MEMBERS PRESENT

Kurt W. Bauer, Chairman  Executive Director Emeritus, SEWRPC
Robert P. Biebel, Secretary  Special Projects Environmental Engineer, SEWRPC
Julie A. Anderson  Director, Racine County Division of Planning and Development
Thomas J. Bunker  Representative, Water and Wastewater Utility, City of Racine
Douglas S. Cherkauer  Professor of Hydrogeology, University of Wisconsin-Milwaukee
Lisa Conley  Representative, Town and Country Resource
                Conservation and Development, Inc.
Michael P. Cotter  Director, Walworth County Land Use and Resource Management Department
Charles A. Czarkowski  Regional Water Program Expert, Wisconsin Department of Natural Resources, Southeast Region
Charles P. Dunning  Hydrologist, U.S. Geological Survey
Franklyn A. Ericson  Manager, Environmental Operations & Central Services, S.C. Johnson & Son, Inc.
Thomas M. Grisa  Director of Public Works, City of Brookfield
Andrew A. Holschbach  Director, Ozaukee County Planning, Resources, and Land Management Department
Terrence H. Kiekhaefer  Director of Public Works, City of West Bend
Mark Lurvey  Agricultural Business Operator
J. Scott Mathie  Director of Government Affairs, Metropolitan Builders
                (for Matthew Moroney)  Association of Greater Milwaukee
George E. Melcher  Director, Kenosha County Department of Planning and Development
Nancy Quirk  Technical Services Manager, Waukesha Water Utility,
                City of Waukesha
                (for Daniel S. Duchniak)
Michael P. Rau  General Manager, We Energies-Water Services
Dale R. Shaver  Director, Waukesha County Department of Parks and Land Use
James Surfus  Senior Environmental Engineer, Miller Brewing Company
Steven N. Yttri  General Manager, Water and Sewer Utility, City of Oak Creek
MEMBERS EXCUSED OR OTHERWISE ABSENT

Kenneth R. Bradbury  Hydrogeologist/Professor, Wisconsin Geological and Natural History Survey
David Ewig  Water Superintendent, City of Port Washington
Jeffrey A. Helmuth  Hydrogeologist Program Coordinator, Wisconsin Department of Natural Resources, Madison
Eric J. Kiefer  Manager, North Shore Water Commission
Carrie M. Lewis  Superintendent, Milwaukee Water Works, City of Milwaukee
Thomas J. Krueger  Water and Wastewater Utility Director, Village of Grafton
Paul E. Mueller  Administrator, Washington County Planning and Parks Department
Jeffrey Musche  Administrator/Clerk, Town of Lisbon
Edward St. Peter  General Manager, Water Utility, City of Kenosha
George A. Torres  Director, Milwaukee County Department of Transportation & Public Works
Daniel S. Winkler  Director of Public Works and Utilities, City of Lake Geneva

GUESTS

Daniel R. Butler  Engineer, Ruekert & Mielke, Inc.
Darryl Enriquez  Reporter, Milwaukee Journal-Sentinel
Steven H. Schultz  Department Head, Water Supply and Wastewater Treatment, Ruekert & Mielke, Inc.

STAFF

Joseph E. Boxhorn  Senior Planner, Southeastern Wisconsin Regional Planning Commission

CALL TO ORDER AND ROLL CALL

Chairman Bauer called the meeting to order at 9:05 a.m. Roll call was taken by circulating an attendance signature sheet, and a quorum was declared present.

CONSIDERATION OF MINUTES OF THE MEETING OF MAY 15, 2007

Chairman Bauer noted that copies of the minutes of the May 15, 2007, meeting of the Committee had been provided to all members of the Committee for review prior to the meeting, and asked that the Committee consider approval of those minutes.

Chairman Bauer reminded the Committee members that all of the revisions which the Committee directed to be made in the materials reviewed at that meeting were intended to be fully documented in the minutes, or in attachments thereto. He noted that approval of the minutes would constitute approval of Chapter IV, “Anticipated Growth and Change Affecting Water Supply in the Region,” and Chapter VI, “Water Supply Law,” of SEWRPC Planning Report No. 52, A Regional Water Supply Plan for Southeastern Wisconsin. He noted that the approval would, of course, be subject to any comments received today on the minutes and the attachments thereto.

Ms. Conley referred to the last partial paragraph on page 6 of the minutes and noted the reference to the western shore of Pewaukee Lake as being an area where it was envisioned that private water supply systems would be maintained because of the relatively large lot sizes and because there were no known significant water quality problems. She reported that that area was substantially lower than the area to the west, including the Lake Nagawicka area and that this may result in increased groundwater flow and
pressure. She also noted that some homes in that area had radon problems. It was agreed that the staff would check to see if there were any groundwater quality problems in the area, and, if so, the recommendation on the need for public water supply would be reevaluated.

[Secretary’s Note: The Commission staff checked with the Environmental Health Division of the Waukesha County Department of Parks and Land Use to determine if there were any significant groundwater quality problems in the vicinity of western Pewaukee Lake. The Department staff, who are familiar with well, septic tank, and general groundwater conditions in the area in question, indicated that no significant water supply quality problems were known to exist in the area.]

Dr. Cherkauer referred to Map VI-4 and noted that certain areas in Walworth and Waukesha Counties should have been included within the designated groundwater management area.

[Secretary’s Note: Map VI-4 has been corrected. A revised copy of the map is attached hereto as Exhibit A.]

Dr. Cherkauer referred to Map VI-3a and noted that there appeared to be a very large number of springs shown in Waukesha and Walworth Counties compared to the other five counties of the Region. He indicated that he was aware of other springs not shown. For example, he indicated that there were several springs in the vicinity of the Cedarburg Bog in Ozaukee County which were not shown on the map. He asked if the inventories had focused on Walworth and Waukesha Counties and did not present a comparably complete depiction of springs in the other counties of the Region. Mr. Biebel noted that the Committee had, at the meeting held on May 15, 2007, requested that a map of known springs be included in Chapter VI. He noted that the only available inventory of springs was one recently completed by the Wisconsin Wildlife Federation which was based upon studies carried out over the period from 1930 through 1988. He also noted that the note on the map indicated the inventory period and that the spring locations have not been field checked. Mr. Grisa indicated that, in his opinion, the inventory was useful, even with its limitations. Upon brief discussion, it was agreed to expand the note contained in the legend of the map to clarify that the map reflected different levels of inventories conducted over a long period of time and some of the springs shown on the map may no longer exist in 2007; and that, in any case, the inventories which provided the data were not of comparable quality within the counties nor of current status.

[Secretary’s Note: The note on Map VI-3a has been expanded to read as follows:

“This map illustrates the location of springs based upon historic information collected under three programs carried out from 1930 through 1985. The depth of the inventories may have varied by county. The majority of the springs data depicted were obtained from a Wisconsin Conservation Department survey carried out from 1956 through 1962 which was conducted in all seven of the counties in the Region. Only a limited number of the locations of the springs have been field checked, and some of the springs no longer exist.”]

In addition, the map and the attendant table have been moved to a more fitting location within the report, that is, Chapter II, “Description of the Study Area.” This is intended to avoid the map being interpreted as having some legal meaning within the context of Section 281.34(1)(f) of the Wisconsin Statutes which defines regulated springs as having a flow of at least one cubic feet per second at least 80 percent of the time.
Dr. Cherkauer referred to Map VI-3 and asked how the designation of the groundwater protection areas was made and what was the source of the stream designations. Mr. Biebel responded that the groundwater protection areas were defined in the State Statutes as being within 1,200 feet of an outstanding resource water, an exceptional resource water, or a trout stream. He reported that these designated surface waters were specifically identified in the State Statutes and the Administrative Code. He also noted that because of their legal connotation, the specifically designated surface water and associated buffers had to be shown on the map. Mr. Bunker noted that the Wisconsin Department of Natural Resources had a specified process for establishing the types of streams being considered. After further discussion, it was agreed to add the basis for the stream designations to the map.

[Secretary’s Note: The source of Map VI-3 has been expanded to indicate the basis of the stream and groundwater protection area designations. In addition, Messrs. Czarkowski and Helmuth have provided additional information on the designation groundwater recharge areas. They note that, as defined in Act 310, the trout streams referred to are those listed in the Wisconsin Department of Natural Resources (WDNR) year 1980 version of the Department publication entitled Wisconsin Trout Streams. With the expected passage of Chapter NR 820 of the Wisconsin Administrative Code in September 2007, the trout streams involved will be those listed in the 2002 version of that document. Accordingly, the map has been revised to have a September 2007 date and to reflect the 2002 trout stream list. A copy of the revised Map VI-3 is attached hereto as Exhibit B.]

There being no further corrections or additions, the minutes of the meeting of May 15, 2007, were approved as amended, on a motion by Mr. Melcher, seconded by Mr. Rau, and carried unanimously.

CONSIDERATION OF CHAPTER V, “PLANNING OBJECTIVES, PRINCIPLES AND STANDARDS,” OF SEWRPC PLANNING REPORT NO. 52

Chairman Bauer then asked the Committee to consider Agenda Item 3. He noted that all Committee members had received a copy of the previously approved Chapter V, “Planning Objectives, Principles, and Standards,” of SEWRPC Planning Report No. 52 for individual review prior to the meeting. He noted that Chapter V had been reviewed and approved at the meeting held on January 18, 2006. However, at the request of some of the Committee members, it was agreed to provide a copy of the chapter to all of the members of the Committee so that those members who chose to rereview it could do so conveniently. He asked for any questions or comments that Committee members may have based upon their rereview of the chapter.

Mr. Grisa noted that the text of Chapter V contained references to the Great Lakes Charter 2001 Annex, while subsequent chapters referred to the Great Lakes-St. Lawrence River Basin Water Resources Compact, or simply to the “Compact.” He recommended, and it was generally agreed, that Chapter V be revised to make it consistent with the most recently reviewed chapters.

[Secretary’s Note: The references to the “Great Lakes Chapter 2001 Annex” in Chapter V were changed to the “Great Lakes-St. Lawrence River Basin Water Resources Compact.”]

Mr. Biebel reported that Ms. Lewis was unable to attend the meeting, but had provided a memorandum which had two comments. A copy of that memorandum, he noted, was distributed to all the Committee members in attendance. He indicated that Ms. Lewis’ first comment indicated agreement with the manner in which the forecasts and projections of water use had been revised in Chapter IV. He indicated Ms. Lewis’ second comment related to Objective No. 1 as set forth on pages 5-2 and 5-3 of Chapter V. Ms. Lewis indicated a concern that the regional land use plan would be “driving” the regional water supply
plan which would be “subservient” to the land use plan. She recommended strengthening the objective to indicate that the land use planning process itself consider constraints related to water supply before planning development.

[Secretary’s Note: A copy of the memo provided by Ms. Lewis is attached hereto as Exhibit C.]

Mr. Biebel indicated that the regional land use plan did specifically include recommendations recognizing that the regional water supply planning was underway at the time the regional land use plan was completed and indicating the need to include the findings of the water supply plan in future land use planning. He noted that this cyclic approach to planning was the only way to practically achieve the integration of water supply planning and to have the needed consistency in land use, transportation, and water resources planning, and given that Federal and State regulation required the completion of the regional land use plan in 2006. Mr. Bunker observed that the integration of various facility plans with land use plans in the manner described by Mr. Biebel was technically sound.

Chairman Bauer indicated that, in his opinion, the manner in which the objective under discussion was currently written was sound from a planning standpoint. He noted that land use planning must be conducted considering a number of factors, including transportation; sewage, drainage, and flood control; park and open space; air and water quality; housing; and economic development, among others, as well as water supply, and that the proposed approach of refining the land use plan following the completion of the regional water supply plan was a practical, as well as technically sound, way to integrate the two planning efforts.

Mr. Holschbach asked who would decide to reconsider the regional land use and water supply plans if actual development differs from the land use and population forecasts. Chairman Bauer indicated that the Regional Planning Commission monitors the forecasts and actual development within the Region annually, and reports the results of this monitoring in its Annual Reports. If significant differences are found between the forecasts and actual development, the plans concerned are reevaluated and revised. However, in any case, he said, the regional land use and transportation plans are updated every 10 years.

There being no further questions or comments, it was the consensus of the Committee that no changes be made to the previously reviewed and approved version of Chapter V, except for the changes to the terminology related to identification of the Great Lakes-St. Lawrence River Basin Water Resources Compact.

CONSIDERATION OF CHAPTER VII, “WATER SUPPLY PROBLEM IDENTIFICATION AND ISSUES TO BE ADDRESSED,” OF SEWRPC PLANNING REPORT NO. 52, A REGIONAL WATER SUPPLY PLAN FOR SOUTHEASTERN WISCONSIN

Chairman Bauer then asked the Committee to consider Agenda Item 4. He noted that all Committee members had received a copy of Chapter VII, “Water Supply Problem Identification and Issues to Be Addressed,” of SEWRPC Planning Report No. 52, A Regional Water Supply Plan for Southeastern Wisconsin, for review prior to the meeting. He then asked Mr. Biebel to review the chapter with the Committee on a page-by-page basis. The following comments were made, questions asked, and actions taken during the review.

Dr. Cherkauer referred to the first problem described on page 2 related to the existing infrastructure, specifically noting Table VII-1 which identifies the water supply system infrastructure capacity and compares it to existing and forecast demands. He indicated that for groundwater-supplied systems an important consideration which was not described was the sustainability of the source of supply. Mr. Biebel responded that it was recognized that sustainability was, indeed, a very important consideration in evaluating the ability of groundwater-supplied systems to meet existing and forecast demands. He noted,
however, this issue had been deliberately separated from the infrastructure analysis, and was the focus of the second problem description set forth beginning on page 3 which addresses groundwater quantity and sustainability.

Ms. Conley referred to the problem described on pages 2 and 3 and indicated she had expected to see a statement on the importance of balancing water supply pumpage and recharge. Mr. Grisa noted that that issue was covered under the second problem on groundwater quantity and sustainability, and under the issue of land use development impacts on groundwater recharge on page 14. He indicated that the chapter had, in his opinion, been carefully and wisely structured to separate the various problems and issues which can be more readily and understandably be described individually, and a basis for resolution developed, rather than dealing in a confusing manner with broader interrelated problems and issues.

Chairman Bauer observed that Mr. Grisa had correctly articulated the essence and intent of the chapter. He indicated that a chapter on the topic of problems and issues was not typically included in SEWRPC planning reports, since the problems and issues were typically dealt with in alternative plan evaluation. However, for the water supply planning effort, it was deemed desirable to describe the problems and issue individually and to set forth the potential means by which the planning process will address each.

Dr. Cherkauer observed that the average groundwater recharge in the Region was less than six inches of water per year, and that this can support about seven people per acre, assuming a water use of 65 gallons per capita per day. He noted that at higher densities, there would be a supply deficit.

Mr. Biebel indicated that the issue of balancing the water use and recharge was included under the problem description and basis for resolution on pages 3 and 4. Upon further brief discussion, it was agreed that the staff would review the text set forth on those pages to see if the consideration of balancing groundwater use with recharge needed increased emphasis.

[Secretary’s Note: In order to reiterate the desirability of balancing water use with recharge, the following sentence was added following the first full sentence in the last partial paragraph on page 5:

“This evaluation will identify the alternative plan which best provides for balance between the amount of groundwater used and the recharge of the groundwater aquifers concerned.”]

Mr. Schultz referred to the last paragraph on page 3, and noted that pumping from the deep aquifer also results in a reduction in the amount of inflow to surface waters, as does pumping from the shallow aquifer, although the location of the impacts varies. He recommended, and it was generally agreed, that the text of the subject paragraph be revised to reflect this.

[Secretary’s Note: In order to clarify the impact of groundwater withdrawal impacts from the different aquifers, the second sentence in the fourth paragraph on page 3 was revised to read as follows:

“The location of the impacts on surface water conditions could be altered by increased groundwater withdrawal from the shallow aquifer to compensate for reduced pumpage of the deep aquifer.”]

Mr. Grisa referred to the sixth line in the first paragraph on page 3, noting that the statement regarding the cost-effective reach of transmission mains was subjective, and that it was uncertain what that distance would be depending upon circumstances. It was agreed to revise the sentence in concerned.
Dr. Cherkauer referred to the last sentence in the second full paragraph on page 3. He recommended, and it was generally agreed to revise that sentence to indicate that the change in the source of supply for portions of the City of Mequon and Villages of Thiensville and Bayside had reduced the drawdown of the shallow aquifer.

[Secretary’s Note: In order to properly reflect the impact of the change in source of water supply in portions of the City of Mequon and Villages of Thiensville and Bayside, the last sentence in the second full paragraph on page 3 has been revised to read as follows:

“This change has reduced the historic drawdown of the shallow aquifer in this area.”]

Mr. Holschbach referred to the special water budget analysis described on page 5 and asked when that study would be completed. Dr. Cherkauer indicated that the model simulations of the response of the groundwater aquifer to each of the alternative plans could not proceed until each alternative plan concerned had been formulated.

Dr. Cherkauer referred to the third and last standard listed on page 4. He recommended, and it was agreed, that each instance in which the third standard was listed, the first standard under Objective No. 2 in Chapter V should also be listed.

[Secretary’s Note: The following standard was added to the listings of standards on pages 4, 15, and 16:

“The use of groundwater and surface water for water supply purposes should be carried out in a manner which minimizes adverse impacts to the water resources system, including lakes, streams, springs, and wetlands.”]

Dr. Dunning referred to the text regarding the optimization analysis which is envisioned to be carried out in conjunction with the recommended water supply plan. He noted that the optimization analysis was limited to operational actions and not revised physical system components. It was agreed to clarify the text in this regard.

[Secretary’s Note: In order to clarify the scope of the optimization analysis, the word “operational” was inserted after the word “optional” in the second line on page 6.]

Mr. Rau referred to the section on groundwater quality beginning on page 6. He suggested the surface water quality issues would also be an issue, given concerns regarding the potential for quality impacts, such as invasive species, emerging quality considerations, and sewerage system overflows. He indicated that the potential for nuclear contaminants was a related quality concern. Mr. Rau noted that historically the Waukesha Water Utility had focused on the use of the deep sandstone aquifer as a source of supply, in part, because of its protective setting from nuclear contamination. Chairman Bauer noted in this respect,
that some reports indicated that there is greater likelihood of a nuclear incident today than there was during the Cold War.

After some further discussion, it was agreed to add text on the issue of surface water quality.

[Secretary’s Note: A new section on the issue of surface water quality has been added to the chapter. A copy of the new surface water quality issue section is attached hereto as Exhibit D.]

Mr. Bunker indicated that the groundwater system is likely to be contaminated sometime in the future, and that the regional water quality management plan update currently being prepared presents extensive water quality data and protection recommendations for surface waters and groundwater. He indicated that he had confidence that the water utilities will take the needed steps to provide a safe water supply. However, he believed that many of the potential problems should be dealt with by source control measures, such as the collection of household hazardous waste materials and that these measures can often be most effectively taken at regional-, subregional-, or county-level scale, rather than by the individual utilities or communities. He recommended that governance for the management of some problems should be considered where countywide or subregional management is rational. Mr. Melcher agreed, noting that Kenosha County carried out agricultural hazardous waste material collections. Mr. Rau indicated that this would come under the umbrella of source water protection.

After further discussion, it was agreed to add to the text on source water protection referenced to the needed institutional arrangements.

[Secretary’s Note: The following paragraph has been added to the section on groundwater quality after the first full paragraph on page 9 to address source water protection and institutional arrangements:

“The quality of the source water is an important determinant in the development of water supply systems. The Wisconsin Department of Natural Resources has conducted source water assessments for all of the municipal water supply systems operating within the Region. Such assessments include information on source water quality and recommend needed protection measures. In the case of selected contaminants, including emerging and unregulated contaminants, such as pharmaceuticals and personal care products, proactive measures that prevent the discharge of the potential contaminants to the environment are more likely to be effective than corrective actions once such discharge has occurred. This approach also limits environmental exposure of aquatic community to the contaminants. For such contaminants, programs, such as household hazardous waste and pharmaceutical collections will be needed. Such programs may be most effectively carried out on a county or subregional level, rather than being left to the individual water or wastewater utilities. Consideration of the need for, and governance of, such programs will be given in the development of the recommended water supply plan and the associated implementation strategy.”

A similar paragraph is included in the newly added surface water quality issue section is attached hereto as Exhibit D.]

Mr. Grisa referred to the first full paragraph on page 11 relating to the basis of resolution for the Lake Michigan availability and diversion issue. He indicated that an important consideration was the definition of what constitutes a “return flow” component. Mr. Biebel agreed, noting that at this time the term was
not specifically defined, but rather, was intended to be defined within the context of the Compact. Mr. Grisa noted that this definition would have to be agreed upon in order to direct the formulation of one or more of the alternative plans to be considered.

Mr. Bunker referred to the first full paragraph on page 11 and noted that there could be communities which were not classified as straddling communities, but where there could be aquifer problems which might impact the ability to fight fires or which might result in public health issues. In such cases, he indicated that communities should not be precluded from obtaining a Lake Michigan water supply. Mr. Biebel indicated that, in such cases, under the Compact, communities within straddling counties could be considered for the potential of using a Lake Michigan supply.

Mr. Rau referred to the issue of underutilization of existing Lake Michigan treatment plant capacities and indicted that this issue entailed three considerations: economics, ownership, and political boundaries. Mr. Biebel agreed that these considerations were related. He noted that the economic consideration was directly addressed in the text by way of identifying the need for preliminary and more-detailed local fiscal analyses. Mr. Rau noted that the fiscal analysis should be broader than the consideration of treatment capacities, in that transmission facilities and costs were also important. Mr. Biebel agreed, noting that the text recognized that transmission costs were an important consideration. Chairman Bauer recommended, and it was generally agreed, to change the second order heading on page 11 to “Underutilization of Existing Lake Michigan Water Supply Capital Facilities.” He also agreed with Mr. Rau that political availability was an important consideration.

Upon further discussion, it was agreed that the Commission staff would consider additions to the text on the issues of political boundaries and ownership.

[Secretary’s Note: In response to the concern raised regarding the related issues of economics, ownership, and political boundaries, the following sentence was added to the first partial paragraph on page 12:

“This issue requires consideration of the cost-effectiveness and fiscal impacts of potential facility consolidation. It also requires consideration of ownership and related political availability concerning any underutilized water supply facility capacity.”

In addition, the following paragraph was added at the end of the section on basis for resolution ahead of the last partial paragraph on page 12:

“As noted above, in addition to cost-effectiveness and fiscal impacts, this issue also requires consideration of the ownership and political availability of any underutilized water supply facility capacity. For purposes of the regional water supply planning effort, it was deemed appropriate to identify the situations where potentially cost-effective consolidation may exist and in those situations to recommend further, more-detailed local fiscal analyses be conducted by the utilities involved. Given that the ownership and political availability of facility capacity may depend upon the fiscal analyses, and given that the political climate can change over the planning period, no specific recommendations are intended to be included in the plan to address this issue. Rather, resolution is intended to be left to the local units of government as an implementation issue.”]

Ms. Conley referred to the section on page 11 regarding underutilization of existing Lake Michigan water supply facility capacities and noted that a related issue in Milwaukee was the wastewater treatment capacity. She noted that the Milwaukee Metropolitan Sewerage District (MMSD) was promoting water
conservation, indicating it had merit from a wastewater treatment perspective. She asked if the water supply planning program was going to contain recommendations which were conflicting with MMSD actions. Mr. Biebel noted that the plan would assume a level of water conservation for the Milwaukee area which was not inconsistent with the MMSD water conservation initiative. Dr. Cherkauer noted that the chapter clearly distinguished between the differing needs for water conservation within the Region, depending upon the sustainability of the source of supply. Mr. Bunker agreed, noting that the “toolbox” approach to water treatment being promoted by the U.S. Environmental Protection Agency and Wisconsin Department of Natural Resources recognized that different water supply strategies, including conservation efforts, would be applicable in different areas.

Ms. Conley noted that there was no discussion on Lake Michigan levels in the chapter. She suggested that should be a consideration, and indicated that it should be recognized that Lake Michigan levels have been falling. She referred to two supporting graphs documenting Lake Michigan water levels. Mr. Biebel responded that the graphic information could be a useful addition to the inventory chapter of the report. Chairman Bauer noted that the water supply uses within the Region did not have any significant impact on Lake Michigan levels; rather, any changes in lake levels were due to climate variations; major diversions, such as occur in the Chicago area; and structural changes, such as occurred by the dredging of the St. Claire River near Detroit.

[Secretary’s Note: Ms. Conley provided the Commission staff graphs illustrating Lake Michigan water levels: one over the period 1860 through 2000 and one for 2007. These graphs will be considered in refining the information on Lake Michigan levels included in Chapter III.]

Mr. Yttri referred to Table VII-2 and noted that the City of Oak Creek Water and Sewer Utility water treatment plant capacity of 20.0 mgd was identified as being exceeded by 2035. He indicated that the plant intake has a capacity of 48 mgd and that the plant is designed to be incrementally expanded to reach that level. Upon further discussion, it was agreed to indicate by appropriate footnotes to the table concerned, any specific provisions for capacity expansion associated with the Lake Michigan water treatment plants.

[Secretary’s Note: In order to report on the specific provisions for future increased water treatment plant capacities, Table VII-2 has been revised by the addition of footnotes to indicate such provisions. A revised copy of Table VII-2 is attached hereto as Exhibit E.]

Ms. Quirk referred to the regional estimates of imperviousness in the sixth paragraph on page 14 and asked if the estimates for 2035 included the impacts of implementing the requirements of Chapter NR 151 of the Wisconsin Administrative Code, that code having specific post-development recharge preservation requirements. Mr. Biebel indicated that the impact of the Code concerned had not been explicitly considered, and that the same standardized imperviousness factors associated with each land use category had been applied for the historic, existing, and future land use conditions. He noted that the infiltration requirements of NR 151 included some exceptions and that the estimated percent imperviousness was estimated to change from 8.2 to 9.3 over the period from year 2000 to 2035. He indicated that this increase in imperviousness would not be expected to be significantly changed given the new requirements, but may be reduced somewhat.

Mr. Grisa referred to the sixth paragraph on page 14. He recommended, and it was generally agreed to add the words “and an increase in runoff to surface waters” at the end of that paragraph.

Mr. Bunker referred to the section on the relationship of recharge and use to areas beyond the Region beginning on page 12. He noted a related issue could be use of deep wells for disposal of wastes in the Chicago area. He noted that this had apparently been done in the past, possibly by steel mills and other
industries. He questioned if this could be a problem due to waste migration to the Region. Mr. Ericson reported that he had worked for the Upjohn Corporation and that that company had similar waste disposal wells in Michigan. He noted that these facilities were all properly permitted. Upon further discussion, it was agreed that the staff would investigate this possibility and report the findings of its investigation in the minutes.

[Secretary’s Note: The U.S. Environmental Protection Agency (USEPA) Underground Injection Control Program recognizes five classes of underground injection wells. Two of these classes are relevant to disposal of hazardous wastes and to potential effects on groundwater quality in deep aquifers in Southeastern Wisconsin. Class I injection wells are used to inject hazardous wastes, nonhazardous industrial wastes, and municipal wastewater beneath the lowermost underground source of drinking water. According to USEPA inventories, as of September 2006 there were no Class I injection wells located in Wisconsin. These same inventories show that as of September 2006, there were four active and four abandoned Class I injection wells located in Illinois. None of these injection wells are located in the Chicago or northeastern Illinois areas. Class IV injection wells are those that inject hazardous or radioactive wastes into or above the lowermost underground source of drinking water. The use of wells in this class has been prohibited since 1986. Because the location of these wells is relatively remote from the Southeastern Wisconsin Region, and the wells are located deep in the bedrock, it is not expected that there would be water quality concerns for groundwater within the Region. Thus, no additional text was added to the report chapter being reviewed.]

Dr. Cherkauer referred to the section on land use development impacts on groundwater recharge beginning on page 14. He noted that the conversion of agricultural lands to even lower-density urban development can reduce groundwater recharge because of the roadways and attendant stormwater drainage facilities. He suggested the need to provide recharge protection in all developments. Mr. Shaver noted that certain types of urban development result in a greater amount of recharge than the agricultural use it replaces. Upon further discussion, it was agreed that the staff would review the section concerned to determine if changes were needed to respond to Dr. Cherkauer’s expressed concern.

[Secretary’s Note: A staff review of the section on land use development impacts on groundwater recharge on pages 14, 15, and 16, indicated that the following sentences should be added to replace the first full sentence on page 15:]

“Lower-density urban development may also have an impact on groundwater recharge, either positively or negatively, depending upon the length of roadway involved, the type of roadway cross-sections, and the type of stormwater management entailed. Reductions in the amount of recharge has the potential to intensify future water supply problems.”]

Mr. Holschbach raised the issue of abandoned wells, and if the counties should expand their regulatory programs to address the issue. Mr. Biebel indicated that abandoned wells were primarily a water quality issue. Mr. Czarkowski, however, noted that such wells could also affect the quantity of groundwater if they were dual aquifer wells. Mr. Bunker asked if the Wisconsin Department of Natural Resources was considering having the counties regulate abandoned wells. Mr. Czarkowski reported that a State program was in place since the 1980s to permit counties to accept responsibility for regulating wells, but that few counties—with the exception of Waukesha County in this Region—have chosen to do so. The delegated activities include issuing permits for new and replacement wells, he said, and enforcement of well abandonment regulations, as well as other related activities. He noted, currently, the regulations require
that water utilities have the responsibility for ensuring wells are properly abandoned within water supply service areas. He noted that, as of July 2008, a new Administrative Rule will require that home inspections for real estate transactions include well inspections. The new rule would also require licensing of professionals involved in well drilling. He indicated that many mortgage companies have required well inspections and that this has been fairly effective in identifying and mitigating problems with improperly abandoned wells.

Mr. Shaver noted that Waukesha County does have a private well regulation program and provides, among other things, inspections for homeowners who have permitted landscape plant watering wells in public water supply service areas. He questioned whether or not that was a good practice from a water conservation standpoint. Mr. Holschbach indicated that Ozaukee County had discouraged such practice because of the potential for groundwater contamination. After further discussion, it was agreed to raise the issue of abandoned wells in the report text.

[Secretary’s Note: In order to raise the issue of abandoned wells, the following paragraph has been added following the third full paragraph on page 8 under the section on groundwater quality:

“Potential sources of groundwater contamination are many and varied because, in addition to some natural processes, such as dissolved and particulate matter in precipitation, decay of organic matter, natural radioactivity and dissolution of arsenic-containing minerals, many types of facilities or structures and many human activities may eventually contribute to groundwater quality problems. Potential sources of groundwater contamination include onsite sewage disposal systems; landfills; leaking underground storage tanks; wastewater sludge application; agricultural activities, including major farm animal raising operations and fertilizer and pesticide storage facilities. Other potential sources of contamination include the stockpiles of salt for highway de-icing, salvage yards, and bulk fuel storage sites.

One of the important potential sources of groundwater contamination are wells that are no longer used, but have not been properly sealed when abandoned. Proper well abandonment requires filling the well from the bottom up with cement grout or bentonite. The locations of old wells are often not well known, and buildings or roads may have been built over the top of open boreholes. These wells can serve as a means for transmission of contaminants from the land surface to an aquifer and can permit contaminated water to migrate freely from one aquifer to another. This is particularly critical within the Region where the open intervals of many wells penetrate more than one aquifer unit. Even in areas where groundwater contamination potential is ordinarily considered low because of favorable soil and geological properties, such as Milwaukee and eastern Waukesha Counties, large numbers of improperly abandoned or unaccounted-for old wells may create a significant threat to groundwater quality.”

In addition, the following paragraph has been added following the first full paragraph on page 9:

“As previously noted, there are a number of important sources of groundwater contamination which have been considered in the regional water supply planning program. In most cases, regulations and programs are in place which are designed to prevent or mitigate such contamination. With
regard to the sources of groundwater contamination, the regional water supply plan recommendations will include references to regulations and programs which are underway or proposed to prevent or mitigate groundwater contamination.”

Dr. Dunning referred to the second full paragraph on page 16 regarding groundwater-surface water interdependence and impacts. He recommended, and it was agreed, to note the total percentage of groundwater withdrawn from the shallow aquifer that is lost from the surface water system.

[Secretary’s Note: In order to present the total impact of shallow aquifer pumping on surface water the following sentence was added as the second to last sentence in the second full paragraph on page 16:

“Thus, a total of about 85 percent of the water extracted from the shallow aquifer was diverted or extracted from surface waters.”

In addition, the following text was added at the end of the second full paragraph on page 16:

“The reductions in groundwater contributions to the surface water system may be expected to be relatively modest on an areawide basis. For example, the USGS estimated that in the four-county area, including Kenosha, Milwaukee, Ozaukee, and Racine Counties, the reduction in groundwater contribution to the surface water system due to groundwater withdrawals was about 8.5 percent between 1864 and the year 2000. However, the impacts on a small area basis and/or involving high-quality streams, lakes, and wetlands can be more significant.”]

Dr. Cherkauer referred to the third full paragraph on page 17. He recommended, and it was generally agreed, to add the words “and sustainable” following the word “adequate” in the second sentence.

Dr. Cherkauer referred to the second full paragraph on page 25 regarding climate change. He recommended, and it was generally agreed, to add the sentence indicating that the regional groundwater model was calibrated to, among other parameters, stream base flows.

[Secretary’s Note: In response to Dr. Cherkauer’s recommendation, the following sentence was added as the fifth sentence in the second full paragraph on page 25:

“The transient simulation was also calibrated to stream base flows in 2000.”]

Mr. Grisa asked why the section on the climate change issue was included. Mr. Biebel indicated that it was included because it has been raised as an issue a number of times by Committee members and others. Chairman Bauer noted that it was better to include this issue rather than remain silent on it, in which case people may think the issue was ignored. Mr. Ericson agreed, stating that people will ask how this issue was considered. Mr. Grisa noted that in the end, the issue of climate change was not being quantitatively considered. Dr. Cherkauer noted that the text was clear on that and indicated the basis for it.

Ms. Conley indicated the climate change was producing more rainfall and, thus, it was conducive to capturing more rainwater. Chairman Bauer indicated that there was generally broad agreement among the scientific community that global warming was occurring. There was not, however, he said, such agreement on the extent to which this warming may be attributable to human causes as opposed to natural causes. There were, moreover, conflicting opinions with respect to the effects of the warming on weather and climate, including on rainfall. Dr. Cherkauer agreed.
Mr. Mathie asked if the SEWRPC staff opinion on global warming was reflected in the fourth full paragraph on page 20. Mr. Biebel responded that the statements were based upon the scientific reports cited, not on staff opinion. Upon further discussion, it was agreed to refine the text on page 20 to more clearly note the difference in opinion with respect to the cause of climate change.

[Secretary’s Note: A review of additional peer-reviewed scientific literature by Commission staff supported the emergence of a scientific consensus regarding climate change. The second sentence in the fourth full paragraph on page 20 was revised to read as follows:

“A broad scientific consensus has emerged that climate change—rapid warming—is occurring. While some debate is still occurring on how much of the changes result from human activities, this consensus includes anthropogenic influences as one driver of the changes."

Ms. Quirk asked if the groundwater sustainability would be considered on a community-by-community basis, or on a regional basis. Mr. Biebel replied that it would be done on a small area basis, representing major pumping centers. Mr. Schultz reported that the definition of sustainability was also covered in the state-of-the-art report.

There being no further questions or comments, on a motion by Dr. Dunning, seconded by Dr. Cherkauer, and carried unanimously, Chapter VII, “Water Supply Problem Identification and Issues to Be Addressed,” of SEWRPC Planning Report No. 52, *A Regional Water Supply Plan for Southeastern Wisconsin*, were approved as amended.

**DATE AND TIME OF NEXT MEETING**

After brief discussion, it was agreed that the next meeting of the Advisory Committee would be held at the Commission offices on Tuesday, August 21, 2007, beginning at 9:00 a.m. Chairman Bauer noted that the Committee had at its meeting held on June 7, 2006, reviewed and conditionally approved a staff memorandum conceptually describing the alternative plans proposed to be considered. The Committee at that time directed that this memorandum be expanded to provide further details on some of the proposed alternative plans. He noted that at the next meeting it was proposed to review an expanded version of the memorandum concerned.

**ADJOURNMENT**

There being no further business to come before the Committee, on a motion by Mr. Grisa, seconded by Mr. Mathie, and carried unanimously, the meeting was adjourned at 11:30 a.m.

* * *

---

BOUNDARY OF THE GROUNDWATER MANAGEMENT AREA IN THE SOUTHEASTERN WISCONSIN REGION DESIGNATED UNDER WISCONSIN ACT 310

LEGEND
GROUNDWATER MANAGEMENT AREA
---
SUBCONTINENTAL DIVIDE

Source: SEWRPC.
Exhibit C

Biebel, Robert P.

From: clewis@mpw.net
Sent: Monday, July 16, 2007 9:21 AM
To: Biebel, Robert P.
Subject: Water Supply meeting

Sorry I won’t be able to make tomorrow’s meeting of the Regional Water Supply Planning Advisory Committee.

I have two comments on the documents that you sent in preparation for the meeting.

The first relates to Chapter V, Planning Objectives, Principles and Standards and carries through to Chapter VII, Water Supply Problem Identification and Issues to be Addressed. Specifically, it relates to Objective No. 1. The Committee had considerable discussion early on as to whether the regional land use plan should "drive" the water supply plan, or if the water supply plan should "drive" the regional land use plan. As written, the objective reflects that the water supply plan should identify any constraints to development anticipated in the land use plan. I am troubled that the water supply plan is so "subservient" to the land use plan. The water supply plan identifies constraints. Mightn’t it be recommended that the land use planning process itself investigate constraints before planning development? I would recommend strengthening this language in the objectives if the rest of the Committee agrees.

The second relates to the adjustment made to the forecast water use in the case of Milwaukee County where the actual trend differed considerably from the projected trend. I think that the alternative proposed for this section works quite well and better reflects reality.

Enjoy the meeting.

Cheers,
Carrie
Surface Water Quality

Issue Description

Information on existing water quality in the nearshore Lake Michigan areas is summarized in Chapter III of this report and more detailed information is provided in SEWRPC Technical Report No. 39, Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds, in process. The information provided indicates that Lake Michigan provides a high-quality source of supply for public water supply systems. The water taken from offshore deep water intakes is amenable to treatment by conventional methods. Finished water utilizing these methods typically meets, and generally exceeds, Federal and State drinking water quality requirements. Examples of raw water and finished water quality characteristics reported by selected water treatment plants in the Region are summarized in Appendix D of this report.

Several potential issues exist, however, with regard to surface water quality. These issues are related to a number of causes including sanitary sewer overflows, pharmaceutical and personal care products, zebra and quagga mussels, and nuisance algae and may have a variety of potential impacts upon surface water quality.

Sewer Overflows

Sewer overflows constitute a significant surface water quality issue. Two types of sewer overflows occur within the Region that contaminate surface waters of the Region: combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs).

Combined sewer overflows are overflows comprised of sanitary sewage and stormwater runoff. Approximately 25 square miles within the Region, located in the City of Milwaukee and the Village of Shorewood, are served by combined sewers. These sewers convey sanitary sewage along with stormwater runoff from adjacent lands. During dry weather, combined sewers function much like sanitary sewers, conveying sewage to a sewage treatment plant. During wet weather, inflow of stormwater can sometimes cause the capacity of the combined sewer system to be exceeded. This can result in excess flow being discharged into nearby surface waters. Effluent from CSOs generally contains a high proportion of stormwater. There are currently 117 combined sewer overflow outfalls in the Region. All of them discharge either into Lake Michigan or into streams tributary to Lake Michigan.

Sanitary sewer overflows consist of raw sanitary sewage entering the surface water system of a watershed either directly from sanitary sewer overflows, or indirectly via flow relief devices to separate storm sewer systems. This direct or indirect conveyance of sanitary sewage to the surface water system of a watershed occurs through various types of flow relief devices as a result of one or more of the following conditions: inadequate sanitary sewage conveyance capacity; excessive infiltration and inflow of clear water during wet weather conditions; and mechanical and/or power failures at sanitary sewage pumping facilities. In order to prevent damage to residential dwellings or to elements of the conveyance system as a result of the aforementioned system failures, a sanitary sewage flow relief device may be provided. Since the promulgation of the regional water quality management plan in 1979 and State and Federal clean water initiatives, it has been the policy within the Region to reduce reliance on such devices as general sewerage system upgrades are implemented.

The frequency of combined sewer overflows into Lake Michigan and into streams tributary to Lake Michigan in the Southeastern Wisconsin Region has decreased from about 50 overflows per year prior to 1994 to less than three per year since 1994 as a result of the completion of the Milwaukee Metropolitan Sewerage District’s Water Pollution Abatement Program, including construction of the Inline Storage—or Deep Tunnel—System. Similar reductions have occurred in the frequency of sanitary sewer overflows. Water quality data indicate the sewer overflows are no longer an important concern for water supply system source water in the Region.
Pharmaceuticals and Personal Care Products

Pharmaceuticals and personal care products (PPCPs) encompass thousands of substances that are ingested or externally applied, including prescription and over the counter drugs, fragrances, cosmetics, sunscreen agents, diagnostic agents, and nutritional supplements. Many of these compounds are specifically designed to be biologically active at low concentrations and their presence in drinking water may pose risks to human health and to the health of aquatic and other wildlife.

PPCPs are released into surface waters through a number of mechanisms. The most prevalent and well-documented route is through discharges of municipal and onsite wastewater treatment facilities. Other sources include both agricultural and urban runoff, as well as industrial discharges. While some of these compounds may be fully or partially removed by wastewater treatment facilities, removal efficiencies vary greatly by compound and among treatment plants. Municipal wastewater treatment plants are not specifically designed to remove these chemicals. In addition, in most instances where removal efficiencies have been examined, only the fate of the parent compound has been tracked. Metabolites and transformation products, which may exhibit biological activity, have not been included in these studies. The persistence of PPCPs in the environment varies. Some of these compounds are relatively resistant to breakdown. Others are degraded relatively rapidly in the environment. Despite this, the constant release of many of these substances to the environment may make them effectively persistent. For most, there is a paucity of data on their fate in the environment.

Most existing surface water treatment technologies incidentally remove some level of pharmaceuticals, personal care products, and endocrine disrupting chemicals. Coagulation and flocculation are not particularly effective on most of the substances concerned and, therefore, sedimentation and filtration are typically not very effective in their removal. The chemicals involved are typically synthetic organic compounds, and the treatments for such compounds set forth in Chapter IV of SEWRPC Technical Report No. 43, State-of-the-Art Water Supply Practices, under the groundwater and surface water treatment technologies may be effective. Granular activated carbon can be effective in the removal of these chemicals, but release of the chemicals in large concentrations from the carbon appears to occur if regeneration of the carbon is not performed in a timely fashion. Oxidation appears to be effective in deactivating the chemicals involved, although little is, as yet, known about the effects of the compounds formed. Ozone appears to be the most effective oxidant for these contaminants. Chlorine and its derivatives are relatively ineffective and ultraviolet irradiation has almost no effect. Oxidation appears to improve the removal of pharmaceuticals, personal care products, and endocrine disrupting chemicals by sand filtration. Reverse osmosis is effective at removing these chemicals directly, but its use is costly. Other membrane processes appear to be effective after oxidation of the chemicals concerned in the source water. The treatment technology selected will need to be specific for the compounds existing in the source water and multiple treatment technologies may be needed, depending upon the specific chemicals to be removed.

Few data exist on the presence of PPCPs in surface waters. In general, they have been detected in most places that have been examined for their presence. While few data are available for the nearshore areas of Lake Michigan, several of these compounds have been detected at low concentrations in water samples collected from the Milwaukee outer harbor, from streams tributary to Lake Michigan, and from offshore areas of the Lake. While most attention to the presence of these substances in the environment is relatively recent, the presence of PPCPs in surface water is probably not a new development. Their presence in the environment has become more widely evident in the last decade due to improvements in analytical methodologies which lower the limits of detection for many of these substances. It is likely that these compounds have been present in the environment for as long as they have been used commercially, although perhaps not in current quantities given historic changes in lifestyles and economic conditions.

---


With some exceptions, the risks posed to humans by PPCPs are essentially unknown. Few data are available on the presence of most PPCPs in drinking water or on the effects of exposure to humans and aquatic life.

Additional information on PPCPs in surface waters is presented in SEWRPC Technical Report No. 39, Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds, under preparation.

Zebra Mussels and Quagga Mussels
The zebra mussel (*Dreissena polymorpha*) is an exotic mollusk that has invaded waters of the Great Lakes region, including Lake Michigan. Adult zebra mussels colonize solid substrates in waters with concentrations of dissolved calcium greater than 15 mg/l.\(^3\) These colonies can be very dense; beds of zebra mussels containing up to 100,000 mussels per square meter have been reported in Lake Erie.\(^4\) Because they prefer to attach to hard substrate, zebra mussels can clog water intakes, increasing operating costs for drinking water plants, power plants, industrial plants, and dams. Left uncontrolled zebra mussel shells can block entire intake pipes over time. Zebra mussel control is typically done through velocity control or through periodic chemical treatment to remove the mussels. Utilizing a variety of pipe sizes and several intake pipes allows flexibility to maintain sufficient velocity to inhibit zebra mussel attachment. More recently, the quagga mussel (*Dreissena bugensis*) has been found in Lake Michigan and may become a problem similar to the zebra mussel. The quagga mussels are active year-round, while zebra mussels are dormant in the winter. Thus, year-round chemical controls may be needed for the quagga mussel. Intakes with limited control over velocity use biocides, often oxidizers, such as potassium permanganate, to eliminate the mussels. Chemical treatment is typically done intermittently as a preventative maintenance activity.

Nuisance Algae
Cyanobacteria, or blue-green algae, have become a concern in some surface waters. Some species of cyanobacteria produce toxins which can be release into water. Cyanobacteria can also create taste and odor problems in water. The conditions favorable to the growth of cyanobacteria are generally not those associated with water supply system source water in the Region as drinking water supplies.

Related Plan Objectives
One plan objective and four standards are directly related to the issues associated with surface water quality:

- Objective—A regional water supply system which protects the public health, safety, and welfare.
- Standard—Water supply systems should be designed, constructed, and operated to deliver finished water to users which meets the drinking water standards established by the Wisconsin Department of Natural Resources to protect the public health, safety, and welfare.
- Standard—The selection of sources of supply and the design, contribution, and operation of related treatment facilities should be made cognizant of the potential presence of unregulated emerging pollutants, such as pharmaceuticals, personal care products, and certain viruses.
- Standard—Water supply sources and treatment processes should be selected to minimize potential problems with subsequent treatment and disposal of created waste streams.

---


\(^4\)F.L. Snyder, M.B. Hilgendorf, and D.W. Garton, “Zebra Mussels in North America: The Invasion and its Implications,” Ohio Sea Grant, Ohio State University, Columbus, Ohio, [http://www.sg.ohio-state.edu/search.html](http://www.sg.ohio-state.edu/search.html), 1977.
-4-

- Standard—Groundwater and surface water sources of water supply should be protected from sources of contamination by appropriate siting, design, and land use regulation.

**Basis for Problem Resolution**

Each of the design year 2035 alternative plans is to include components intended to address existing and anticipated surface water quality problems. As previously noted, the recommended regional water supply plan is to be selected based upon a comparative evaluation of the ability of the alternative plans to meet the agreed-upon objectives and standards, including those related to surface water quality. The quality of the source water for water supply systems using Lake Michigan as a source of supply is currently not considered a water supply problem, given proper management. Within the Region, the surface water supply treatment systems are considered to be well operated and include facilities designed to properly treat Lake Michigan source water. Given the dynamic nature of surface water quality, it is possible that surface water quality conditions at some locations may change, and that unanticipated surface water quality problems may emerge over the course plan implementation. Each of the alternative plans considered, however, are to include recommendations for continued monitoring of raw and finished water quality in order to identify and address these changing conditions.

As previously noted, the quality of the source water is an important determinant in the development of water supply systems. The Wisconsin Department of Natural Resources has conducted source water assessments for all of the municipal water supply systems within the Region. Such assessments include information on source water quality and recommend needed protection measures. In the case of selected contaminants, including many of the emerging and unregulated contaminants, such as pharmaceuticals and personal care products, it is likely to be more effective to remove the chemicals prior to discharge to the environment. This approach also limits environmental exposure of aquatic community. For such contaminants, programs, such as household hazardous waste collections and pharmaceutical collections will be needed. Such programs may be most effectively carried out on a county or subregional level, rather than being left to the individual water or wastewater utilities. Consideration of the need for, and governance of, such programs will be given in the development of the recommended water supply plan and the associated implementation strategy.

* * *
### Exhibit E

#### Table VII-2

**CAPACITY AND USE OF LAKE MICHIGAN WATER TREATMENT PLANTS**
**WITHIN SOUTHEASTERN WISCONSIN: 2000 AND 2035**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Existing 2000 Pumpage&lt;sup&gt;a&lt;/sup&gt; (mgd)</th>
<th>Estimated 2035 Pumpage&lt;sup&gt;b&lt;/sup&gt; (mgd)</th>
<th>Existing Rated Plant Capacity (mgd)&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Reserve Capacity (mgd)&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing Rated Plant Capacity (mgd)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Reserve Capacity (mgd)&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>Maximum Day</td>
<td>Average</td>
<td>Maximum Day</td>
</tr>
<tr>
<td>City of Cudahy Water Utility</td>
<td>4.8</td>
<td>6.6</td>
<td>4.8</td>
<td>6.0</td>
</tr>
<tr>
<td>City of Kenosha Water Utility</td>
<td>14.5</td>
<td>21.6</td>
<td>22.2</td>
<td>33.4</td>
</tr>
<tr>
<td>City of Milwaukee Water Works</td>
<td>125.0</td>
<td>176.6</td>
<td>132.9</td>
<td>212.3</td>
</tr>
<tr>
<td>Linwood Avenue</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Howard Avenue</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>City of Oak Creek Water and Sewer Utility</td>
<td>7.0</td>
<td>15.5</td>
<td>14.2</td>
<td>29.2</td>
</tr>
<tr>
<td>City of Port Washington</td>
<td>1.3</td>
<td>1.7</td>
<td>1.9</td>
<td>3.1</td>
</tr>
<tr>
<td>City of Racine Water and Wastewater Utility</td>
<td>25.0</td>
<td>39.0</td>
<td>29.2</td>
<td>44.2</td>
</tr>
<tr>
<td>City of South Milwaukee Water Utility</td>
<td>2.7</td>
<td>3.6</td>
<td>2.6</td>
<td>4.3</td>
</tr>
<tr>
<td>North Shore Water Commission</td>
<td>4.2</td>
<td>8.1</td>
<td>4.9</td>
<td>9.6</td>
</tr>
</tbody>
</table>

<sup>a</sup>Based upon reports from the Public Service Commission of Wisconsin.

<sup>b</sup>Forecast pumpage data developed in Chapter IV.

<sup>c</sup>Based upon data from the Wisconsin Department of Natural Resources files. The capacity data given are based upon the capacity of the critical plant component. Other plant components may have higher capacities. Thus, some components may provide a higher reserve capacity than that based upon the capacity of the critical element used to construct the table.

<sup>d</sup>Difference between capacity and highest maximum day in 2000 or 2035.

<sup>e</sup>The City of Kenosha Water Utility water treatment plant two primary intakes have a capacity of 50 mgd and 85 mgd.

<sup>f</sup>The City of Oak Creek water treatment plant is designed to be expanded in increments up to 48 mgd. The potential expanded plant capacity exceeds the forecast 2035 demand by about 19 mgd.

Source: Public Service Commission of Wisconsin, Wisconsin Department of Natural Resources, water utilities, and SEWRPC.