REGIONAL WATER SUPPLY PLAN FOR SOUTHEASTERN WISCONSIN

NEWSLETTER 1 JANUARY 2006

INTRODUCTION

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) has initiated work on the preparation of a water supply plan for the seven-county Southeastern Wisconsin Region. The plan is to identify the best means of providing a sustainable water supply for the Region. The scope of the study is outlined in a document entitled *Regional Water Supply Planning Program Prospectus*. The planning program has been supported by all seven of the counties in southeastern Wisconsin. The prospectus, other related reports, and plan development information are available on the SEWRPC web site (www.sewrpc.org). The plan is to have a design year 2035 and is to constitute a major element of the comprehensive plan for the development of the Region. The planning effort is being overseen by the SEWRPC Regional Water Supply Planning Advisory Committee. Membership on this Committee includes knowledgeable and concerned representatives of the constituent counties and municipalities; of concerned State and Federal agencies; of the academic community; and of businesses and industries. The water supply plan is scheduled to be completed over a 30-month period ending in mid-2007.

The preparation of the regional water supply plan represents the third, and final, element of the Commission's water supply planning program. The first element—completed in 2002—consisted of basic groundwater resource inventories. The second element—completed in 2005—consisted of the development of a groundwater simulation model for the Region. The completion of these elements involved interagency partnership programs with the U.S. Geological Survey (USGS), the Wisconsin Geological and Natural History Survey (WGNHS), the University of Wisconsin-Milwaukee (UWM), the Wisconsin Department of Natural Resources (WDNR), and a number of the public water supply utilities serving the Region.

The regional water supply planning program includes the following major components:

- A comprehensive inventory and analysis of the location, condition, and service areas of the existing public and private water supply facilities within the Region, and of the capacity of those facilities to treat and deliver water supply;

- An inventory and analysis of existing water use within the Region, with particular attention to the geographic distribution of the water uses;

- Determination of urban water supply service areas and of existing and forecast demand water use by these urban service areas; by exurban residential, commercial, and industrial uses; and by rural agricultural and recreational uses;

- Identification of existing and potential water supply problems as revealed by inventories, analyses, and forecasts;

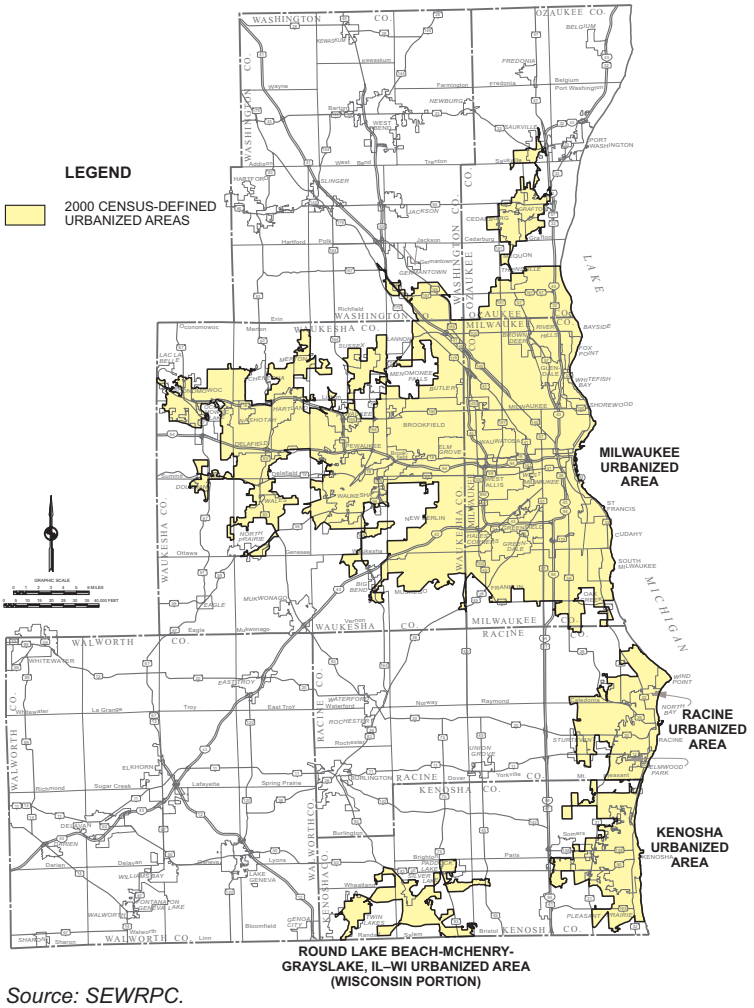
- Development of recommendations for water conservation efforts to reduce water demand;

- Development and evaluation—including environmental assessment—of alternative means of addressing the identified water supply problems, culminating in the identification of a recommended plan for the sources of supply and for development of the basic infrastructure required to deliver that supply. (It is important to understand that each of the 80 public water supply utilities within the Region periodically must prepare their own individual water supply plans.) Depending upon the source of supply, such planning may include analysis of the effects of the utility water demand on the local source of supply. It is only within this regional study that there will be an assessment of the cumulative, areawide effects of future regional water demands upon the groundwater and surface water supplies, the sustainability of these supplies, and upon the natural resource base of the Region);

- Identification of groundwater recharge areas to be considered for protection from incompatible development;

Map 1

THE SOUTHEASTERN WISCONSIN REGION



Source: SEWRPC.

- Identification of any constraints to development levels in subareas of the Region that may emanate from water supply sustainability concerns; and

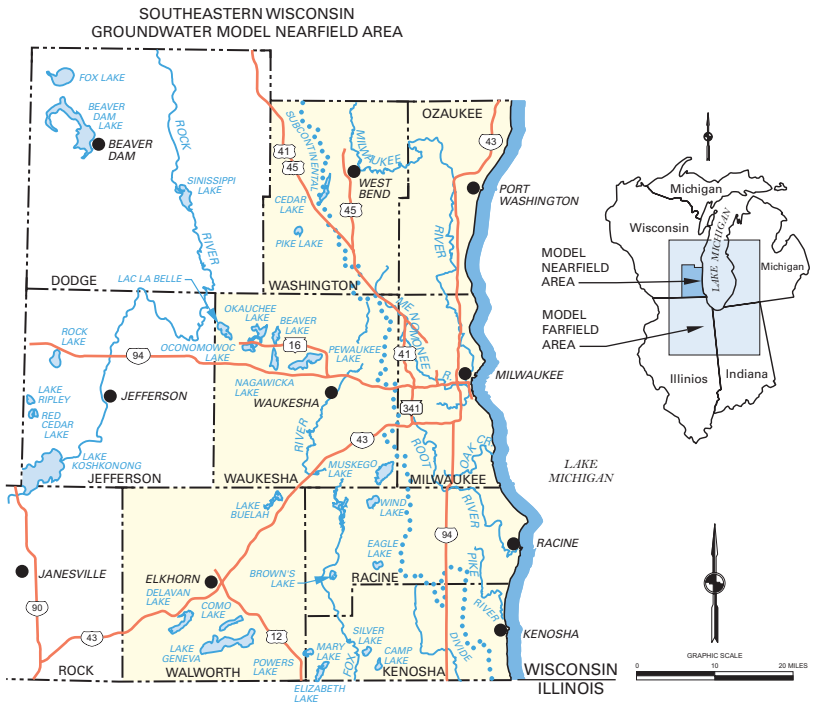
- Identification of any new institutional structures found necessary to carry out the plan recommendations.

Two very important components—the evaluation of water supply sources and the specification of water conservation measures—will be done considering a full range of viable options. This evaluation will be constrained by the regulations and policies regarding the ability to obtain water from the Great Lakes basin, including the 2001 Great Lakes Charter Annex put forth by the Council of Great Lakes Governors and now under consideration. In addition, the planning is intended to be coordinated with, and consistent with, the State of Wisconsin groundwater legislation and the related activities of the Groundwater Coordinating Council.

This newsletter is the first in a series of newsletters intended to provide information to the public about the problems and issues to be addressed in the plan preparation; and the alternative means of addressing those problems and issues over the long-term. The newsletters are also intended to provide information regarding opportunities for stakeholder and public input during the planning process. This issue focuses on background information, plan objectives, and information on historic and current water uses in the Southeastern Wisconsin Region.

Figure 1

AREA OF SOUTHEASTERN WISCONSIN SIMULATED IN GROUNDWATER MODEL



Source: U.S. Geological Survey, University of Wisconsin-Extension, Wisconsin Geological and Natural History Survey, and SEWRPC.

THE REGIONAL PLANNING COMMISSION

The Southeastern Wisconsin Regional Planning Commission is the official areawide planning agency for the seven-county Southeastern Wisconsin Region. The Commission is charged by law with making and adopting a comprehensive plan for the physical development of the Region. The permissible scope and content of that plan, as outlined in the enabling legislation, extends to all phases of regional development, implicitly emphasizing, however, the preparation of plans for the use of land and for the supporting transportation, utility, and other public infrastructure facilities. The work of the Commission is advisory and is intended to assist the responsible Federal, State, county, and local units of government in the making of decisions concerning the development of the planning Region. Accordingly, the work of the Commission emphasizes close cooperation between the various levels, units, and agencies of government with oversight for land use development and with the responsibility for the design, construction, operation, and maintenance of the supporting infrastructure facilities. In this light, regional planning is not a substitute for Federal, State, or local public planning or for private planning. Rather, regional planning is an important supplement to such planning.

WATER SUPPLY PLAN STUDY AREA

The focus of the water supply planning effort will be on the Southeastern Wisconsin Region consisting of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties (see Map 1 on page 2). Exclusive of Lake Michigan, these seven counties have a total area of about 2,689 square miles, or about 5 percent of the total area of Wisconsin. These counties, however, account for about 36 percent of the total population of the State, about 36 percent of all jobs in the State, and about 37 percent of the total tangible wealth of the State as measured by equalized real property value. Exclusive of school and other special-purpose districts, the study area contains 154 local units of government.

It is recognized that some sources for water supply extend beyond the boundaries of that study area. Most importantly, the largest current source of supply used in the study area, Lake Michigan, is of interstate and international importance. In addition, the deep sandstone aquifer and its recharge areas—an important source of supply in the Southeastern Wisconsin Region—extend well beyond the Region. Thus, there will be a need to consider the water supply sources of the study area within the context of larger, related areas. For example, the regional groundwater model developed as part of the regional water supply planning program was constructed to represent the aquifer system as it exists primarily in southeastern Wisconsin—the so-called model nearfield area—as shown in Figure 1. However, because the deep aquifer underlying the seven-county southeastern

Wisconsin planning region extends well beyond that area, the model is structured to permit consideration of a larger model nearfield area and a much larger farfield area in order to properly establish boundary conditions for the aquifer as it underlies the Region.

WATER SUPPLY PLANNING OBJECTIVES

Planning is a rational process for formulating and meeting objectives. Accordingly, five planning objectives have been proposed by the Commission Advisory Committee.

Objective No. 1—Support of Existing Land Use Patterns and Support and Direction of Planned Land Use Patterns
A regional water supply system which, through its capacity and efficiency, will effectively serve the existing regional land use pattern, promote the implementation of the regional land use plan, and identify any constraints to development in subareas of the Region which may require refinement of the regional land use plan.

Objective No. 2—Conservation and Wise Use of the Surface Water and Groundwater Supplies
A regional water supply plan which conserves and wisely utilizes the surface water and groundwater supplies of the Region so as to sustain those supplies for future, as well as existing needs.

Objective No. 3—Protection of Public Health, Safety, and Welfare
A regional water supply system which protects the public health, safety, and welfare.

Objective No. 4—Economical and Efficient Systems
The development of water supply facilities, operational improvements, and policies that are both economical and efficient, best meeting all other objectives at the lowest practical cost, considering both long-term capital and operation and maintenance costs.

Objective No. 5—Responsive and Adaptive Plans
The development of water supply systems, operations, and policies which are flexible and adaptive in response to changing conditions.

For each planning objective, complementary planning standards were also developed which serve to facilitate the application of the objectives in plan design, test, and evaluation. The planning standards provide the link between objectives and plan proposals by providing a measure of the ability of a plan proposed to meet stated objectives. This permits the comparative evaluation of alternative plans on the basis of their ability to meet stated objectives.

CURRENT AND LONG-TERM TRENDS IN WATER USE

Data on water use are periodically collected by the USGS under a cooperative program with the WDNR. The inventory data are documented in five reports prepared by the USGS and summarized for the Southeastern Wisconsin Region in SEWRPC Technical Report No. 37, *Groundwater Resources of Southeastern Wisconsin*. The USGS data indicates that, during 2000, water users in the Region withdrew about 324 million gallons per day (mgd) of water from surface and groundwater sources, not including water used for thermoelectric-power production (see Table 1). Most

Table 1

ESTIMATED USE OF WATER IN THE SOUTHEASTERN WISCONSIN REGION BY COUNTY: 2000 (IN MILLIONS OF GALLONS PER DAY)

County	Domestic	Agricultural	Irrigation	Industrial	Commercial	Public Use and Losses	Total
Kenosha	7.02	0.18	0.25	4.44	2.95	3.89	18.73[a]
Milwaukee	54.06	0.01	0.81	57.92	33.14	43.60	189.54[b]
Ozaukee	4.11	0.32	0.51	1.88	1.08	1.42	9.32[c]
Racine	13.00	1.80	2.16	10.82	5.22	6.87	39.87
Walworth	5.13	2.16	0.66	3.20	1.67	2.20	15.02
Washington	5.64	0.62	0.31	2.55	1.84	2.42	13.38[d]
Waukesha	14.12	0.27	2.68	9.10	5.07	6.67	37.91
Total	103.08	5.36	7.38	89.91	50.97	67.07	323.77
Percent of Total	31.80	1.70	2.30	27.80	15.70	20.70	100.00

[a] *Does not include 15.2 mgd of thermoelectric power generation use.*

[b] *Does not include 1,867.6 mgd of thermoelectric power generation use.*

[c] *Does not include 118.8 mgd of thermoelectric power generation use.*

[d] *Does not include 2.4 mgd of thermoelectric power generation use.*

Source: U.S. Geological Survey.

Table 2

TRENDS IN WATER USE IN THE SOUTHEASTERN WISCONSIN REGION BY COUNTY: 1979-2000 (IN MILLIONS OF GALLONS PER DAY)[a]

County	1979			1985			1990			2000		
	Surface Water	Groundwater	Total	Surface Water	Groundwater	Total	Surface Water	Groundwater	Total	Surface Water	Groundwater	Total
Kenosha	17.81	3.42	21.23	17.87	2.54	20.41	20.41	2.56	22.97	16.04	2.69	18.73
Milwaukee	172.47	10.18	182.65	213.26	9.91	223.17	184.96	6.17	191.13	183.22	6.32	189.54
Ozaukee	1.19	6.66	7.85	1.15	6.33	7.48	1.43	6.66	8.09	1.52	7.80	9.32
Racine	22.55	7.69	30.24	22.55	7.28	29.83	29.32	8.85	38.17	26.24	13.63	39.87
Walworth	0.14	9.89	10.03	1.16	9.14	10.30	0.08	16.07	16.15	0.07	14.95	15.02
Washington	0.15	10.11	10.26	0.06	9.37	9.43	0.08	9.76	9.84	0.08	13.30	13.38
Waukesha	0.02	33.37	33.39	0.12	27.84	27.96	0.04	30.78	30.82	0.35	37.56	37.91
Total	214.33	81.32	295.65	256.17	72.41	328.58	236.32	80.85	317.17	227.52	96.25	323.77

[a]*Includes all water use within each county, excepting water used for thermoelectric uses.*

Source: U.S. Geological Survey.

water was used for domestic household supplies (32 percent), industry (28 percent), and public uses (20 percent). Agricultural, other irrigation, and commercial users took the remaining 20 percent.

The total use of water for all categories of uses, excepting thermoelectric power generation, in the Region fluctuates somewhat from year-to-year. However, it has been relatively stable since 1979, with an increase of just under 10 percent between 1979 and 2000 (see Table 2 and Figure 2). Between 1985 and 2000, total water use in the Region was virtually unchanged. This compares to an increase in population within the Region of about 8 percent over the period of 1985 and 2000, suggesting a reduction in water use for industrial and other nonresidential uses on an overall regional basis. While the total water use in the Region has been relatively stable, the portion of ground and surface water in the total water use is changing. From 1985 to 2000, the use of groundwater increased about 33 percent, from about 72 to 96 mgd, while the use of surface water dropped about 11 percent, from 256 to 227 mgd (see Table 2 and Figure 2).

The total use of water on a per person basis has also fluctuated over time (see Figure 3). However, on a regional basis, the total water use per person was constant between 1979 and 2000 and has declined by about 9 percent between 1985 and 2000.

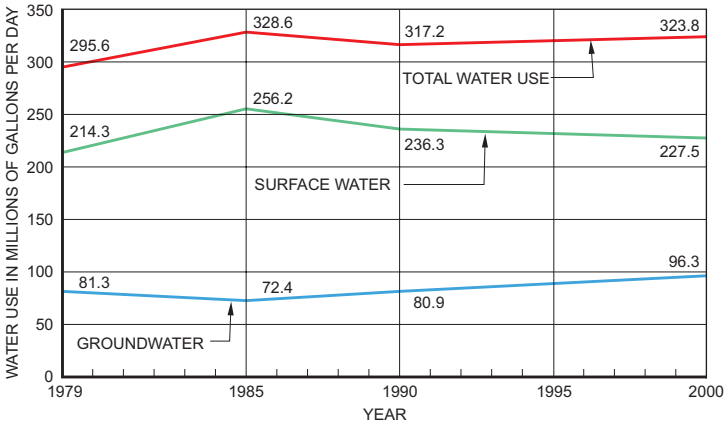
The water use data presented herein is being updated for 2005 by the U.S. Geological Survey. That data will be available later this year and will be presented in a subsequent newsletter.

CURRENT AND RECENT TRENDS PUBLIC (MUNICIPAL) WATER USES

The amounts of water used in public water supply systems within the Southeastern Wisconsin

Figure 2

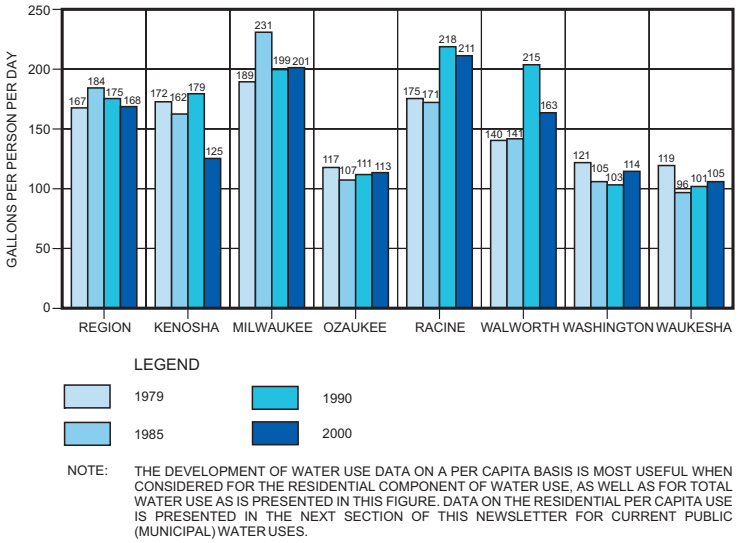
TRENDS IN WATER USE IN THE SOUTHEASTERN WISCONSIN REGION: 1979-2000 (IN MILLIONS OF GALLONS PER DAY)[a]



[a]*Excludes thermoelectric power generation uses.*
Source: U.S. Geological Survey and SEWRPC.

Figure 3

HISTORIC PER CAPITA TOTAL WATER USE IN THE SOUTHEASTERN WISCONSIN REGION: 1979-2000 (GALLONS PER PERSON PER DAY)



NOTE: THE DEVELOPMENT OF WATER USE DATA ON A PER CAPITA BASIS IS MOST USEFUL WHEN CONSIDERED FOR THE RESIDENTIAL COMPONENT OF WATER USE, AS WELL AS FOR TOTAL WATER USE AS IS PRESENTED IN THIS FIGURE. DATA ON THE RESIDENTIAL PER CAPITA USE IS PRESENTED IN THE NEXT SECTION OF THIS NEWSLETTER FOR CURRENT PUBLIC (MUNICIPAL) WATER USES.

Source: U.S. Geological Survey and SEWRPC.

Region account for over 70 percent of the total water used, excepting for thermoelectric-power generation uses (see Map 2). A breakdown of the public water supply on a per capita basis for residential and total water use and on a per acre basis for residential, industrial, and commercial, institutional, and miscellaneous water uses on a county-by-county basis for the year 2000 is shown in Table 3.

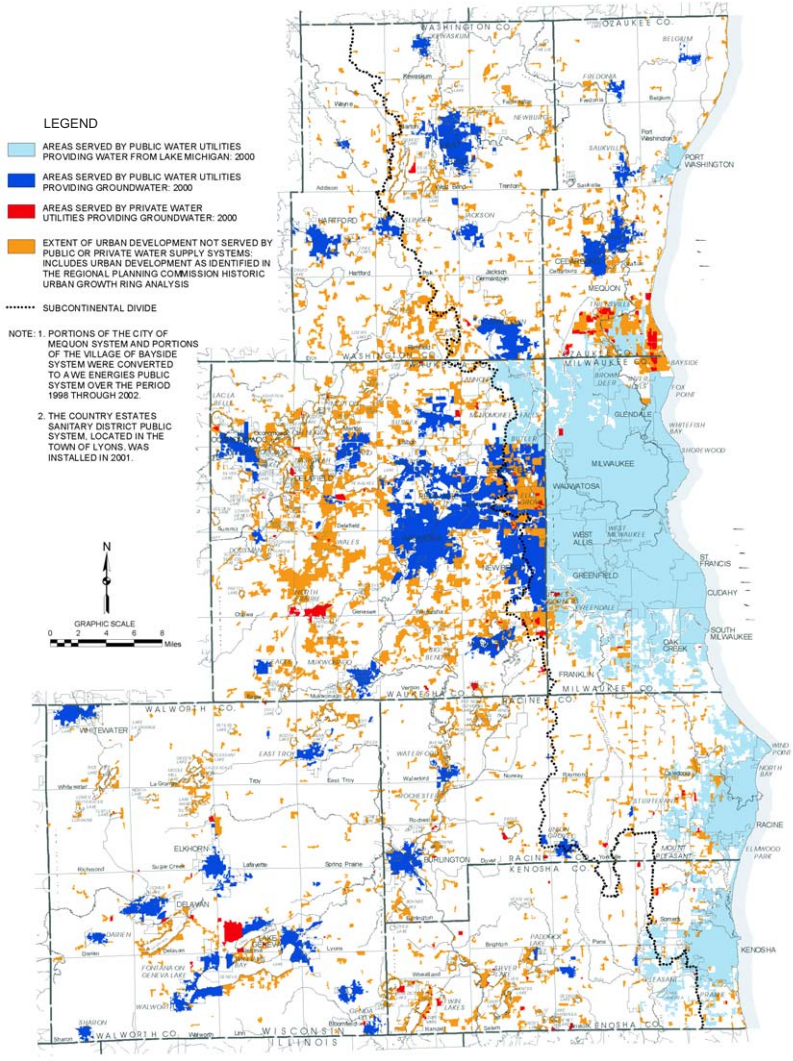
In 2000, the average daily per capita municipally supplied residential water use in the Region was similar between counties with an average of 67 gallons per day per capita, and a range of from 57 to 70 gallons per day per capita on a county-by-county basis (see Table 3). The residential water use in the Region averaged 911 gallons per day per acre, with a range of from about 474 to 1,282 gallons per day per acre of residential land.

In 2000, the average daily municipally supplied industrial water use in the Region varied considerably between counties with an average of 4,000 gallons per day per acre of industrial land, and a range between counties of from about 1,200 to 7,500 gallons per day per acre of industrial land (see Table 3). The data suggest a larger land area per square foot of building and lower water use industry types, among other factors, in the counties with the lower water uses on an acreage basis. In 2000, the average daily municipally supplied water uses for commercial, institutional, and other miscellaneous uses in the Region also varied considerably between counties with an average of 1,050 gallons per day per acre of commercial land, and a range of from about 420 to 1,520 gallons per day per acre of commercial land (see Table 3). The data suggest a larger land area per square foot of building, among other factors, in the counties with the lower water uses on an acreage basis.

In 2000, the total municipal water use in the Region averaged 145 gallons per day per capita, with a range between counties of from about 96 to 175 gallons per day per capita. This range reflects the amount of industrial, commercial, institutional, and other nonresidential uses in each county. The amount of water which is unaccounted for averages 9 percent of the total amount of water pumped into the water distribution systems within the Region. This unaccounted

Map 2

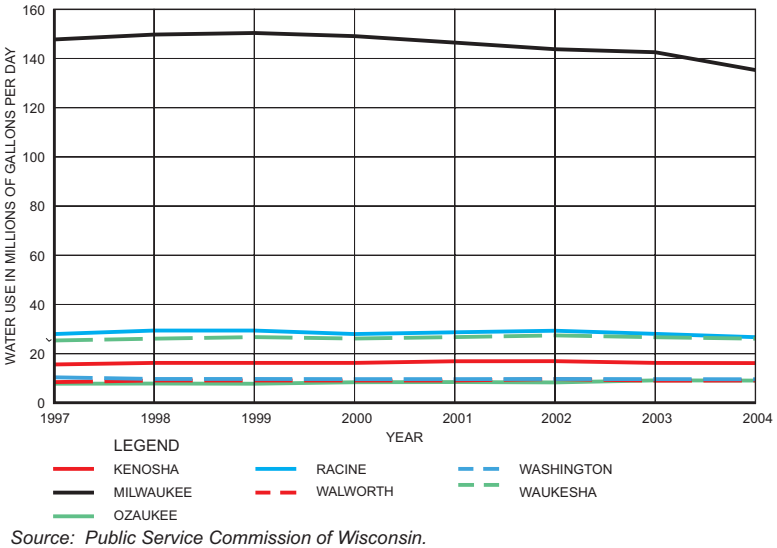
AREAS SERVED BY PUBLIC AND PRIVATE WATER UTILITIES IN THE SOUTHEASTERN WISCONSIN: 2000



Source: SEWRPC.

Figure 4

RECENT TRENDS IN MUNICIPAL WATER USE BY COUNTY IN THE SOUTHEASTERN WISCONSIN REGION



Source: Public Service Commission of Wisconsin.

Table 3

SUMMARY OF PUBLIC (MUNICIPAL) WATER USE IN THE SOUTHEASTERN WISCONSIN REGION BY COUNTY: 2000

County	Average Annual Water Uses										Percent Unaccounted for Water[g]
	Residential Water Use[a]			Industrial Water Use		Commercial, Institutional, Multi-Family Residential, and Miscellaneous Water Use[a]		Other Municipal[e] Water Uses (gallons per acre per day)	Total Municipal Water Use[b]		
	Total[c] (gallons per day X 1,000)	Per Person[d] (gallons per capita per day)	Per Acre[d] (gallons per acre per day)	Total[c] (gallons per day X 1,000)	Per Acre (gallons per acre per day)	Total[c] (gallons per day X 1,000)	Per Acre (gallons per acre per day)		Total[c] (gallons per day X 1,000)	Per Person[f] (gallons per capita per day)	
Kenosha	5,619	61	836	1,926	2,362	3,160	828	2,451	13,156	119	12
Milwaukee	51,942	70	1,282	30,462	5,320	35,413	1,516	30,561	148,378	160	7
Ozaukee	2,570	64	581	1,999	4,123	808	424	198	5,575	123	14
Racine	7,804	61	832	10,235	7,482	3,666	818	3,625	25,330	175	12
Walworth	2,565	57	474	1,270	2,023	1,764	574	651	6,250	111	16
Washington	3,488	66	724	1,287	1,843	1,405	471	231	6,411	96	13
Waukesha	11,404	60	506	3,720	1,239	7,308	646	661	23,093	102	11
Total Region	85,392	67	911	50,899	4,001	53,524	1,051	38,378	228,193	145	9

[a] *Residential category includes population associated with single-family and two-family housing units, plus some larger multi-family housing where individual water meters are used for each unit. Other multi-family units are included in the commercial water use category.*

[b] *Includes all water specifically accounted for.*

[c] *As reported in annual reports submitted to the Public Service Commission of Wisconsin.*

[d] *Estimated based upon reported residential water uses and the total residential population and land area served adjusted by county to reflect the population land area estimated to be associated with one- and two-family housing units in order to be most directly related to the reported water use for this category.*

[e] *Includes uses for fire protection services, sales to public authorities, sales to irrigation customers and interdepartmental sales.*

[f] *Estimated based upon total residential population served.*

[g] *Water not specifically accounted for as a percent of total pumpage into distribution system.*

Source: Public Service Commission of Wisconsin and SEWRPC.

Table 4

RECENT TRENDS IN MUNICIPAL WATER USE BY COUNTY: 1997-2004

County	Total Municipal Water Use (million gallons per day)							
	1997	1998	1999	2000	2001	2002	2003	2004
Kenosha	12.4	13.2	13.5	13.2	13.7	13.8	13.7	13.2
Milwaukee	147.6	149.6	150.1	148.4	146.0	143.6	142.1	134.8
Ozaukee	4.7	4.9	4.7	5.6	5.3	5.7	5.7	5.7
Racine	25.2	26.4	26.6	25.3	26.0	27.0	25.0	23.9
Walworth	5.3	6.0	6.1	6.3	6.3	6.6	6.3	6.0
Washington	7.1	6.6	6.5	6.4	6.7	6.8	6.8	6.7
Waukesha	22.3	23.5	24.0	23.1	23.7	24.6	24.3	23.5
Total Region	224.6	230.2	231.5	228.3	227.7	228.1	223.9	213.8

Source: Public Service Commission of Wisconsin.

for water is the result of such factors, among others, as leakage, water main breaks, fire flows, hydrant flushing, and other unmetered public uses.

Recent trends in total public (municipal) water uses on a county-by-county basis over the period 1997 through 2004 are shown in Table 4 above and Figure 4 on page 6. These data illustrate that water use in the Region has declined from 1997 to 2004 by about 4 percent, from about 225 mgd to about 215 mgd. Municipal water use peaked during the period of analysis in 1999 at about 232 mgd. Since 1999, water use has declined or remained stable in all of the counties, excepting Ozaukee, which had an increase of 21 percent. This change in Ozaukee County was likely due, in part, to the provision and expansion of public water service in portions of the City of Mequon and Village of Thiensville since 1998 through the We Energies Water Services system development.

Data for 2005 public uses was not available as of the date of this Newsletter. Because of the relatively dry growing season during 2005, water use in that year may vary from the trends shown by the data from 1997 through 2004. The 2005 data may be an important consideration in the design of the final recommended water supply plan which should consider drought-type conditions. Thus, the 2005 data will be presented in a subsequent edition of this Newsletter series.

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This newsletter was mailed directly to a list of individuals and organizations that have expressed interest in receiving such information. If you did not receive this newsletter directly, and would like to receive future issues directly, please contact the Commission using the contact information above.

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