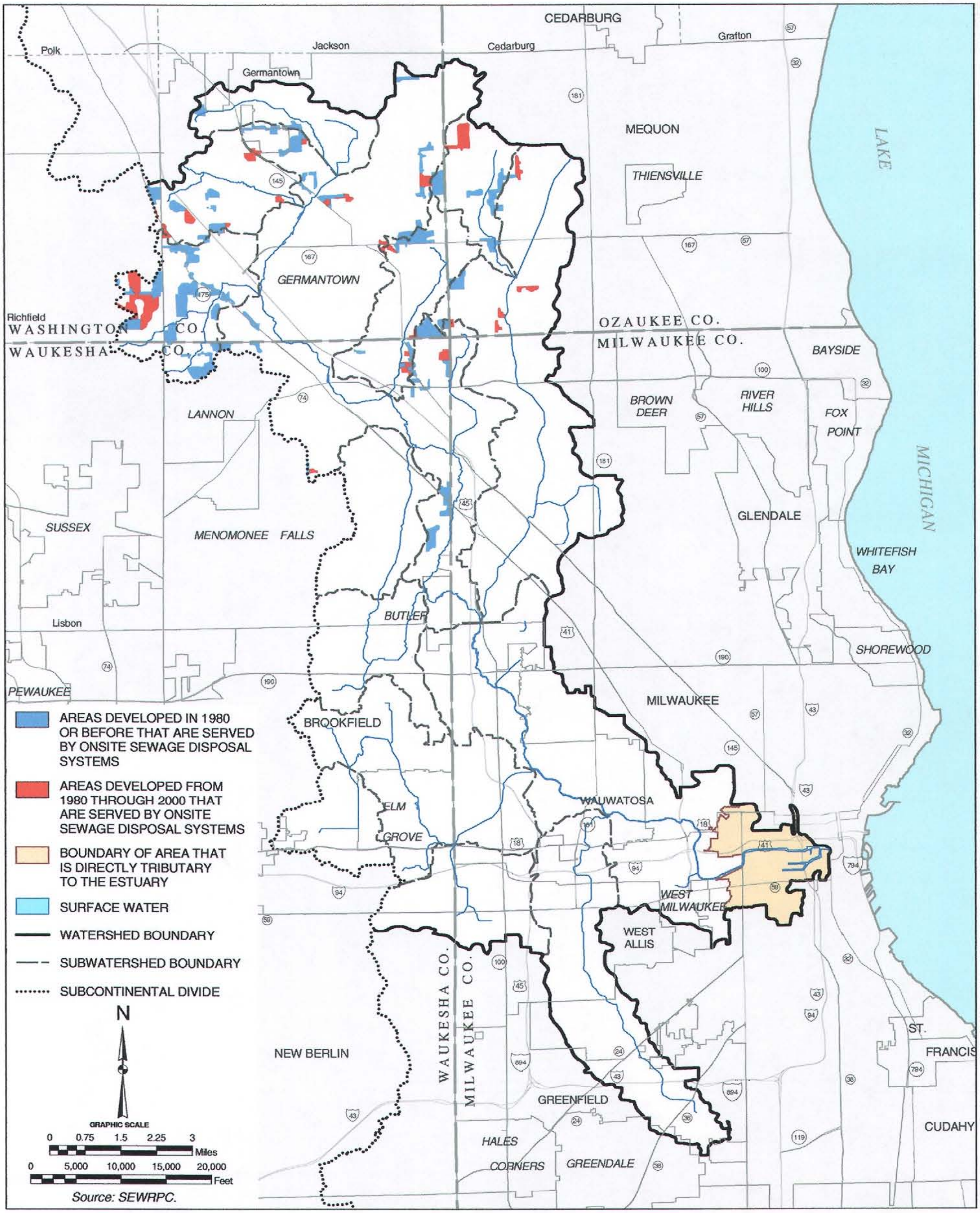
Source: U.S. Geological Survey, Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage District, and SEWRPC.

Figure VI-24

TISSUE CONCENTRATIONS OF PCBS IN FISH AND OTHER AQUATIC ORGANISMS SAMPLED IN THE MENOMONEE RIVER WATERSHED: 1975-2000



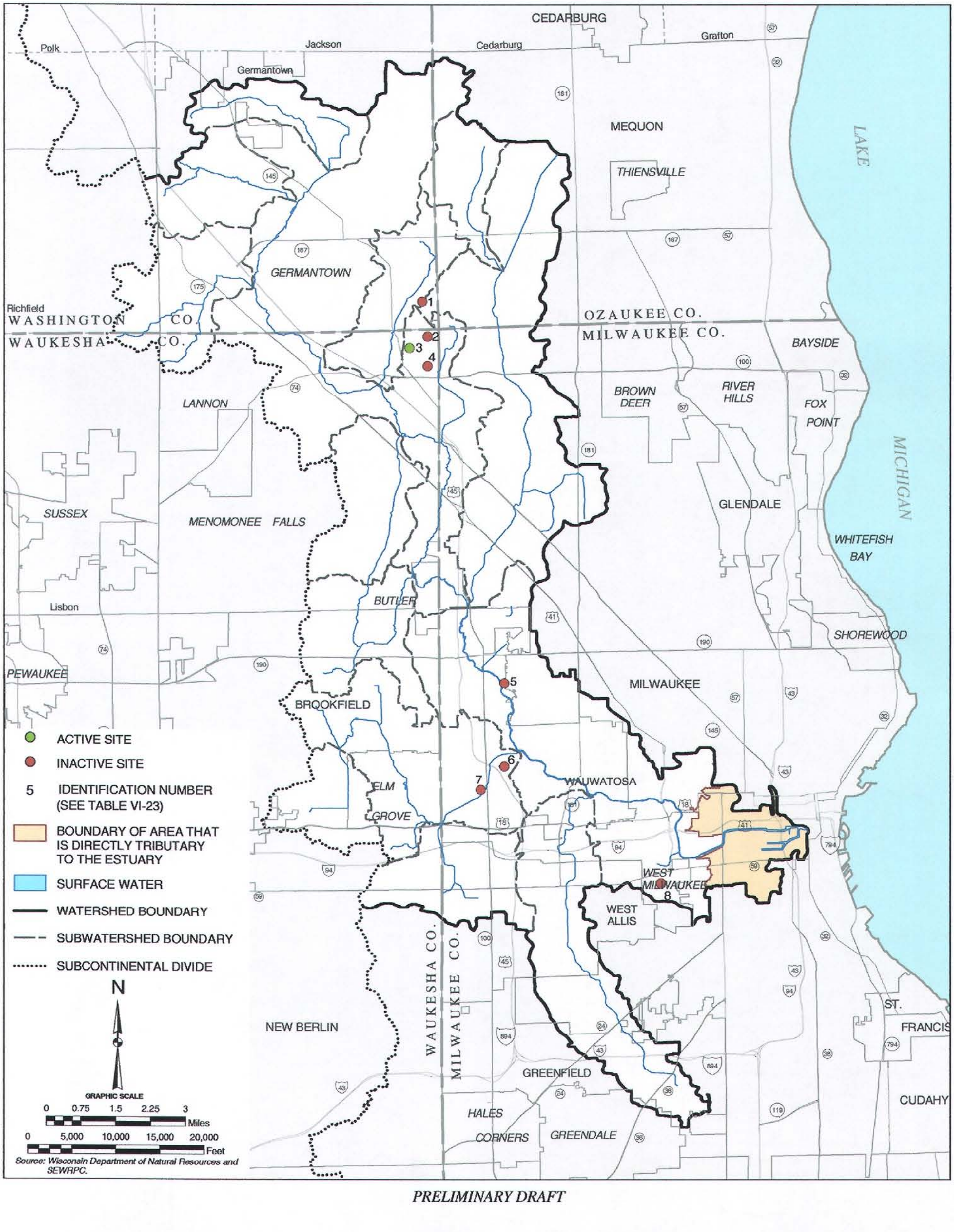
AREAS WITHIN THE MENOMONEE RIVER WATERSHED THAT ARE SERVED BY ONSITE SEWAGE DISPOSAL SYSTEMS: 1980 AND PRIOR AND 1981 THROUGH 2000



Source: SEWRPC.

PRELIMINARY DRAFT

ACTIVE AND INACTIVE SOLID WASTE DISPOSAL SITES WITHIN THE MENOMONEE RIVER WATERSHED: 2004



PRELIMINARY DRAFT

Exhibit G (continued)

Table VI-23

ACTIVE AND INACTIVE SOLID WASTE DISPOSAL SITES IN THE MENOMONEE RIVER WATERSHED: 2004

Number on Map VI-16	Facility Name	Address	Municipality	Classification	Subwatershed	License Number	Status
1	Schreiner Landfill	- -	Germantown	Landfill, unclassified	Nor-X-Way Channel	880	Inactive
2	Waste Management WI, Parkview Recycling and Disposal	N96 W13475 County Line Road	Menomonee Falls	Landfill >500,000 cubic yards	Upper Menomo-nee River	3108	Inactive
3	Waste Management WI, Orchard Ridge Recycling and Disposal	W124 N9355 Boundary Road	Menomonee Falls	Landfill >500,000 cubic yards	Upper Menomo-nee River	3360	Active
4	Waste Management WI, Boundary Road Landfill	Menomonee Falls	Menomonee Falls	Landfill, unclassified	Upper Menomo-nee River	11	Inactive
5	Milwaukee County Hartung Quarry Landfill	W. Concordia Avenue	Milwaukee	Landfill >500,000 cubic yards monofil	Lower Menomo-nee River	1501	Inactive
6	Milwaukee County Institutions	8731 Watertown Plank	Wauwatosa	Landfill, unclassified	Underwood Creek	194	Inactive
7	Wauwatosa City Landfill	11100 W. Walnut Road	Wauwatosa	Landfill >500,000 cubic yards monofill	Underwood Creek	525	Inactive
8	Village of West Milwaukee Landfill	4755 W. Beloit Road	West Milwaukee	Landfill 0-50,000 cubic yards	Lower Menomo-nee River	1272	Inactive

Source: Wisconsin Department of Natural Resources and SEWRPC.

Exhibit H

TEXT TO BE ADDED TO SEWRPC TECHNICAL REPORT NO. 39, CHAPTER VI

SUMMARY

The summary of water quality and pollution sources inventory for the Menomonee River system have been summarized by answering five basic questions. The chapter provided detailed information needed to answer the questions. The information is summarized below.

How Have Water Quality Conditions Changed Since 1975?

Water quality conditions in the Menomonee River watershed have both improved in some respects and declined in other respects since 1975.

Improvements in Water Quality

Concentrations in the estuary portion of the Menomonee River of several pollutants associated with combined sewer overflows, such as BOD, fecal coliform bacteria, and ammonia, have decreased. These reductions in nutrients and oxygen-demanding wastes have produced some improvements in dissolved oxygen concentration and have resulted in lower chlorophyll-*a* concentrations in the estuary portion of the River. In addition, concentrations of ammonia and BOD have also declined in the sections of the River upstream from the estuary. Improvements have also occurred in the concentrations of some toxic metals detected in the Menomonee River. One important, though not the only, factor responsible for these decreases is the reduction in combined and separate sewer overflows resulting from construction and operation of MMSD's inline storage system. These improvements also likely reflect both changes in the types of industries present in the watershed, the connection of most process wastewaters to the MMSD sewerage system, and the implementation of treatment requirements for all industrial discharges. Concentrations of lead have also declined, due largely to the phasing out of the use of lead as an additive to gasoline. Concentrations of mercury in the water have declined.

No Change or Reductions in Water Quality

Concentrations of suspended and dissolved pollutants typically associated with stormwater runoff and other nonpoint source pollution, such as chloride, copper, total suspended solids, and zinc have remained unchanged or increased. For some of these pollutants, such as zinc, increases in concentration have occurred in all reaches sampled along the Menomonee River. For others, such as copper, chloride, and total suspended solids, concentrations have increased in some reaches while remaining unchanged in others. In addition, specific conductance has increased in at least three reaches of the River, suggesting that the total concentration of dissolved material in the water has increased. In other reaches, the concentration of dissolved material, as indicated by specific conductance, has remained unchanged. Water temperatures in the estuary, especially at the Burnham Canal sampling station, have increased, especially during the summer.

How Have Toxicity Conditions Changed Since 1975?

In some respects, toxicity conditions in the Menomonee River have improved since 1975; in other respects, they have declined or not changed.

Improvements in Toxicity Conditions

The concentrations of PAHs in water in the section of the Menomonee River upstream from the estuary have declined. Concentrations of PCBs in fish tissue have declined, but remain above the threshold used by the WDNR to trigger fish consumption advisories. While it does not represent a change, in all of the available data the concentration of mercury detected in the tissue of fish and other aquatic organisms has been below the threshold used by the WDNR to trigger fish consumption advisories. In additions, as described above, there have been reductions in concentrations of some toxic metals in the water column. As part of remediation efforts, sediments contaminated with PAHs have been removed from the Little Menomonee River and treated and the channel of this tributary has been relocated. This should reduce the toxic effects related to contaminated sediments in the Little Menomonee River.

Worsened Toxicity Conditions
Other toxicity conditions in the Menomonee River have gotten worse. The concentrations of PAHs detected in water in the estuary portion of the River have increased. Also, concentrations of zinc in the water column have increased along the entire Menomonee River mainstem.

Inconclusive Toxicity Data
In some cases the available data are not adequate to assess changes. For example, the concentrations of PCBs detected in water during the period 1998 to 2001 were lower than the concentrations detected in previous samplings; however, the most recent samplings may underestimate PCB concentrations both because of methodological differences in sample collection and because they only screened for a subset of PCB congeners. Various pesticides have been detected in water in the Menomonee River, but different compounds were screened for in recent samplings than were examined in historical samplings.

Sediment Conditions
As part of remediation efforts, sediments contaminated with PAHs have been removed from the Little Menomonee River and treated. This should reduce the toxicity of sediments in the Little Menomonee River.

What Are The Sources of Water Pollution?
The Menomonee River watershed contains several potential sources of water pollution. These fall into two broad categories: point sources and nonpoint sources.

Point Sources
There are no public or private sewage treatment plants discharging into the Menomonee River watershed. MMSD has 28 combined sewer overflow outfalls that discharge to the streams in the Menomonee River watershed. These outfalls convey a combination of stormwater runoff and sanitary sewage from the combined sewer system to the surface water system of the watershed as a result of high water volume from stormwater, meltwater, and excessive infiltration and inflow of clear water during wet weather conditions. Prior to 1994, overflows from these sites typically occurred around 50 times per year. Since MMSD's inline storage system came online in 1994, the number of combined sewer overflows per year has declined to about three. Since 1995, separate sewer overflows have been reported at 26 locations: seven within MMSD's SSO area and 19 within local communities. The number of SSO events occurring per year has shown a decline similar to that of CSO events. As of February 2003, 150 industrial dischargers and other point sources were permitted through the WPDES program to discharge wastewater to streams in the Menomonee River watershed. Almost half of the permitted facilities discharged noncontact cooling water. The remaining discharges are of a nature which typically meets or exceeds the Wisconsin Pollutant Discharge Elimination System permit levels which are designed to meet water quality standards.

Nonpoint Sources
The Menomonee River watershed is comprised of a combination of urban land uses and rural land uses. As of 2000, about 36 percent of the watershed was in rural and other open land uses. About 77 percent of the watershed is contained within planned sewer service areas: 41 percent within MMSD's planned sewer service area and 36 percent within the sanitary sewer service areas of local communities that are connected to MMSD's conveyance and treatment systems. About three percent of the watershed consists of urban enclaves outside of the planned sewer service area. Failure of onsite sewage treatment systems is an issue of concern in these portions of the watershed. About eight percent of the watershed is served by combined sanitary and storm sewers which convey sewage and stormwater to MMSD's sewage treatment facilities, resulting in a high degree of nonpoint source pollution control from the combined sewer service area. All communities in the watershed have adopted construction erosion control ordinances except for the Towns of Germantown and Richfield. All communities in the watershed except for the Towns of Germantown and Richfield and the Village of West Milwaukee have adopted stormwater management ordinances or plans. It is anticipated that the Village of West Milwaukee will adopt a stormwater management ordinance in order to fulfill the conditions of the WPDES stormwater discharge permit that they have applied for. As of February 2003, 267 facilities engaged in industrial activities in the

watershed had applied for and obtained WPDES stormwater discharge permits. As a condition of these permits, these facilities are required to develop and follow a stormwater pollution prevention plan. There is currently one active sanitary landfill in the watershed. The watershed contains seven inactive sanitary landfills.

Quantification of Pollutant Loads

The current annual average load of BOD to streams of the Menomonee River watershed is estimated to be ___ pounds per year. Combined sewer overflows and separate sewer overflows contribute about ___ percent and ___ percent respectively of this load. Industrial discharges and other point sources contribute about ___ percent of this load. The rest of BOD loadings to streams in the Menomonee River watershed, about ___ percent, are contributed by nonpoint sources, mostly urban nonpoint sources.

The current annual average load of TSS to streams of the Menomonee River watershed is estimated to be ___ pounds per year. Combined sewer overflows and separate sewer overflows contribute about ___ percent and ___ percent respectively of this load. Industrial discharges and other point sources contribute about ___ percent of this load. The rest of TSS loadings to streams in the Menomonee River watershed, about ___ percent, are contributed by nonpoint sources, mostly urban nonpoint sources.

The current annual average load of fecal coliform bacteria to streams of the Menomonee River watershed is estimated to be ___ billion cells per year. Combined sewer overflows and separate sewer overflows contribute about ___ percent and ___ percent respectively of this load. Industrial discharges and other point sources contribute about ___ percent of this load. The rest of fecal coliform bacteria loadings to streams in the Menomonee River watershed, about ___ percent, are contributed by nonpoint sources, mostly urban nonpoint sources.

The current annual average load of total phosphorus to streams of the Menomonee River watershed is estimated to be ___ pounds per year. Combined sewer overflows and separate sewer overflows contribute about ___ percent and ___ percent respectively of this load. Industrial discharges and other point sources contribute about ___ percent of this load. The rest of total phosphorus loadings to streams in the Menomonee River watershed, about ___ percent, are contributed by nonpoint sources, mostly urban nonpoint sources.

What Is The Current Condition of The Fishery?

The Menomonee River watershed seems to have a poor fishery community at present. The fish community contains relatively few species of fishes, is trophically unbalanced, contains few or no top carnivores, and is dominated by tolerant fishes. The quality of the macroinvertebrate community has improved substantially since 1993 and is generally indicative of fair to very good water quality. Since water quality has generally been improving in the watershed and habitat seems to be adequate, it is likely that some other factor, such as periodic stormwater loads, is limiting both the fishery community.

To What Extent Are Water Use Objectives and Water Quality Standards Being Met?

During the 1998 to 2001 study baseline period, the Menomonee River only partially met the water quality criteria supporting its recommended water use classification. In the vast majority of the samples taken from the mainstem of the River temperatures and concentrations of dissolved oxygen and ammonia were in compliance with the relevant water quality standards. Only in occasional samples at the Burnham Canal station were temperatures above the standard of 89ºF. In occasional samples collected in the reaches upstream from W. Hampton Avenue, dissolved oxygen concentrations were below the standard of 5.0 mg/l that applies to fish and aquatic life waters. Concentrations of fecal coliform bacteria in the estuary portion of the Menomonee River often exceeded the special variance standard of 1,000 cells per 100 ml which applies to the estuary. Similarly, in the vast majority of samples collected from the section of the River upstream of the estuary, the concentrations of fecal coliform bacteria exceed the standard of 200 cells per 100 ml. The rate of compliance with this standard varies among reaches. At the N. 70th Street station, fecal coliform counts were below the standard in about 24 percent of samples. This increased to about 60 percent at the station at the N. 70th Street station. Compliance with the standard for total phosphorus recommended in the regional water quality management plan also varied among reaches: the number of samples showing total phosphorus below the 0.1 mg/l standard ranged from a low of about 32 percent at the N. 25th Street station to a high of about 66 percent at the County Line Road station.

Relatively few data are available for assessing whether streams tributary to the Menomonee River are meeting water use objectives and water quality standards. Based on available data, Honey Creek, the Little Menomonee River, and Willow Creek are only partially meeting their water use objectives. In all samples collected from each of these streams, ammonia concentrations were below the acute toxicity standard for fish and aquatic life, water temperatures are under the 89^{o}F standard, and dissolved oxygen concentrations were above the applicable standard. Concentrations of fecal coliform bacterial in Honey Creek generally exceeded the standard of 1,000 cells per 100 ml which applies to this stream. Total phosphorus concentrations in the Little Menomonee River and Willow Creek exceeded the recommended concentration in about 20 percent of the samples. Based on limited sampling, Butler Ditch appears to be meeting water use objectives and water quality standards. In all of the samples taken, dissolved oxygen concentrations and temperatures were in compliance with the applicable water quality standards.

Some toxic substances have been detected in the Menomonee River watershed at concentrations that may impede beneficial uses. In eight to 38 percent of the water samples taken at the six sampling stations along the mainstem of the Menomonee River, PCBs were present in concentrations that exceeded the human cancer criterion for public health and welfare. In addition, concentrations of mercury in water samples taken from the Menomonee River often exceeded both the human threshold concentration for public health and welfare and the wildlife criterion for surface water quality. Also, concentrations of copper in water samples occasionally exceeded the EPA’s criterion maximum concentration.

Exhibit I

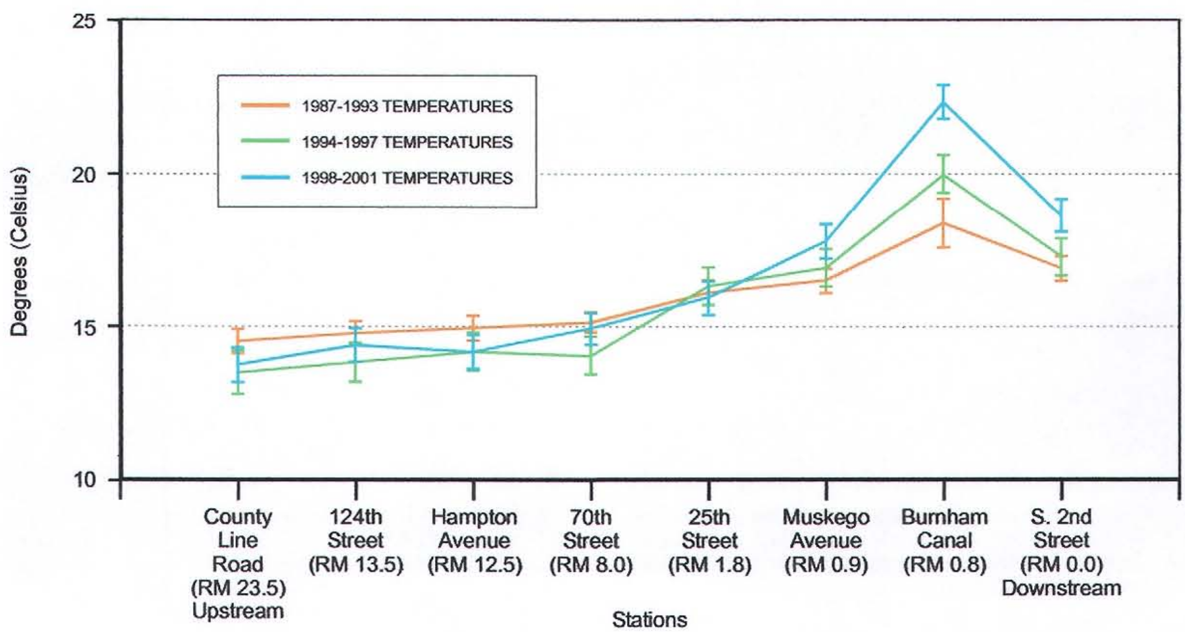
RWQMPU / 2020 FP
WATER QUALITY MODELING STATUS: 05/25/2005

Watershed	Task 1 Model Structure	Task 2 Model Data Sets	Task 3 Hydrology Calibration	Task 4 Quality Calibration	Task 5 Integrate with Estuary/Lake	Task 6 Production Runs	Task 7 Document Results	Comments
Kinnickinnic River	Completed	Completed	Completed	Underway				Initial SEWRPC review of Task 1 and Task 2 complete SEWRPC review of reach definition memo complete Corrections requested based on Task 2 review have been addressed Final Task 1 memo approved by SEWRPC Initial SEWRPC review of hydrology calibration memo (including revised Task 2) complete
Menomonee River	Completed	Completed	Completed	Completed				Initial SEWRPC review of Task 1 and Task 2 complete SEWRPC review of reach definition memo complete Corrections requested based on Task 1 and 2 review have been addressed Final Task 1 memo approved by SEWRPC Initial SEWRPC review of hydrology calibration memo complete. Revised memo currently being reviewed by SEWRPC Initial SEWRPC review of water quality calibration memo complete. Revised memo currently being reviewed by SEWRPC
Milwaukee River	Completed	Completed	Underway					Model structure has been agreed upon. Tetra Tech has completed dataset SEWRPC completed development of precipitation and temperature datasets to use for calibration Task 1 and Task 2 memos have not been received
Oak Creek	Completed	Completed	Completed	Being revised for comments from SEWRPC review				Initial SEWRPC review of Task 1 and Task 2 complete SEWRPC review of reach definition memo complete Corrections requested based on Task 2 review have been addressed Final Task 1 memo approved by SEWRPC Initial SEWRPC review of hydrology calibration memo complete Initial SEWRPC review of water quality calibration memo complete
Root River (upper)	Completed	Completed	Underway					Initial SEWRPC review of Task 1 and Task 2 complete No reach definition memo submitted Corrections requested based on Task 1 and 2 review have been addressed Final Task 1 memo approved by SEWRPC
Root River (lower)	Completed	Completed	Underway					Model structure has been agreed upon. Tetra Tech has completed dataset SEWRPC completed development of precipitation and temperature datasets for use in calibration Task 1 and Task 2 memos have not been received
Harbor Estuary and Lake Michigan Nearshore	Completed	Completed	Underway	Underway				Model grid system refined Review of initial calibration memo by SEWRPC underway

Exhibit J

Figure VI-7

MEAN WATER TEMPERATURE AT STATIONS ALONG THE MENOMONEE RIVER: 1987-2001

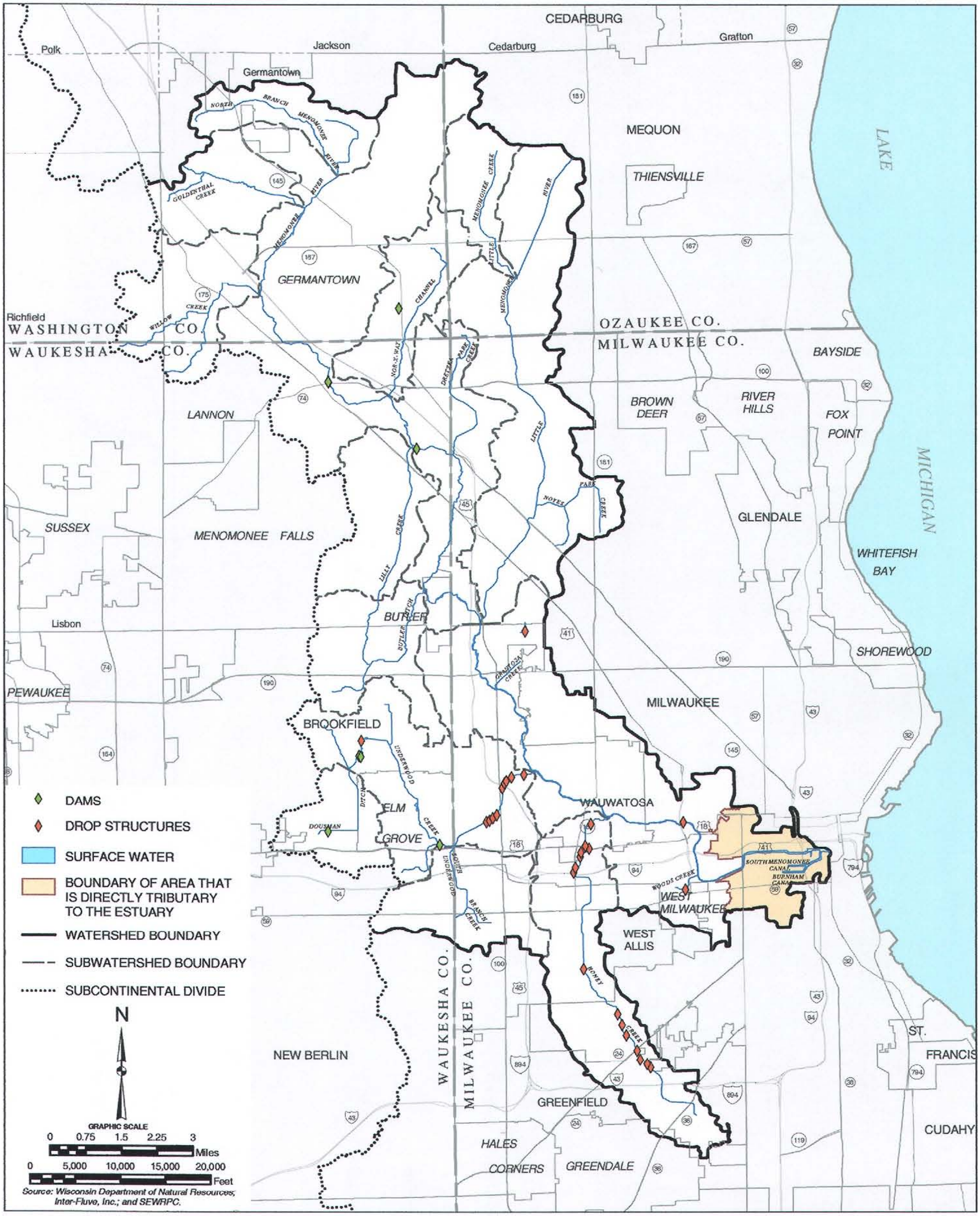


NOTE: Water quality standard is at 31.7 degrees, which is off the graph.

Source: U.S. Geological Survey, Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage District, and SEWRPC.

Map VI-9 Exhibit K

DAMS AND DROP STRUCTURES WITHIN THE MENOMONEE RIVER WATERSHED: 2005



PRELIMINARY DRAFT

Exhibit L

Table VI-20

COMBINED SEWER OVERFLOW OUTFALL LOCATIONS IN THE MENOMONEE RIVER WATERSHED

WPDES Number	Location	Collector[a]	Outfall Size (inches)	Number of Days with Overflow August 1995 to August 2002
10	W. Canal Street and 8th Street	Unknown	48	0
61	Emergency Wastewater Exit Facility	Unknown	180 x 144	0
170	S. 2nd Street	CT 8	54	5
171	N. Muskego Avenue	CT 7	30	0
172	N. Muskego Avenue	CT 7	54	18
173	N. 15th Street	CT 7	84 x 48[b]	17
174	N. 15th Street	CT 7	84 x 48	17
174A	N. 16th Street and Pittsburgh Street	CT 7	42	16
175	N. 17th Street	CT 7	69 x 42	18
176	N. 17th Street	CT 5/6	84 x 84[b]	45
177	N. 25th Street	CT 5/6	84 x 72[c]	42
177A	N. 25th Street	CT 5/6	96[a]	41
178	S. 27th Street	CT 5/6	48	27
179	S. 27th Street	CT 5/6	48	0
180	S. 35th Street	CT 5/6	60	0
181	W. Wisconsin Avenue	CT 3/4	24	0
182	N. 43rd Street	CT 3/4	144 x 72	37
182A	N. 43rd Street	CT 3/4	54	30
183	N. 45th Street	CT 3/4	60	0
184	N. Hawley Road	CT 2	102 x 60	15
185	N. 9th Street	CT 7	96	18
187	S. 4th Street	CT 8	48	16
188	S. 6th Street	CT 8	30	15
189	S. 9th Street	CT 7	54	0
190	S. 9th Street	CT 7	78	0
191	S. 11th Street	CT 7	36	0
193	S. 13th Street	CT 7	60	0
194	S. Muskego Avenue	CT 7	78	0

[a]*CT stands for Cross Town Tunnel Location*

[b]*Double outfall.*

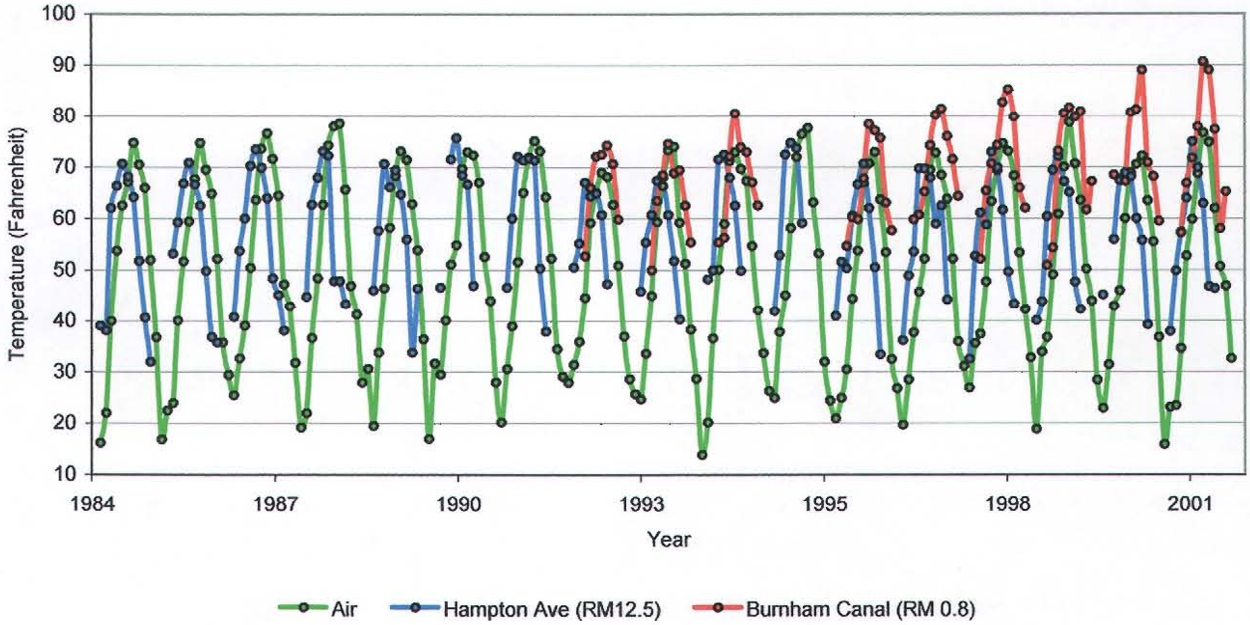
[c]*Triple outfall.*

Source: Milwaukee Metropolitan Sewerage District, Triad Engineering, and SEWRPC.

Exhibit M

Figure VI-8

MONTHLY MEAN AIR AND WATER TEMPERATURES AT STATIONS ALONG THE MENOMONEE RIVER: 1985-2001



Source: U.S. Geological Survey, National Oceanic and Atmospheric Association, Wisconsin Department of Natural Resources, Milwaukee Metropolitan Sewerage Dictrict, and SEWRPC.