

SEWRPC Planning Report No. 52

A REGIONAL WATER SUPPLY PLAN FOR SOUTHEASTERN WISCONSIN

Chapter I

INTRODUCTION AND BACKGROUND

INTRODUCTION

The Southeastern Wisconsin Regional Planning Commission (Commission) is the official areawide planning agency for the seven-county Southeastern Wisconsin Region. The Commission is charged by law with making and adopting a comprehensive plan for the physical development of the Region. The permissible scope and content of that plan, as outlined in the enabling legislation, extends to all phases of regional development, implicitly emphasizing, however, the preparation of plans for the use of land and for the supporting transportation, utility, and other public infrastructure facilities. The work of the Commission is intended to assist the responsible Federal, State, county, and local units of government in the making of decisions concerning the development of the planning Region. Accordingly, the work of the Commission emphasizes close cooperation between the various levels, units, and agencies of government with oversight for land use development and with the responsibility for the design, construction, operation, and maintenance of the supporting infrastructure facilities.

Pursuant to requests received from several constituent counties and municipalities, the Commission, following its long-established practices, with assistance from an advisory committee on water supply planning created for this purpose, published a prospectus for the preparation of a regional water supply system plan.¹ The prospectus sets forth the need for and scope and content of a regional water supply plan, an estimated cost of the needed plan, and recommended means for funding the planning effort. The membership of the advisory committee that guided the preparation of the prospectus included knowledgeable and concerned representatives of the constituent counties and municipalities; of concerned State and Federal agencies; of the academic community; and of concerned businesses and industries.

The preparation of the regional water supply plan, as outlined in the prospectus, would represent the third, and final, element of a Commission water supply planning program. The first element consisted of basic groundwater resource inventories; and the second consisted of the development of a groundwater simulation model for the Region. These elements involved interagency partnership programs with the U.S. Geological Survey (USGS), the Wisconsin Geological and Natural History Survey (WGNHS), the University of Wisconsin-Milwaukee (UWM), the Wisconsin Department of Natural Resources (WDNR), and a number of the water supply utilities serving the Region.

The regional water supply plan, as outlined in the prospectus, is to include the following major components:

¹See Regional Water Supply Planning Program Prospectus, *Southeastern Wisconsin Regional Planning Commission, September 2002.*

- Development of water supply service areas and of forecast demand for water use;
- Documentation of existing and potential water supply problems and issues as revealed by inventories, analyses, and forecasts to be prepared under the planning program;
- Development of recommendations for water conservation efforts to reduce water demand;
- Development and evaluation of alternative means of addressing the identified water supply problems and issues, culminating in the identification of recommended sources of supply and in recommendations for development of the basic infrastructure required to deliver that supply;
- Identification of groundwater recharge areas to be considered for protection from incompatible development;
- Specification of any new institutional structures found necessary to carry out the plan recommendations; and
- Identification of any constraints to development levels in subareas of the Region that may emanate from water supply sustainability concerns.

This report documents the regional water supply plan for southeastern Wisconsin, as well as the process used to arrive at that plan. The plan is based upon the design year 2035 and represents a major element of the comprehensive plan for the seven-county Southeastern Wisconsin Region.

STUDY AREA

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

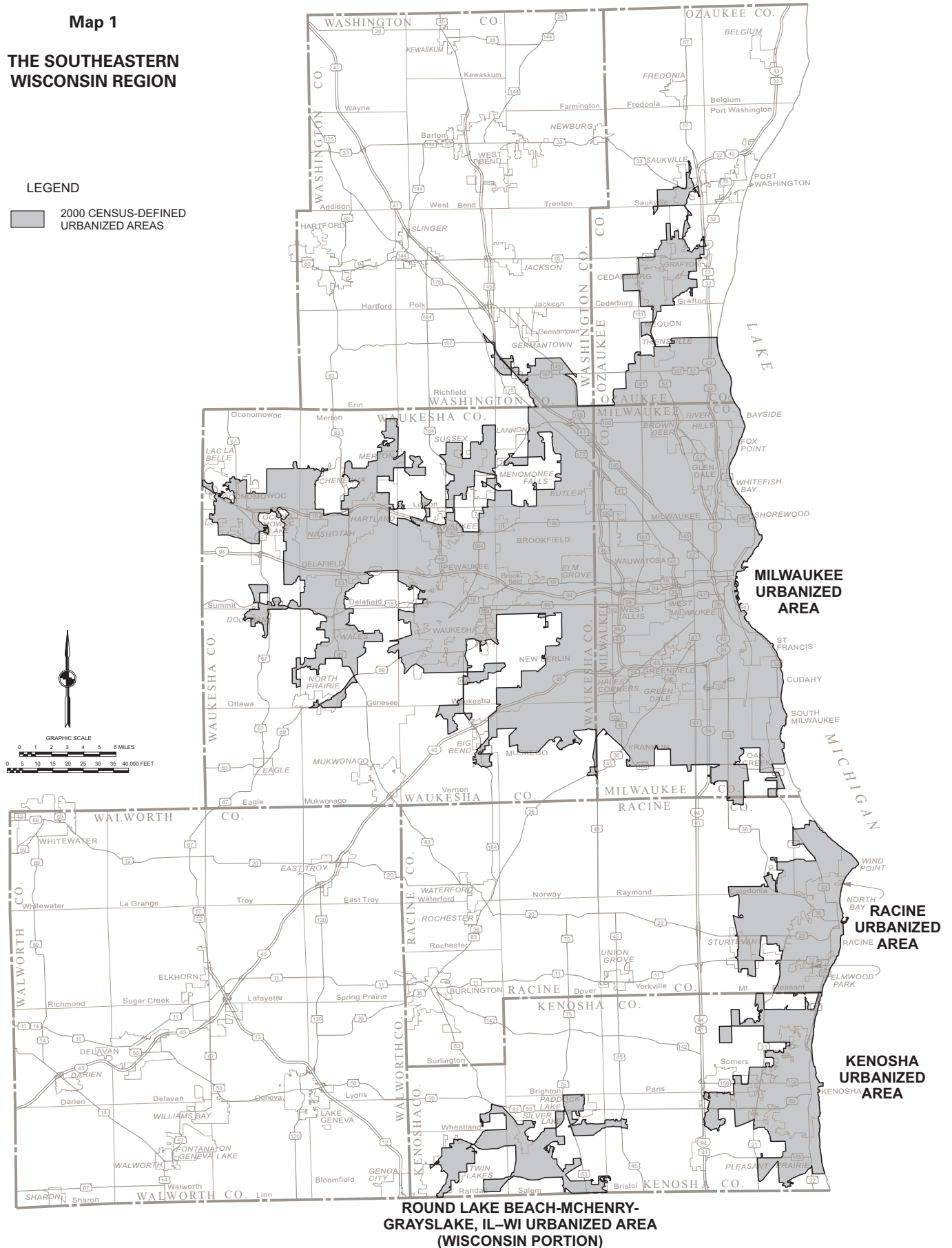
The study area is bounded on the east by Lake Michigan, which is an important source of water supply. It is bounded on the south by the rapidly expanding metropolitan region of northeastern Illinois, and on the west and north by the fertile agricultural lands and desirable recreation areas of the rest of the State of Wisconsin. Map 1 also shows the boundaries of the urbanized areas within the Region as defined by the U.S. Bureau of the Census. These areas may be thought of as those portions of the core central cities concerned and environs actually devoted to relatively dense urban development radiating outward from the core cities in a contiguous fashion.

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

Map 1
THE SOUTHEASTERN WISCONSIN REGION

LEGEND

2000 CENSUS-DEFINED URBANIZED AREAS

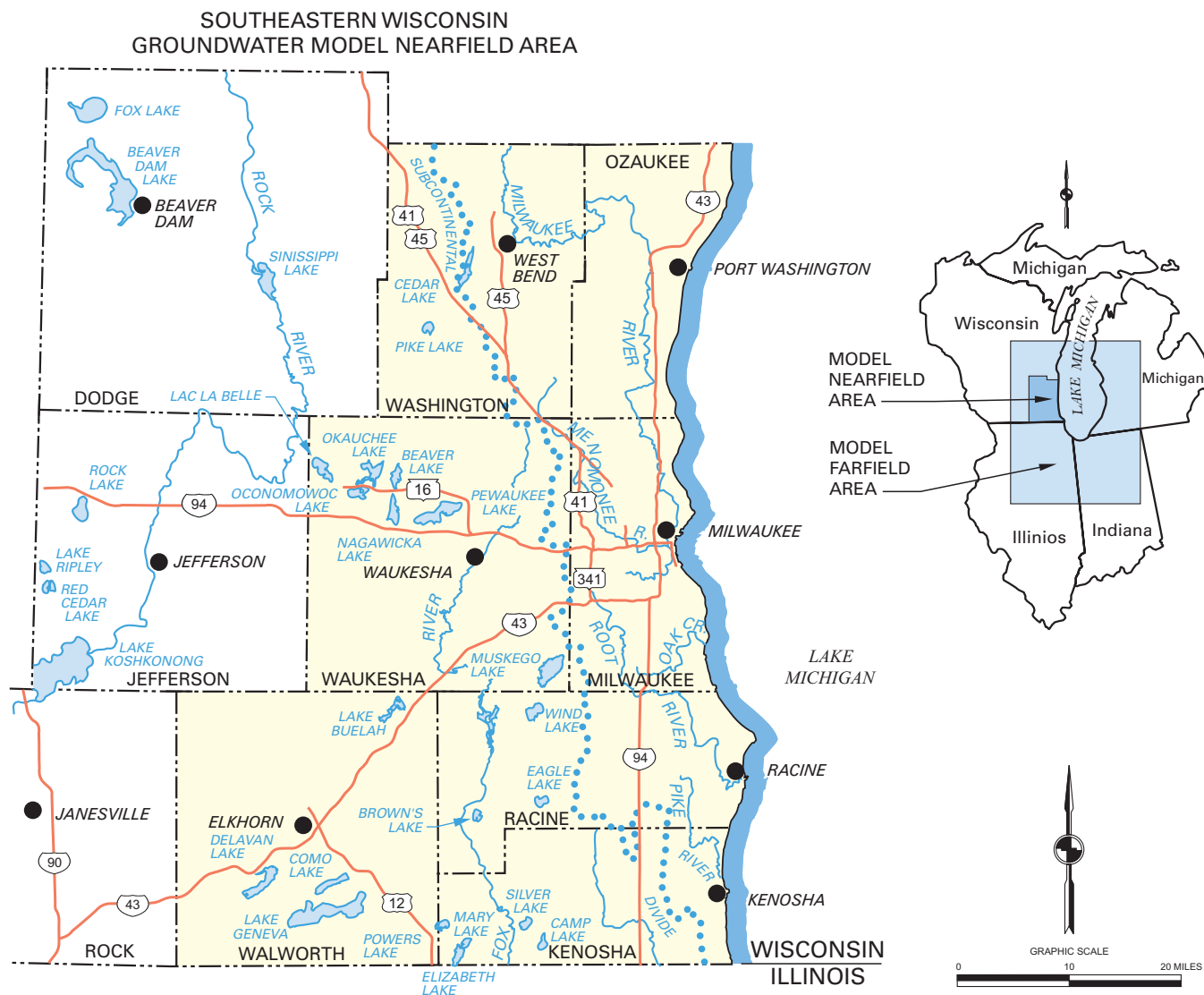


Source: U.S. Bureau of the Census and SEWRPC.

PRELIMINARY DRAFT

Figure 1

AREA OF SOUTHEASTERN WISCONSIN SIMULATED IN GROUNDWATER MODEL



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

water supply planning will specifically consider areas outside of the Region that are part of general-purpose units of government lying partially within the Region. These areas include portions of the Cities of Hartford and Whitewater.

PLAN PURPOSE

The primary purpose of the regional water supply system planning program is to develop a sound and workable plan for the provision and protection of long-term, sustainable sources of water for the Southeastern Wisconsin Region in a manner which best meets the plan objectives. Those objectives are described in Chapter V of this report. More specifically, the planning program is intended to develop a system plan for the management of water supplies incorporating measures to resolve existing water supply quality and quantity problems and to avoid the

future creation of such problems. It should be recognized that plan implementation will be dependent upon local actions, including, but not limited to: refinement and detailing of water supply service areas; the development of detailed local water supply facilities plans consistent with the regional system plan; and the integration of the plan recommendations into comprehensive county and local planning programs.

NEED FOR REGIONAL PLANNING

Regional, or areawide, planning has become increasingly accepted as a necessary governmental function in the large metropolitan areas of the United States. This acceptance is based, in part, on an awareness that problems of physical and economic development and of environmental deterioration transcend the geographic limits of local units of government. It has also been recognized that sound resolution of areawide problems requires the cooperation of all units and agencies of government concerned and of private interests, as well.

Public, as well as private, interests are vitally affected by areawide developmental and environmental problems and by proposed solutions to these problems. Regional planning is necessary to promote a consensus on proposed solutions and the necessary cooperation among urban and rural; local, State, and Federal; and public and private interests. In this light, regional planning is not a substitute for Federal, State, or local public planning or for private planning. Rather, regional planning is an important supplement to such planning.

As already noted, the Southeastern Wisconsin Regional Planning Commission is the official areawide planning agency for the seven-county Southeastern Wisconsin Region. 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. 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 watershed plans specifically address drainage and flood control and related problems.

The Commission has long-recognized that the comprehensive plan for the development of the Region lacked a water supply element. The regional water supply plan documented in this report is intended to provide that element by addressing water supply problems and issues which have developed, or are developing, within the Region that are regional and subregional in nature, as documented in the aforementioned prospectus. The 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.

BASIC PRINCIPLES

The regional water supply planning program is based on four basic principles:

1. Water Supply System Planning Must Be Conducted Concurrently with, and Cannot Be Separated from, Land Use Planning. The land use pattern determines the amount and spatial distribution of

water supply demand to be accommodated by the water supply system. In turn, the water supply systems may have some impact on shaping the future land use pattern. Although detailed land use patterns are primarily of local concern and properly subject to local planning and control, the aggregate effects of the spatial distribution of land use activities are regional in scope and interact with the need for and capacity of water supply systems.

2. Land Use and Water Supply System Planning Must Recognize the Existence of a Limited Natural Resource Base to Which Urban and Rural Development Must Be Properly Coordinated to Ensure the Overall Environmental Quality of the Region. Land and water resources are limited and subject to potential misuse through improper land use development.
3. The Regional Water Supply System Plan is Intended to Provide a Framework Plan within Which Local Water Supply Facilities Planning Can Be Soundly Conducted. Under this concept, water supply system planning recommendations are initially advanced at the regional systems level of planning and are followed by implementation actions in the form of local project planning and preliminary engineering. If, for whatever reasons, a particular water supply facility, or management proposal, advanced at the regional systems planning level cannot be implemented at the project level, that determination is taken into account through consideration of amendment to the regional water supply plan.
4. Water Supply System Planning in Southeastern Wisconsin Must Recognize the Constraints of Regulations and Policies Relating to the Ability of Obtain Water from the Great Lakes Basin and Groundwater Aquifers. The current and potential future regulatory framework, including the 2001 Great Lakes Charter Annex being put forth by the Council of Great Lakes Governors and the recent State of Wisconsin groundwater legislation and the related activities of the Groundwater Advisory Council, are important factors which will impact the framework of the regional water supply plan.

RELATIONSHIP TO OTHER PLANNING PROGRAMS

The regional land use plan for 2035, which was completed in 2005,² serves as a basis for the land use development envisioned in the regional water supply plan. In addition to the regional land use plan, the regional water supply plan is directly, or indirectly, related to a number of past or ongoing planning programs. These include, among others, the regional water quality management plan and its current update; the county land and water resource management plans; the ongoing and anticipated future comprehensive or “smart growth” plans being prepared at the county and local level of government; and the basin planning being carried out by the Wisconsin Department of Natural Resources. In addition to these planning programs, there are other local planning programs which are relevant to the regional water supply planning effort which have been considered, as appropriate, during the planning process. These include local water supply system facility plans, local stormwater management plans, and local land use plans.

Regional 2035 Land Use Plan

The future condition land use identified in the regional water supply plan is based upon the 2035 regional land use plan. However, it is recognized that the regional water supply planning program may identify a need to refine or revise the 2035 land use conditions owing to water supply considerations which were not known during development of the regional land use plan. In that event, the regional water supply plan would include recommendations for appropriate amendments to the regional land use plan.

²The findings and recommendations of this planning effort are documented in SEWRPC Planning Report No. 48, A Regional Land Use Plan for Southeastern Wisconsin: 2035.

Regional Water Quality Management Plan

The Commission is the State-designated and Federally recognized areawide water quality management planning agency for southeastern Wisconsin. Pursuant to the provisions of Section 208 of the Federal Clean Water Act, the Commission prepared and adopted in 1979 an areawide water quality management plan for the Southeastern Wisconsin Region. That plan was subsequently adopted by the Wisconsin Natural Resources Board and approved by the U.S. Environmental Protection Agency (USEPA).

The regional water quality management plan was designed, in part, to meet the Congressional mandate that the waters of the United States be made to the extent practicable “fishable and swimmable.” In accordance with the requirements of Section 208 of the Federal Clean Water Act, the plan provides recommendations for the control of water pollution from such point sources as sewage treatment plants; points of separate and combined sewer overflow; industrial waste outfalls; and from such nonpoint sources as urban and rural stormwater runoff.

Since completion of the initial regional water quality management plan, Commission and the Wisconsin Department of Natural Resources have cooperatively conducted a continuing water quality management planning effort. That effort, however, has been severely limited by fiscal constraints, with work confined largely to sanitary sewer service area planning, groundwater inventories and analyses, and selected plan implementation activities. A major update of the plan is underway and is expected to be completed early in 2007 for the Kinnickinnic River, Milwaukee River, Menomonee River, Oak Creek, and Root River watersheds, as well as the Milwaukee Harbor estuary and a portion of the nearshore Lake Michigan and its direct tributary drainage area.³ The updated plan includes a groundwater management component. The planning effort is being coordinated with the preparation of a new facilities plan by the Milwaukee Metropolitan Sewerage District (MMSD), also presently underway.

Components of the regional water quality management plan are directly related to the water supply plan, including the sewer service area component of the point source element, and the groundwater management element and related stormwater management components of the nonpoint source pollutant control element. With regard to the sewer service area plan component, it is important to properly relate sewer service areas and water supply sources and service areas. Particular attention has been given to the coordination of drainage basin water withdrawals with sewerage system discharge requirements. With regard to groundwater management, components of both the regional water supply plan and the regional water quality management plan provide recommendations for the protection and management of groundwater recharge areas and for the development of stormwater management practices which are designed to maintain the natural hydrology.

County Land and Water Resource Management Plans

Each of the counties within the study area has prepared a land and water resource management plan pursuant to Chapter 92 of the *Wisconsin Statutes*. Those plans are typically updated every five to seven years. These plans provide information on the natural resources, including groundwater, in each county; on the limitations, issues, and problems of those resources; and include a strategy to address the natural resource issues and problems. The plans also provide a means to inform the public about these issues and problems and to include the public in developing the steps necessary to protect the natural resource base. As such, these plans were all carefully reviewed during development of the water supply system plan. In addition, certain of the regional water supply plan recommendations and implementation strategies include elements which require integration into the county land and water resource management plans for purposes of local refinement and implementation.

Comprehensive Planning

Pursuant to Section 66.1001 of the *Wisconsin Statutes*, counties, cities, villages, and towns need to adopt so-called “smart growth” plans if the counties and municipalities are to continue to exercise certain land use regulations, including zoning, land subdivision control, and official mapping. These plans are to consist of nine specific elements, three of which are directly related to the regional water supply plan. These elements include:

³The findings and recommendations for this planning effort are documented in SEWRPC Planning Report No. 50, A Regional Water Quality Management Plan Update for the Greater Milwaukee Watersheds.

- Land Use Element: The land use element is to consist of a compilation of objectives, policies, goals, maps and programs to guide the future development and redevelopment of public and private property. The element is to include a series of maps that show current land uses and proposed future land uses; that identify productive agricultural soils, areas with natural limitations for building site development, floodplains, wetlands and other environmentally sensitive lands; and that set forth the boundaries of areas to which public utility and community facility services are proposed to be provided in the future.
- Utilities and Community Facilities Element: The utilities and community facilities plan element is to consist of a compilation of objectives, policies, goals, maps and programs to guide the future development of utilities and community facilities by the local governmental unit concerned, including sanitary sewerage, stormwater management, and water supply facilities. This element is to describe the location, use, and capacity of existing public utilities and community facilities that serve the local governmental unit concerned, and is to include an approximate schedule for needed expansion and rehabilitation of existing facilities, or for the development of new facilities; and is to assess future needs for government services in the local governmental unit that are related to such utilities and facilities.
- Agricultural, Natural and Cultural Resources Element: The agricultural, natural and cultural resources element is to consist of a compilation of objectives, policies, goals, maps and programs for the conservation and effective management of natural resources, such as ground and surface water, woodlands, productive agricultural areas, environmentally sensitive areas, floodplains, and wetlands.
- Intergovernmental Cooperation: The intergovernmental cooperation element is intended, as the name implies, to promote cooperation between the various levels and units of government operating within an area, including the general purpose units of government and such special-purpose units of government as school and sewerage districts; with particular emphasis upon coordination in the siting and construction of public facilities and sharing of public services.

The development of the regional water supply plan has been coordinated insofar as possible with the ongoing comprehensive—smart growth—planning efforts within the Region. In addition, the plan implementation strategies include specific recommendations for the integration into, and local refinement of, selected elements into the county and local comprehensive planning programs.

Wisconsin Department of Natural Resources Basin Planning

The Wisconsin Department of Natural Resources conducts planning and program management activities for the Milwaukee River basin, comprised of the Kinnickinnic, Menomonee, and Milwaukee River watersheds; the Root-Pike River basin, which includes the Root River and Oak Creek watersheds; the Fox River basin, which includes the Fox River and Des Plaines River watersheds; and the Rock River basin, which includes the Rock River watershed. The Department has prepared “state-of-the-basin” plans for each of these basins.⁴ These plans include resource management recommendations related to the Department programmatic activities, including surface water quality objectives or classifications, sewerage system management, and related water resources programs and include groundwater management recommendations. The regional water supply planning included coordination with the basin planning, and has specific plan implementation strategies for integrating the current regional water supply planning with the Department basin planning.

⁴*Wisconsin Department of Natural Resources, The State of the Milwaukee River Basin, August 2001; Wisconsin Department of Natural Resources, The State of the Root-Pike River Basin, May 2002; Wisconsin Department of Natural Resources, The State of the Southeast Fox River Basin, February 2002; and Wisconsin Department of Natural Resources, The State of the Rock River Basin, April 2002.*

State Groundwater Advisory Committee Activities

The Groundwater Advisory Committee was created by *2003 Wisconsin Act 310* to make recommendations to the State Legislature regarding future groundwater management needs in Wisconsin. In this regard, two reports are due to the environmental and natural resources standing committees of the Legislature on December 31, 2006, and December 31, 2007. These reports will: 1) provide recommendations on how to manage areas of the State with existing groundwater problems; and 2) report on how the scope of the current groundwater law is working to protect the groundwater resources. The first charge to complete by the end of 2006 specifically relates to the regional water supply planning in that it is to include recommendations for strategies for addressing groundwater management issues and areas designated as “groundwater management areas” which includes all, or portions, of each of the counties in the Southeastern Wisconsin Region. Ideally, the regional water supply plan for southeastern Wisconsin would serve as the model for developing management recommendations in the groundwater management areas.

ORGANIZATIONAL STRUCTURE AND PUBLIC INVOLVEMENT FOR THE WATER SUPPLY PLANNING PROGRAM

Technical staffing for the regional water supply plan preparation was carried out under a cooperative team arrangement involving the Commission staff; a consulting engineering firm; a consulting law firm; and the hydrogeology staffs of the Wisconsin Geological and Natural History Survey, the U.S. Geological Survey, and the University of Wisconsin-Milwaukee. The Commission was the lead agency in the planning program.

The work leading to the preparation of the regional water supply plan was carried out under the guidance of the Commission Advisory Committee on Regional Water Supply Planning. This Committee is a successor committee to that created to assist the Commission in the preparation of the prospectus for the program. Membership on the Advisory Committee included, like that of the predecessor committee, knowledgeable and concerned representatives of the constituent counties and municipalities; of State and Federal agencies; of the academic community; and of concerned businesses and industries. A list of the membership of the Advisory Committee is provided on the inside front cover of this report. The Advisory Committee guided the planning process, and carefully reviewed and approved this report.

During the course of the study, the Commission staff worked with a number of interests through individual and group meetings, providing information about, and obtaining input on, the plan and the planning process. Also during the course of the study, newsletters were issued from time-to-time to a wide audience including elected officials in the Region, technical and appointed planning and engineering officials within the Region, minority and low-income population groups, business and industry groups, print and broadcast media, and Region residents who have indicated in the past, or during the study, an interest in the planning issues concerned.

The Commission also maintained a website—www.sewrpc.org/regional plans—which includes materials prepared under this study, including summary and background information, the study report as prepared chapter-by-chapter, newsletters, and an opportunity to provide comments on the study. The details of the Advisory Committee structure and other public involvement activities are documented in a public involvement program summary included in this report as Appendix A.

SCHEME OF PRESENTATION

The findings and recommendations of the regional water supply plan are documented in this report. Following this introductory chapter, Chapter II presents base year 2000 information regarding the demographic and economic base, the land use pattern, the natural resource base, and other pertinent aspects of the Southeastern Wisconsin Region, including information that is essential to the water supply planning process. Chapter III presents an inventory of the existing water supply sources and systems in the Region. Chapter IV summarizes the legal structures affecting the water supply planning. Chapter V presents the objectives and supporting standards adopted for use in the water supply planning program. Chapter VI sets forth forecasts of anticipated changes in population, households, and employment within the Region through the year 2035, and the findings of an

evaluation of existing water supply systems under planned future conditions. Chapter VII identifies the water supply problems and issues which need to be addressed in the planning program as revealed by the forecasts and analyses of the water supply systems. Chapter VIII presents a description and evaluation of the forecast conditions and alternative management plans designed to address the identified water supply problems and issues. Chapter IX presents a recommended water supply system plan designed to serve anticipated design year 2035 conditions within the Region. Chapter X describes the actions which should be taken by the concerned units and agencies of government and others to implement the recommended plan. Chapter XI provides a summary of the report.

This planning report is supplemented by two technical reports. These reports document findings of the inventories and analyses of water supply management state-of-the-art measures and water supply law.

[Editor's Note: Prior to publication, proper citations to the technical reports will be added to the above.]