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AMENDMENT TO THE
COMPREHENSIVE PLAN FOR THE
FOX RIVER WATERSHED
AS ADOPTED BY THE
SOUTHEASTERN WISCONSIN
REGIONAL PLANNING COMMISSION
SEPTEMBER 1973

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SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

916 NO. EAST AVENUE

WAUKESHA, WISCONSIN 53186

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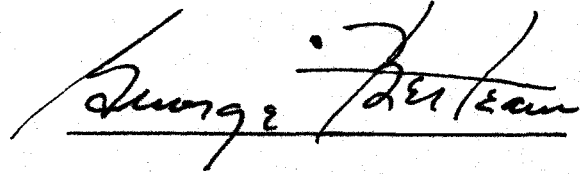
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SUBJECT: Certification of Amendment to the Adopted Comprehensive Plan for the Fox River Watershed.

TO: The Legislative Bodies of all of the Local Units of Government Within the Southeastern Wisconsin Region, Comprising the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha, and also Wholly or Partially Within the Fox River Watershed, Namely: the Counties of Kenosha, Milwaukee, Racine, Walworth, Washington, and Waukesha; the Cities of Franklin, Burlington, Elkhorn, Lake Geneva, Brookfield, Delafield, Muskego, New Berlin, and Waukesha; the Villages of Silver Lake, Twin Lakes, Rochester, Waterford, East Troy, Fontana, Genoa City, Walworth, Williams Bay, Big Bend, Eagle, Hartland, Lannon, Menomonee Falls, Mukwonago, North Prairie, Pewaukee, Sussex, and Wales; and the Towns of Brighton, Randall, Salem, Wheatland, Burlington, Dover, Norway, Rochester, Waterford, Bloomfield, East Troy, Geneva, LaGrange, LaFayette, Linn, Lyons, Spring Prairie, Sugar Creek, Troy, Walworth, Brookfield, Delafield, Eagle, Genesee, Lisbon, Mukwonago, Ottawa, Pewaukee, Vernon, and Waukesha:

This is to certify that at a regular meeting of the Southeastern Wisconsin Regional Planning Commission held at the Kenosha County Courthouse, Kenosha, Wisconsin, on the 13th day of September 1973, the Commission did by unanimous vote of all Commissioners present, being 18 ayes and 0 nays, and by appropriate Resolution, a copy of which is made a part hereof and incorporated by reference to the same force and effect as if it had been specifically set forth herein in detail, adopt an amendment to the comprehensive plan for the Fox River watershed in the Southeastern Wisconsin Region, said Region being comprised of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties, which plan was adopted by the Commission on the 4th day of June 1970 as a part of the master plan for the physical development of the Region. The said amendment to the comprehensive watershed plan is based upon all of the inventory findings, forecasts, maps, charts, figures, diagrams, and supporting data, plans, and plan implementation recommendations contained in SEWRPC Planning Report No. 12, Volume One, entitled A Comprehensive Plan for the Fox River Watershed, Inventory Findings and Forecasts, published in April 1969; in SEWRPC Planning Report No. 12, Volume Two, entitled A Comprehensive Plan for the Fox River Watershed, Alternative Plans and Recommended Plan, published in February 1970; and in a document entitled Revised Implementation Schedule for Meeting Water Quality Objectives and Waste Treatment Requirements for the Fox (Illinois) River Watershed, published in August 1973 by the Wisconsin Department of Natural Resources. Said SEWRPC Planning Report No. 12, Volumes One and Two, were attached to and made a part of the initial certification of the adopted comprehensive plan for the Fox River watershed following Commission adoption of the plan on the 4th day of June 1970. Said Revised Implementation Schedule for Meeting Water Quality Objectives and Waste Treatment Requirements for the Fox (Illinois) River Watershed is attached hereto and made a part hereof. Such action taken by the Commission is hereby recorded on, and is a part of, said plan; and the plan as amended is hereby transmitted to the constituent local units of government for consideration, adoption, and implementation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal and cause the Seal of the Southeastern Wisconsin Regional Planning Commission to be hereto affixed. Dated at the City of Waukesha, Wisconsin, this 14th day of September 1973.

A handwritten signature in dark ink, appearing to read "George C. Berteau", written over a horizontal line.

George C. Berteau, Chairman
Southeastern Wisconsin Regional
Planning Commission

ATTEST:

A handwritten signature in dark ink, appearing to read "Kurt W. Bauer", written over a horizontal line.

Kurt W. Bauer
Deputy Secretary

RESOLUTION NO. 73-5

**RESOLUTION OF THE SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
AMENDING A COMPREHENSIVE PLAN FOR THE FOX RIVER WATERSHED, THE PLAN
BEING A PART OF THE MASTER PLAN FOR THE PHYSICAL DEVELOPMENT OF THE
REGION COMPRISED OF THE COUNTIES OF KENOSHA, MILWAUKEE, OZAUKEE,
RACINE, WALWORTH, WASHINGTON, AND WAUKESHA IN THE STATE OF WISCONSIN**

WHEREAS, petitions in the form of resolutions, were duly adopted by the governing bodies of the governmental units located within the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha in the State of Wisconsin, petitioning the Honorable Gaylord A. Nelson, as the Governor of the State of Wisconsin, to create a regional planning commission, embracing the said Counties, pursuant to the provisions of Section 66.945(2) of the Wisconsin Statutes; and

WHEREAS, pursuant to the said petitions, the Southeastern Wisconsin Regional Planning Commission was duly created by the written Executive Order of the Honorable Gaylord A. Nelson, in his official capacity as the Governor of the State of Wisconsin, attested to by the Secretary of State of the State of Wisconsin, which said Executive Order was duly signed and issued on the 8th day of August 1960, pursuant to the provisions of Section 66.945(2) of the Wisconsin Statutes; and

WHEREAS, the said Executive Order specifically extended to the Southeastern Wisconsin Regional Planning Commission, so created, jurisdiction in the area and boundaries embraced by, included in, and limited to the said Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha in the State of Wisconsin; and

WHEREAS, a copy of the said Executive Order was forwarded by the office of the said Governor to each of the local governmental units included within the area and boundaries defined in the said Executive Order; and

WHEREAS, following the creation of the said Commission, public hearings were held in said local governmental units, following which the membership composition of the said Regional Planning Commission was duly appointed under, and pursuant to, the provisions of Sections 66.945(3) and (4) of the Wisconsin Statutes; and

WHEREAS, following the appointment of the said membership, the said Regional Planning Commission met and organized and elected a Chairman and Executive Committee and appointed a Director and appointed advisory committees and adopted bylaws and established its own rules of procedure and scheduled quarterly meetings of the Commission to be held each year and hired such experts and consultants as it deemed necessary for the prosecution of its responsibilities and engaged a general counsel; and it thereafter kept a record of its resolutions, transactions, findings, and determinations, which have been and are a public record under, and pursuant to, the provisions of Section 66.945(5), (6), and (7) of the Wisconsin Statutes; and

WHEREAS, following the organization of the said Regional Planning Commission and under, and pursuant to, the provisions of Section 66.945(8) of the Wisconsin Statutes, it proceeded to conduct all types of research studies, collect and analyze data, prepare maps, charts and tables, and conduct all necessary studies for the accomplishment of its other duties and has prepared numerous reports presenting the findings and recommendations of its research and studies concerning the physical, social, and economic development of the Region and has distributed these reports and provided advisory services on planning problems to the local governmental units within the Region and to other public and private agencies in matters relative to its functions and objectives and made annual reports of its activities to the State Legislature of Wisconsin and the legislative bodies of the local governmental units within the Region, all leading to the ultimate adoption of a master plan for the Region when all studies, data, maps, charts, and tables have been completed; and

WHEREAS, pursuant to Section 66.945(10) of the Wisconsin Statutes, a comprehensive plan for the Fox River watershed was duly adopted at the meeting of the Southeastern Wisconsin Regional Planning Commission held on the 4th day of June 1970, as part of the master plan for the physical development of the Region, such plan being comprised of:

1. The inventory findings and forecasts contained in SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume One, Inventory Findings and Forecasts, published in April 1969, comprised of 445 printed pages;
2. The plans, programs, and descriptive and explanatory matter contained in SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume Two, Alternative Plans and Recommended Plan, published in February 1970, comprised of 497 printed pages; and

WHEREAS, the comprehensive Fox River watershed plan contains recommendations relating to land use development and regulation, environmental corridor land acquisition and preservation, park and outdoor recreation land acquisition and development, floodland regulation, water control facility construction, stream flow recordation, pollution abatement facility construction, soil and water conservation practices, stream water quality monitoring, and water supply management, together constituting a desirable and workable water control and water-related community facility plan for the Fox River watershed; and

WHEREAS, such plan in particular recommends the provision of advanced waste treatment at all major sewage treatment plants in the watershed in order to meet the adopted water use objectives and supporting stream water quality standards for the Fox River; and

WHEREAS, with respect to the upper Fox River watershed, the plan contains three alternative subsystem plans to provide for such advanced waste treatment, including, in the case of alternative stream water quality management plan 1A, the provision of advanced waste treatment at six sewage treatment plants; in the case of alternative stream water quality management plan 1B, the provision of advanced waste treatment at two sewage treatment plants; and in the case of alternative stream water quality management plan 1C, the provision of advanced waste treatment at one sewage treatment plant; with all three alternative subsystem plans found to be approximately equal in terms of cost effectiveness and further found to each fully meet the adopted water use objectives and supporting stream water quality standards for the Fox River; and

WHEREAS, the adopted comprehensive Fox River watershed plan recommends to the several local units of government in the upper Fox River watershed, the selection of alternative stream water quality management plan 1C for joint implementation, which alternative would include the abandonment of existing sewage treatment facilities located in the Cities of Brookfield and Waukesha and the Villages of Pewaukee and Sussex and connection of the sanitary sewers tributary to these plants and all other sanitary sewers necessary to support existing and proposed urban development in the upper Fox River watershed to a single sewage treatment plant proposed to be located downstream from Waukesha by an integrated trunk sewer system; and

WHEREAS, a true, correct, and exact copy of Commission Resolution No. 70-6 adopting the comprehensive plan for the Fox River watershed, together with a complete and exact copy of the said printed comprehensive plan for the Fox River watershed, consisting of Volumes One and Two of the aforementioned SEWRPC Planning Report No. 12, was certified to each of the local legislative bodies of the local governmental units within the Region entitled thereto and to other public bodies and agencies affected, including the Wisconsin Natural Resources Board and the U. S. Environmental Protection Agency; and

WHEREAS, the Wisconsin Natural Resources Board did, on the 11th day of June 1971, approve in principle the comprehensive Fox River watershed plan and subsequently certified such plan to the U. S. Environmental Protection Agency as the interim basin plan for the Fox (Illinois) River; and

WHEREAS, the Wisconsin Department of Natural Resources, in May 1972, published A Pollution Investigation Survey for the Fox (Illinois) River, which survey recognized the aforementioned Natural Resources Board action in approving the comprehensive plan for the Fox River watershed and noted the need for a specific implementation schedule with respect to the proposals contained in the plan for sanitary sewerage system development in the upper Fox River watershed; and

WHEREAS, the Wisconsin Department of Natural Resources, in December 1972, published an Implementation Schedule for Meeting the Water Quality Objectives and Waste Treatment Requirements in the Fox (Illinois) River Watershed, which schedule proposed the establishment in early 1974 of an Upper Fox River Watershed Metropolitan Sewerage District, including at least the Cities of Brookfield and Waukesha and the Villages of Lannon, Pewaukee, and Sussex; the immediate initiation of engineering studies by the City of Waukesha for the construction and operation of a second sewage treatment plant to be located downstream from the existing Waukesha facility, such plant to be the first phase of a contemplated 35-40 mgd plant to serve the proposed metropolitan sewerage district; completion of all phases of the district treatment plant by 1985; construction of an interim sewage treatment facility to serve immediate needs in the Village of Sussex; connection of the Village of Pewaukee and the City of Brookfield to the district treatment plant during the period 1980-1982, together with abandonment of the existing sewage treatment facilities serving these communities; and the connection of the Villages of Lannon and Sussex to the district treatment plant no later than 1985, together with abandonment of the Sussex sewage treatment facility, all in accordance with the recommended water quality management plan (alternative plan 1C) element of the Fox River watershed plan; and

WHEREAS, the Wisconsin Department of Natural Resources held on January 18, 1973, a public informational meeting to discuss the aforementioned implementation schedule; and

WHEREAS, public officials representing the various units of government in the upper Fox River watershed expressed at that informational meeting doubts and reservations about the feasibility of implementing the proposed metropolitan sewerage district for the upper Fox River watershed by the design year of the plan—1990, and subsequently agreed to form an ad hoc committee of local public officials to discuss the proposed implementation schedule and to formulate an appropriate response to the Wisconsin Department of Natural Resources and the Southeastern Wisconsin Regional Planning Commission with respect thereto; and

WHEREAS, the ad hoc committee of local public officials, acting upon the advice of a technical subcommittee comprised of public works officials of the various communities, formulated recommendations concerning the implementation schedule for transmittal to each of the local governing bodies involved, including a recommendation that the local governing bodies request the Southeastern Wisconsin Regional Planning Commission to amend the comprehensive plan for the Fox River watershed to include, in lieu of the establishment of a single centralized sanitary sewerage system for the upper Fox River watershed, described as alternative water quality management plan 1C in the aforementioned SEWRPC Planning Report No. 12, the establishment of two centralized sanitary sewerage systems in the upper watershed, one to serve the City of Waukesha and adjacent urban development in the Towns of Pewaukee and Waukesha with treatment to be provided at a single large sewage treatment plant at Waukesha, and the other to serve all remaining urban development in the upper Fox River watershed, with treatment to be provided at a single large sewage treatment plant in the City of Brookfield, which systems are included as alternative stream water quality management plan 1B in the aforementioned SEWRPC Planning Report No. 12; and

WHEREAS, the governing bodies of 10 of the 13 local units of government concerned in the upper Fox River watershed, excepting only the Village of Lannon and the Towns of Delafield and Waukesha, have formally adopted resolutions endorsing the water quality management element of the comprehensive plan for the Fox River watershed provided that the Southeastern Wisconsin Regional Planning Commission subsequently amends the plan in the manner recommended by the ad hoc committee of local public officials; and

WHEREAS, in response to such resolutions an interagency staff meeting was held on July 17, 1973, attended by representatives of the U. S. Environmental Protection Agency, the Wisconsin Department of Natural Resources, and the Southeastern Wisconsin Regional Planning Commission, at which meeting it was indicated that amendment of the adopted Fox River watershed plan in the manner requested would be acceptable to the state and federal agencies involved provided that the amended plan were accompanied by an acceptable implementation schedule, which schedule would not only serve to bring the requested two-plant areawide upper Fox River watershed system into being within a reasonable time but would also minimize the capital investment in interim facility improvements; and

WHEREAS, in response to the aforementioned interagency staff meeting, the Wisconsin Department of Natural Resources, in August 1973, published a Revised Implementation Schedule for Meeting Water Quality Objectives and Waste Treatment Requirements in the Fox (Illinois) River Watershed, which schedule with respect to the upper Fox River watershed proposes the establishment of two centralized sanitary sewerage systems with treatment to be provided at Brookfield and Waukesha in the manner proposed in the aforementioned alternative water quality management plan 1B set forth in SEWRPC Planning Report No. 12, and which includes a proposed timetable for construction of the necessary sewerage facilities needed to carry out alternative water quality management plan 1B; and

WHEREAS, Section 66.945(9) of the Wisconsin Statutes authorizes and empowers the Regional Planning Commission, as the work of making the whole master plan progresses, to amend, extend, or add to the master plan or carry any part or subject matter thereof into greater detail.

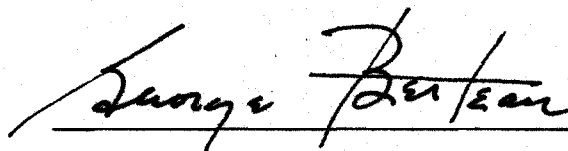
NOW, THEREFORE, BE IT RESOLVED:

FIRST: That the comprehensive plan for the Fox River watershed, being a part of the master plan for the physical development of the Region and comprised of SEWRPC Planning Report No. 12, Volumes One and Two, which plan was adopted by the Commission as a part of the master plan on the 4th day of June 1970, be and the same hereby is amended to include alternative water quality management plan 1B in lieu of alternative water quality management plan 1C as initially included in the adopted plan;

SECOND: That the Revised Implementation Schedule for Meeting Water Quality Objectives and Waste Treatment Requirements for the Fox (Illinois) River Watershed, published in August 1973 by the Wisconsin Department of Natural Resources, be and the same hereby is in all respects ratified, approved, and officially adopted as an amendment to and extension of the subject matter contained in the comprehensive plan for the Fox River watershed, provided that all agencies and units of government concerned recognize that the recommendation set forth in the implementation schedule to remove 85 percent of influent phosphorus at the several sewage treatment plants in the watershed represents an immediate objective to be attained by 1976, and that the recommendation to remove 95 percent of influent phosphorus at the several sewage treatment plants as set forth in SEWRPC Planning Report No. 12 remains the desirable long-range objective for the year 1990;

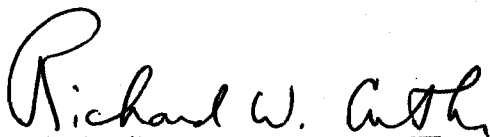
THIRD: That a true, correct, and exact copy of this resolution, together with a complete and exact copy of the aforementioned revised implementation schedule, shall be forthwith distributed to each of the local legislative bodies of the local governmental units within the Region entitled thereto and to such other bodies, agencies, or individuals as the law may require or as the Commission or its Executive Committee or its Executive Director in their discretion shall determine and direct.

The foregoing resolution, upon motion duly made and seconded, was legally adopted at the meeting of the Southeastern Wisconsin Regional Planning Commission on the 13th day of September 1973, the vote being: Ayes 18; Nays 0.



George C. Berteau, Chairman

ATTEST:



Richard W. Cutler, Secretary

**THE
FOX (ILLINOIS)
RIVER**

**Revised
Implementation Schedule
For Meeting
Water Quality Objectives
And
Waste Treatment Requirements**

August, 1973

**WIS. DEPT. OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION**

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PREFACE

In December, 1972, the Wisconsin Department of Natural Resources published a report entitled "The Fox (Illinois) River - An Implementation Schedule for Meeting Water Quality Objectives and Waste Treatment Requirements." Following subsequent action and reconsideration by the parties concerned, this report is now presented as a revision to the original report. Many sections are similar to the previous document, but are included here to provide a complete implementation schedule for the entire Fox River watershed.

Although this report has been written and prepared by the staff of the Department of Natural Resources, community leaders and the technical staffs of the upper watershed communities are largely responsible for developing the revisions concerning that portion of the basin. This report will briefly summarize the actions since presentation of the first schedule and will present the plan and a timetable to serve as a basis for implementing waste treatment and disposal requirements in the Fox River watershed. It must be kept in mind that changing legislative and administrative requirements may necessitate minor additions and alterations to the schedules and treatment levels outlined in this report. The basic goals, however, are not foreseen as differing from those presented.

INTRODUCTION

The Fox River Basin in southeastern Wisconsin is located within the planning area of the Southeastern Wisconsin Regional Planning Commission (SEWRPC). SEWRPC has developed a two-volume report entitled "A Comprehensive Plan for the Fox River Watershed". Volume I, "Inventory Findings and Forecasts," was published in April, 1969, and Volume II, "Alternative Plans and Recommended Plan," was published in February, 1970. A major consideration of this plan relates to surface water quality and methods to control pollution of the waters in the basin. Personnel from the Department of Natural Resources (DNR) served on several committees during preparation of the report and assisted in the plan formulation. Following adoption of the SEWRPC plan by its membership, the Natural Resources Board formally gave the plan its endorsement. It was certified to the U. S. Environmental Protection Agency (EPA) for approval under federal planning guidelines. The Federal government has not approved this plan primarily because it lacks a specific and detailed implementation schedule and because of more recent federal planning requirements not in effect at the time the SEWRPC plan was undertaken.

A report and time schedule for implementing the waste treatment and sewage disposal aspects of the SEWRPC planning reports was prepared by the DNR in December, 1972, and was discussed at a January, 1973, watershed meeting. At that meeting considerable disagreement was voiced regarding the basic recommendation and implementation schedules concerning sewage disposal as presented in the SEWRPC planning documents. This concern was almost exclusively limited to those communities in the upper watershed where major revisions in waste disposal practices were recommended in the plan.

Following the January meeting, local community leaders in the upper watershed formed a committee to prepare a recommended alternative to the DNR schedule for presentation to local governing units for approval and subsequent regional, state and federal action. Nearly unanimous approval of the concepts initiated by this committee has been received (10 of 12 involved governmental units, including all major municipalities). A subcommittee was formed, consisting of technical and professional representatives of those involved communities in the upper watershed. In cooperation with the DNR and SEWRPC this subcommittee prepared an implementation schedule which conforms to their desired alternative.

The remaining sections of this report will detail a sewerage system implementation schedule for the entire Fox River Basin.

DEFINITIONS

Several concepts and definitions as they relate to sewage collection and treatment are helpful to assure understanding of various terms used herein. The definitions are as follows:

Interceptors - Large diameter sewers designed to convey wastes from the terminal of a sanitary sewer system to a treatment works.

Secondary Sewage Treatment - Biological treatment of sanitary sewage which should be capable of removing at least 90 percent of the BOD and 90 percent of the suspended solids.

Tertiary Sewage Treatment - Additional treatment following secondary, designed to enhance BOD and suspended solids removal. Overall efficiencies of 95 to 99 percent BOD removal are obtained.

Advanced Sewage Treatment - Additional treatment following secondary or tertiary to provide for the removal of constituents such as phosphorus and nitrogen. Advanced treatment may include tertiary treatment.

Disinfection - The killing of the larger portion of potentially harmful microorganisms in an effluent through use of chemicals or other means. Chlorine is the chemical most often used.

Water Quality Standards - Standards of water quality as set forth in Chapters NR 102, 103 and 104, Wisconsin Administrative Code. (Water quality standards are in the process of being revised at this time. These new standards may affect the waste treatment requirements at some basin treatment facilities.)

Upper Fox River Watershed - That portion of the Fox River Basin upstream from and including the City of Waukesha. Other communities wholly or partially in this area and affected by this portion of the plan are the Cities of Brookfield and New Berlin; the Villages of Lannon, Menomonee Falls, Pewaukee, and Sussex; the Towns of Brookfield, Lisbon, Pewaukee, Waukesha and Delafield; and the Pewaukee Lake Sanitary District.

PLAN ALTERNATIVES

Volume II of the SEWRPC planning report sets forth several sewage treatment alternatives for the cities and villages currently discharging treated wastes to basin streams. These include alternative 1 with three subalternatives, and six additional alternatives. Separate sets of alternatives for 22 of the larger lakes in the basin are also presented. Recommendations for waste disposal and treatment around these various lakes are discussed in separate sections of this report. The effect of an unplanned alternative on water quality is also discussed. The alternatives presented are those which are to become effective through the plan year of 1990. The cost estimate of each of the alternatives is outlined, based on a present worth analysis and 1970 costs.

Alternative 1 of the stream water quality management plan consists basically of the provision of advanced waste treatment at all major sewage treatment plants within the basin. The plan indicates that this alternative would provide effluents so as to not reduce stream water quality below the established standards. Advanced waste treatment, as defined in the SEWRPC report, should provide for BOD and suspended solids removal in excess of 95 percent. Phosphorus removal of 95 to 99 percent is recommended together with 95 percent nitrogen removal.

Subsystem plan 1A would provide separate sewage treatment plants at each of the following 12 locations within the watershed: Lannon, Sussex, Brookfield, Poplar Creek, Pewaukee, Waukesha, Mukwonago, Waterford-Rochester, East Troy, Lake Geneva, Burlington and Twin Lakes. These plants would all provide advanced treatment and disinfection while Genoa City and Silver Lake would require secondary treatment only. The 1970 cost estimate of this subalternative was estimated at \$57,478,700.

Subalternative plan 1B would provide advanced waste treatment at two large plants in the upper watershed and at individual plants in the lower basin. The individual treatment requirements in the lower basin would remain the same as in plan 1A. Large plants would be located to serve the City of Waukesha and another to serve the area above Waukesha. This would require abandonment of the Sussex, Brookfield and Pewaukee sewage treatment facilities in favor of a single plant to be located at the Poplar Creek site. Interceptors would be provided to transport sewage from these other sites to the larger plant. The Waukesha plant would be an expansion at the existing site. The estimated 1970 cost of subalternative 1B was estimated at \$54,909,700.

Subalternative 1C calls for treatment at lower watershed plants similar to that proposed in 1A, but that the upper basin be served by a single advanced waste disposal facility to be located downstream from Waukesha. This would require abandonment of all treatment plants in the upper basin, including Waukesha, and construction at a new site downstream. Intercepting sewers would be constructed to convey wastes to this new facility. This subalternative has a 1970 estimated cost of \$56,960,700.

Alternative 2 of the water quality plan proposed the diversion of all raw sewage from the upper watershed to the treatment facilities of the Milwaukee Metropolitan Sewerage District. This would require construction of large interceptors from the upper basin to the Milwaukee Metropolitan service area. The Milwaukee South Shore sewage treatment plant would require expansion to accommodate these additional wastes. This alternative would result in diversion of water out of the watershed and subsequent reduced flows in the Fox River. Advanced waste treatment would be provided at the lower watershed communities listed under subalternative 1B. The cost of this plan in 1970 amounted to \$69,000,000.

Alternative 3 includes provision for secondary treatment and disinfection for all major discharges in the basin and disposing of the effluent by land irrigation. Interest in this treatment and disposal method is growing and may be seriously considered in many cases. In the southern basin where sewage treatment plants are located close to rural lands, irrigation can be practiced. For example, Williams Bay and Fontana both presently use seepage for ultimate wastewater disposal.

However, in the populated upper watershed where water quality conditions are acute and land is at a premium, large areas would have to be purchased to dispose of the relatively large amounts of treated sewage. The 1970 cost of providing this alternative was estimated at \$76,000,000.

Stream treatment is alternative 4 of the basin plan. This plan element would require secondary treatment with disinfection at all treatment plants, additional (tertiary) BOD removal where necessary (including the upper watershed), and weed and algae controls in receiving streams. A trunk sewer system would be required to divert effluents from the upper watershed to below Waukesha because of the algae and weed treatment difficulties in this upper stretch of stream. The estimated 1970 cost of this alternative was \$46,000,000. This alternative does not appear viable at this time because of the environmental concerns associated with massive applications of chemicals to surface waters.

Alternative 5 is basically the same as alternative 4 with the addition of low flow augmentation to the Fox River. Secondary treatment and disinfection for all wastes, additional BOD removal where necessary, and weed and algae control would be provided. The plan indicates that diversion of Lake Michigan water to the Fox River is the only potential source of added water for flow augmentation. The problems attendant with diverting water across the sub-continental divide complicate this alternative. The 1970 cost of this project was estimated at \$53,000,000.

Two other alternatives (Numbers 6 and 7) are presented in the SEWRPC report. As determined by the planning commission, neither of these plan elements would provide water quality suitable to meet the established water use objectives. Alternative 6 would be a continuation of present practices in that all communities would provide secondary treatment and disinfection. Under this alternative some of the smaller streams, including the upper portion of the Fox River, would not meet minimal water quality standards. Alternative 7 would require tertiary BOD removal at several plants in the basin, including those in the upper watershed. Removal of nutrients would, however, not be required. This alternative would not produce a significant reduction in the level of nutrients in basin streams, and increased amounts of nuisance weed and algae growths could be anticipated. Present (1970) cost of alternative 6 is \$33,000,000 and for alternative 7 is \$42,000,000.

THE "UNPLANNED ALTERNATIVE"

The unplanned alternative is that plan which would allow existing development in the Fox River Basin to continue without an attempt to guide such development in the public interest. Although SEWRPC does not suggest that this type of development continue, it is discussed to indicate, for comparison purposes, what might happen in the watershed if some sort of plan is not followed.

Land use would probably have the greatest effect on the other resources of the basin including water quality. Small, dispersed concentrations of people within the watershed would make it very uneconomical to extend sanitary sewers to these developments. Proliferation of small sewage treatment facilities to serve these sub-urban subdivisions would be contrary to state and federal policies, and water quality in many small streams to which treated wastes would flow could be expected to deteriorate. Past experience indicates that small sewage treatment plants are not operated as efficiently as larger ones, and thus treatment to the point of nutrient removal would be difficult to attain. SEWRPC has predicted that if a hodge-podge of such developments occurs above Waukesha, the Fox River would be suitable only for waste assimilation and transmission. It is also felt that some lakes in the basin will be further hastened to extreme eutrophication if corrective action is not taken. As lake water conditions become more objectionable, shoreline property values would decrease substantially.

Benefits of this unplanned alternative are few. It would allow individual land owners and developers to utilize the land as they please. This would probably result in a substantial monetary benefit to those few who speculate on real estate in near-urban areas. Although local governments would realize short-time property tax benefits from developments, the long-term burdens on the community will undoubtedly outweigh these immediate advantages.

The disadvantages of not planning a logical development for an area would soon become apparent to residents of the watershed if the natural resources were ignored in uncontrolled urban sprawl. The objection to the unplanned alternative can best be indicated by one of the summary statements in the SEWRPC report: "The unplanned alternative, however, could be expected to lead to a continued intensification of existing environmental problems within the watershed, including flooding and water pollution; could be expected to result in the almost total destruction of the natural resource base; and could be expected to result in a land use pattern which would be as disorderly and inefficient as it would be ugly."

RECOMMENDED ALTERNATIVE

As stated in the SEWRPC report, all subalternatives of alternative 1 would satisfy the water quality requirements in effect at that time. Revision of the water quality standards may, however, change the treatment requirements necessary to meet the upgrading of some basin waters. Treatment

efficiencies and effluent criteria for each facility are not specifically indicated in this document; rather the schedule and concepts are much more important to assure that waste discharge permits, planning, and grant-in-aid are coordinated into a total water quality control program.

In contrast to the recommended alternative (1C) presented in the SEWRPC report and the schedule prepared for that alternative in the earlier DNR report, this document will outline a schedule for subalternative IB of the basin plan. The decision to proceed with this schedule in preference to subalternative 1C was made in response to the actions taken as explained in the introduction of this report.

The schedule only minimally alters the requirements for communities in the lower watershed, but more specifically changes the sewerage disposal practices in the upper basin from a one-plant concept to a two-plant concept. As conceived in the December, 1972, DNR report, a metropolitan sewerage district would have served as the controlling entity in the establishment of an areawide system. Subsequent resolutions of the several communities involved indicate that inter-community contractual sewer service agreements are preferable. Although this may require more compromising on the part of the communities involved, the enthusiasm for this type of agreement may overcome some of the difficulties. Close cooperation of the involved parties will make such a system feasible.

BASIN LAKES

The schedule presented here implements alternative 1 of the SEWRPC plan with some variations with respect to treatment requirements. Later sections of this report will spell out specific dates by which certain actions must be taken to be in compliance with the final plan date.

Lake water quality in the Fox River Basin is quite variable. Some of the lakes are extremely eutrophic with nuisance weed and algae growths while others, such as Lake Geneva, are fairly oligotrophic. Enrichment of lakes can be traced to a combination of factors such as agricultural runoff, seepage or direct flow from private waste disposal systems, and feeder stream inputs. All of these sources contribute nutrients, especially nitrogen and phosphorus, to the lakes, thereby encouraging weed and algae growths. Bacterial contamination of lake waters can occur due to malfunctioning private sewage disposal systems. Such contamination usually is localized and is most evident at a point of direct waste discharge.

Several alternatives have been proposed in the SEWRPC plan which would reduce nutrient inputs and bacterial contamination of lake waters in the basin. Provision of sanitary sewerage systems to serve the developed areas around lakes would eliminate the nutrient and bacterial contributions from malfunctioning waste disposal systems. Agricultural runoff of nutrients could be controlled by eliminating the practice of spreading manure on frozen ground and proper application of commercial fertilizers to prevent leaching to surface waters. Sediment runoff, which also carries nutrients, could be controlled by proper soil conservation practices.

Nuisance control in eutrophic lakes is considered necessary to make them useful for recreational purposes. Weed harvesting and removal will eliminate the associated nuisances and the small amount of nutrients contained in plant tissues. Algae and weed control through the use of chemicals is practical only to eliminate nuisance conditions. Lake water mixing to prevent stratification may improve lake water quality by preventing anaerobic conditions in the hypolimnion. Other control or renovation measures would include dredging, direct nutrient removal, algae harvesting, etc. All of the above were considered in arriving at a rational recommendation for lake water quality management. Planning recommendations were prepared for the 22 largest and most heavily used lakes in the Fox River Basin. (see table 1.)

Construction of sanitary sewerage systems to serve all lake properties is not a necessity. Where such installations are warranted or the local property owners desire a system of sanitary sewers, construction of facilities may be required or permitted. In some cases, sanitary district formation around lakes has been carried out and implementation of a sewage disposal plan has been initiated.

Two lake communities illustrate cases where waste control problems are now being corrected. The Eagle Lake Sanitary District is an area where sewage disposal problems have been evident for several years. The Town of Norway Sanitary District includes the area around Wind Lake, and plans for a sanitary sewerage system have been approved. Installation of the system is encouraged to eliminate any possible problems and to convenience the Wind Lake Property owners.

TREATMENT REQUIREMENTS

The removal of organic matter from sanitary sewage is generally accomplished in biological treatment units. Treatment efficiencies obtainable in the two most common types of plants (trickling filter and activated sludge) are usually in the 80-90 percent range. Secondary treatment was defined earlier as being capable of 90 percent BOD and 90 percent suspended solids removal. Well maintained and operated activated sludge treatment plants can remove in excess of 90 percent BOD.

All sewage treatment facilities discharging wastes to surface waters in the Fox River system should be providing a minimum of 90 percent BOD removal (or equivalent effluent criteria) by July, 1977. In certain cases, where stream dilution is small and effluent volume is large, higher removal efficiencies and effluent or instream aeration may be required to prevent deterioration of the receiving body of water. These conditions will be included as a part of the permit to be issued to all dischargers in the basin. Permit conditions will be based upon effluent or water quality standards, whichever is the controlling factor at the point of discharge. In accordance with legislative requirements, best practicable control technology will be required at all sewage treatment plants by July, 1983.

Phosphorus and nitrogen are most often considered when nutrient limitations are discussed. Efficient and economical phosphorus removal technology is presently available to secure removal efficiencies on the order of 85 to 90 percent. Due to the nature of the waters which eventually receive wastes discharged from sewage treatment plants in the Fox River Basin, phosphorus removal will be required at all major treatment plants in the basin by July, 1975. In many cases, these facilities will be of an interim nature consisting of chemical storage and feed equipment and utilizing existing clarification and sludge handling facilities. Permanent phosphorus removal will be provided at nearly all existing and new treatment plants by July, 1977. Consistent with requirements in other parts of the State, phosphorus removal efficiencies of 85 percent (or equivalent effluent limits) will be required at the several plants in the basin.

Advanced treatment for removal of nitrogen compounds from sewage treatment plant effluents is not recommended at this time because of uncertainties regarding technology and economics of such installations. Conversion of nitrogen forms is feasible, however, and must be considered. Nitrogen in the form of ammonia is toxic to fish and, through oxidation, exerts a significant oxygen demand. Converting ammonia to the more stable nitrate forms may be necessary where there is a large discharge to a small stream. The SEWRPC sewerage study currently under preparation recommends that conversion of ammonia forms to the more stable nitrates be included as a part of most sewerage systems in the region, excluding those sewage treatment plants discharging directly to Lake Michigan and some of the larger streams such as the lower reaches of the Milwaukee and Fox Rivers. Though this is a long range goal, such treatment will be necessary at an earlier date in cases where streams experience extreme low flows in relation to the sewage volume. Therefore, many basin sewage treatment plants will be required to provide an ammonia reduction capability by or before July, 1983.

The effect of chlorine on fish life has, at this time, not been thoroughly determined. When dilution is low, chlorine residuals in a stream below a disinfected sewage treatment plant effluent may be so high as to create toxic conditions for fish and aquatic life. As more information regarding the effects of chlorine compounds becomes available, control or removal may be required.

The requirements outlined below may not be the final goal in sewage treatment. As technology improves and new methods of treatment develop, further requirements for removal of contaminants will be proposed. Total recycling of wastewaters may not seem feasible at the present time, but at some future date, such a concept may become a reality.

IMPLEMENTATION SCHEDULE

Lower Watershed

The lower Fox (Illinois) River watershed streams and the associated pollutional contributions from municipal sewage treatment plants present relatively minor implementation problems. Six of the ten existing sewage treatment plants will require advanced treatment to include phosphorus removal within a fairly short period of time. Two of the remaining four plants would remain as secondary treatment units. The other two would continue to provide seepage ponds for effluents from secondary sewage treatment plants. A small portion of the eastern basin in the Village of Muskego and the City of New Berlin will have wastes diverted to the Milwaukee Metropolitan Sewerage District.

The Western Racine County Sewerage District placed an activated sludge sewage treatment plant in operation in 1968. This plant was designed to treat wastes from a population of 5,000 and a flow of 500,000 gallons per day. The 1970 population of the two communities served by the plant (Waterford and Rochester) totaled 2,358, and the projected population is 3,328. Assuming a 20-year life expectancy of the treatment facility, major revisions to the plant will probably be necessary around 1990. If treatment efficiencies drop significantly below the 90 percent level now provided at the plant, interim construction will be required to upgrade the plant so as to provide required efficiency in the 90 to 95 percent BOD removal range. Equipment for removal of phosphorus from wastewater will be necessary by July, 1975.

The City of Burlington placed a new activated sludge treatment plant in operation in 1971. The design population equivalent for this plant, including industrial contribution, is 25,000 with an anticipated flow of 2.5 million gallons per day. The 1970 population of the city was 7,479, and the

1990 projection is 12,300. The plant, therefore, is not likely to be overloaded soon; however, due to normal deterioration, improvements will probably have to be made around the 1990 plan year. In the interim, if the plant is not capable of removing the required 90 percent BOD, additional treatment will be required. Phosphorus removal will be necessary at the treatment plant by July, 1975.

The Village of Silver Lake built an activated sludge sewage treatment plant in 1967. Present (1970) population of the village is 1,210, and the 1990 projection is 1,489. The existing plant is designed to serve 3,000 persons, so it should not become overloaded by the plan year. By 1990 the plant will be over 20 years old, and it is likely that some major revisions will be necessary to assure treatment in the 90 percent range. Presently the plant provides an adequate degree of treatment, but may require interim modifications if efficiencies decrease substantially. The area around Silver Lake contains a heavy concentration of cottages and homes. Extension of sewer service to the populated shoreline areas will eliminate possible nutrient seepage to the lake from septic tank systems. Such a project, which involves extensive sewer and interceptor construction, should be completed by December, 1978.

The Village of Mukwonago constructed a trickling filter sewage treatment plant in the early 1950's. Design population of the plant is 1,500. The 1970 population of the village was 2,367, and the projected 1990 population is 4,471. Present treatment efficiencies are inadequate, and an engineer has been retained to design new sewage treatment facilities. The new treatment plant must be designed to provide phosphorus removal and secondary treatment. Completion of facilities is necessary by July, 1977.

The Village of Muskego operates two sewage treatment plants, one discharging to the Root River Basin and the other, a lagoon system, to the Muskego Canal in the Fox River watershed. Modifications have been made to the stabilization lagoons including installation of equipment which converts the plant to an aerated lagoon with disinfection of the plant effluent. The Muskego service area is part of the Milwaukee Metropolitan Sewerage District. An interceptor sewer is to be extended to the Little Muskego Lake area, and trunk sewers would serve the remaining populated portion of the village. Because of delays in interceptor sewer construction it appears that this service from the Milwaukee Metropolitan District will not be provided until 1980 to 1985. A high level of treatment must be provided until that time. Additions to existing treatment facilities, though not foreseen at present, may be necessary if treatment efficiencies fall below required levels. Phosphorus removal facilities are also necessary at this plant beginning July, 1975. These should be designed as interim facilities, as they will only be operated for three to eight years before they are abandoned and connection to the Milwaukee system is made.

The Town of Norway Sanitary District serves that portion of Racine County around Wind, Kee Nong Go-Mong and Waubeesee Lakes. Plans have been approved for a collection and sewage treatment system. The system is designed as a secondary treatment plant at the present time with a design population of over 6,000. This sanitary district is somewhat larger than originally anticipated by the SEWRPC in its report, which primarily provided for lake water quality enhancements, so the sewage treatment plant and sewer service area will be larger than proposed under the plan. Phosphorus removal facilities will have to be added to the plant, therefore the design should be altered to provide such equipment. The sanitary sewers and sewage treatment plant must be constructed by July, 1977.

The City of East Troy operates a trickling filter sewage treatment plant which was built in 1960. The design population and flow is 2,770 and 319,400 gallons per day, respectively. Present flow to the plant is about 200,000 gallons per day with a 75 percent BOD reduction. Disinfection of the plant effluent is not now provided, but must be installed by July, 1974. Improvements are necessary in operation; and the plant does not apparently have the ability to remove 90 to 95 percent of the BOD. The facility should be upgraded to provide this level of treatment and also must be capable of removing phosphorus by July, 1975.

The City of Lake Geneva has a trickling filter sewage treatment plant with inadequate disinfection. Separate disinfection equipment must be provided by July, 1974. BOD and suspended solids removal efficiencies are currently inadequate, and necessary revisions in the treatment plant are required to increase removal to 90 to 95 percent by July, 1977. Phosphorus removal will be required by July, 1975.

The Village of Fontana on Lake Geneva disposes treated wastes through a seepage system. Plans have been approved for an activated sludge treatment plant in addition to the trickling filter plant preceding the seepage lagoons. Continued use of the seepage lagoon will prevent direct discharge of wastes to surface waters and eliminate an outfall problem. The approved addition to the treatment plant must be constructed to relieve a potential overload of the existing trickling filter unit. Installation of the plant must be completed by July, 1977.

The Village of Williams Bay is the other plant which provides seepage for a trickling filter plant effluent. Existing treatment appears to be satisfactory, and without a discharge there is no surface water degradation problem. Clear waters are a problem in the sanitary sewers, and a program for elimination of this problem must be carried to completion by July, 1977. Upgrading of the plant will probably be necessary prior to 1990. The most recent modification was made in 1968.

The Village of Twin Lakes operates a new activated sludge treatment plant which provides a high degree of BOD and suspended solids removal. Sanitary sewers are being extended to the area around Elizabeth Lake as recommended in the planning report. Completion of this sewer service must be made by December, 1976. In addition, phosphorus removal facilities must be provided by July, 1975.

The Village of Genoa City trickling filter sewage treatment plant is presently providing inadequate treatment. This plant was last modified in 1959, and the design population was 1,200. The 1970 population of the village was very near this design level indicating that expanded and improved facilities are needed. Upgrading of the existing treatment plant, or if so determined, a major revision to the sewage treatment facilities is needed by July, 1977. Design must be for 90 percent BOD removal or equivalent effluent requirements.

Residences in the Eagle Lake Sanitary District in Racine County are served by private waste disposal systems. Problems are experienced with absorption of wastes into the soil and plans have been approved for a community sanitary sewerage system. Construction of these facilities must be completed before July, 1977. The Town of Lyons Sanitary District, including the community of Lyons in Walworth County, also experiences problems with sanitary sewage disposal. A community-wide collection and treatment system will also be necessary by July, 1977.

Sewage treatment facilities not planned in accordance with appropriate regional, state and federal guidelines will not be approved for construction. Local governmental units will have primary responsibility for the necessary zoning and land use restrictions to control developments requiring sewage disposal facilities, but are not in conformance with such guidelines or rules. Sanitary sewer service from existing systems may be provided to outlying areas if deemed necessary to control existing pollution or to serve approved developments within the basin.

Upper Watershed

The Fox River Basin above Waukesha is a rapidly expanding suburban area. Surface waters must be upgraded and maintained to protect the public's right to use and enjoy these waters. Water quality standards will require that the stream be able to support fish and other aquatic life and that a public health hazard not exist due to sewage effluents. Relatively small streams in comparison to discharge volumes indicate that high levels of treatment, or elimination of a discharge, will be necessary to achieve those standards.

The schedule presented in the following paragraphs and in Table 2 and Fig. 1 is for the provision of two sewage treatment plants in the upper basin. One plant will be located in Brookfield (Poplar Creek Site) and will service the general area north of Waukesha, and the other will be located below and operated by the City of Waukesha to service that city and adjacent environs only. It is anticipated that in order to meet the water quality criteria of the Fox River, high treatment levels will be necessary. The degree of treatment will eventually be nearly equal at both plants in that nitrification, phosphorus removal, and tertiary BOD and suspended solids removal will be required.

Sewage treatment at the two plants will be provided to other communities and outlying areas on a contract basis. Such contracts will provide reasonable fees commensurate with operating, maintenance and new construction costs. Interceptor sewer construction costs will be shared in accordance with pre-construction agreements between the involved parties. As capacity permits, the cities operating the sewage treatment plants will provide such service as deemed necessary and reasonable by appropriate regional and state agencies.

In 1967, the City of Waukesha expanded its sewage treatment plant to 8.5 million gallons per day capacity. By 1972, daily flow to the plant has reached 9 to 10 million gallons. Although the plant is hydraulically overloaded, good secondary treatment is being provided with effluent BOD concentration often less than 10 mg/l and efficiencies of 90 to 95 percent. The city is expanding rapidly, and the flow volume is much in excess of that expected from a city of this size. The approximate per capita sewage flow is in the range of 200 to 225 gallons per day. This is over twice that used in current design criteria for domestic loadings to a sewage treatment plant.

The excessive influent flows apparently come from industrial wastewaters being discharged to the sanitary sewers. Uncontaminated cooling waters should not be discharged to the sanitary sewers if they can be safely discharged to surface waters. Removal of excessive quantities of clear water will increase the time the existing plant is able to function adequately without expansion. The City of Waukesha should continue its program to eliminate both industrial clear water and infiltration into the sanitary sewers. Uncontaminated waters or waters which can readily be treated by the industry should be removed from the sanitary sewer and directed to the stream. A report relative to this problem should be submitted to the Department of Natural Resources. Included should be alternatives and a time schedule for controlling clear water entrances to the sanitary sewers.

BOD and suspended solids removal at the Waukesha treatment plant is becoming a critical factor as new service areas are added and the city expands. Due to the existing small overload and the potential gross overload, removal efficiencies will likely decrease from current 90 to 95 percent value. Expansion of total treatment capacity will, therefore, be required within the next several years. Pumping capacity of the present treatment plant is about 18 million gallons per day, and piping capacity is 13 million gallons per day which also means additional equipment will be needed in the near future.

The City of Waukesha has retained a consulting engineer to prepare a preliminary engineering report relative to the expansion of sewage treatment capacity for the city. Consideration of alternatives include addition of treatment capacity at the existing site or construction of additional capacity at another location. The SEWRPC plan proposes 18.5 million gallon per day of total treatment capacity for the Waukesha area under subalternative 1B. More current engineering estimates may alter this somewhat, but provision must be made to service the entire recommended service area.

It is anticipated that new treatment facilities serving the Waukesha area will be operated in parallel with the existing plant regardless of location. Tertiary BOD and suspended solids removal must be provided at the existing plant in conjunction with any new construction.

Nitrification of all sewage flows may be required at a later date. Phosphorus removal must be designed into new facilities, and must be provided at the existing trickling filter plant by July, 1975. This latter requirement may involve use of interim equipment to serve until permanent facilities are provided with an expansion by 1977. The additional treatment capacity must be provided by July, 1977 to prevent gross overloading of the existing plant. Intra- and extra-city interceptor construction will continue in accordance with applicable planning and zoning restrictions. The specific time schedule included in Table 2 indicates current estimates by the City of Waukesha.

Cooperation and coordination between the communities constructing and connecting to the sewerage system serving the area north of Waukesha will be essential. The City of Brookfield will be the responsible unit of government for the construction and operation of the treatment facility itself. Brookfield's new Poplar Creek sewage treatment plant is to become operational about September, 1973, providing secondary treatment for 5 mgd. The plant was designed to accept wastes from the old treatment plant as well as the expanding southern portion of the city. Although approved as an interim facility, the plant will serve as a permanent part of a much larger plant to be eventually located at the site in accordance with this implementation schedule. Flows to the new plant will be approaching design values when it becomes operational and, therefore, due to an expanding service area, almost immediate expansion will be necessary. The addition will require a much less significant effort to construct, and must be completed by July, 1977. Only clarification and aeration equipment will be necessary as all other appurtenances are currently sufficient to handle the 10 mgd addition anticipated. Interim phosphorus removal will be provided at the new facility by July, 1975, and permanent equipment will be constructed as part of the expansion program. In addition, tertiary BOD and suspended solids removal will be provided by July, 1977 and nitrification may be necessary at a later date.

The SEWRPC study indicates that the 1990 capacity of this plant should be 17.9 mgd. Expansion to that volume will be provided in 1985 when additional waste volumes are diverted to the plant via the interceptors.

Interceptor sewer construction between outlying communities and the Brookfield sewage treatment plant will be according to the attached chart. Action with respect to the sewer serving the Pewaukee area must be initiated soon to allow connection into the Brookfield plant by July, 1977. Although originally recommended as a gravity interceptor, a cost comparison will be made between that method of conveyance and a force main. Staged construction of the sewers north from Brookfield will be provided so as to assure service to those areas by 1985. Intercommunity contractual agreements for all intercepting sewers constructed prior to 1978 will be affected during 1974. All other interceptor sewer construction will require contract agreements prior to 1980.

The Village of Lannon does not have a sanitary sewer system at the present time. Until an interceptor to serve this area is available, a restriction on construction and development may be necessary to prevent sewage disposal problems. Interceptor sewer service will be available by 1985, and a sanitary sewer system to collect and convey wastes must be constructed.

The eastern portion of the Village of Menomonee Falls is located within the boundaries of the Milwaukee Metropolitan Sewerage District. At the present time the western portion of the village is only sparsely populated and does not require sewer service. Sewage collection systems for this area will not be provided until the interceptor to the Poplar Creek plant is available in 1985. Control of suburban development may be necessary in this area to prevent sewage disposal problems.

The interceptor sewer serving the northern part of the basin will be adequate to accept sewage collected in areas of the Town of Lisbon adjacent to incorporated communities. This service will probably not be available until after 1985. Therefore limitations on growth may also be necessary to prevent waste disposal problems.

Existing sewage treatment facilities serving the Village of Sussex are currently overloaded. Water quality in the stream below the outfall is degraded, and remedial action is required. The village has approved plans for an interim sewage treatment plant to serve the community until 1985 when interceptor service to Poplar Creek is available. The plant is designed to provide tertiary BOD and suspended solids removal through activated sludge and microstraining methods. Phosphorus removal will also be provided. Conditions are such that construction of this plant must begin very soon. A construction period of about one year is contemplated, indicating that the plant will be operational in early 1975.

An expanded sewage treatment plant was put into operation by the City of Pewaukee in 1971. This was approved as an interim expansion, and it will be necessary to abandon it when an interceptor becomes available in 1977. While the existing treatment is not adequate to maintain high quality conditions downstream under low flow, the early date for diversion of this sewage flow to the regional plant requires no additional capacity. Maintenance of treatment efficiencies at the highest possible levels utilizing the existing system must be provided. Phosphorus removal for the short interim will not be required.

The Pewaukee Lake Sanitary District consists of the more populated areas near the northern shore and eastern end of Pewaukee Lake. Sewer service for these areas is not available, but plans have been developed for a system. The wastes collected by the sewers will flow into the interceptor which will be built between Pewaukee and the Poplar Creek regional plant. In this instance, timing is important to see that the interceptor is available when hookups to the collection system are made.

Sanitary sewer service is not provided for a populated area in the Town of Brookfield and the northwestern part of the City of New Berlin. Although no significant pollution problems are noted in the area, service is necessary to prevent those problems. It is anticipated that a trunk sewer from the regional plant at Poplar Creek will be extended into this area by 1978.

It is possible that other areas outside existing corporate limits may at some time in the future require sewer service. In accordance with the SEWRPC land use planning guidelines, any area in the upper watershed served by sanitary sewers must be connected into proposed interceptors and the appropriate treatment plant.

SUMMARY AND CONCLUSIONS

This revised implementation schedule is intended to serve as a guideline in the development of an orderly waste disposal plan for the Fox River Basin. It serves as a supplement to Department of Natural Resources reports and the planning documents of the Southeastern Wisconsin Regional Planning Commission. Revision of the initial schedule published in December, 1972, was necessitated by a strong desire on the part of the local municipalities to proceed in the development of a waste management system in a manner different from that proposed. This report incorporates those desires and establishes dates by which certain actions must be taken to conform to the planning recommendations and policies of the Department of Natural Resources.

In general, phosphorus removal must be provided for all communities by July, 1975. BOD and suspended solids removals will, in most cases, be limited by the stream water quality and will have to meet an effluent criteria more stringent than that normally referred to as secondary treatment by the dates described. Effluent ammonia reduction will be required where found necessary by further studies.

Two sewage treatment plants will be provided in the upper Fox River watershed. A regional plant will be provided at Brookfield's Poplar Creek site to serve the area above this point. The plant will be expanded to sufficient capacity by 1977 and further by 1985 as interceptor service is extended. Expanded sewage treatment capacity will be provided by the City of Waukesha to serve that community and the surrounding area. This addition will be constructed by July, 1977. All interceptor sewer construction will be phased as indicated in the accompanying tables. Facilities will be constructed and operated by inter-community contracts signed prior to actual service.

Permits to discharge will be issued to follow (as nearly as possible) the proposals made in this report. Permit conditions and schedules will extend for a maximum of five years and therefore will reflect only the requirements during that period. Cooperation of the basin communities in the implementation of this plan will result in a sound waste management system and enhanced water quality in the Fox (Illinois) River Basin.

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Dist.: List 2

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TABLE 1
LAKE WATER QUALITY ALTERNATIVES

<u>Lake</u>	<u>Problem</u>	<u>Recommended Alternative</u>
Beulah Lake	Weeds	Weed Harvesting Agricultural Runoff Control
Big Muskego Lake	Weeds, Algae, Possible Sewage Contamination	Weed Harvesting and Algae Control Investigate Sewage Problems
Bohner Lake	Weeds, Algae	Weed and Algae Control Agricultural Runoff Control
Browns Lake	Heavy Weeds and Algae, Possible Sewage Contamination	Weed Harvesting and Algae Control Sewerage System
Camp and Center Lakes	Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Agricultural Runoff Control Sewerage System
Como Lake	Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Agricultural Runoff Control Sewerage System
Eagle Lake	Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Agricultural Runoff Control Sewage System
Echo Lake	Moderate Nutrients	None
Elizabeth and Marie Lakes	Weeds	Weed Control Agricultural Runoff Control Sewerage System
Geneva Lake	None	Agricultural Runoff Control
Little Muskego Lake	Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Sewerage System
Pell Lake	Weeds	Weed Harvesting Agricultural Runoff Control
Pewaukee Lake	Weeds and Algae	Weed and Algae Control Agricultural Runoff Control Sewerage System
Phantom Lakes	Weeds	Weed and Algae Control Agricultural Runoff Control
Powers, Tombeau and Benedict Lakes	Moderate Weeds	Agricultural Runoff Control Weed Control
Silver Lake	Occasional Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Agricultural Runoff Control Sewage System
Tichigan Lake	Heavy Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Sewerage System Control of Upstream Fox River Nutrients
Wind Lake	Weeds and Algae Possible Sewage Contamination	Weed and Algae Control Agricultural Runoff Control Sewerage System

TABLE 2
PROPOSED TIME SCHEDULE
FOR MUNICIPAL SEWAGE TREATMENT
FOX (ILLINOIS) RIVER BASIN

Name	Disinfection	Phosphorus Removal	Revise or Upgrade Secondary	Other
Western Racine Co. Sanitary District		July, 1975	As required by 1990	
Burlington		July, 1975	As required by 1990	
Silver Lake				Sewer Extension, Dec., 1978.
Mukwonago		July, 1975	July, 1977	
Muskego		July, 1975		Connect to Milwaukee Met. Sew. Dist. by 1985.
Town of Norway Sanitary District		July, 1975	July, 1977 (new plant)	
East Troy	July, 1974	July, 1975	July, 1977	
Lake Geneva	July, 1974	July, 1975	July, 1977	
Fontana on Lake Geneva			As required by 1990	
Williams Bay			As required by 1990	Clear Water Elimination, January, 1978.
Twin Lakes		July, 1975		Complete Sewer Extension by December, 1976.
Genoa City			July, 1977	
Eagle Lake Sanitary District			July, 1977 (new plant)	
Lyons Sanitary District			July, 1977 (new plant)	
Lannon				Connect to Interceptor Sewer From Regional Treatment Plant, 1985. (new collection system)
Menomonee Falls				Connect to Interceptor Sewer From Regional Treatment Plant, 1985.
Sussex		March, 1975	March, 1975	Connect to Interceptor Sewer From Regional Treatment Plant, 1985.
Brookfield		July, 1975	July, 1977 (expansion) By 1985 (expansion)	Accept Wastes, 1985.
Pewaukee				Connect to Interceptor Sewer From Regional Treatment Plant, July, 1977.
Pewaukee Lake Sanitary District				Connect to Interceptor Sewer From Regional Treatment Plant, July 1977.
New Berlin				Connect to Trunk Sewer From Regional Treatment Plant, Jan., 1978. (new collection system)
Waukesha		July, 1975		New or Expanded Sewage Treatment Plant, July, 1977.

PROPOSED CONSTRUCTION SCHEDULE
SEWERAGE DISPOSAL SYSTEMS
UPPER FOX (ILLINOIS) RIVER

Interceptor Sewers

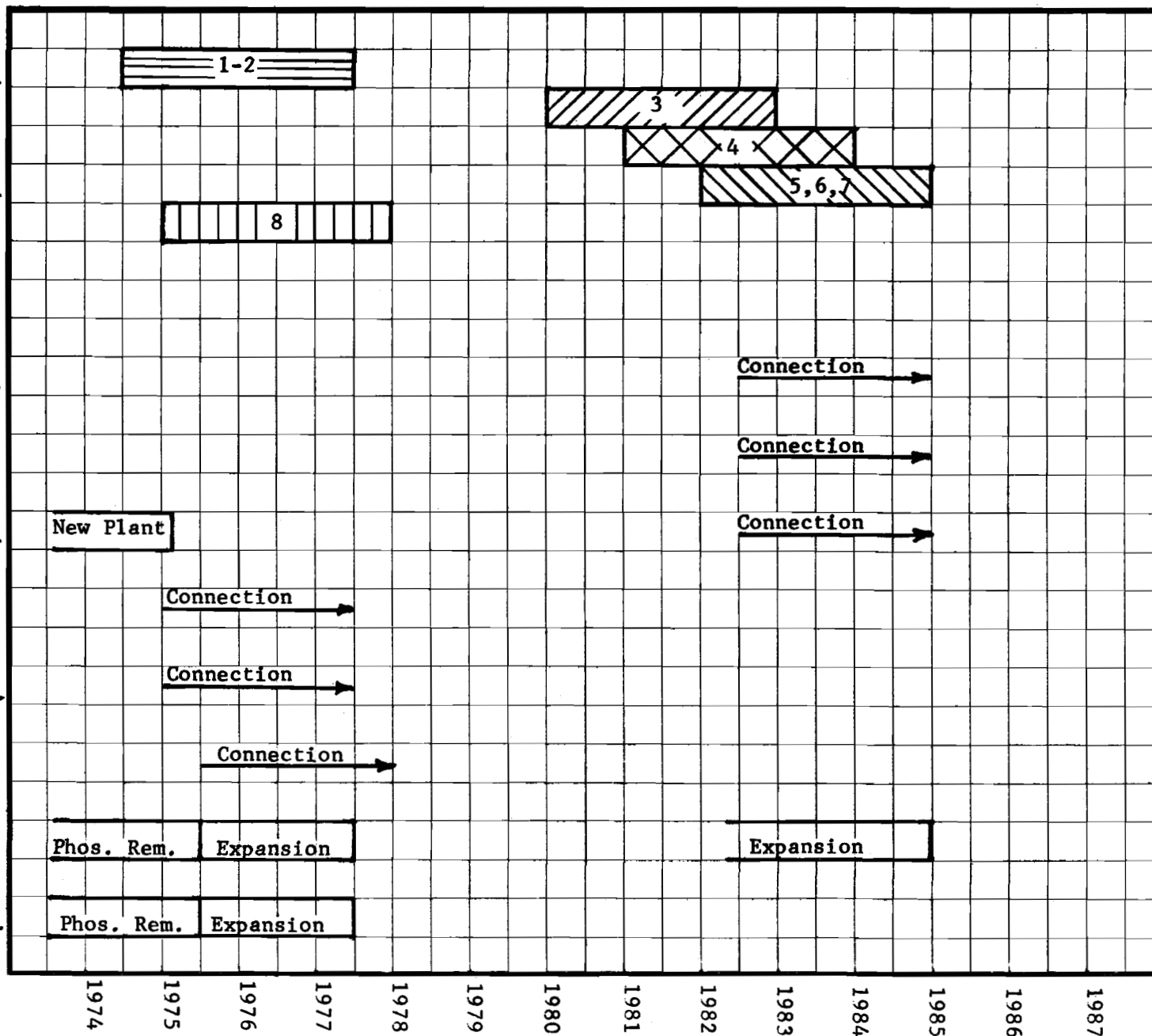
Segment 1-2 (See Map)...

Segment 3.....

Segment 4.....

Segment 5,6,7.....

Segment 8.....



Proposed Interceptor Sewer
Construction Schedule

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Segment	Proposed Completion Date
1	July, 1977
2	July, 1977
3	1983
4	1984
5	1985
6	1985
7	1985
8	Jan., 1978

