

# REGIONAL WATER SUPPLY PLANNING PROGRAM PROSPECTUS

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# **REGIONAL WATER SUPPLY PLANNING PROGRAM PROSPECTUS**

Prepared By

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## TABLE OF CONTENTS

	Page		Page
<b>Chapter I—INTRODUCTION AND BACKGROUND</b> .....	1	Summary .....	14
Introduction .....	1	<b>Chapter IV—MAJOR ELEMENTS OF A REGIONAL WATER SUPPLY PLANNING PROGRAM</b> .....	17
The Regional Planning Commission .....	1	Introduction .....	17
Advisory Committee Structure .....	2	Study Design .....	18
<b>Chapter II—PURPOSE OF PROSPECTUS</b> .....	3	Formulation of Objectives and Standards .....	19
<b>Chapter III—NEED FOR A REGIONAL WATER SUPPLY PLAN</b> .....	5	Inventory .....	19
Introduction .....	5	Analyses and Forecasts .....	26
Constraints on Use of Lake Michigan Water .....	7	Preparation, Test, and Evaluation of Alternative Plans .....	28
Increasing Demand for Water West of the Subcontinental Divide .....	7	Plan Selection and Adoption .....	28
Under-Utilization of Existing Lake Michigan Water Treatment Plant Capacity .....	11	Plan Implementation Recommendations .....	29
The Need to Address Groundwater Quality Concerns .....	11	Planning Report .....	29
The Need to Coordinate Public and Private Water Supply Planning Efforts .....	13	Time Schedule .....	30
The Need to Coordinate Water Supply Planning with Land Use, Transportation, Sanitary Sewerage, Park and Open Space, and Natural Resource Protection Planning .....	13	<b>Chapter V—ORGANIZATION FOR THE CONDUCT OF A REGIONAL WATER SUPPLY PLANNING PROGRAM</b> .....	33
The Need to Address Growing Concerns over the Security of the Water Supply Facilities in the Region .....	14	Introduction .....	33
Statutory Planning Requirement .....	14	Administrative Direction .....	33
		Technical Staffing .....	33
		Committee Structure .....	34
		<b>Chapter VI—BUDGET</b> .....	35
		Cost Estimate .....	35
		Cost Allocation .....	35
		<b>Chapter VII—CONCLUSIONS AND RECOMMENDATIONS</b> .....	39

## LIST OF APPENDICES

			Page
Appendix			
A	Resolutions Supporting the Preparation of a Prospectus for the Development of a Regional Water Supply Plan .....		45

## LIST OF TABLES

Table		Page
<b>Chapter III</b>		
1	Number of Permitted High-Capacity Wells Used Serving Nonresidential Land Uses by County: 1995 .....	8
2	Capacity and Use of Lake Michigan Water Treatment Plants within Southeastern Wisconsin: 1997 and 2000.....	12
<b>Chapter VI</b>		
3	Regional Water Supply Plan Cost Estimate .....	36
4	Recommended Funding Strategy for Southeastern Wisconsin Regional Water Supply Planning Program.....	37

## LIST OF FIGURES

Figure		Page
<b>Chapter III</b>		
1	Use of Surface and Groundwater within Southeastern Wisconsin by County: 1995 .....	10
2	Historic Changes in Water Level Elevation in the Sandstone Aquifer Underlying Southeastern Wisconsin: 1945 through 2000.....	10
3	Historic Utilization of Lake Michigan and Groundwater in Southeastern Wisconsin: 1979-2000 .....	12
<b>Chapter IV</b>		
4	Major Phases of the Regional Water Supply Planning Program.....	31
5	Proposed Timing of Major Work Elements for a Water Supply Planning Program for the Southeastern Wisconsin Region.....	32

## LIST OF MAPS

Map		Page
<b>Chapter III</b>		
1	The Southeastern Wisconsin Region.....	6
2	Areas Served by Public and Private Water Supply Systems in Southeastern Wisconsin: 2000 .....	9

## Chapter I

# INTRODUCTION AND BACKGROUND

### INTRODUCTION

Water supply systems are among the most important infrastructure facilities affecting the economic development and environmental quality of an area. Such systems directly affect the health and welfare of the resident and transient populations of an area, and the viability of commercial and industrial activities in an area. Accordingly, the availability of an ample and secure supply of high quality water for residential, commercial, industrial, institutional, and agricultural use, and for fire protection, together with the protection and wise use of the available sources of supply should be the primary concerns of the elected and appointed public officials of an area; and water supply should be an important consideration in public planning efforts at all levels of government.

### THE REGIONAL PLANNING COMMISSION

The Southeastern Wisconsin Regional Planning Commission is the official areawide planning agency for the seven-county Southeastern Wisconsin Region. The Region is comprised of the counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha. The Commission is charged with the responsibility for the collection, analysis, and dissemination of basic planning and engineering data on a uniform, areawide basis; for the preparation of a framework of long range plans for the physical development of the Region; and for the promotion of intergovernmental cooperation and coordination in the adoption and implementation of such long range plans.

Section 66.0309 of the *Wisconsin Statutes* specifically charges the Commission with the function and duty of “making and adopting a master plan for the physical development of the region.” The permissible scope and content of this 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 intended to assist the responsible Federal, State, county, and local units and agencies of government in the making of decisions concerning the development of the Region. The work of the Commission emphasizes close cooperation between the various levels, units, and agencies of government responsible for the development and maintenance of land uses and for the design, construction, operation, and maintenance of the supporting infrastructure facilities. In the pursuit of its statutory responsibilities, the Commission has, to date, prepared and adopted a number of elements of a comprehensive plan for the development of the seven-county Region, including a land use plan, a park and open space plan, a natural areas management plan, a transportation system plan, a series of seven watershed plans for the major natural watersheds lying within the Region, a water quality management plan, and a sanitary sewerage system plan.

The Commission has long-recognized that its comprehensive plan for the development of the Region lacked a water supply element. It has, however, been the long-standing practice of the Commission to undertake the preparation of elements

of the evolving comprehensive plan for the development of the Region only upon the expressed request of its constituent counties and municipalities; at the request of cognizant State agencies; or pursuant to Federal requirements. By resolution adopted on November 19, 2001, the Waukesha County Board indicated that an urgent need existed to develop and manage the water resources of the Region in an efficient and cost-effective manner that would protect and preserve the quality and quantity of the regional water supply. The resolution further requested the Commission to prepare a prospectus for the preparation of a regional water supply system plan, and to present that prospectus to the seven constituent county boards for approval and cooperative implementation. The request was supported by the Waukesha County Executive; and by the City of Waukesha; by the Villages of Hartland and Wales; and by the Town of Genesee, all in Waukesha County. The request was also supported by resolutions subsequently adopted by the County Boards of the Counties of Kenosha and Racine. Copies of the County Board resolutions requesting the preparation of a prospectus are provided in Appendix A.

The requests reinforce the requirements of Section 66.1001 of the *Wisconsin Statutes*, the so-called “smart growth” law. That law effectively requires the Commission to adopt a regional water supply plan by January 1, 2010. Accordingly, in response to the new State law and to the action of the Waukesha County Board and County Executive, the Commission undertook the preparation of this prospectus.

### ADVISORY COMMITTEE STRUCTURE

The long-established practice of the Commission has been to prepare prospectuses for the conduct of major regional planning programs with the assistance of an appropriately structured advisory committee. The membership of such a committee is to be drawn to include knowledgeable and concerned representatives of the constituent counties and municipalities; of concerned State and Federal agencies; of the academic community; and of concerned private businesses and industries. Accordingly, the Commission acted on June 4, 2002, to appoint the following members to a Commission Advisory Committee on Regional Water supply Planning:

Kurt W. Bauer, Chairman.....	Executive Director Emeritus, SEWRPC
Robert P. Biebel, Secretary....	Chief Environmental Planner, SEWRPC
Brian S. Barrett.....	Chairman, SEWRPC Technical Advisory Committee for Groundwater Resources
Daniel A. Barthold.....	Environmental and Energy Engineering Director, Miller Brewing Company
Lee H. Boushon.....	Chief, Drinking Water Section, Wisconsin Department of Natural Resources, Madison
Thomas J. Bunker.....	General Manager, Water and Waste Water Utility, City of Racine
Douglas S. Cherkauer.....	Professor of Geology, University of Wisconsin-Milwaukee
Charles A. Czarkowski.....	Drinking Water Expert, Wisconsin Department of Natural Resources, Southeastern Wisconsin District Office
Frank Ericson.....	Manager, Environmental Operations, S. C. Johnson & Son, Inc.
David Ewig.....	Water Superintendent, City of Port Washington
Ronald G. Hennings.....	Assistant Director, Wisconsin Geological and Natural History Survey
Roger Johnson.....	Manager, North Shore Water Commission
Terrence H. Kiekhaefer.....	Manager, Water Utility, City of West Bend
Lawrie J. Kobza.....	Attorney at Law, Boardman Law Firm, Madison
James T. Krohelski.....	Hydrologist, U.S. Geological Survey
Thomas J. Krueger.....	Utility Director, Village of Grafton
Michael P. Rau.....	General Manager, We Energies-Water Services
Thomas Roberts.....	District Manager, Layne Christiansen Company Layne Northwest Division
Edward St. Peter.....	General Manager, Water Utility, City of Kenosha
Mariano A. Schifalacqua.....	Commissioner, Department of Public Works, City of Milwaukee
Steven H. Schultz.....	Manager, Water Supply Department, Ruekert & Mielke, Inc.
Mark D. Simon.....	Water Superintendent, City of Brookfield
Daniel Warren.....	President, Water Utility, City of Waukesha
Daniel S. Winkler.....	Director of Public Works and Utilities, City of Lake Geneva
Telesfore P. Wysocki.....	Mayor, City of New Berlin
Steve Yttri.....	General Manager, Water and Sewer Utility, City of Oak Creek

The members of the Committee have knowledge and experience in the planning, design, construction, operation, and maintenance of water supply facilities and the Committee was intended to bring this knowledge and experience to collectively bear on the preparation of a regional water supply plan. That Committee, working with Commission staff, from its initial meeting on July 16, 2002, through September 17, 2002, its final meeting, prepared and unanimously endorsed this prospectus.

## Chapter II

### PURPOSE OF THE PROSPECTUS

The purpose of the prospectus is to explore the need for and recommend the means by which a technically sound and feasible regional water supply planning program can be established for the Southeastern Wisconsin Region. The prospectus is intended to provide the information required to permit the levels, units, and agencies of government concerned to consider the benefits and costs of such a program and to determine the desirability of its execution.

To this end, the prospectus is intended to accomplish the following:

1. Establish the need for a regional water supply planning program in Southeastern Wisconsin;
2. Specify the scope and major divisions of the work required to prepare a technically sound and feasible regional water supply plan;
3. Recommend the most effective means for establishing, organizing, and accomplishing the required work;
4. Recommend a practical time sequence and schedule for the required work; and
5. Provide sufficient cost data to permit the preparation of an initial budget for the work required and to suggest a means for funding and a possible allocation of costs among the various levels, units, and agencies of government concerned.

## Chapter III

# NEED FOR A REGIONAL WATER SUPPLY PLAN

### INTRODUCTION

Southeastern Wisconsin is a highly urbanized and rapidly urbanizing Region. The seven counties comprising the Region have an area of about 2,689 square miles and a resident population of about 1.93 million. About 36 percent of the population of the State reside within the Region, which comprises about 5 percent of the area of the State. The Region provides about 38 percent of all of the jobs within the State, and contains about 37 percent of all the tangible wealth of the State, as measured by equalized real property valuation. As shown on Map 1, there are 147 general-purpose municipal governments within the seven-county Region, all of which participate in the work of the Southeastern Wisconsin Regional Planning Commission. While the seven-county Region is highly urbanized, agriculture is still a very important economic activity within the Region. About 1,395 square miles, or 52 percent, of the total area of the Region are still in agricultural use. The adopted land use plan recommends the preservation of agricultural lands within the Region, and the extent of the area in agricultural use is planned to decline only slightly to about 1,332 square miles, or 50 percent, of the Region by the year 2020. Agricultural lands are, however, being lost at a higher rate than envisioned in the adopted regional land use plan.

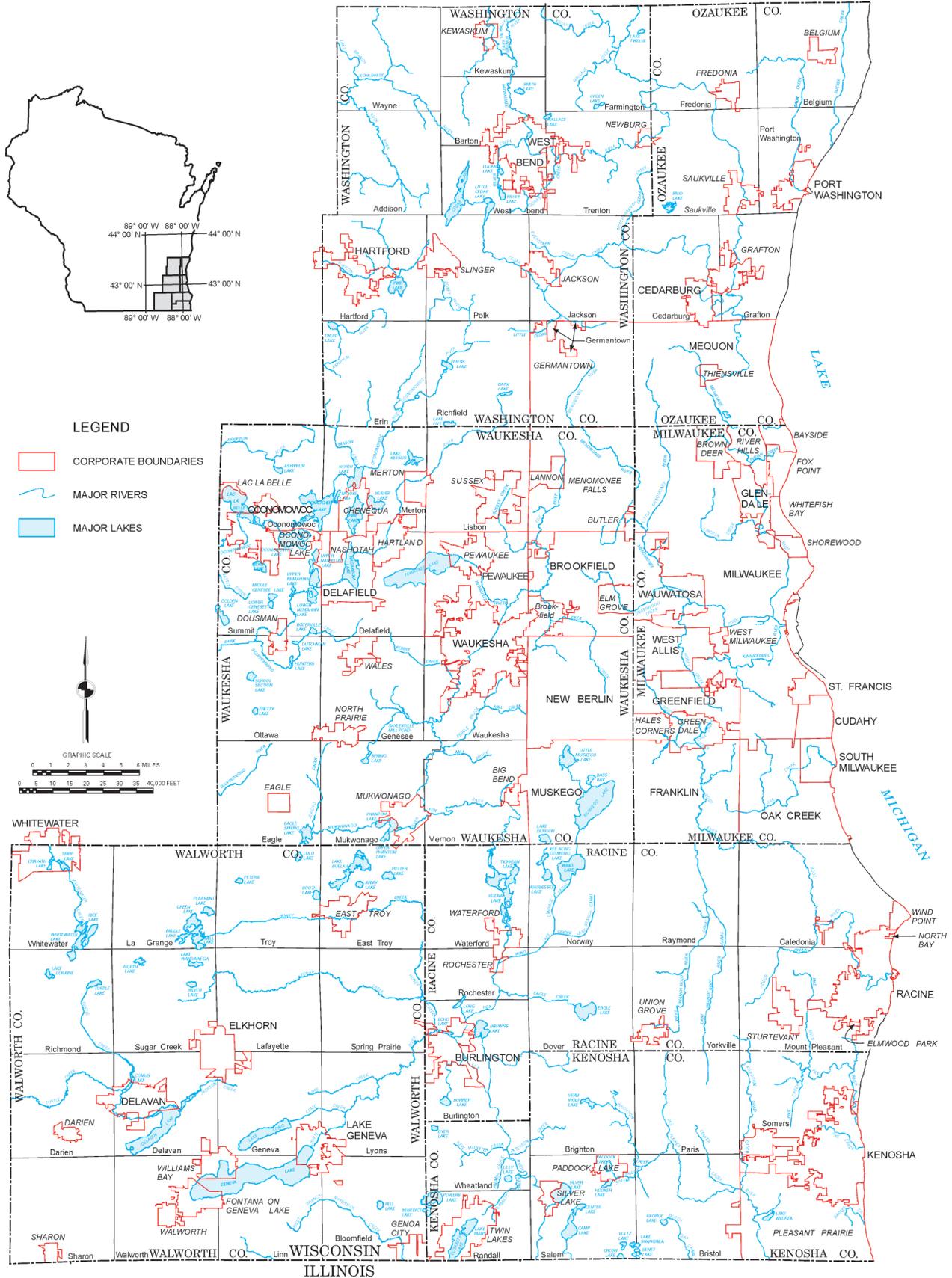
The Southeastern Wisconsin Region is richly endowed with water resources. In addition to bordering on Lake Michigan, as shown on Map 1, the Region contains 101 major inland lakes, approximately 1,150 miles of perennial streams and water-

courses with their associated wetlands and floodlands, and is underlain by two major aquifers. The surface waters of the Region comprise an invaluable recreational asset as well as a potential source of water supply. The historic growth and development of the Region may be attributed, in part, to the abundant water supply available within the Region for domestic, commercial, and industrial uses. Properly husbanded, these water resources can serve the Region for all time to come. Misused and mismanaged, however, these resources can become a severe constraint on the sound social, economic, and physical development of the Region. The water resources of the Region include inland lakes and streams, Lake Michigan, and the shallow and deep groundwater aquifers underlying the Region. The residential, commercial, industrial, institutional, and agricultural land uses within the Region rely on two major sources for water supply: surface water supplied primarily by Lake Michigan, and groundwater supplied from both the deep and shallow aquifer systems underlying the Region. Neither the surface nor groundwater sources are unlimited, and both are subject to contamination as well as over-use.

An ample supply of clean, wholesome water is essential to urban development. Indeed, without a reliable water supply, urban areas become unhealthy as places in which to live and work, subject to epidemics of such waterborne diseases as cholera; dysentery; typhoid fever; and parasitic infections, such as cryptosporidium. In addition to providing safe drinking water, a reliable water supply is also essential in other ways to good sanitation in urban

# Map 1

## THE SOUTHEASTERN WISCONSIN REGION



Source: SEWRPC.

areas. An adequate and reliable water supply is essential for bathing, laundering, and other forms of cleaning and washing, and provides the basis for the water carriage system of sanitary sewage conveyance essential to a high level of quality in urban life. An adequate and reliable water supply is essential to good fire protection. An adequate and reliable source of high quality water is also essential to all types of commercial and industrial development, and especially to certain industries such as food processing.

In 1995, about 343,000 residents of the seven-county planning Region, or about 18 percent of the total resident population of about 1.879 million, were without public water supply service. These residents have to rely upon on-site water supply facilities, primarily wells open to shallow unlithified deposits and to the dolomitic bedrock formations of the Region. Some commercial, industrial, institutional, and agricultural uses also rely upon on-site water supply facilities. Some of these on-site facilities consist of high-capacity wells—that is, wells having a pumping capacity of 70 gallons per minute, equivalent to about 100,000 gallons per day. The pumping capacity is to be determined by the pump-rating curve at the lowest pressure setting. Based upon a 1995 inventory, there were 505 high-capacity wells within the Region serving nonresidential uses. Of this total, 92 served industrial uses; 132 were used for agricultural and other irrigation uses; and 281 served a variety of commercial, institutional, and recreational uses. The distribution of these wells by county is provided in Table 1.

Eight factors contribute to the need for the preparation of a regional water supply plan for the Southeastern Wisconsin Region at this time:

1. Constraints on use of Lake Michigan water
2. Increasing demand for water west of the subcontinental divide
3. Underutilization of existing Lake Michigan water treatment plant capacity
4. The need to address groundwater quality concerns
5. The need to coordinate public and private water supply planning efforts

6. The need to coordinate water supply planning with land use, transportation, sanitary sewerage, park and open space, and natural resource protection planning
7. Security
8. Statutory planning requirement

#### **Constraints on Use of Lake Michigan Water**

Because a subcontinental divide between the Mississippi River and the Great Lakes drainage basins traverses the Region, the use of Lake Michigan water as a source of supply within much of the Region is problematic. In addition to the constraints on the use of such water imposed by the costs of transmission, legal constraints rooted in State and Federal law and in international charter exist on the diversion--or loss--of water from the Great Lakes basin. The legal constraints are complex, but in essence, at the present time, the extension of Lake Michigan water to areas lying west of the subcontinental divide is possible only if the spent water is returned to Lake Michigan. Such return is most positively assured via sanitary sewerage systems. Only limited diversion is legally possible in the absence of such return. As shown on Map 2, the service areas of major water utilities within the Region using Lake Michigan as a source of supply, include only a few relatively small areas lying west of the divide. These service areas were historically permitted as exceptions to the constraint on diversion due to the relatively small amounts of water concerned.

The governors of the eight states and the premiers of the two Canadian provinces bordering on the five Great Lakes agreed in 2001 to cooperatively consider further the issues of diversions, withdrawals, and consumptive uses of both surface and groundwaters in the Great Lakes basin. Such consideration may lead to an international treaty with far-reaching impacts on water supply alternatives in Southeastern Wisconsin.

#### **Increasing Demand for Water West of the Subcontinental Divide**

Much of the growth in population, employment, and urban land uses is occurring, and is planned to continue to occur, in areas of the Region lying west of the subcontinental divide, and in such areas as north central Washington County, areas while east of the subcontinental divide may lie beyond the cost effective reach of transmission mains from Lake Michigan.

Table 1

**NUMBER OF PERMITTED HIGH-CAPACITY WELLS USED  
SERVING NONRESIDENTIAL LAND USES BY COUNTY: 1995**

County	Number of Wells and Use			
	Industrial	Irrigation	Other <sup>a</sup>	Total
Kenosha.....	1	12	32	45
Milwaukee.....	26	16	34	76
Ozaukee.....	8	7	19	34
Racine.....	23	29	22	74
Walworth.....	8	12	57	77
Washington.....	4	4	19	27
Waukesha.....	22	52	98	172
Total	92	132	281	505

NOTE: The high-capacity wells summarized in this table were permitted as of 1995. In some cases, the wells have been abandoned or are otherwise no longer in use.

<sup>a</sup>Includes wells serving commercial, institutional, recreational, and special land uses.

Source: Wisconsin Geological and Natural History Survey, U.S. Geological Survey, and SEWRPC.

About 62 percent of the area of the Region lies west of the subcontinental divide. The resident population of that part of the Region lying west of the divide is expected to grow from about 447,000 persons in 1995 to about 535,000 persons in 2020, an increase of about 88,000 persons, or about 20 percent. The resident population of the Region lying east of the subcontinental divide is anticipated to increase from about 1,432,000 persons in 1995 to about 1,543,000 persons in 2020, an increase of about 111,000 persons, or about 8 percent. Growth in population and attendant growth in employment and in urban land uses in that part of the Region lying west of the subcontinental divide may be expected to place substantially increased demands upon the groundwater resources of the area.

Assuming an increase in groundwater use proportional to the anticipated increases in population levels, groundwater use may be expected to increase from about 93 million gallons per day in 1995, as shown in Figure 1, to about 112 million gallons per day by the year 2020. The Region is underlain by essentially two aquifers—a shallow aquifer consisting of the Silurian age dolomitic bedrock and overlying sand and gravel deposits, and a deep aquifer consisting of Cambrian and Ordovician age sandstone. The two aquifers under most of the Region are

separated by a layer of essentially unpermeable shale so that the two aquifers function almost independently—the shallow aquifer being recharged locally, and the deep aquifer regionally in areas lacking the separating shale layer. Although the shallow groundwater aquifer can meet some of this increased demand, much of the projected demand may be expected to have to be met by increased exploitation of the deep sandstone aquifer.

The deep sandstone aquifer is already exhibiting relatively rapid declines in potentiometric surface—that is, in water levels. Concentrated pumping and well interference has resulted in rates of decline in this potentiometric surface of from six to 10 feet per year over the last approximately 50 years. This has necessitated the lowering of well pumps and has resulted in increased pumping heads for municipal water utilities and private industries drawing upon this source of supply. The decline in water levels in the deep aquifers underlying the Region is reflected in the long-term deep well hydrographs maintained by the U.S. Geological Survey, as shown in Figure 2, on page 10. In the absence of a regional water supply plan, and implementation of such a plan, these declines may be expected to continue. Increasingly, the declines may be expected to be attended by significant increases in the cost of supply, and

Map 2

**AREAS SERVED BY PUBLIC AND PRIVATE WATER SUPPLY SYSTEMS IN SOUTHEASTERN WISCONSIN: 2000**

**LEGEND**

PUBLIC WATER SUPPLY

- GROUNDWATER
- SURFACE WATER

COMMUNITY PUBLIC OTHER THAN MUNICIPAL WATER SUPPLY

- GROUNDWATER
- SUBCONTINENTAL DIVIDE

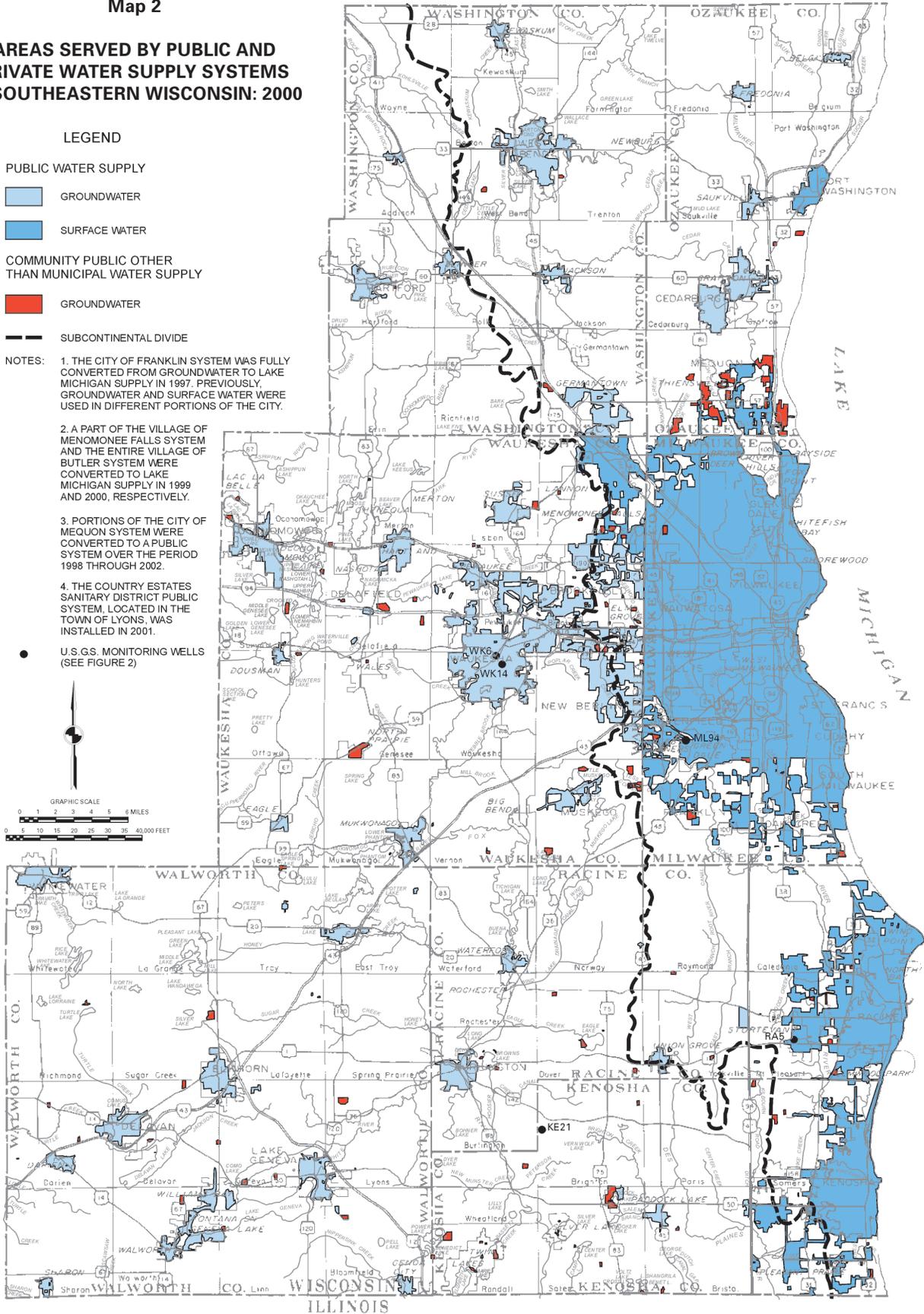
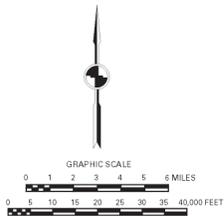
NOTES: 1. THE CITY OF FRANKLIN SYSTEM WAS FULLY CONVERTED FROM GROUNDWATER TO LAKE MICHIGAN SUPPLY IN 1997. PREVIOUSLY, GROUNDWATER AND SURFACE WATER WERE USED IN DIFFERENT PORTIONS OF THE CITY.

2. A PART OF THE VILLAGE OF MENOMONIE FALLS SYSTEM AND THE ENTIRE VILLAGE OF BUTLER SYSTEM WERE CONVERTED TO LAKE MICHIGAN SUPPLY IN 1999 AND 2000, RESPECTIVELY.

3. PORTIONS OF THE CITY OF MEQUON SYSTEM WERE CONVERTED TO A PUBLIC SYSTEM OVER THE PERIOD 1998 THROUGH 2002.

4. THE COUNTRY ESTATES SANITARY DISTRICT PUBLIC SYSTEM LOCATED IN THE TOWN OF LYONS, WAS INSTALLED IN 2001.

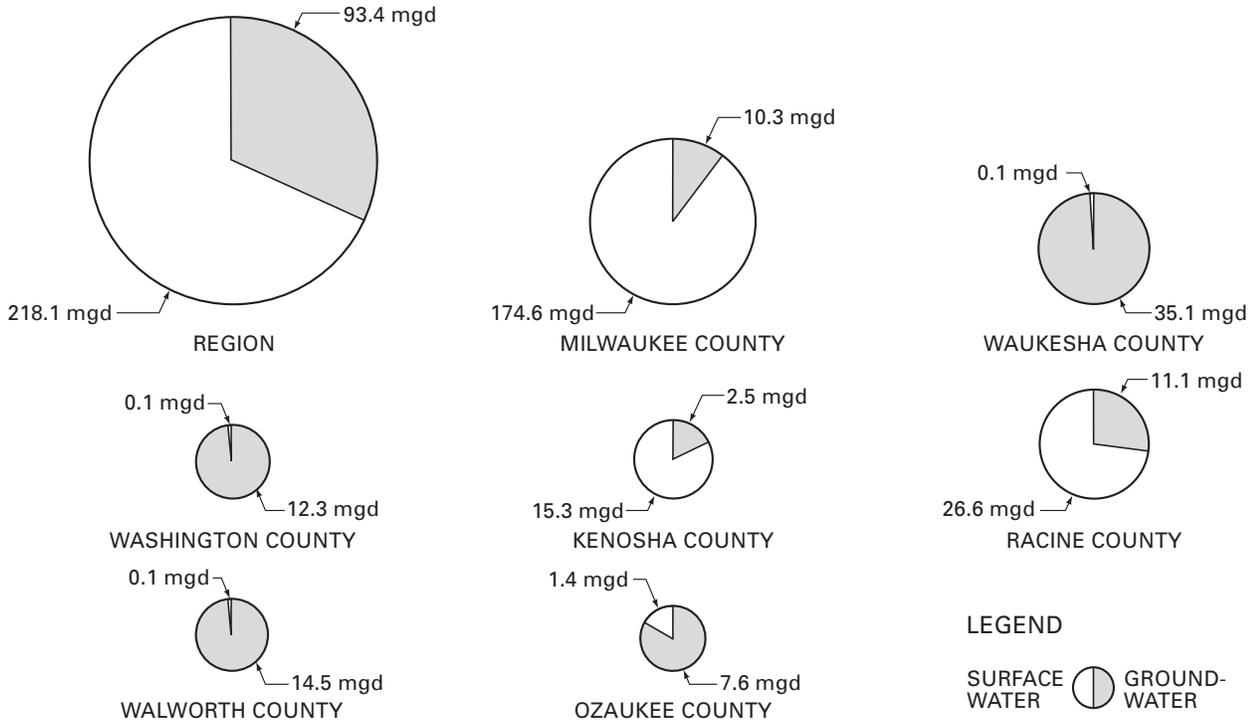
● U.S.G.S. MONITORING WELLS (SEE FIGURE 2)



Source: Wisconsin Department of Natural Resources and SEWRPC.

**Figure 1**

**USE OF SURFACE AND GROUNDWATER WITHIN SOUTHEASTERN WISCONSIN BY COUNTY: 1995**

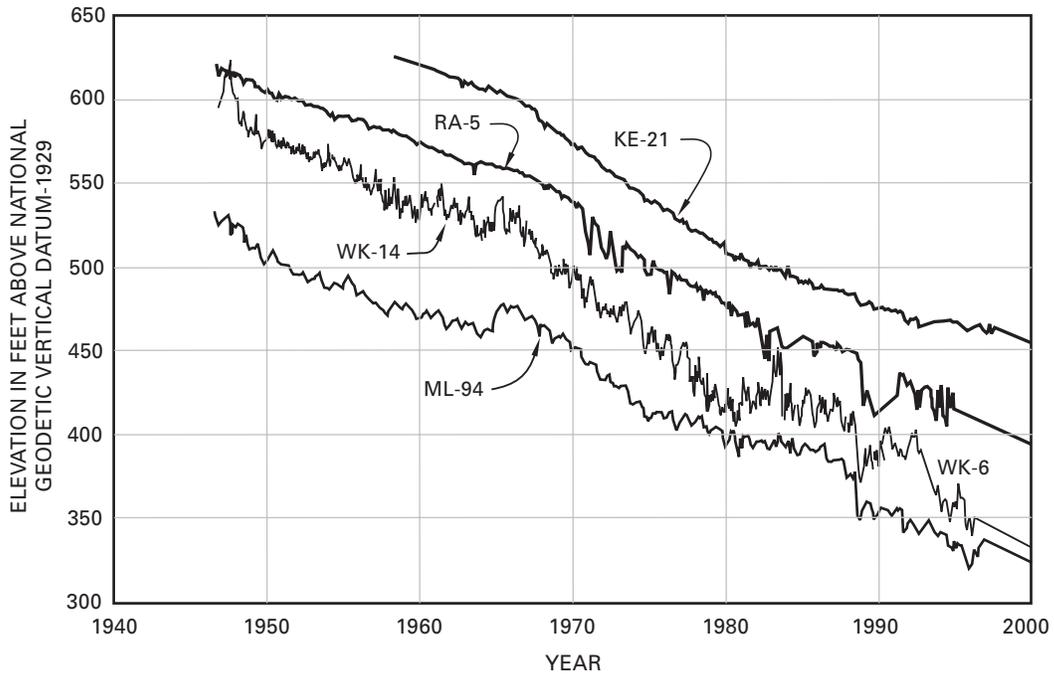


NOTE: WATER USES IN THE FIGURE INCLUDE PUBLIC WATER SUPPLY, INDUSTRIAL, COMMERCIAL, IRRIGATION AND OTHER AGRICULTURAL, AND INDIVIDUAL PRIVATE WATER USES.

Source: U.S. Geological Survey.

**Figure 2**

**HISTORIC CHANGES IN WATER LEVEL ELEVATION IN THE SANDSTONE AQUIFER UNDERLYING SOUTHEASTERN WISCONSIN: 1945 THROUGH 2000**



**LEGEND**

ML-94 DENOTES U.S.G.S. MONITORING WELL IDENTIFICATION (SEE MAP 2 FOR LOCATIONS)

Source: U.S. Geological Survey.

decreases in the quality of that supply as the dissolved solids content of the water increases as water is drawn from the lower reaches of the deep aquifer.

Historically, the shallow aquifer underlying the Region has not been subject to the same intensive pumpage than has the deep aquifer. In those areas of the Region where the shallow aquifer has been used as a source of municipal supply, the pumpage has been roughly balanced by the change in discharge to surface water bodies. Therefore, the shallow aquifers have not experienced the same long-term declines in water tables, as have the deep aquifers. Seasonal declines in the water table of the shallow aquifer have, however, occurred with attendant serious supply shortages for wells finished in that aquifer. Interferences between the drawdown cones of such wells have also occurred. Thus, increased use of the shallow aquifer will require careful planning to avoid well interferences, declining water tables, and adverse effects upon lake levels, streamflows, and wetlands.

#### **Under-Utilization of Existing**

##### **Lake Michigan Water Treatment Plant Capacity**

Nine public water supply treatment plants within the Region use Lake Michigan as a source of supply. These plants provide water to 28 municipalities within the Region. Together these plants provide an average of 208 million gallons of water per day to meet domestic, commercial, and industrial needs within their service areas. Table 2 provides information on the rated capacity and existing utilization of these treatment plants. The data provided indicate that seven of the nine plants have sufficient reserve capacity to serve the existing development within their service areas with an adequate margin of reserve capacity to meet planned urban development within those service areas. The data indicate, however, that the two City of Milwaukee plants have reserve capacity considerably in excess of any needs attendant to planned urban development within the City of Milwaukee and within the suburban municipalities currently served by those plants. The data provided in Table 2, moreover, indicate that while the pumpage of seven of the nine treatment plants concerned increased or remained stable over the period from 1995 through 2000, the pumpage of the two Milwaukee plants declined over that same period.

The current underutilization of the two City of Milwaukee treatment plants presents an opportunity to utilize the capital investment in these plants in a more cost-effective manner by providing water to

communities currently not served by Lake Michigan water located east of the subcontinental divide and within a cost-effective transmission distance of the plants concerned. Given the increasing demand upon the groundwater resource by development located west of the subcontinental divide, the potential for increased use of Lake Michigan water as a means of conserving the groundwater supply by more cost effectively using the excess capacity of the Milwaukee plants needs to be assessed. The relative historic use of the two sources of supply—Lake Michigan and the groundwater—is shown by Figure 3. It should be noted that while the use of Lake Michigan water has actually been declining since about 1985, the latent demand for Lake Michigan water may actually be increasing. Evidence of such increase is reflected in the recent extension of Lake Michigan water to the Village of Butler and to portions of the Village of Menomonee Falls and the City of Mequon, as well as by pending requests for such extension from such communities as the City of New Berlin. It should also be noted, however, that if the extension of Lake Michigan water results in significant increases in cost to users, then some large users may revert to the use of groundwater through the reactivation of existing or through the construction of new on-site wells.

#### **The Need to Address**

##### **Groundwater Quality Concerns**

The deep sandstone aquifer underlying the Region has historically provided a source of very high-quality water for domestic and industrial use. As the water table in this aquifer declined under the effects of ever-increasing use of the aquifer for municipal and industrial supply, the quality of that water, as measured in terms of dissolved solids content, has declined, and may be expected to continue to decline as well pump settings are increasingly deepened. In some cases, salinity may be encountered as a serious quality problem. Moreover, recently adopted Federal standards, and currently proposed State standards, with respect to the radionuclide content of drinking water may be expected to make it necessary to reduce the radionuclide content of the water from at least some of the existing municipal wells. Such reduction may be accomplished by a number of measures, including: selective casing of deep wells; blending of water from different wells; ion exchange treatment; manganese filtration treatment; and potential blending with Lake Michigan water, all relatively costly measures. To a more limited extent, newly adopted

Table 2

**CAPACITY AND USE OF LAKE MICHIGAN WATER TREATMENT PLANTS  
WITHIN SOUTHEASTERN WISCONSIN: 1997 AND 2000**

Plant	1997 Pumpage <sup>a</sup>		2000 Pumpage <sup>a</sup>		Rated Plant Capacity (mgd) <sup>b</sup>	Potential Reserve Capacity (mgd) <sup>c</sup>
	Average	Maximum Day	Average	Maximum Day		
City of Cudahy .....	4.8	8.2	4.8	6.6	6.0	None
City of Kenosha.....	12.1	19.3	12.6	25.2	42.0	16.8
City of Milwaukee.....	131.7	183.5	123.2	166.8	380.0	196.5
Linwood Avenue .....	--	--	--	--	275.0	--
Howard Avenue.....	--	--	--	--	105.0	--
City of Oak Creek.....	6.1	10.3	6.6	11.9	20.0	8.1
City of Port Washington.....	1.3	1.8	1.2	1.7	4.0	2.2
City of Racine.....	22.5	36.6	22.8	34.3	40.0	3.4
City of South Milwaukee.....	2.4	3.9	2.4	3.6	5.1	1.2
North Shore Utility.....	4.3	7.9	3.8	6.7	18.0	10.1

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

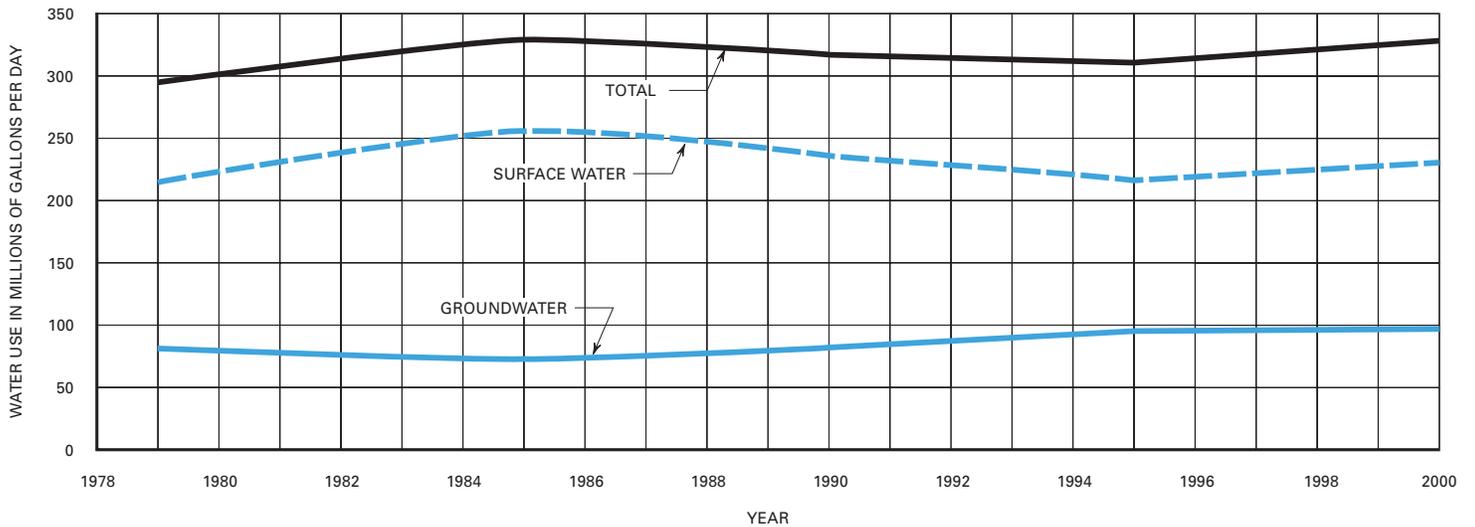
<sup>b</sup>Based upon data from the Wisconsin Department of Natural Resources files. The capacity data given are based upon the capacity of the critical plant component. Other plant components may have higher capacities. Thus, some components may provide a higher reserve capacity than that based upon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

<sup>c</sup>Difference between capacity and highest maximum day in 1997 or 2000.

Source: SEWRPC.

Figure 3

**HISTORIC UTILIZATION OF LAKE MICHIGAN AND  
GROUNDWATER IN SOUTHEASTERN WISCONSIN: 1979-2000**



Source: SEWRPC.

Federal standards for the arsenic content of drinking water may require reductions in that also naturally occurring element in water drawn from some municipal wells and some private community wells.

The shallow groundwater aquifers are much more readily susceptible to contamination from various sources of pollution than the deep aquifer, although generally on a geographically limited basis. Nevertheless, the deep aquifer is subject to long-term contamination from sources of pollution located within its recharge area located in the western reaches of Walworth and Waukesha Counties, and in areas west of the Region. Consequently, the need exists to prepare aquifer and wellhead protection plans to abate the potential contamination of the major aquifers underlying the Region. Land use planning and management may comprise one of the most cost-effective means for protection of the aquifers and wells concerned.

#### **The Need to Coordinate Public and Private Water Supply Planning Efforts**

Historically, planning for water supply within Southeastern Wisconsin has been accomplished largely on an individual municipal basis. As the Region continues to urbanize, such individual municipal planning must increasingly be set within the framework of an areawide water supply plan. In the absence of such a framework plan, increasing conflicts may be expected to develop between the efforts of individual communities to obtain additional sources of supply. In the absence of a plan, the drawdown cones of individual wells may intersect, certain particularly productive segments of the aquifers underlying the Region may become overutilized, and there would be no basis for achieving the conservation and wise use of the water resources of the Region. In the absence of a framework plan, the availability of Lake Michigan water as a substitute for groundwater as a source of supply for some communities may remain uncertain. Moreover, the impact of the substitution of Lake Michigan for groundwater on the aquifer concerned, and the implications of a potential aquifer recovery, on the development of the groundwater supply for other communities may remain unknown and unconsidered.

A regional water supply plan would provide the necessary framework within which technically sound public and private water supply planning can proceed within the Region. An areawide water supply plan as a

framework for the preparation of local water supply system plans would permit the analysis of the potential impacts of the extension of Lake Michigan water to subareas of the Region on the quality and quantity of the groundwater supply; and would permit the analysis of proposed new major well locations for optimization of both cost effectiveness and preservation of the available supply through simulation modeling. An areawide framework plan would also identify opportunities for the interconnection and consolidation of local water supply systems with potential significant economies. In the absence of such a plan, water supply system development will, at best, result in suboptimization with respect to the conservation and use of the groundwater resource; and, at worst, result in the depletion of the resource.

#### **The Need to Coordinate Water Supply Planning with Land Use, Transportation, Sanitary Sewerage, Park and Open Space, and Natural Resource Protection Planning**

A needs exists at the regional level to relate water supply planning to regional land use, transportation, sanitary sewerage system, park and open space, and natural resource protection planning. The availability of public water supply is an important determinant of the urban land use pattern of an area. Along with the availability of sanitary sewerage, and a level of accessibility, as determined by the transportation system, the availability of public water supply influences the type, intensity, location, and extent of urban land use development in an area. Water supply facilities should form coordinated subsystems within the urban and urbanizing areas, and should be designed to promote land use development in accordance with adopted regional, county, and local municipal comprehensive plans. Such comprehensive plans are, in turn, required as a basis for the design of the location, configuration, and capacity of the public water supply facilities.

The natural resource conservation protection element of adopted regional, county, and local comprehensive plans should be a particularly important consideration in water supply system planning. The groundwater resources of an area constitute an integral part of the natural resource base. The groundwater reservoir sustains lake levels, provides the base flow of streams, and contributes to the health of wetlands. Great care must be taken to assure that the location of major wells and well fields will not contribute to the decline of lake levels, decline of base flows in streams, and to the deterioration and destruction of wetlands,

particularly relatively rare wetlands, such as fens, and of associated flora and fauna.

### **The Need to Address Growing Concerns Over the Security of the Water Supply Facilities of the Region**

Security of water systems is a growing concern of, and issue facing, municipal water utilities. The potential for natural, deliberate, and accidental, contamination of the water supply and the loss of treatment and transmission facilities has always existed. The international situation with respect to terrorism now heightens the awareness of the potential for deliberate contamination and destruction of water supply facilities. The growing importance of security is indicated by the issuance in May of 1998 of a Presidential Decision Directive outlining Federal policy on critical infrastructure protection, including protection of water supply facilities. The terrorist attack on the United States of September 11, 2001, refocused attention on the vulnerability of water supply systems to terrorist activities.

Municipal water supply systems are, because of their geographic extent and visibility, inherently vulnerable to purposeful contamination, damage, and destruction that may compromise the ability of the facilities to deliver an adequate and safe supply of water. The vulnerability extends to the raw water source, the treatment facilities, and to the storage and transmission facilities compromising the total water supply system. Disruption of any of these components can result in significant economic cost, inconvenience, and loss of confidence by users, and in a direct threat to human health and safety.

Responsibility for the immediate security of the water supply facilities of the Region rests with the local water utilities. While this important responsibility should be acknowledged in any regional water supply planning effort, such an effort should address long-term measures for enhancing the security of the water supply facilities within the Region. Such long-term measures may include the interconnection of municipal water supply facilities so that, in an emergency, water may continue to be supplied to a distressed system by another interconnected system. The need for such potential interconnections for security purposes can best be addressed within the framework of an areawide water supply plan. This is true because the design of cost-effective interconnections would involve systems performance modeling to identify cost-effective pumping, storage,

and transmission facilities for any interconnections. The long-term security of water supply systems can also be achieved through good system design and engineering; and a regional water supply system plan should set forth recommended engineering practices that could be uniformly adopted within the Region to enhance the long-term security of the water supply of the Region.

### **Statutory Planning Requirement**

The State Legislature in 1999 enacted legislation, which revised and expanded municipal, county, and regional planning requirements. Specifically, Section 66.1001 of the *Wisconsin Statutes* requires that the comprehensive plan for the development of a region, as adopted or amended under Section 66.0309 of the *Wisconsin Statutes*, must consist of at least nine elements. Two of those nine elements, in effect, require the preparation of a regional water supply plan. One of the nine elements referenced in the new State legislation is an agricultural, natural, and cultural resources element. This element must address, among other considerations, the effective management of ground and surface waters within the planning area.

Another one of those nine elements is a utilities and community facilities element, an element that must address among other considerations, water supply. The element must describe the location, use, and capacity of existing water supply facilities; provide forecasts of the need for the rehabilitation and expansion of existing water supply facilities; and for the creation of new facilities.

Meeting the letter of the new planning legislation will require the Regional Planning Commission to prepare a water supply plan for the Southeastern Wisconsin Region. The Statutes implicitly envision such a regional water supply plan as a framework plan within which county and municipal water supply planning can proceed in a sound and efficient manner.

### **SUMMARY**

The rapid urbanizing Southeastern Wisconsin Region is richly endowed with water resources. The historic growth and development of the Region may be attributed, in part, to the abundant water supply available within the Region for domestic, commercial, and industrial uses. Properly husbanded, these water resources can serve the Region for all time to come. Misused and mismanaged, however, these resources can become a severe constraint on the sound social,

economic and physical development of the Region. Consequently, a need exists to prepare a water supply plan for the seven-county Southeastern Wisconsin Region.

Eight factors contribute to the need for the preparation of a regional water supply plan for the Region at this time:

1. Constraints on use of Lake Michigan water
2. Increasing demand for water west of the subcontinental divide
3. Underutilization of existing Lake Michigan water treatment plant capacity
4. The need to address groundwater quality concerns
5. The need to coordinate public and private water supply planning efforts
6. The need to coordinate water supply system planning with land use, transportation, sanitary sewerage, park and open space, and natural resource protection planning
7. The need to address growing concerns over the security of the water supply facilities of the Region
8. Statutory planning requirement

## Chapter IV

# MAJOR ELEMENTS OF A REGIONAL WATER SUPPLY PLANNING PROGRAM

### INTRODUCTION

This chapter sets forth the major work elements of a proposed regional water supply planning program for the Southeastern Wisconsin Region. The chapter is intended to establish the general scope and content of a planning program required to produce a water supply plan for the Southeastern Wisconsin Region. The major elements of the planning program are presented in sufficient detail to permit the development of cost estimates for budgetary purposes; to establish a practical time sequence and schedule for the work; and to recommend an organizational structure for the conduct of the work.

The scope and content of the proposed planning program are based upon the following assumptions:

1. That the primary purpose of the planning program will be the development of a sound and workable plan to guide the provision of adequate water supply service to existing and planned future development within the Region and to do so in a manner consistent with the adopted regional land use plan and the protection and wise use of the natural resource base and, particularly, of the ground and surface water resources of the Region.
2. The water supply plan produced by the program should be in sufficient depth and detail to provide a sound framework for local water supply planning and engineering and should, insofar as possible, provide planning and engineering data which can be used in county and local water supply system planning and engineering. To this end, the plan should recommend the location and extent of the areas to be served by public water supply within the Region, together with the sources of supply to be used to serve the delineated service areas. The plan should recommend the generalized configuration, size, and capacity of needed water supply intakes, wells, and treatment plants; major water transmission mains and pumping stations; and major storage facilities. The plan should recommend any needed realignments and revisions of the existing public water supply facilities, including any needed abandonments of existing supply facilities; improvement of the quality and quantity of supply for existing systems; and the consolidation of existing public water supply systems. The plan should address major social, economic, legal, and environmental issues, including, specifically, the issue of the possible transfer of water across the subcontinental divide traversing the Region.
3. That, in addition to the plan elements related to public water supply systems, the plan will include alternative and recommended elements for onsite residential, commercial, industrial, institutional, and agricultural water supply facilities.

4. To the maximum extent practicable, the plan should assure that the groundwater aquifers underlying the Region are wisely used. The plan should identify those areas where groundwater is the optimum source of supply and those areas where Lake Michigan is the optimum source of supply. The plan should avoid unacceptable depletion of the groundwater aquifers underlying the Region. Consideration should be given in the plan to artificial recharge of, storage in, and recovery from the groundwater aquifers underlying some areas of the Region.
5. Inland surface water resources have not, to date, constituted an important source of water supply within the Region. The planning should consider the use of these resources giving due consideration to potential environmental impact.
6. That all existing and proposed water use within the Region be metered or otherwise quantified; that programs will be instituted by all utilities operating within the Region to detect and control leakage; and that the potential application of water conservation practices will be duly considered.
7. That public water supply service will not be provided within those areas of the Region proposed in the adopted regional land use plan to remain in rural uses.
8. That the task of preparing, adopting, and implementing a regional water supply plan will require close and continuing cooperation among the various levels, units, and agencies of government concerned. Toward this end, the plan will specifically address the legal, administrative, and fiscal issues in plan implementation; and will contain jurisdictional, as well as functional, elements.
9. That full use will be made of all existing and available surveys, studies, reports, and other data which may influence, affect, or be required for the proposed work and that additional data collection activity will be considered only as necessary to develop data essential to plan preparation not available in the existing databanks.
10. That current state-of-the-art techniques will be used in the preparation of the regional water supply plan.

It is intended that the proposed planning program will culminate in the preparation and adoption by the Commission of a regional water supply plan selected from among alternative plans considered for the provision of public water supply services to the existing developed areas of the Region and for the extension of such service to developing areas of the Region, in a manner consistent with the adopted regional land use plan, the adopted regional sanitary sewerage system plan, and the adopted areawide water quality management plan. The alternative plans which provide the basis for final plan selection shall be composed of various combinations of plan elements, including land use; sanitary sewerage; and potential sources of supply, including Lake Michigan and shallow and deep groundwater aquifers underlying the Region.

## STUDY DESIGN

The descriptions of the work elements that are recommended to comprise a regional water supply planning program are presented in this prospectus with sufficient detail to provide an adequate guide for the conduct of the necessary work. Generally, it should not be necessary to develop a detailed study design for the planning program, nor to develop staff memoranda to specify the manner in which data are to be gathered, presented, and analyzed, nor the manner in which projections and forecasts are to be prepared. The investigative and forecasting procedures to be applied have been well developed by the Regional Planning Commission during its over 40 years of experience with such complex planning programs as the regional land use, transportation system, sanitary sewerage system, and water quality management planning programs. As applicable, the Commission's developed techniques would be applied in the water supply planning program.

Nevertheless, some staff memoranda may need to be prepared in order to define more fully or precisely the scope and content of some work elements which have not been encountered in previous Commission work programs. In such instances, the memoranda should specify the scope and content of the work elements concerned together with the time and resources required to perform the particular work element.

An important element of the study design will be identification of the organizational structure for the conduct of the recommended planning program. The constitution of the Advisory Committee structure required for the conduct of the planning program in a collegial, cooperative, intergovernmental manner will have to be revisited, a determination will have to be made as to whether or not the Advisory Committee structure created for the preparation of the study prospectus will be adequate to provide the necessary guidance to the conduct of the study; whether the Committee should be expanded or reconstituted; and whether or not the Committee structure should be split into technical and intergovernmental coordinating committees, the former consisting of professional staff of concerned Federal, State, and local units and agencies of government and the latter of elected public officials.

With respect to the organizational structure and the conduct of the proposed planning program, the study design, importantly, will have to determine how the overall management of the planning program will be effected; and what elements of the work program are to be conducted by Regional Planning Commission staff and what elements are to be conducted by consultants specifically retained for the elements concerned.

Commission staff skills available for use in the planning program will include skills in demographic and economic studies; land use planning; natural resource base related studies; sanitary sewerage, stormwater management, and flood control planning; and park and related open space planning. Consultant skills required may include water supply system simulation modeling, water supply planning and engineering, hydrogeology, utility financing, and water law.

## **FORMULATION OF OBJECTIVES AND STANDARDS**

The formulation of a set of water supply management and system development objectives is an essential task which will have to be accomplished before alternative plans can be prepared and evaluated and a recommended plan selected. The objectives must be related in a demonstratable way to alternative water supply and management programs and related system development proposals through a set of quantifiable standards. Only if the objectives are clearly related through the standards to water supply management

and development, and subject to objective test, can a choice be made from among alternative plans in order to select that plan which best meets the agreed-upon objectives.

In scope, the water supply management and system development objectives and standards may be expected to range from general objectives relating to the extension of adequate water supply service to the existing and planned urban and rural areas of the Region to detailed standards relating to the determination of system capacity and demand. Particular attention will have to be focused upon objectives and standards relating to the conservation and wise use of the groundwater aquifers underlying the Region and on the relationship of water demand to population, household, and economic activity levels within the Region. The standards should be suitable for use in county and local, as well as regional, water supply system planning and engineering.

Formulation of the necessary objectives and standards will have to be preceded by appropriate studies. The objectives and standards should reflect good current planning and engineering practice and be amenable to adoption by all levels, units, and agencies of government concerned.

## **INVENTORY**

Reliable planning and engineering data collected on a uniform areawide basis are essential to the formulation of a sound regional water supply plan. Consequently, inventory becomes the first operational step in the planning process growing out of the study design. Much of the data required can be collated from the files of the Regional Planning Commission and the public water supply systems operating within the planning area. Some of the data may have to be collected; that is, obtained by direct measurement as a part of the planning program. The following inventory operations will have to be conducted as a part of the proposed planning program.

1. Mapping  
Essential to any water supply planning effort is definitive knowledge of the topographic and cultural features of the planning area. Such knowledge can only be adequately obtained from topographic and cadastral maps of the required scale and accuracy. Information will be required on such natural features of the planning area as relief; on watershed

boundaries, including especially on the location of the subcontinental divide; on the location of lakes and streams and of associated floodlands; and on wetlands and woodlands; as well as on such manmade features as streets and highways, railways, major and minor structures, stormwater retention facilities, and on real property boundary lines and municipal corporate limit lines.

a. General Base Maps

General base maps of the Region will be required to provide a medium for recording and presenting in graphic form the results of the planning studies as well as the natural and manmade features of the Region. Regional base maps have been prepared by the Commission and are available for use in the planning program. These maps portray each county in the Region at three scales—1:24000, 1:48000, and 1:96000. These maps are available in digital as well as hardcopy format and can be readily assembled to cover all necessary parts of the planning Region, such as individual water supply system service areas. These base maps can be expanded or reduced in scale for use in various phases of the planning program and show among other information: all lakes, streams, and watercourses; all streets and highways; all railways; all U.S. Public Land Survey system township, range, and section lines; and all civil division boundaries. The maps are compiled to National Map Accuracy Standards utilizing the Wisconsin State Plane Coordinate grid, South Zone, as the map projection.

b. Large Scale Topographic and Cadastral Maps

Large scale—1:2400 and 1:1200—topographic and cadastral maps are available for approximately 1,813 square miles, or about 67 percent, of the total area of the Region. These maps have been prepared to Commission promulgated standards and are based upon a monumented system of horizontal and vertical survey control which combines the U.S. Public Land Survey and State Plane Coordinate systems and permits the accurate correlation of topographic and

real property boundary line data. These maps provide the basis for the creation within the Region of automated parcel-based land information systems by the constituent counties and municipalities. The topographic maps show relief by contours having a vertical interval of two feet. The topographic maps meet National Map Accuracy standards; the cadastral maps meet Commission promulgated standards. These large-scale maps will be available in both digital and hard copy formats for use in the planning program.

c. Orthophotographs

Orthophotographs are available for the entire Region at a scale of 1:2400 in digital format and 1:4800 in both digital and hard copy format. These orthophotographs were obtained by the Regional Planning Commission in April 2000 and will be available for use in the planning program.

2. Climatological Data

Certain climatological data will have to be assembled for use in the water supply planning program. These data should include definitive information on ambient air temperatures, including seasonal and monthly maxima and minima averages; precipitation, including annual, seasonal, and monthly maxima and minima averages; and on annual and seasonal patterns and frequencies; data on snowfall accumulations, including seasonal patterns and frequencies; data on droughts, including dates of occurrence, intensity, duration, and frequencies; and data on frost depths within the planning area.

Much of the needed climatological information has been collected and compiled by the Regional Planning Commission from records of the U.S. Weather Bureau and other agencies as part of the comprehensive regional planning program. Accordingly, no new data collection activities are contemplated in this respect. All of the available data, however, will have to be collated and presented in a form suitable for water supply planning and facility design.

### 3. Surface Water Data

Data will have to be gathered on the levels, and on fluctuations in the levels, of the major inland lakes of the Region that have significant groundwater inflows or outflows, including at least 62 such lakes which are classified as seepage, or groundwater-fed lakes. The data will also have to be collated on streamflows at the 28 streamflow gaging stations within the Region. For the streams, the data should include the tributary drainage area and streamflow discharge-duration-frequency relationships with emphasis upon low, as well as high, flows. The adequacy of the existing stream gaging station network will be evaluated, and recommendations may be made for the installation, as may be found necessary or desirable, of additional stations.

The Regional Planning Commission has, since 1963, in cooperation with the Cities of Kenosha, Muskego, and Racine, the Town of Delavan, Waukesha County, the Fontana-Walworth Water Pollution Control Commission, the Geneva Lake Environmental Agency, the Walworth Metropolitan Sewerage District, the Milwaukee Metropolitan Sewerage Commission, the Illinois Department of Transportation, the Wisconsin Department of Natural Resources, the U.S. Army Corps of Engineers, and the U.S. Geological Survey carried on a streamflow gaging program within the Region. As of 2000, a total of 28 continuous recording streamflow gages were in operation on stream reaches originating or ending, lying entirely within, the Region. In addition, there were 24 continuous recording streamflow gauge sites within the Region at which streamflow gaging stations had been operated, but at which the operation was discontinued upon an adequate period of record having been obtained. As of 2000, the periods of record for these gaging stations and sites varies, ranging from a minimum of two years for special purpose gauges to a maximum of over 60 years for some of the permanent long-term stations. The Regional Planning Commission has, as part of its regional flood control planning efforts, conducted hydrologic and hydraulic water quality studies of approximately 805 of the 1,150 miles of perennial streams within the Region. These studies have developed

discharge-duration-frequency relationships for the stream reaches concerned.

Given the extensive streamflow gaging network within the Region, and the Commission flood control planning efforts, all of the lake level and streamflow data necessary for the water supply planning program should be available in the Commission planning data bank. The data will, however, have to be collated in preparation for analysis.

### 4. Groundwater Data

Given the degree of dependency of much of the Southeastern Wisconsin Region upon groundwater as the primary source of supply, definitive data must be assembled on the hydrogeology of the groundwater aquifers underlying the Region, including data on the historical consumption of groundwater and the historical progression of water levels, or potentiometric surfaces, throughout the primary aquifers. The data required should include data on the permeability, transmissibility, and specific capacities of the aquifers, and the susceptibility of the aquifers to contamination. Because many lake levels, low streamflows, and wetland complexes are maintained by groundwater discharges, the relationships between the groundwaters and surface waters of the Region must also be established.

In 1994, the Commission entered into a cooperative agreement with the Wisconsin Geological and Natural History Survey providing for the conduct of a regional groundwater resource inventory and analysis. The extensive work entailed was completed in 2001, and a report setting forth the findings of the inventory and analysis was published in September of this year. Utilizing existing well logs and available geological survey and detailed soil survey data, definitive data were developed on such factors as depth to bedrock, depth to water table, groundwater flow patterns, potential for groundwater contamination, and sources of groundwater contamination. A series of county maps was developed at a compilation scale of 1:48000 presenting the results of the inventory and analysis, the mapped data being available in both hardcopy and digital format. The series

included maps showing the topmost bedrock units and specifically the areal extent of the Maquoketa shale unit; depth to bedrock; bedrock outcrops; depth to water table, water table elevation; potentiometric surfaces for units deeper than the water table; the surfaces and thicknesses of the primary aquifers underlying the Region; hydrogeologic properties of the surficial deposits, and susceptibility of the shallow aquifer to contamination. The maps were based on carefully designed criteria to be useful in regional and local groundwater protection studies and related land use planning; and the maps, as well as the data and analyses on which the maps are based, are essential for the development of mathematical models that permit simulation of the performance of both the shallow and deep aquifers underlying the Region. The data and maps developed by the regional groundwater resource inventory and analysis will be available and adequate for use in the regional water supply planning effort. In addition, the important groundwater recharge areas will be delineated and mapped. Indeed, the inventory and analyses were undertaken specifically to provide data essential to sound regional water supply planning.

#### 5. Regional Aquifer Performance Simulation Model

In 1976, the Regional Planning Commission, in cooperation with the U.S. Geological Survey, developed a mathematical model that could be used to simulate the performance of the deep aquifer underlying the Regional. The model was intended to permit projections to be made of the effects of the major pumping centers within the Region on drawdowns of the water levels in the deep aquifer. The model was applied to project such drawdowns under alternative pumping rates at the major deep aquifer utilization centers.

In June 1999, the Regional Planning Commission, in cooperation with the Wisconsin Geological and Natural History Survey and U.S. Geological Survey and 35 municipal water utilities which utilize groundwater as a source of supply, undertook the development of a mathematical model that would permit simulation in an integrated manner of the performance of the shallow and deep aquifers underlying the Region. The model was intended to allow

simulation of water levels, and the dynamics of the interactions between the shallow and deep aquifers in a manner adequate to address such issues as the effect of land use activities on the ground water resources, well-head protection, groundwater recharge and storage, well interferences, optimal locations of new water supply wells, water conservation, and optimization of groundwater use. The new regional aquifer performance simulation model is expected to be completed and available for use in a regional water supply planning effort by the end of 2002.

#### 6. Water Quality Data

The suitability of a water supply for various uses is directly related to the quality of the water. It will, therefore, be necessary to establish an understanding of the quality of the surface and groundwater resources of the Southeastern Wisconsin Region and the suitability of the various sources for municipal and industrial uses. The Regional Planning Commission as a part of its areawide land use and water quality management planning efforts, has conducted extensive inventories of stream flows and water quality within the Region. Such surveys were conducted in 1964 and again in 1976, and included the collection of samples at 87 sites in 1964 and 36 sites in 1976, including 23 of the original 87 sites, within the seven-county Region. An extensive, continuing surface water quality sampling program within the greater Milwaukee area is carried out by the Milwaukee Metropolitan Sewerage District. Water quality sampling programs have also been conducted within the Region by the U.S. Geological Survey and the Wisconsin Department of Natural Resources. The analyses of the samples taken under these various programs have included determination of the standard parameters, and defined the physical, chemical, and bacteriological quality of the water. In some instances, data on the heavy metal and pesticide content of the water was also determined. The stream water quality surveys data should be available and adequate for use in a regional water supply planning program.

Water quality data are also available for 62 of the 101 inland lakes within Southeastern Wisconsin. These lake water quality data are

also available and adequate for use in a regional water supply planning program.

Data will also be required on the quality of the groundwater resources of the Region. The data should define the physical, chemical, and bacteriological quality of the water from both the shallow and deep aquifers. The required data will have to be collated from the records of the major public water supply systems and the major industrial wells in operation within the Region. In this respect, the groundwater quality data collated should be adequate to characterize the quality of the water for use by municipal and industrial supply sources and to identify any needed treatment prior to transmission and distribution. The required data are not intended to identify localized problems associated with private onsite sources of water supply.

#### 7. Water Use Data

Data will have to be assembled on historic and current water uses within the Region. The historic and current uses must be identified in terms of total quantity, intensity, and spatial distribution of use by place and time for each of the major municipal and industrial sources of supply, including the two major groundwater aquifers underlying the Region and Lake Michigan. Data should also be assembled on water use for mining, cooling, irrigation, and power, including data on the location and capacity of major onsite water supply wells.

Data will also have to be assembled on the unit cost of supplying water from each of the major sources of supply within the Region, including the municipal Lake Michigan water intakes and treatment plants and the major municipal wells within the Region. In addition to data on the unit costs of supply and attendant treatment, data on the unit costs of storage and transmission will also have to be assembled. The cost data must be adequate for use in available mathematical models for comparative cost analyses of alternative configurations of water supply and transmission. The primary purposes of such cost models are to estimate the total annual cost of construction, operation, and maintenance of alternative water supply systems in a planning area, and to compute the unit cost of water supply under each alternative system configuration to be considered. The unit

costs must include the cost of supply, treatment, storage, and transmission, which costs will vary depending upon the flow requirements of a given service area, the distance of the area from the source, and the water quality of the source.

#### 8. Land Use Data

Since land use is an important determinant of water use, as well as of the potential pollution of sources of supply, a land use inventory will be required for the water supply planning. Such an inventory must provide definitive data on the existing and probable future amount, type, intensity, and spatial distribution of the various land uses in sufficient detail to enable the establishment of historic patterns and trends and provide a basis for the preparation of areawide land use and related water supply plans.

Supplementary data may have to be collected on market values, taxes on land and improvements, local land use plans and zoning ordinances, and the suitability of specific sites that may be required for the development of alternative water supply system configurations within the Region.

The Regional Planning Commission has periodically, since 1963, conducted definitive inventories of the existing land use patterns within the Region. The regional land use inventory provides data on 67 categories of land use. The land use inventory data are available and adequate for use in a regional water supply planning program.

#### 9. Demographic and Economic Data

It will be necessary to inventory the socio-economic factors which underlie urbanization within the Region and the demand for land and water resources. Data will be required on the historic and current resident population, household, and economic activity levels within the Region. The socioeconomic data will have to be available for relatively small geographic areas that can be aggregated into configurations representing existing and alternative future water supply system service areas. The data will have to be in a format that permits collation of historic and existing population, household, and economic activity levels with historic and current water use.

Demographic and economic studies required for regional land use, transportation, and public infrastructure system planning have been conducted periodically by the Commission since 1963. The data are available by U.S. Public Land Survey section, are available and adequate for use in a regional water supply planning program.

#### 8. Natural Resource Base Data

Because of the relationship between natural resource conservation and recreational use and water supply facilities, definitive data will be required on the natural resource base of the Region. The data should include data on the location, extent, and quality of wetland, woodland, and wildlife habitat areas within the Region, and on the location and extent of related park and open space reservations. The data should include the identification of natural areas and critical species habitats requiring protection, and on any potential water supply reservoir sites having natural resource conservation and recreational use potential. Data will also be required on the location and extent of the floodland areas within the Region, and on the location and extent of commercially workable mineral deposits.

The Commission has, since 1963, periodically inventoried the woodland, wetland, and wildlife habitat areas of the Region and has identified natural areas and critical species habitats requiring protection and management. The mapped data have been compiled on ratioed and rectified aerial photos, having a scale of one inch equals 400 feet, and are available in hardcopy and digital format. The Commission has also conducted hydrologic and hydraulic studies to determine the 100-year recurrence interval flood stages along about 805 miles of stream channel. The related 100 year recurrence interval flood hazard lines have been mapped on 1 inch equals 100 feet and one inch equals 200 feet scale, two foot contour interval topographic maps.

The Commission has also mapped all existing park and outdoor recreation sites within the Region, and has delineated Commission defined environmental corridors within the Region. The environmental corridors encompass concentrations of natural resource elements, including

woodlands, wetlands, wildlife habitats, surface waters and associated floodlands and shorelands as well as sites having cultural and recreational value. Importantly, these corridors also encompass areas of both groundwater recharge and discharge within the Region. The corridors represent a composite of the best remaining elements of the natural resource base of the Region and the adopted regional land use plan recommends the preservation of these corridors in natural open uses. Such preservation is essential to the maintenance of a high level of environmental quality within the Region, to the protection of its natural heritage and beauty, and to the provision of invaluable opportunities for outdoor recreational and educational pursuits. The exclusion of urban development from these corridors will also help avoid the creation or intensification of such serious and costly problems as flood damages, water pollution, wet basements, building and pavement foundation failures, and excessive infiltration of clear water in sanitary sewerage systems.

The primary environmental corridors of the Region encompass an area of about 474 square miles, or 18 percent of the total area of the Region. The location, extent, and preservation of these corridors must be an important consideration in any regional water supply planning program.

#### 9. Public Utility Facilities

An inventory of the existing and proposed public utility service areas within the Region, including particularly existing and probable future sanitary sewer and water supply service areas, will be required. The sanitary sewer system service areas within the Region, existing and proposed, have been delineated by the Commission in cooperation with the Wisconsin Department of Natural Resources as a part of its areawide water quality management planning program. The sanitary sewerage system service areas, the attendant sewage treatment plant locations and major trunk sewer configurations have been mapped at a scale of 1:24,000 from system plans acquired at various larger scales for individual municipal and sanitary district facilities. These sanitary sewerage system maps have been maintained current through the year 2000.

The Commission, in 1964 and periodically since then, has also completed inventories of the service areas of the municipal water supply systems within the Region. The service areas have been mapped at a scale of 1:24,000 and are current through 1995 and currently are being updated to reflect year 2000 conditions. The service area data will have to be supplemented by mapping showing the location, sizes, and capacities of the major Lake Michigan water intakes and treatment plant locations, the major municipal well locations, the major transmission lines, the water storage facilities, and the location and configuration of pressure zones.

The Commission inventory data on the existing municipal water supply facilities within the Region will have to be carefully reviewed and brought to a current state as of the base year of the water supply planning program. Any deficiencies in the available inventory data due to a lack of adequate records may have to be filled by data collection operations, including, if necessary, field surveys. In addition, current data will be required on the service area resident populations, households, and employment levels served by the existing systems for correlation with water use data.

#### 10. Local System Plans

All locally prepared water supply system plans will have to be collated for use in the regional system plan preparation. The information assembled should include engineering reports prepared by municipal water utilities, together with adopted system improvement and extension plans, and any such plans currently under preparation. Particular attention will need to be given to infrastructure replacement, as well as expansion, needs, and plans.

#### 11. Water Law Inventory

A careful inventory of the legal framework governing the planning, engineering, financing, operation and maintenance of municipal water supply systems within the Region will be required. The inventory should include a review of permits and orders issued by the Wisconsin Department of Natural Resources and its predecessor agencies for high capacity wells, for maintenance of lake levels, and for maintenance of stream flows; decisions by the Wisconsin Public Service Commission

affecting the planning, engineering, construction, operation, maintenance, and financing of municipal water supply facilities within the Region, including matters affecting water rates; and policies and practices followed by the major municipal water utilities operating within the Region, particularly those which may have intermunicipal service agreements for water supply. Importantly, the water law inventory should include analyses of the International Great Lakes Charter, and of the Federal and state laws affecting the use of Lake Michigan water, and the diversion of such water across the subcontinental divide traversing the Region.

#### 12. State-of-the-Art of Water Supply Technology and Administration

A state-of-the-art study should be carried out to ascertain the current and probable future status of the technology applied in water supply source development, and water treatment, transmission, and storage, including monitoring and control systems and other appurtenances that might affect the formulation of alternative water supply plans and the selection of a recommended plan. Particular attention should be given to such emerging techniques as use conservation; and aquifer recharge and storage; and stream flow and lake level augmentation. The study should include information on pertinent unit costs. The study should also provide data on the status and advantages and disadvantages of providing supply through private corporations as opposed to public utilities.

#### 13. Related Water Supply Conditions and Planning

It is recognized that important aspects of water supply planning, such as groundwater aquifer and surface water characteristics, are inter-regional in nature. However, it is also expected that the majority, as well as the most difficult and important, of the water supply problems of the seven-county Southeastern Wisconsin Region can be soundly addressed by focusing on water resources and the uses of those resources within the Region. Notwithstanding interregional factors will be considered as may be found necessary and to the extent practical in the inventory phase of the proposed water supply planning effort. Available data on ongoing water supply planning in the north-eastern Illinois area and in Wisconsin counties adjacent to the Southeastern Wisconsin Region

will be reviewed and collated, as needed. In this regard, it should be noted that the regional groundwater aquifer performance simulation model previously noted has been developed considering groundwater conditions in an area extending beyond the boundaries of the seven-county Southeastern Wisconsin Region in order to properly delineate groundwater divides located in the surrounding area and to establish appropriate boundary conditions for the model.

## **ANALYSES AND FORECASTS**

Inventories provide factual information about historic and current situations. Analyses and forecasts prepared utilizing the inventory information are necessary to provide estimates of future needs. With respect to water supply, these future needs must be determined from a sequence of interlocking forecasts. Demographic and economic activity projections and forecasts provide estimates of future growth within the Region. These projections and forecasts can, in turn, be translated into future demands for the various types of land uses, into land use plans, and attendant water use. These future demands for water can then be scaled against the existing supplies and the existing treatment, transmission, and storage facility capacities, alternative plans formulated to meet identified deficiencies, and a recommended plan selected from among the alternatives.

1. **Technical Analyses of Climatological, Surface Water, Groundwater, Water Quality, and Water Use Inventory Data**  
Analyses of the climatological, surface water, groundwater, water quality, and water use inventory data collated and collected under the program inventories will be required to establish functional relationships pertinent to sound water supply planning and facility design. The analyses of the climatological data should include the development of severity-frequency data for droughts as related to the availability of water supplies from both surface and groundwater sources, as well as the development of design-related criteria such as frost depths. Analyses of the surface water data should include the preparation of maps identifying effluent and influent lakes and stream reaches pertinent to the determination of the relationships to groundwater discharge and recharge. Streamflow-frequency-duration data should be developed for designated stream

reaches. Statistical data should be developed on high, low, and average lake levels. The surface-water-related analyses should be limited to those lakes and streams which might be used as a source of water supply, or which might be affected by the use of groundwater as a source of supply.

The groundwater inventory data, as previously described, is in a form ready for use in the water supply planning. The surface and groundwater quality data are available but will have to be assembled in a form suitable for use in the water supply planning program. Data on historic and current population, household, and employment levels, and on land use will have to be related to water use data to establish water supply planning and facility design standards.

As already noted, some of the required analyses have been completed by the Commission under its areawide water quality management and comprehensive watershed planning programs; and, importantly, under the hydrologic studies of the groundwater aquifers underlying the Region recently completed by the Commission, and will only need to be reviewed for water supply planning purposes. Also as already noted, other analyses will have to be conducted as required for sound system planning and engineering procedures.

Analyses will be conducted of inventory data obtained on water supply planning in the areas immediately surrounding the seven-county Southeastern Wisconsin Region. Such analyses will include review and incorporation as may be found appropriate of ongoing or recently completed groundwater and water supply plans prepared for adjacent areas.

2. **Technical Analyses of Population, Household, Economic Activity and Land Use Data and Water Use Projections and Forecasts**  
A water supply plan for the Southeastern Wisconsin Region should be consistent with the land use plan prepared by the Regional Planning Commission and adopted by that Commission and by the county boards of the seven counties concerned. The adopted regional land use plan is based upon a careful set of interlocking forecasts of population, house-

holds, and employment prepared by the Commission. The current forecasts and the currently adopted regional land use plan are for the design year 2020. Historic and current year 2000, as well as planned year 2020, population, household, employment, and land use data, are available for U.S. Public Land Survey system one-quarter sections. The Commission is in the process of updating the regional land use plan to the design year 2030; and is, in addition, extending the socioeconomic forecasts to the year 2040. Thus, the socioeconomic and land use data required for water supply planning are available from the Commission planning databank in a form suitable for water supply planning. The population, household, economic activity, and land use projections and forecasts will have to be translated into projections and forecasts of the probable future demand for water by the various land uses, and by potential demand on the two aquifers and Lake Michigan.

### 3. Technical Analyses of

#### Natural Resource Base Data

The Regional Planning Commission has adopted a regional park and open space plan and a regional natural areas and critical species habitat protection and management plan as elements of a comprehensive plan for the physical development of the Southeastern Wisconsin Region. These two plan elements are reflected in the adopted regional land use plan and pertinent data on woodlands, wildlife habitat, and on environmental corridors—like the socioeconomic and land use data—are available by U.S. Public Land Survey system one-quarter section. Therefore, the historic and current natural resource base data and plan proposals for the protection of the natural resource base of the Region are available in the Commission planning databank in a form suitable for water supply planning.

### 4. Technical Analyses of the

#### Existing Water Supply Facility Data

The inventory data collated and collected on the existing public water supply facilities within the Region will have to be assembled in a form suitable for system planning. This will require the preparation of water supply treatment, transmission, and storage network maps at a uniform scale suitable for use in capacity analyses by simulation modeling. Such network

maps should be prepared and would have to show, in addition to the pertinent conduit dimensions and materials of construction, the location and configuration of the transmission mains, the location of elevated and ground storage reservoirs, the location of pumping stations, the location of wells by type of well, the location of Lake Michigan water intakes and treatment plants, the estimated age of the various components of the systems, the tributary service areas at critical locations in the systems, and a coding system for computer application.

The existing facilities will have to be analyzed to identify existing and excess capacities available to serve existing and projected water demands. Attention will have to be focused on the feasibility of improving, expanding, and consolidating existing systems to provide service to any developing areas of the Region, as well as to substitute Lake Michigan water for groundwater as a source of supply. The specific capacities of the existing sources of supply as obtained at the Lake Michigan water intakes and treatment plants; and the potential yields of the major groundwater aquifers and associated hydrologic and ecologic effects within the Region will have to be determined.

The relationships existing between the existing water supply facility service areas and between such service areas and planned sanitary sewerage system service areas will have to be analyzed. Particular attention will have to be given in the analyses to the identification of any conflicts between, or duplications of service areas, as indicated by locally prepared plans. Importantly, opportunities for consolidation of systems should be identified.

### 5. Analysis of Water Law Inventory Data

The information assembled in the water law inventory will have to be analyzed to determine potential impacts on water supply design. Particular emphasis will have to be placed upon determination of the legal viability of specific alternatives under present International Charter, Federal and State law, and State regulatory policies and practices. The existing legal structure may constitute a significant constraint on the development of alternative plans, particularly with respect to the import-

ance of the subcontinental divide traversing the Region on the availability of Lake Michigan water as a source of supply.

6. Analysis of State-of-the-Art of Water Supply Technology

The information assembled in the state-of-the-art study of water supply technology will have to be analyzed to determine its impact on water supply system design alternatives. Trade-offs between the capacities of the supply, transmission, and storage facilities, and alternative control system configurations must be analyzed. Particular emphasis will have to be given to any emerging technologies that might affect the relative use of Lake Michigan and the groundwater reservoirs underlying the Region as sources of supply in various subareas of the Region. Such technologies may include, but are not limited to, the use of the shallow and deep aquifers as storage reservoirs, both for Lake Michigan water and for groundwater, the former to change the balance of Lake Michigan and groundwater use within the Region, and the latter to increase the efficiency of groundwater use within the Region.

## **PREPARATION, TEST, AND EVALUATION OF ALTERNATIVE PLANS**

A sound regional water supply planning program should include the preparation and presentation of a number of feasible alternative water supply plans for comparative analyses, and public evaluation prior to selection of a recommended plan for adoption and implementation. Alternative plans may include proposals for the use of various combinations of groundwater sources of supply as well as for the expansion of the use of Lake Michigan as a source of supply. Existing and probable future water quality conditions must be given careful consideration in the development of the alternative plans. Water conservation should also be given consideration in the formulation of alternative system plans, including programs for the detection and control of leakage in public water supply systems; the development of conservation measures, the use of water-conserving plumbing fixtures and products; and in times of drought, the use of control measures for nonessential

uses. The design year of the alternative plans should—to match the design year of the new regional land use plan—be 2030. As necessary, sensitivity analyses could be conducted using socioeconomic forecasts to the year 2040.

Each alternative plan must be quantitatively tested to establish the ability of the proposed facilities to meet existing and forecast water supply demands as well as to provide a level of water quality within adopted standards. Each alternative plan will carry with it potential impacts on land and water use patterns, allocation of resources, public investment policies, and broadly defined community benefits and costs. Therefore, the related physical, economic, social, and legal impacts of the alternative plans considered must be comparatively analyzed and presented in a clear, understandable form to elected public officials and interested citizens for evaluation. This must be done through a planning report describing the corollary effects and broad benefits and costs of each alternative plan considered.

## **PLAN SELECTION AND ADOPTION**

Following public informational meetings and hearings on the alternative plans considered, one plan should be selected as the recommended plan to be used to guide the long range development of regional water supply systems within Southeastern Wisconsin. The recommended plan may consist of one of the alternative plans considered, or may be a composite of the best features of two or more of those alternative plans and would have a design year of 2030.

The recommended plan should clearly delineate those areas of the Region which are to be served by public water supply systems. Existing, committed, and authorized service areas should be distinguished from recommended service areas. The plan should indicate the physical facilities necessary to provide the recommended water supply service. This should include the approximate location and configuration and size and capacity of the Lake Michigan water intakes and treatment plants, of the municipal wells, of the water transmission mains and pumping stations, and of the major storage facilities. Importantly, the aquifers to be used as sources of supply should be identified. Existing, committed, and authorized facilities should be distinguished from recommended facilities. The types and levels of treatment required

should be indicated. Estimates of system development costs should be prepared and presented, along with capital improvement programs for each of the subsystems concerned based upon a recommended staging of the recommended plan to the design year 2030.

The recommended water supply plan should be based upon careful analyses of the capacities of the existing facilities, probable future load factors, water law constraints, and the organizational structures and management policies of the existing water utilities. The water supply systems should be designed as a set of integrated subsystems for the Region as a whole, with each link in each subsystem carefully fitted to projected loadings and the affect of each proposed facility on the remainder of the subsystem and on future land use development patterns quantitatively tested and evaluated. An environmental assessment should be developed and presented for the recommended plan.

## **PLAN IMPLEMENTATION RECOMMENDATIONS**

Upon agreement on a recommended water supply plan and supporting cost data, recommendations should be made with respect to the organizational and financial arrangements under which the recommended plan and its component subsystems can be implemented. The fiscal implications of the recommended plan should be determined and any Federal and State financial assistance for the plan identified. Recommended organizational structures, and capital improvement programs for each of the subsystems concerned, and related financial programs for plan implementation should be outlined. Impacts of the recommended plan on water costs should be determined. Any necessary legislative, regulatory, and administrative measures required for plan implementation should be addressed. The possibility of utilizing private corporations for the provision of water supply services to portions of the Region should be investigated.

## **PLANNING REPORT**

A planning report should be prepared and published setting forth a clear graphic and written description of the inventory findings, the analyses and forecasts made, the alternative plans considered, and the

recommended plan. The reasons for the selection of the recommended plan from among the alternatives considered should be clearly set forth, and the required plan implementation measures specified. An environmental assessment of the recommended plan should be included in the planning report.

The planning report should provide an adequate basis for the adoption of the recommended plan by the Federal, State, County, and local units and agencies of government concerned. To this end, the report should provide clear statements with respect to:

1. The purpose of the regional water supply planning program and of the resultant report as an instrument for public policy determination;
2. The existing and potential water supply problems of the Region as revealed by the inventories, analyses, and forecasts prepared under the planning program, with particular emphasis upon those areas of the Region in which the water uses are placing, or may be expected to place, excessive demands on the groundwater aquifers underlying the Region and upon the existing water supply infrastructure systems serving the various subareas of the Region;
3. The alternative means available for addressing the water supply problems of the Region, including any potential water shortages;
4. The evaluation of the benefits and costs broadly defined of the alternative means considered for adequately providing a long-term, sustainable water supply for the Region; and
5. The critical decisions that need to be made in light of the identified water supply problems and the interrelationship of those problems to long-term urban land use development and resource conservation within the Region.

Particular attention should be focused in the report on those aspects of the recommended plan relating to the extension of existing water supply facilities to presently undeveloped areas of the Region lying between urban growth centers, and to such areas lying astride the subcontinental divide traversing the

Region, and in delineating desirable limits to the extension of Lake Michigan water to areas of the Region lying west of the subcontinental divide.

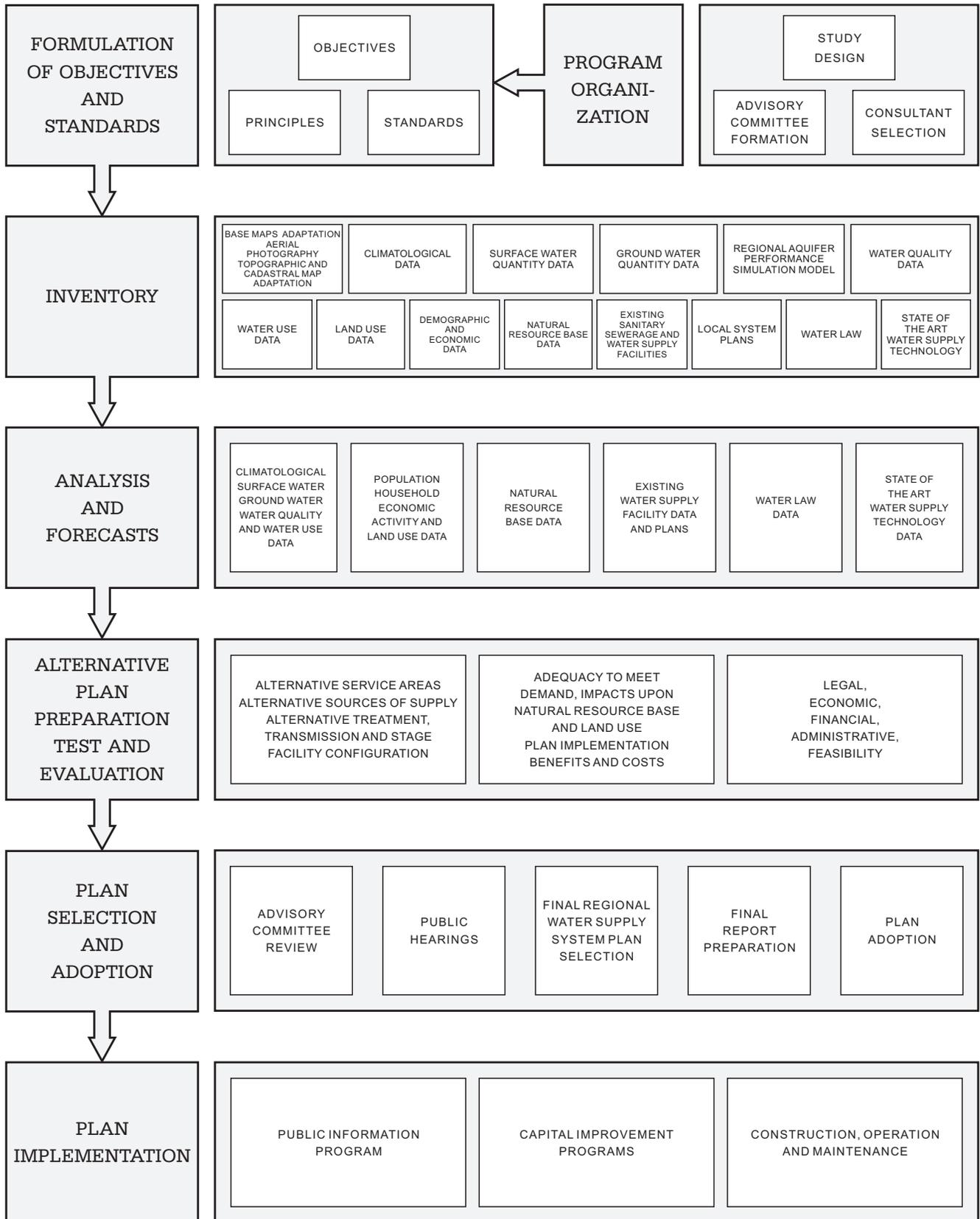
The major work elements comprising the recommended regional water supply planning program are summarized in Figure 4.

## **TIME SCHEDULE**

An estimated time schedule for the accomplishment of the major elements of the proposed water supply plan program is provided in Figure 5. This schedule is subject to revision upon the preparation of any needed detailed study design memoranda as work on the planning program proceeds.

Figure 4

MAJOR PHASES OF THE REGIONAL WATER SUPPLY PLANNING PROGRAM



Source: SEWRPC.



## Chapter V

# ORGANIZATION FOR THE CONDUCT OF A REGIONAL WATER SUPPLY PLANNING PROGRAM

### INTRODUCTION

The proper conduct of the proposed planning program will require the assumption by a public agency of responsibility for the administration of the study; a means of providing the technical skills required; and identification of an intergovernmental coordinating mechanism to guide the conduct of the study in a collegial manner. Alternative approaches to fulfilling the administrative direction, technical staffing, and intergovernmental coordination required were explored. After careful consideration, the following organization for the study was recommended.

### ADMINISTRATIVE DIRECTION

It is recommended that the Southeastern Wisconsin Regional Planning Commission assume responsibility for the administrative direction of the study. The Commission has a long record of successful administration of major planning and engineering studies for its constituent counties and local units of government and is a neutral, disinterested party with respect to the provision of water supply within the Region.

### TECHNICAL STAFFING

It is recommended that the necessary technical staff skills be provided by a combination of Commission staff, consulting engineering and legal firms, and by the Wisconsin Geological and Natural History Survey. The skills required clearly include water supply

planning, engineering, and hydrogeology. The skills required also include all aspects of such planning and engineering broadly defined, including the knowledge, ability, and experience to deal with the legal, administrative, and fiscal, as well as systems engineering, elements of the planning work.

It is further recommended that the Commission staff be responsible for the following work elements. With respect to study design, the Commission staff should be responsible for the detailed study design and study organization elements required. With respect to the inventory operations, the Commission staff should be responsible for the mapping, climatological data, surface water data, groundwater data, regional aquifer performance simulation model provision, water quality data, water use data, land use data, demographic and economic data, and natural resource base data elements. With respect to the analyses and forecasts, the Commission staff should be responsible for the natural resource base element of the analyses and forecasts. Finally, the Commission staff should be responsible for the publication of the required planning report. The writing of that report would, however, be a cooperative effort between the Commission staff and the engineering consultants engaged for the conduct of the planning program.

An engineering consulting firm, or consortium of such firms, should be retained to conduct all other elements of the planning program, except the conduct of the water law elements. A number of engineering consulting firms could provide the necessary expertise

and the most highly qualified of these firms should be engaged for the conduct of the desired work. The engineering consulting firm engaged should be responsible for recommending objectives and standards; and for the following inventory elements: public utility facilities data, local system plans, and state-of-the-art of water supply technology. The firm should be responsible for the conduct of all of the analyses and forecasts except those relating to the natural resource base; for the preparation, test, and evaluation of alternative plans; for plan selection and adoption, and for the plan implementation elements. A legal firm, or consortium of such firms, with appropriate expertise should be retained and be responsible for the water law study. The Commission would also enter into a cooperative agreement with the Wisconsin Geological and Natural History Survey (WGNHS) to conduct the necessary hydrogeologic inventories and analyses. The WGNHS may subcontract some of the work concerned to the U.S. Geological Survey and University academic staff. The preparation of the required planning report would be a cooperative effort of the Commission staff, consulting firm, WGNHS and other cooperators, and the legal firm retained to conduct the necessary water law study.

## **COMMITTEE STRUCTURE**

It is recommended that a two-tiered advisory committee structure be provided to guide the conduct of the proposed planning effort. Such a structure would consist of a technical advisory committee and an intergovernmental coordination and policy advisory committee. The membership of the technical advisory committee would be selected to include members of the technical staffs of water utilities, of industrial firms and agricultural enterprises; regulatory agencies, and of environmental organizations and members of the academic community. That committee

would have an important role in guiding the detailed study design, the selection of inventory and analytical techniques, the formulation of objectives and support standards; the design test and evaluation of alternative plans; and the selection of a recommended plan. The committee would review preliminary drafts of the various chapters of the required planning report as those drafts are produced. The committee would also be involved in identifying the financial, administrative, and intergovernmental means for effective plan implementation. It is recommended that the Technical Advisory Committee which guided the preparation of this prospectus be retained as the required technical advisory committee—reconstituted as may be necessary or desirable—to include all of the major technical interests that are involved in water supply system planning, engineering, construction, operation, and maintenance within the Region.

The intergovernmental coordination and policy committee would be comprised of elected and appointed officials representing the local units of government within the Region, and the heads of State agencies concerned with water supply. This committee would be involved in the initial phases of the planning effort by receiving periodic briefings from the Commission staff and through review of actions of the Technical Advisory Committee. The committee would have a particularly important role in the selection of a final plan, acting on recommendation of the Technical Advisory Committee, and in identifying recommended plan implementation methods and procedures. The committee would assist in familiarizing the political, business, and industrial leadership within the Region with the work as it progresses, and in fostering an understanding of the basic objectives of the planning effort, the structure of a recommended plan and of alternatives thereto, and of the implementation procedures necessary.

## Chapter VI

# BUDGET

### COST ESTIMATE

Estimated study costs are set forth in Table 3 and are based upon the scope of work, time schedule, and study organization recommended in this prospectus. Study costs are estimated to total \$913,750, of which the Regional Planning Commission can contribute \$182,500 in the form of in-kind services through its normal regional planning program. This leaves \$731,250 as the cost of the study requiring special funding. In any consideration of these cost estimates, it must be recognized that precise estimates cannot be made in the absence of a detailed study design. This is particularly true with respect to the analytical and alternative plan design phases of the work; since the depth and detail of the analyses required and the number and complexity of the alternative system plans to be considered will become apparent only as the work proceeds. Consequently, the cost estimates presented in Table 3 must be considered tentative with respect to the allocation of the total cost among the various work elements. Changes in this allocation must be expected as the work proceeds. Overall study costs, however, should not vary greatly from those estimated.

### COST ALLOCATION

The advisory committee guiding the preparation of this prospectus deliberated at some length upon the issue of study cost allocation, and directed that three alternative cost allocation strategies be presented for consideration. All of the alternatives assume that the study would be funded over a three year period.

Under the first alternative considered, the study costs would be allocated to the seven counties comprising the Southeastern Wisconsin Region on the basis of equalized real property values. This allocation is consistent with the manner in which the regular ongoing work program of the Regional Planning Commission is funded pursuant to statutory requirements.

Under the second alternative considered, the study costs would be allocated to the counties on the basis of equal shares. Under the third alternative considered, the study costs would be allocated not to the counties, but to the 52 public water supply utilities operating within the seven-county Southeastern Wisconsin Region, on the basis of average annual water pumpage.

Based upon consideration of practicality, as well as equity, the Committee recommended adoption of the second alternative, under which the three-year study costs would be allocated on the basis of equal annual shares to the seven counties. In making this recommendation, the Committee considered that the provision of an adequate and safe water supply was a broad regional issue related to the continued sound social and economic development of the Region as a whole. More specifically, the Committee rejected the alternative that would attempt to fund the study through the public water utilities in the Region, finding that such an approach would be impractical because of the number of such utilities and unfair because a regional water supply plan would benefit all water users within the Region, not just those served by existing public water supply utilities. Consequently,

**Table 3**

**REGIONAL WATER SUPPLY PLAN COST ESTIMATE**

Work Element	Cost
A. Study Design	
1. Detailed Study Design.....	\$ 15,900 <sup>a</sup>
2. Study Organization.....	12,800 <sup>a</sup>
B. Formulation of Objectives and Standards.....	\$ 25,400
C. Inventory	
1. Mapping .....	\$ 5,000 <sup>a</sup>
2. Climatological Data .....	1,000 <sup>a</sup>
3. Surface Water Data .....	12,100 <sup>a</sup>
4. Groundwater Data .....	10,000 <sup>a</sup>
5. Regional Aquifer Performance Simulation Model.....	10,000 <sup>a</sup>
6. Water Quality Data .....	21,300 <sup>a</sup>
7. Water Use Data.....	35,400 <sup>a</sup>
8. Land Use Data .....	2,000 <sup>a</sup>
9. Demographic and Economic Data .....	1,000 <sup>a</sup>
10. Natural Resource Base Data .....	3,000 <sup>a</sup>
11. Public Utility Facilities.....	35,400
12. Local System Plans .....	22,100
13. Water Law .....	50,000 <sup>b</sup>
14. State-of-the-Art of Water Supply Technology.....	70,000 <sup>b</sup>
D. Analyses and Forecasts	
1. Climatological Surface Water, Groundwater, Water Quality, and Water Use .....	\$ 31,800
2. Population, Household, Economic Activity, and Land Use .....	12,600
3. Natural Resource Base.....	3,000 <sup>a</sup>
4. Existing Water Supply Facilities.....	70,800
5. Water Law .....	- _c
6. State-of-the-Art of Water Supply Technology.....	- _c
E. Preparation, Test, and Evaluation of Alternative Plans .....	\$111,600
F. Plan Selection and Adoption .....	\$ 63,000
G. Plan Implementation.....	\$ 55,800
H. Publication of Report.....	\$ 50,000 <sup>a</sup>
Subtotal	\$731,000
I. Travel, Contingencies, and Miscellaneous Expenses .....	\$182,750
Total	\$913,750

<sup>a</sup>To be provided by SEWRPC in in-kind services; total value \$182,500.

<sup>b</sup>Lump sum contract with legal and consulting engineering firms.

<sup>c</sup>Included under related inventory item.

Source: SEWRPC.

**Table 4**

**RECOMMENDED FUNDING  
STRATEGY FOR SOUTHEASTERN  
WISCONSIN REGIONAL WATER  
SUPPLY PLANNING PROGRAM**

County	Percent Allocation	Funding Amount	Cost per Year
Kenosha .....	14.28	\$104,464	\$ 34,821
Milwaukee.....	14.28	104,464	34,821
Ozaukee.....	14.28	104,464	34,821
Racine.....	14.28	104,464	34,821
Walworth.....	14.28	104,464	34,821
Washington...	14.28	104,464	34,821
Waukesha.....	14.28	104,464	34,821
Total	100.00	\$731,248	\$243,747

*Source: SEWRPC.*

the Committee determined that it would be best to fund the study over the entire seven-county Region.

As between the two alternatives that would fund the study over the entire Region, the Committee considered the alternative that would allocate costs equally among the seven counties to be superior to the alternative that would allocate costs to the counties based upon equalized property valuation. This position by the Committee stemmed from a recognition that the equalized valuation alternative would load a disproportionate share of the study costs upon the heavily developed areas of the Region, areas largely already served by public water supply systems. While all residents from the Region would benefit from the plan, a larger proportion of the benefits would accrue to those portions of the Region that are less intensively developed at the present time and that will require the extension of existing or the establishment of new public water supply systems to serve future development.

## Chapter VII

# CONCLUSIONS AND RECOMMENDATIONS

The Southeastern Wisconsin Regional Planning Commission Technical Advisory Committee on Regional Water Supply Planning, upon careful consideration, acted unanimously to submit the following findings and recommendations to the Southeastern Wisconsin Regional Planning Commission.

As documented in Chapter III of this prospectus, eight factors contribute to the urgent need for the preparation at this time of a regional water supply plan for the Southeastern Wisconsin Region:

1. Constraints on the use of Lake Michigan water.
2. The increasing demand for water in areas located west of the subcontinental divide coupled with the relatively rapid decline in water levels within the deep sandstone aquifer, which aquifer comprises the major source of municipal water supply for those municipalities and industries within the Region located west of the subcontinental divide. These two factors continue to require both the development of new sources of water supply for such municipalities and industries and to wisely use the available sources.
3. Under-utilization of the existing Lake Michigan water treatment plant capacities, particularly the capacities of the Kenosha, Milwaukee, Oak Creek, North Shore Water Utility, and Racine water utility treatment plants, and the ability of these plants to provide high quality water to

outlying areas of the Region, thus relieving loadings on the groundwater aquifers.

4. The need to address groundwater quality concerns, including increased dissolved solids content, salinity, and radionuclide content.
5. The need to coordinate individual municipal water supply planning efforts. In the absence of a regional framework plan, increasing conflicts may be expected to develop between the efforts of individual communities to obtain additional sources of supply; certain particularly productive segments of the aquifers underlying the Region may become overutilized; and the availability of Lake Michigan water as a substitute for groundwater as a source of supply will remain uncertain.
6. The need to coordinate water supply planning with land use, transportation, sanitary sewerage, park and open space and natural resource conservation planning. The availability of public water supply is an important determinant of the urban land use pattern of an area. Along with the availability of sanitary sewerage and an adequate level of accessibility as determined by the transportation system, the availability of public water supply influences the type, intensity, location, and extent of urban land use development in an area. Water supply facilities should form coordinated subsystems within the Region and should be designed to promote land use development in accordance with adopted

regional, county, and municipal comprehensive plans. Such comprehensive plans are, in turn, an essential basis for proper determination of the location, configuration, and capacity of the public water supply facilities.

The natural resource conservation and protection element of adopted regional, county, and local comprehensive plans are a matter of increasing concern in water supply planning. The groundwater reservoir systems affect interconnected lake levels, provide the base flow of streams, and contribute to the health of wetlands and wildlife habitat areas. Great care must be taken to assure that the location of major wells and well fields will not adversely affect lake levels, base flows and streams, and important wetlands and wildlife habitat areas.

7. The need to address growing concerns over the security of the water supply facilities in the Region.
8. New statutory planning requirements. The State legislature, in 1999, enacted legislation which requires that the comprehensive plan for the development of the region, as adopted or amended under Section 66.0309 of the Wisconsin Statutes, must consist of at least nine elements. Two of those elements require the preparation of a regional water supply plan. One of the nine elements—an agricultural, natural, and cultural resources element—must address the effective management of ground and surface waters within the planning area. Another one of the nine elements is a utilities and community facilities element, an element that must explicitly address water supply. This element must describe the location, use, and capacity of existing water supply facilities; and provide forecasts of the need for the rehabilitation and expansion of existing water supply facilities and for the creation of new facilities.

Importantly, a water supply plan, to be practical and workable in an urbanizing region such as Southeastern Wisconsin, must not only be prepared on an areawide basis, but must be cooperatively prepared by all of the levels, agencies, and units of government concerned so that joint implementation of the plan is facilitated.

A regional water supply plan would:

- provide accurate and sufficient information concerning water supply sources, both ground- and surface water;
- provide the preparation of projections and forecasts of future water needs by the various major water use categories;
- provide a comparison of future water supply needs to the availability of supplies to meet those needs; and
- provide a framework plan for the delineation of service areas, the development of facilities, and for the sound conservation and use of the water supplies of the Region that would effectively and efficiently meet current and future water needs; and
- provide for the conservation and wise use of the limited surface and groundwater resources of the Region.

Importantly, a regional water supply plan, by coordinating the actions of the public utilities and other water users within the Region, may be expected to achieve substantial savings in public and private investment in water supply facilities.

Preparation of the needed regional water supply plan is technologically feasible and, considering the importance of an adequate and safe water supply to the continued social and economic development of Southeastern Wisconsin, is financially feasible.

The cost of cooperatively preparing a technically sound water system plan for the rapidly urbanizing Southeastern Wisconsin Region is estimated to total \$913,750. Of this total cost, the Regional Planning Commission would provide \$182,500 in the form of in-kind services. This leaves \$731,250 as the cost of the study requiring special funding. If incurred over three years, the annual funding requirement would be \$243,750. The Advisory Committee guiding the preparation of this prospectus recommended that these annual costs be shared equally by the seven constituent counties. Under this cost allocation, each county would be asked to contribute \$34,821 per year for a three year period.

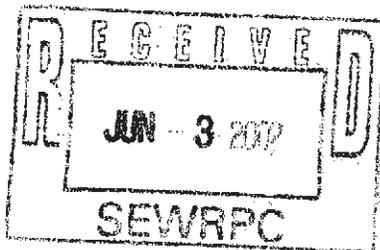
The Committee, therefore, recommends that a regional water supply planning program be established for the Southeastern Wisconsin Region at the earliest possible date; and that the scope, content, techniques, time sequence, staffing, committee structure, and cost allocations for the needed planning effort be as recommended in this prospectus. The Committee respectfully urges the Southeastern Wisconsin Regional Planning Commission to give careful consideration to this prospectus, to act favorably thereon as quickly as possible, and to initiate the necessary planning program as quickly as possible. Some communities within the Region are already facing serious problems with their water supply, including both capacity and quality problems, the latter related particularly to the presence of radionuclides in the present sources of supply. If neglected, water supply may be expected to become a major obstacle to the continued sound development of and to the quality of life in Southeastern Wisconsin. Only within the framework of a sound areawide plan can the conservation and wise use of the water resources of the rapidly urbanizing region be assured.

In conclusion, the Committee acted to stress the urgent need for the Commission to proceed with the recommended planning program as soon as possible, preferably in year 2003. Significant decisions concerning the availability and quality of the existing sources of water supply, the use of those sources, given the pressing existing problems concerning the quality of the groundwater supplies, and the potential extension of the use of Lake Michigan water within the Region will have to be made shortly. In the absence of a regional water supply plan, such decisions made on an expedient short term basis may exacerbate future water supply problems within the Region and impact the ability of, particularly, the public utilities of the Region to meet future needs in a sound and cost effective way. Importantly, a regional water supply plan may be expected to achieve substantial savings in public and private investment in water supply facilities by coordinating the action of the public utilities and other water users within the Region.

## **APPENDIX**

Appendix A

**RESOLUTIONS SUPPORTING THE PREPARATION OF A PROSPECTUS  
FOR THE DEVELOPMENT OF A REGIONAL WATER SUPPLY PLAN**



May 14, 2002

RESOLUTION NO. 2002-20

**RESOLUTION BY THE RACINE COUNTY PLANNING AND DEVELOPMENT  
COMMITTEE SUPPORTING THE PREPARATION OF A PROSPECTUS FOR THE  
DEVELOPMENT OF THE REGIONAL WATER SUPPLY PLAN**

To the Honorable Members of the Racine County Board of Supervisors:

**BE IT RESOLVED** by the Racine County Board of Supervisors that a comprehensive area-wide water supply plan is urgently needed to develop and manage the Region's water resources in an efficient and cost-effective manner that will protect the quality and quantity of the regional water supply for current and future generations.

**BE IT FUTHER RESOLVED** by the Racine County Board of Supervisors that Racine County hereby requests that the Southeastern Wisconsin Regional Planning Commission prepare a prospectus for the development of a water supply plan for the Region, of which Racine County is a part.

**BE IT FURTHER RESOLVED** by the Racine County Board of Supervisors that the prospectus shall identify the need for, the scope and content of, the estimated cost of, a time schedule for, and a recommended means of organizing and funding the desired plan, including the identification of outside funding sources which are anticipated to be available.

**BE IT FURTHER RESOLVED** by the Racine County Board of Supervisors that the Southeastern Wisconsin Regional Planning Commission is urged to create a technical advisory committee to guide the preparation of the prospectus.

**BE IT FURTHER RESOLVED** by the Racine County Board of Supervisors that SEWRPC be requested to present to the seven County Boards of the Region for approval and cooperative implementation.

**BE IT FURTHER RESOLVED** by the Racine County Board of Supervisors that the County Clerk is directed to send a copy of this resolution to SEWRPC.

1 Resolution No. 2002-20  
2 Page Two

3  
4 Respectfully submitted,

5  
6 1st Reading

5/14/02

PLANNING AND DEVELOPMENT COMMITTEE

7  
8 2nd Reading

5/28/02

9  
10 BOARD ACTION

11 Adopted

Yes

12 For

\_\_\_\_\_

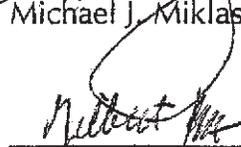
13 Against

\_\_\_\_\_

14 Absent

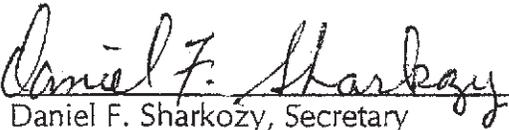
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Michael J. Miklasevich, Chairman

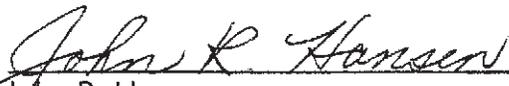
  
Gilbert Bakke, Vice-Chairman

15  
16 VOTE REQUIRED: Majority

17  
18 Prepared by:  
19 Corporation Counsel

  
Daniel F. Sharkozy, Secretary

  
Peter L. Hansen

  
John R. Hansen

  
Thomas Pringle

  
Jeff Halbach

32 INFORMATION ONLY

33  
34 **WHEREAS**, Racine County is charged with the protection of the health and  
35 welfare of its citizens, and the quality of their environs; and

36  
37 **WHEREAS**, the changes in population distribution within Southeastern  
38 Wisconsin have impacted the availability of water supplies in varying ways and placed  
39 increased pressures on groundwater sources; and

40  
41 **WHEREAS**, records have shown that over the past 50 years water levels in the  
42 deep sandstone aquifer underlying much of the Southeastern Wisconsin Region have  
43 declined precipitously due to consumption, and are continuing to decline at a rate of  
44 several feet per year; and

1 Resolution No. 2002-20

2 Page Three

3

4

5

6 **WHEREAS**, tests indicate increasing salinity, radium, and arsenic levels in the  
7 water from the deep sandstone aquifer, as well as localized problems for shallower  
8 aquifers, that may limit groundwater use or be hazardous for human consumption; and

9

10 **WHEREAS**, technically sound water supply management requires consideration  
11 of comprehensive water resources planning addressing both surface water and  
12 groundwater; and

13

14 **WHEREAS**, there may be potential cost-effectiveness advantages to expanding  
15 the uses of Lake Michigan as a source of water supply and to managing groundwater  
16 sources based upon technical area-wide analyses; and

17

18 **WHEREAS**, without a sound plan for the protection and wise use of surface  
19 water and groundwater supplies, significant health, safety, and economic problems may  
20 occur for our citizens and our communities; and

21

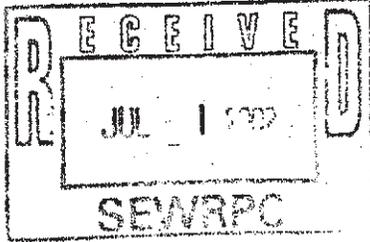
22 **WHEREAS**, the Southeastern Wisconsin Regional Planning Commission is  
23 currently completing a regional groundwater inventory, and is working toward the  
24 completion of a groundwater simulation model for Southeastern Wisconsin.



# COUNTY OF KENOSHA

George E. Melcher, Director  
Department of Planning and Development

Larry B. Brumback, Director  
Division of County Development  
Department of Planning and Development  
19600 - 75th Street, Post Office Box 520  
Bristol, Wisconsin 53104-0520  
Telephone: (262) 857-1895  
Facsimile: (262) 857-6508



June 28, 2002

MR. PHIL EVENSON, EXECUTIVE DIRECTOR  
SOUTHEASTERN WISCONSIN REGIONAL  
PLANNING COMMISSION  
W239 N1812 ROCKWOOD DRIVE P.O. BOX 1607  
WAUKESHA, WI 53187-1607

RE: Resolution of Support for Development of Regional Water Supply Plan

Dear Mr. Evenson:

Please find enclosed a copy of Resolution #24 for support of a prospectus for the Development of a Regional Water Supply Plan adopted by the Kenosha County Board of Supervisors on June 18, 2002 and further approved by Kenosha County Executive Alan Kehl on June 19, 2002. Please keep this office informed as to the progress of this prospectus.

If we can be of any further assistance in the development of this prospectus or if you should have any further questions please feel free to contact this office at your convenience.

Sincerely,

George E. Melcher, Director  
Department of Planning & Development

GEM/dl  
Enclosure



# COUNTY OF KENOSHA

# COUNTY CLERK

Edna R. Highland

1010 - 56th Street  
Kenosha WI 53140  
(262) 653-2552  
Fax: (262) 653-2564

STATE OF WISCONSIN

COUNTY OF KENOSHA

I, Edna R. Highland, am duly elected, qualified and Clerk of the County of Kenosha.

I hereby certify that the attached hereto is a true and correct copy of a resolution or ordinance as adopted by the Kenosha County Board of Supervisors at its meeting held on the 18<sup>th</sup> day of June, 2002.

IN WITNESS WHEREOF, I have executed this certificate in my official capacity this 25<sup>th</sup> day of June, 2002.

*Pam Young/Chief Deputy*  
Edna R. Highland  
County Clerk

(seal)

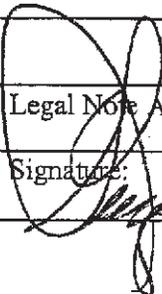
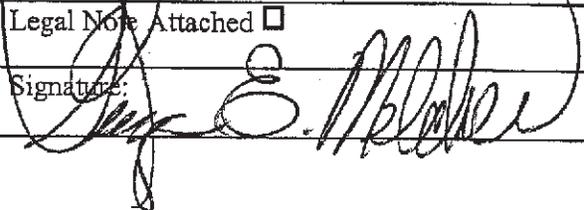
**Kenosha**



**County**

**BOARD OF SUPERVISORS**

**RESOLUTION NO. 24**

<b>Subject: RESOLUTION OF SUPPORT FOR DEVELOPMENT OF REGIONAL WATER SUPPLY PLAN</b>			
Original <input type="checkbox"/>	Corrected <input type="checkbox"/>	2nd Correction <input type="checkbox"/>	Resubmitted <input type="checkbox"/>
Date Submitted: June 18, 2002	Date Resubmitted:		
Submitted By: Land Use Committee			
Fiscal Note Attached <input type="checkbox"/>	Legal Note Attached <input type="checkbox"/>		
Prepared By: George E. Melcher, Director Planning and Development	Signature: 		

- WHEREAS, Kenosha County is charged with the protection of the health and welfare of its citizens, and the quality of their environs; and
- WHEREAS, the changes in population distribution within Southeastern Wisconsin have impacted the availability of water supplies in varying ways and placed increased pressures on groundwater sources; and
- WHEREAS, records have shown that over the past 50-years water levels in the deep sandstone aquifer underlying much of the Southeastern Wisconsin Region have declined precipitously due to consumption, and are continuing to decline at a rate of several feet per year; and
- WHEREAS, tests indicate increasing salinity, radium, and arsenic levels in the water from the deep sandstone aquifer, as well as localized problems for shallower aquifers, that may limit groundwater use or be hazardous for human consumption; and
- WHEREAS, technically sound water supply management requires consideration of comprehensive water resources planning addressing both surface water and groundwater; and
- WHEREAS, there may be potential cost-effectiveness advantages to expanding the uses of Lake Michigan as a source of water supply and to managing groundwater sources based upon technical areawide analyses; and
- WHEREAS, without a sound plan for the protection and wise use of surface water and groundwater supplies, significant health, safety, and economic problems may occur for our citizens and our communities; and

WHEREAS, the Southeastern Wisconsin Regional Planning Commission is currently completing a regional groundwater inventory, and is working toward the completion of a groundwater simulation model for Southeastern Wisconsin.

NOW, THEREFORE, BE IT RESOLVED BY, Kenosha County that a comprehensive areawide water supply plan is urgently needed to develop and manage the Region's water resources in an efficient and cost-effective manner that will protect the quality and quantity of the regional water supply for current and future generations.

BE IT FURTHER RESOLVED, that the Kenosha County Board of Supervisors hereby requests that the Southeastern Wisconsin Regional Planning Commission prepare a prospectus at no cost to the County for the development of a water supply plan for the Region, of which Kenosha County is a part.

BE IT FURTHER RESOLVED, that the prospectus shall identify the need for, the scope and content of, the estimated cost of, a time schedule for, and a recommended means of organizing and funding the desired plan, including the identification of outside funding sources which are anticipated to be available.

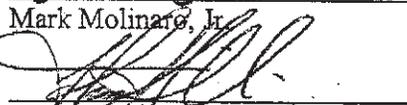
BE IT FURTHER RESOLVED, that the Southeastern Wisconsin Regional Planning Commission create a technical advisory committee to guide the preparation of the prospectus.

BE IT FINALLY RESOLVED THAT, the prospectus, once prepared, be presented to the seven County Boards of the Region for approval and cooperative implementation.

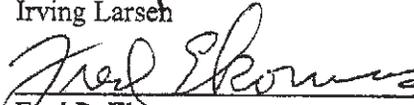
Approved by:

  
\_\_\_\_\_  
Donald Smitz

  
\_\_\_\_\_  
Mark Molinaro, Jr.

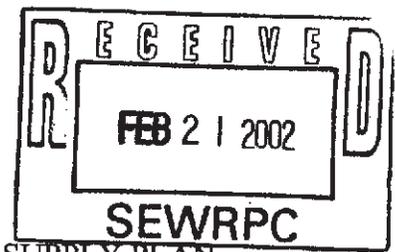
  
\_\_\_\_\_  
Thomas J. Gorlinski

  
\_\_\_\_\_  
Irving Larsen

  
\_\_\_\_\_  
Fred R. Ekornaas

LAND USE COMMITTEE

*Enrolled* 21  
~~PROPOSED RESOLUTION 156-22~~



SUPPORT FOR DEVELOPMENT OF REGIONAL WATER SUPPLY PLAN

1  
2  
3  
4  
5  
6 WHEREAS, the Waukesha County government is charged with the protection of the health and  
7 welfare of its citizens, and the quality of their environs, and  
8

9 WHEREAS, the population of Waukesha County has rapidly increased during the past 50 years  
10 from 85,901 recorded in 1950 to 360,767 according to the official year 2000 Federal census, and  
11

12 WHEREAS, records have shown that over this same 50 year time period water levels in the deep  
13 sandstone aquifer serving Waukesha County have declined more than 300 feet, and are  
14 continuing to decline at a rate of over 5 feet per year, and  
15

16 WHEREAS, tests also indicate increasing salinity as well as radium and arsenic levels in the  
17 water from the deep sandstone aquifer that may be hazardous for human consumption, and  
18

19 WHEREAS, without a sound plan for the protection and wise use of the deep sandstone aquifer  
20 and of related ground and surface water resources, significant health and financial problems may  
21 occur for our citizens and our communities, and  
22

23 WHEREAS, the Southeastern Wisconsin Regional Planning Commission is currently completing  
24 a regional groundwater inventory, and is working towards the completion of a groundwater  
25 simulation model for Southeastern Wisconsin.  
26

27 NOW THEREFORE, BE IT RESOLVED BY THE WAUKESHA COUNTY BOARD OF  
28 SUPERVISORS that a comprehensive area-wide water supply plan is urgently needed to develop  
29 and manager the Region's water resources in an efficient and cost effective manner that will  
30 protect the quality and quantity of the regional water supply for current and future generations.  
31

32 BE IT FURTHER RESOLVED that the Waukesha County Board hereby requests that the  
33 Southeastern Wisconsin Regional Planning Commission within 90 days, or as soon thereafter as  
34 possible, prepare a prospectus for the development of a water supply plan for the Region, of  
35 which Waukesha County is a part.  
36

37 BE IT FURTHER RESOLVED that the prospectus shall identify the need for , the scope and  
38 content of, the estimated cost of, a time schedule for, and a recommended means of organizing  
39 and funding the desired plan  
40

41 BE IT FURTHER RESOLVED that the Southeastern Wisconsin Regional Planning Commission  
42 create a technical advisory committee to guide the preparation of the prospectus.  
43

44 BE IT FINALLY RESOLVED THAT the prospectus, once prepared, be presented to seven  
45 County Boards of the Region for approval and cooperative implementation

SUPPORT FOR DEVELOPMENT OF REGIONAL WATER SUPPLY PLAN

Presented by:  
Land Use, Parks, and Environment Committee

Paul G. Vrakas  
Paul G. Vrakas, Chair

Pauline T. Jaske  
Pauline T. Jaske

James Jeskewitz  
James Jeskewitz

Walter L. Kolb  
Walter L. Kolb

Karen J. McNelly  
Karen J. McNelly

Daniel F. Meissner  
Daniel F. Meissner

Ronald V. Rydberg  
Ronald V. Rydberg

The foregoing legislation adopted by the County Board of Supervisors of Waukesha County, Wisconsin, was presented to the County Executive on:

Date: November 16, 2001, Patricia E. Madden  
Patricia E. Madden, County Clerk

The foregoing legislation adopted by the County Board of Supervisors of Waukesha County, Wisconsin, is hereby:

Approved: ✓

Vetoed: \_\_\_\_\_

Date: 11-19-01, D. M. Finley  
Daniel M. Finley, County Executive