ST. LOUIS, MISSOURI
WATER QUALITY MANAGEMENT PLAN
AREAWIDE WASTE TREATMENT MANAGEMENT STUDY (208)

MAY, 1978

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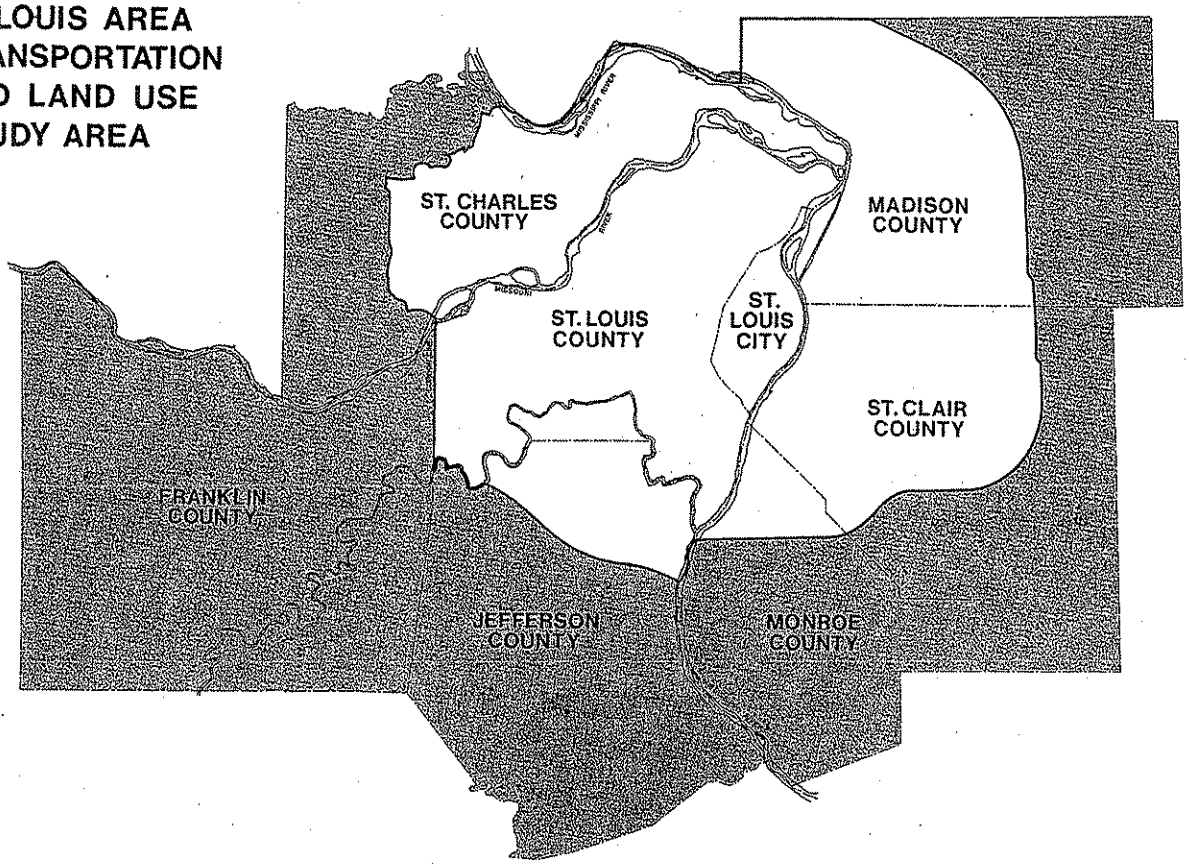
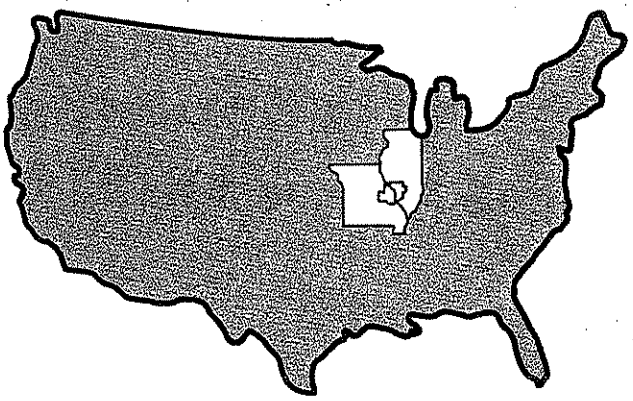
ST. LOUIS AREA TRANSPORTATION AND LAND USE STUDY AREA



ST. LOUIS METROPOLITAN AREA

UNITED STATES



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1. INTRODUCTION

I. THE 208 PLAN--BACKGROUND, GOALS, PURPOSES

Clean water is essential to the health and vitality of our nation. Water pollution affects all living things and upsets nature's delicate balance.

In 1972, a commitment was made to protect the rivers and streams of our nation. P.L. 92-500, the Federal Water Pollution Control Act Amendments, was enacted; it established goals and objectives, and more importantly, the tools to insure that our nation's water quality will be protected. This report, and the planning effort which led up to it, is St. Louis' contribution to this national commitment.

Section 208 of the Clean Water Act makes grants available to designated metropolitan areas and planning agencies to solve water pollution problems and to plan for measures to minimize pollution in the future. In the spring of 1975, the Governor of Missouri designated the City of St. Louis, Franklin, Jefferson, St. Charles and St. Louis Counties as a 208 planning area (see Figure 1). In addition, the Governor designated the East-West Gateway Coordinating Council as the agency responsible for preparing the Water Quality Management Plan for this area.[1]

The objective of the Clean Water Act is to "restore and maintain the chemical, physical and biological integrity of the nation's waters." To accomplish this objective, two

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[1]Owing to the difference in the characteristics of streams and the governmental framework in the Illinois portion of the St. Louis Metropolitan Area, the Governor of Illinois designated the Southwestern Illinois Metropolitan and Regional Planning Commission to undertake 208 planning in Madison, St. Clair and Monroe Counties in Illinois. The two planning efforts have been coordinated through an agreement worked out by both planning agencies, both states and the U.S. Environmental Protection Agency.

AREA OF STUDY

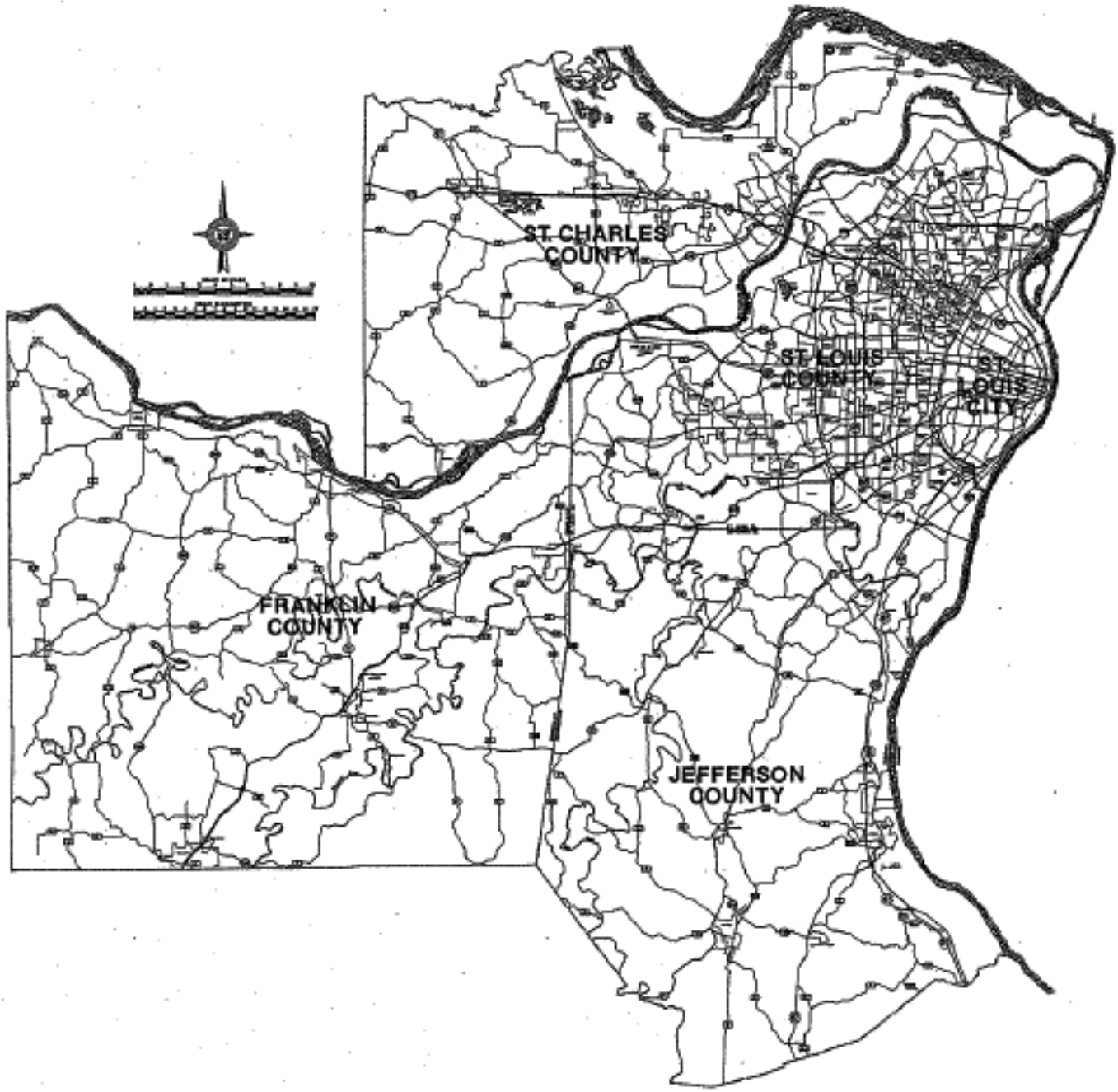

figure 1

primary goals have been established. The first goal, which summarizes the purpose of all aspects of the Clean Water Act, is to eliminate the discharge of pollutants into navigable waters by 1985. A second, interim goal is to attain "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water." This "fishable and swimmable" goal is to be achieved by July, 1983.

A number of policy statements are included in the Act which sets forth the framework for achieving these goals and objectives. One of these policy statements makes it "the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollution in each state." This national policy is the basis for 208 planning.

Planning under Section 208 of the P.L. 92-500 represents a unique opportunity for local governments to assess water quality problems and devise their own strategies for solving them within the framework of national policy. The dominant role of local governments in devising 208 Plans has been stressed continuously by Federal and State agencies administering the program.

Local governments need to have a major role in devising the 208 Plan because local governments will have primary responsibility for enacting, enforcing and financing most aspects of the Plan. Control of nonpoint sources of pollution, for example, involves programs ranging from zoning and building regulations to streetsweeping and leaf collection. Responsibility for these programs is currently and is expected to remain, within the realm of local governments. Although federal and state aid is used for their construction, wastewater treatment plants are generally owned, operated and maintained by units of local government. (These existing "management agencies" in many instances will continue to serve as management agencies as part of the 208 Plan.) For these reasons and others, the 208 Plan must be devised by and, in its final form, be acceptable to the local governments responsible for its implementation.

The 208 Plan has come to mean many things to many people. To some in the St. Louis area, it has meant help in establishing a sewer district to deal with local sewage problems. To others, it has meant assistance in studying local 20-year sewage treatment needs. To still others, it has held the promise for a comprehensive approach to either solving local public health and development problems or providing clean water for the future recreational and commercial pursuits of

citizens in the St. Louis area. To all, most importantly, the 208 program has heightened awareness of the importance of clean water to the health and economic vitality of their community and the total St. Louis region.

Section 208 was intended to do these things and more. In fact, there are 16 major points set forth in the law which a 208 Plan must address (see Appendix C). These points include strategies for treatment plant construction, nonpoint source controls, and management agency designation among others. These 16 points represent the output required by Federal regulations. Federal regulations, however, were not the only factors affecting how the 208 Plan was to be written.

Early in the project, the East-West Gateway Coordinating Council and advisory committees determined that: 1) some of the federal requirements were more relevant to local problems than others; and that 2) given the limited time frame and funding available, 208 planning in the St. Louis area should focus on a manageable number of immediate water quality management problems.

A "regional profile" prepared early in the planning process summarized these immediate water quality management problems. In Jefferson County, for example, attention was drawn to the nearly 500 individual point sources of pollution in the northern part of the county discharging partially treated sewage into small streams. Other problems identified in Jefferson County included geological problems associated with septic tanks and the lack of overall management authority to coordinate sewer development and pollution clean-up efforts. In Franklin County, the organization of rural sewer districts and, again, geological problems associated with septic tanks were seen as critical. St. Charles County, with its high growth rate, active governmental units, and historical experience in water quality management, posed a unique set of issues. The main concerns were to achieve some kind of watershed approach to treatment to deal with the County's anticipated growth and to develop a management approach sensitive to watershed-wide as well as local concerns. In the City of St. Louis and St. Louis County, major concerns included the annexation of urbanized portions of the County into the Metropolitan St. Louis Sewer District, the upgrading of treatment facilities, control of combined sewer overflows and control of pollution from urban stormwater and construction site runoff.

This, then, is a generalized summary of issues and concerns for which the 208 Plan includes a blueprint for future action. As the study progressed, numerous additional issues

were identified and addressed. The Final Plan combines recommendations intended to fulfill federal planning and funding requirements with realistic, implementable approaches to solving the St. Louis area's most significant water quality management problems.

II. HOW THE PLAN WAS PREPARED

A. Study Team Organization

The study team for undertaking the St. Louis 208 Study consisted of the East-West Gateway Coordinating Council staff, a management planning consultant and a prime environmental engineering consultant. Under the prime engineering consultant were two subcontractors retained to perform specific engineering tasks. The overall organization of the study team is shown in Figure 2.

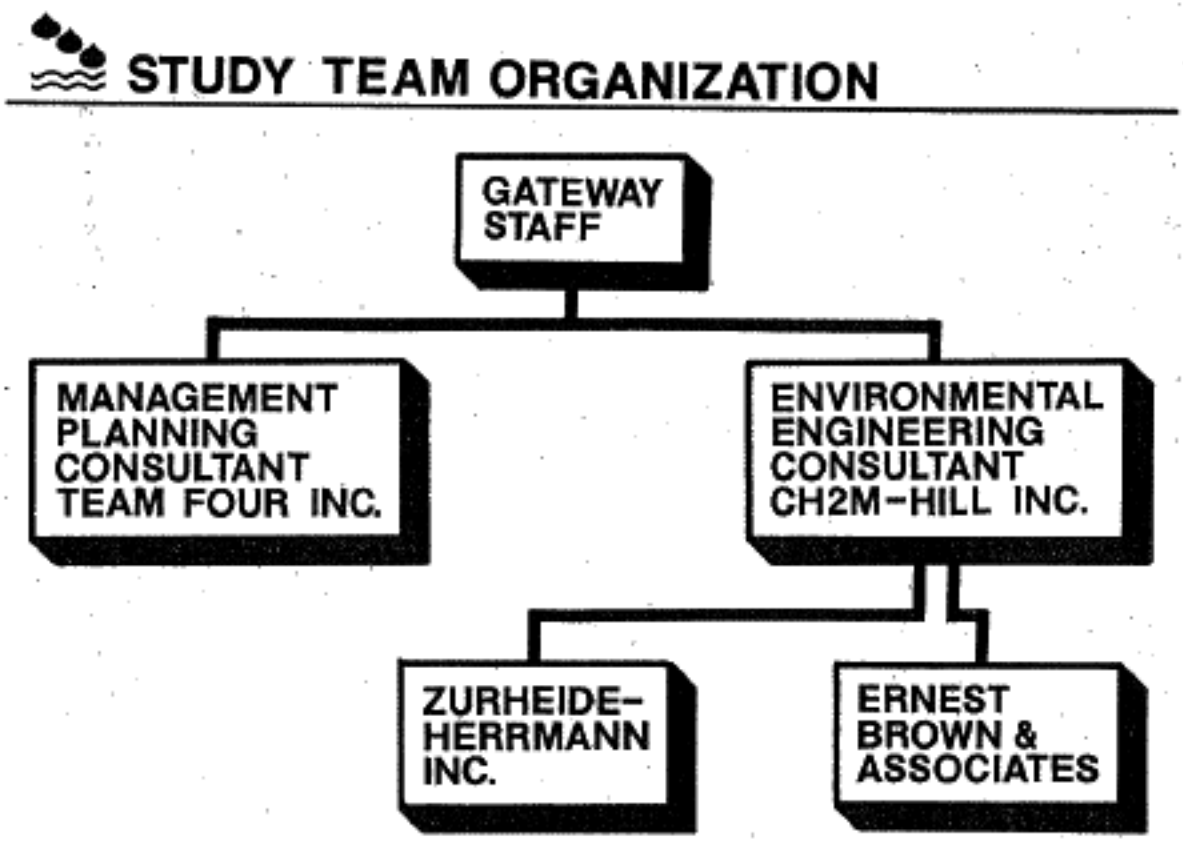

figure 2

The Gateway staff retained overall responsibility for organization and management of the study. In addition to reviewing and supervising the work of consultants, the staff was responsible for public information and public participation activities, liaison with local officials, collection and formating of many kinds of data, and completion of certain technical planning tasks, including the Draft and Final 208 Plan and the Environmental Assessment.

Consultants, selected by a special committee of the Gateway Board of Directors after an extensive screening program, were assigned specific, well defined technical planning tasks. In its capacity as management planning consultant, Team Four Inc. was responsible for the analysis of existing management agencies, their operating procedures and legal capabilities; the assessment of the capability of existing management agencies and laws to fulfill the requirements of 208 Plan implementation; and the identification of alternative approaches to developing effective, feasible and acceptable governmental frameworks for addressing present day water quality management needs.

The environmental engineering consultant and its subcontractors were given the responsibility of identifying existing and potential water quality problems using adopted criteria; determining the sources and relative importance of the sources of these problems; and designing alternative approaches to reducing the impact of these various pollution sources to acceptable levels. These tasks involved assembling and analyzing water quality data and projecting future water conditions based on anticipated growth through use of a computer model. The analysis of pollution sources then enabled the consultants to develop the most cost-effective approaches to water quality improvement.

B. The Study Process

The philosophy employed in producing the St. Louis 208 Plan was two-fold. First, an attempt was made to involve affected governmental officials and interested citizens in the major decision-making points in the project. As a result, three series of community workshops were held at the conclusion of major phases of the project. At these workshops, participants expressed their views on work that had been done

(see Element 16 and 25 Reports).[2] These views were used by the staff in redirecting the project in the succeeding phase.

The second part of the philosophy involved an attempt to analyze in detail only those problems which were most significant and proposed solutions which appeared most feasible. To accomplish this, the project was organized into four phases (see Figure 3). The first phase involved a superficial look at a wide range of pollution problems and potential solutions. This involved collecting all previous reports and existing data as well as listing all potential pollution sources suggested by citizens and officials. During the second phase, this list was reviewed and classified to eliminate problems from investigation that were not significant and proposals to solve problems that did not appear feasible. During Phase III, additional data was sought to provide a well-documented description of water qulaity problems and clearly defined recommendations for solving these problems. At the conclusion of Phase III, alternative pollution control strategies were presented for evaluation and selection of preferred water quality management techniques.

The selected control techniques were fine-tuned during Phase IV and were published in the Draft Plan. The Draft Plan was distributed for review to the U.S. Environmental Protection Agency (EPA); the Missouri Department of Natural Resources (DNR); counties and local communities; and the 208 advisory committees. A public hearing on the Draft Plan was held on March 9, 1978. Comments from these reviewers and the Public Hearing were then used to prepare the recommendations for final publication in this report.

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[2]Because of the thoroughness and complexity of this planning effort, including all data and methodologies in this Final Plan Report would yield an unwieldly document, unsuitable for distribution. Therefore, throughout this report, reference will be made to previous 208 reports where a more indepth discussion of an issue can be found or where detailed methodologies and data collection procedures are described. These interim outputs, called Element Reports, have been distributed to members of the 208 advisory committees and local public officials. Copies of these reports are available at East-West Gateway. See Appendix D for a listing of 208 report outputs. It should be noted that the Element Reports are not technically accurate in all cases. The thrust of the reports was to present methodologies and interim outputs which were later refined and corrected during the 208 planning process.

208 PLANNING PROCESS

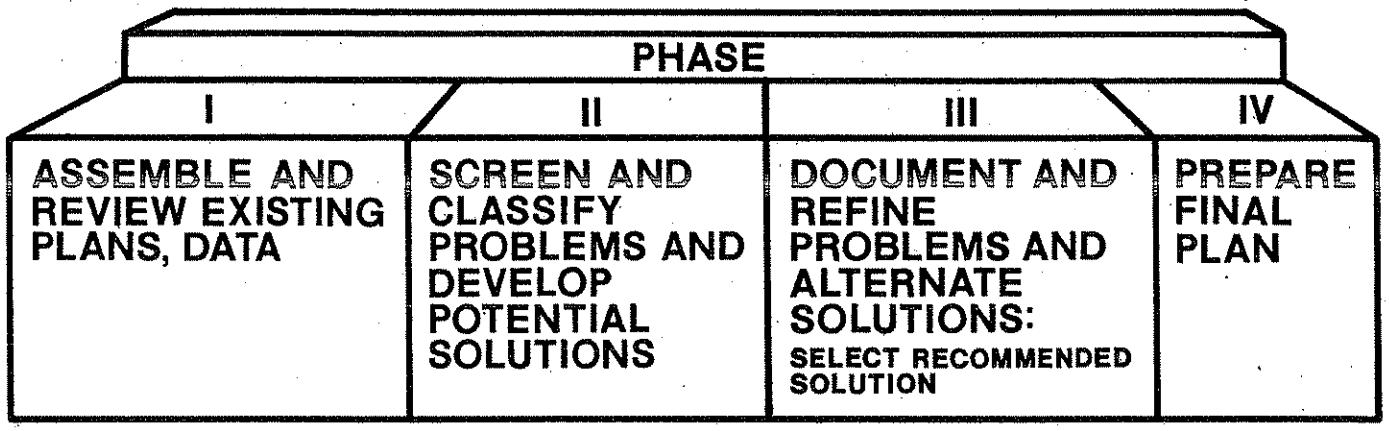

figure 3

This approach meant that detailed data was collected only for those issues which, through workshops, committee reviews and staff evaluation, were viewed as most important. This approach economized on time and money and allowed greater effort to go into developing an effective and acceptable plan of action.

The community workshops held with citizens and officials at the conclusion of the major study phases were only part of the community involvement process. Throughout the project, publications and articles were distributed to a wide range of people on Gateway's mailing list. Regular contacts were made with newspapers and media to publicize progress of the study. Special events, including field trips to study pollution sources, tours of treatment plants, and a barge trip on the Mississippi River to promote Clean Water Week were also part of the 208 community involvement program.

Two advisory committees participated in the development of the Plan (see Figure 4 and Appendix A). The Citizens Water Quality Task Force met monthly throughout the project to provide a sounding board for proposals and to assist the staff in obtaining input from a wider segment of the population. The Policy Advisory Committee, consisting of elected officials, industry leaders, and citizens and agency representatives met monthly to oversee progress of the project and provide policy direction in determining what tasks should be undertaken and how they should be done.

On April 28, 1978, the Policy Advisory Committee recommended to the Board of Directors of East-West Gateway that they approve the recommendations of the 208 Plan. The Board of Directors, on the same date, approved the recommendations with comments from Franklin and Jefferson Counties (see Appendix E).

GATEWAY 208 COMMITTEE ORGANIZATION

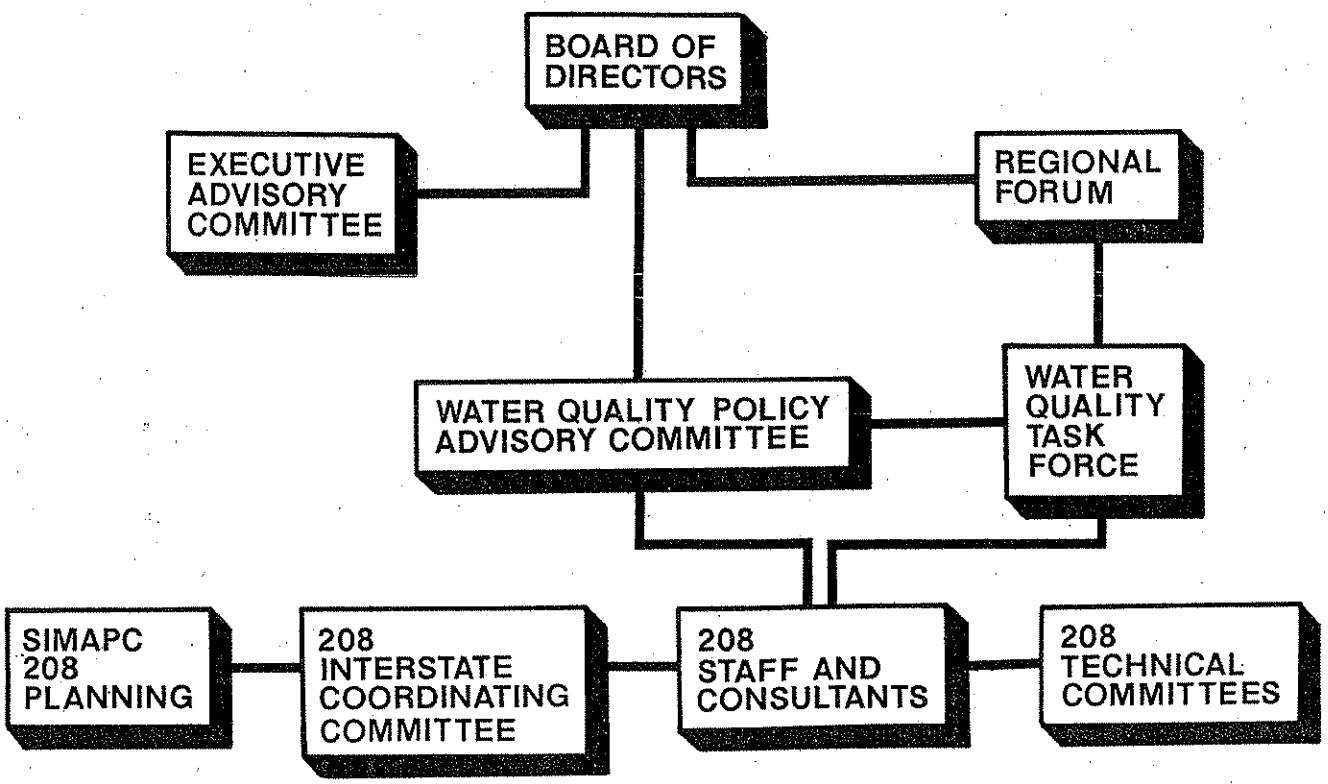

figure 4

III. THE PLAN AND ITS IMPACT ON THE ST. LOUIS AREA

The pollution control measures set forth in this Plan, when implemented, will insure that the level of quality of rivers and streams of the St. Louis area meet current State standards (see Figure 5). The Plan will insure that in areas that are growing and are projected to grow, the negative effects of this growth--inadequately sized treatment plants, malfunctioning septic tanks, and pollution in once clean streams--will be kept to a minimum.

The Plan will result in construction of new treatment facilities and sewer systems. Jobs and economic development will be a direct spinoff of these recommendations. Another result of the Plan will be new ordinances and regulations, new sewer districts, and more importantly, new Statewide legislation.

Essentially, the Plan is a mixture of two approaches to water quality management: brick and mortar (structural) and regulatory (non-structural). Before 208 planning, the approaches were seldom integrated. Structural control measures were generally favored because their results could be more easily quantified. Non-structural controls, however, are less expensive because their purpose is to prevent, rather than treat pollution. This 208 Plan integrates both approaches into a pollution control strategy. Building treatment plants alone will not result in adequate water quality; nor will the passing of ordinances and regulations do the job. The most cost-effective way of meeting water quality standards is to do both simultaneously. The Plan strives to meet that goal.

There are several essential ingredients that go into making a successful Water Quality Management Plan. All of these ingredients can be found in this document. They are: 1) relevant, accurate, and correctly selected data; 2) practical and desirable target objectives identified as a result of analyzing this area's water quality problems; 3) pollution control recommendations which were intelligently selected from among alternatives and which can be understood and accepted by those who must implement them; 4) an identification of the governments and agencies who will implement the recommendations; and 5) a built-in mechanism for updating and modifying the Plan.

Another important ingredient of this Plan, one which engineers and planners don't often brag about, is that the Plan is not perfect and does have shortcomings. It is not improper to say, however, that these shortcomings are actually

BASINS AND WATERSHEDS

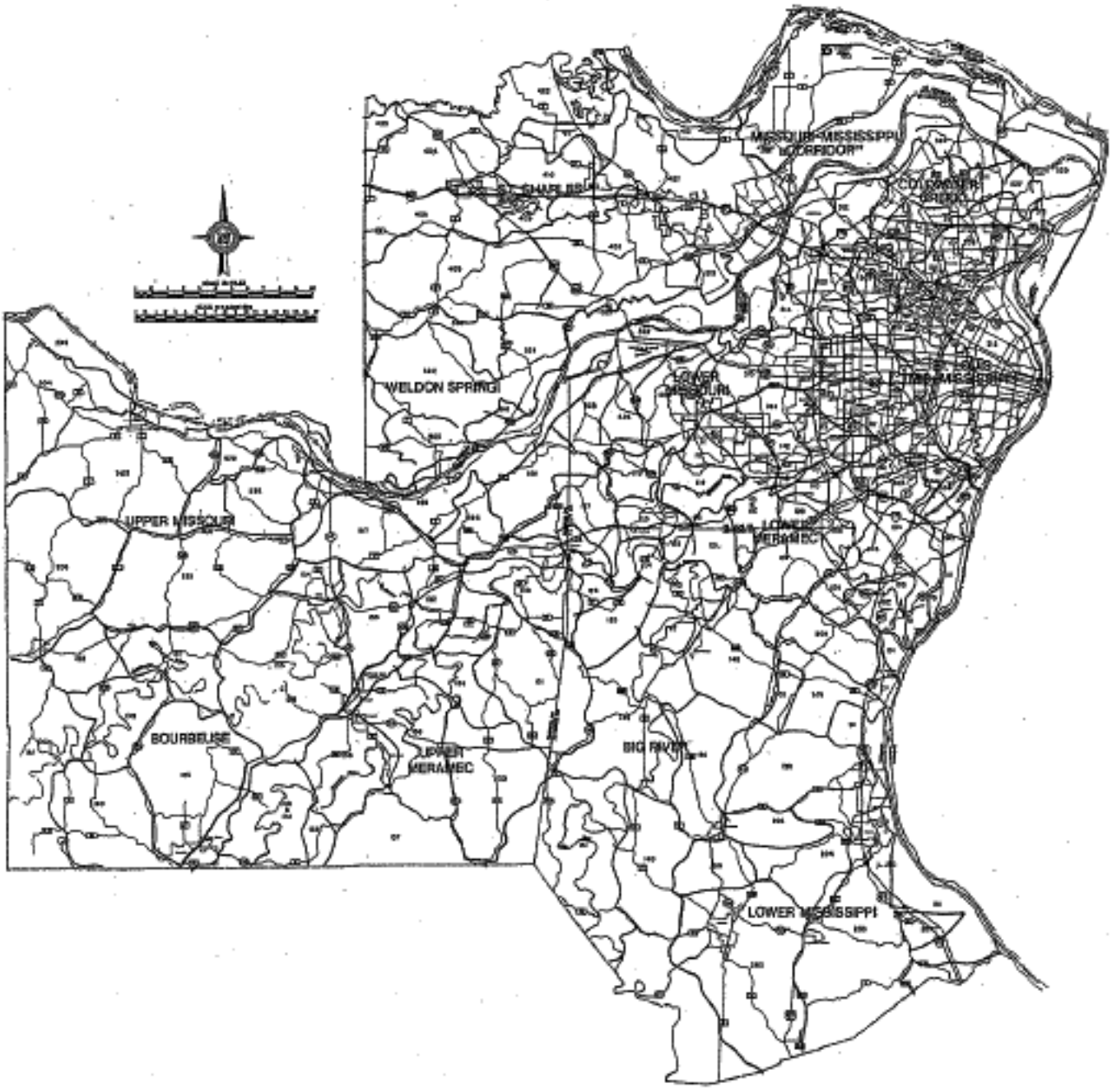

figure 5

one of the Plan's strengths. When a problem presented itself to which there was no current feasible solution, pie-in-the-sky solutions were not developed. Rather, the nature of the limitations were explored and recommendations made on closing the "feasibility gap."

The best example of a shortcoming of the Plan is in the area of nonpoint source controls. There is considerable doubt about whether the Plan's nonpoint source control recommendations can be implemented in Missouri second class counties (Franklin, Jefferson, and St. Charles). These controls are necessary to meet water quality objectives in certain watersheds within these counties; however, the State statutes governing the powers of a second class county do not present the counties with a clear indiciation of whether they can implement the recommendations. This limitation is specifically indicated in the Plan to serve notice to the State that changes in the State statutes may be necessary. Until this issue is resolved, the Plan recommends actions for second class counties to take which are clearly authorized under their governing statutes.

Finally, it is important to emphasize the dynamic nature of this Plan. Section 208 includes provisions for updating and revising the Plan. Funds for continued 208 planning have already been appropriated for fiscal year 1978 and there is strong indication that Congress will fund 208 planning for the next five fiscal years.

Continued 208 planning is one of the key aspects of a Water Quality Management Program. Besides updating the control recommendation, continued 208 planning will help implement some of the major management and regulatory recommendations of the Plan. The momentum to solve water quality problems in the St. Louis area which began over two years ago will be continued.

A major difference between the initial two-year planning period and continued planning is the level of federal funding: the federal government supplied 100 percent of the funds to produce this Plan; during continued planning, 25 percent of the funds must be supplied from local sources. It is, therefore, integral to the success of a continued 208 planning program in the St. Louis area that local matching funds be made available to attract federal 208 funds.

IV. A DESCRIPTION OF THE FINAL 208 PLAN REPORT

This Final 208 Plan Report is divided into two areas--the first, a description of the pollution control recommendations and their effectiveness; the second, how the controls are to be implemented and by whom. The first area contains four sections: Point Source Control Recommendations-Section 2; Nonpoint Source Control Recommendations--Section 3; Residual Waste Control Recommendations--Section 4; and Water Quality Effectiveness--Section 5. A brief description of each section of this report is presented below.

A. Section 2: Point Source Control Recommendations

Point sources of pollution are wastewater treatment facilities and industries--any activity which discharges wastewater at a point into a river or stream (see Figure 6).

There are three major aspects of point source control policy which are stated in this section:

1. The size of the treatment facility, the extent of the trunk sewer system, and the service area of the system based on projected year 2000 population (see Figure 7).

2. The required level of treatment of the facility based on the standards of the receiving stream.

3. The agency given the responsibility for constructing and operating the facility and trunk sewer system.

These three items, once the 208 Plan is approved, will be used as the policy of the federal and state governments for distributing Section 201 Facility Planning Grants. 201 planning is the next step in the process of point source control set up by the Clean Water Act. The 201 funds--which fund 75 percent of the cost of a project--are used by local governments to engineer and construct the treatment facility. These three policy items will be used to determine whether a local community's application for 201 planning funds is in conformance with the 208 Plan. Applications not in conformance with these policies will be turned down.

The third policy item tells the federal and state governments which units of government are eligible for 201 grants. These "management agencies" were selected based on criteria established early in the 208 study derived from the rules and regulations of Clean Water Act. In a number of areas, there are currently no management agencies to implement the

THE WASTEWATER TREATMENT PROCESS: NATURAL AND MAN-MADE

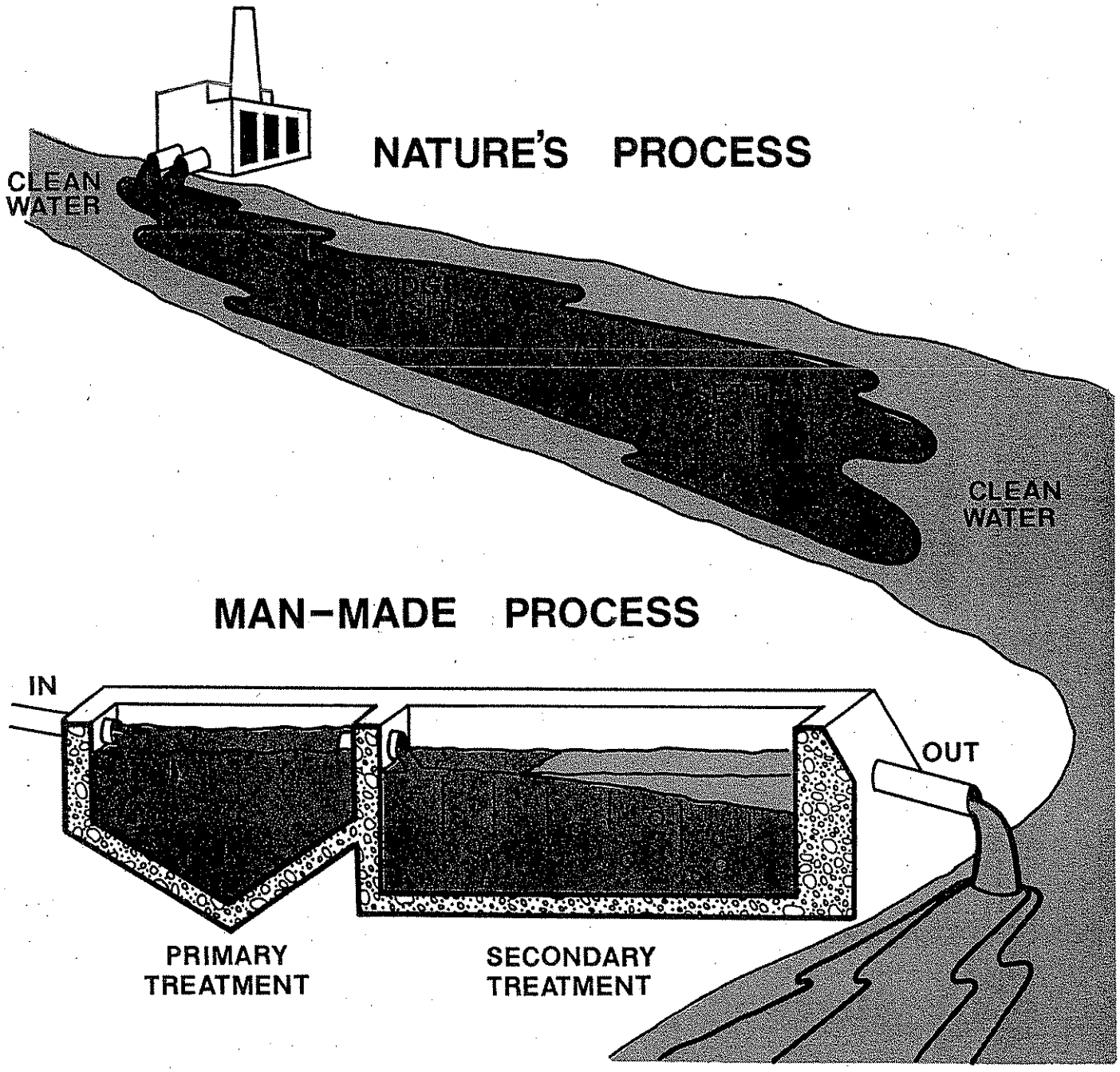

figure 6

URBAN DEVELOPMENT: 1954 – 1975 – 2000

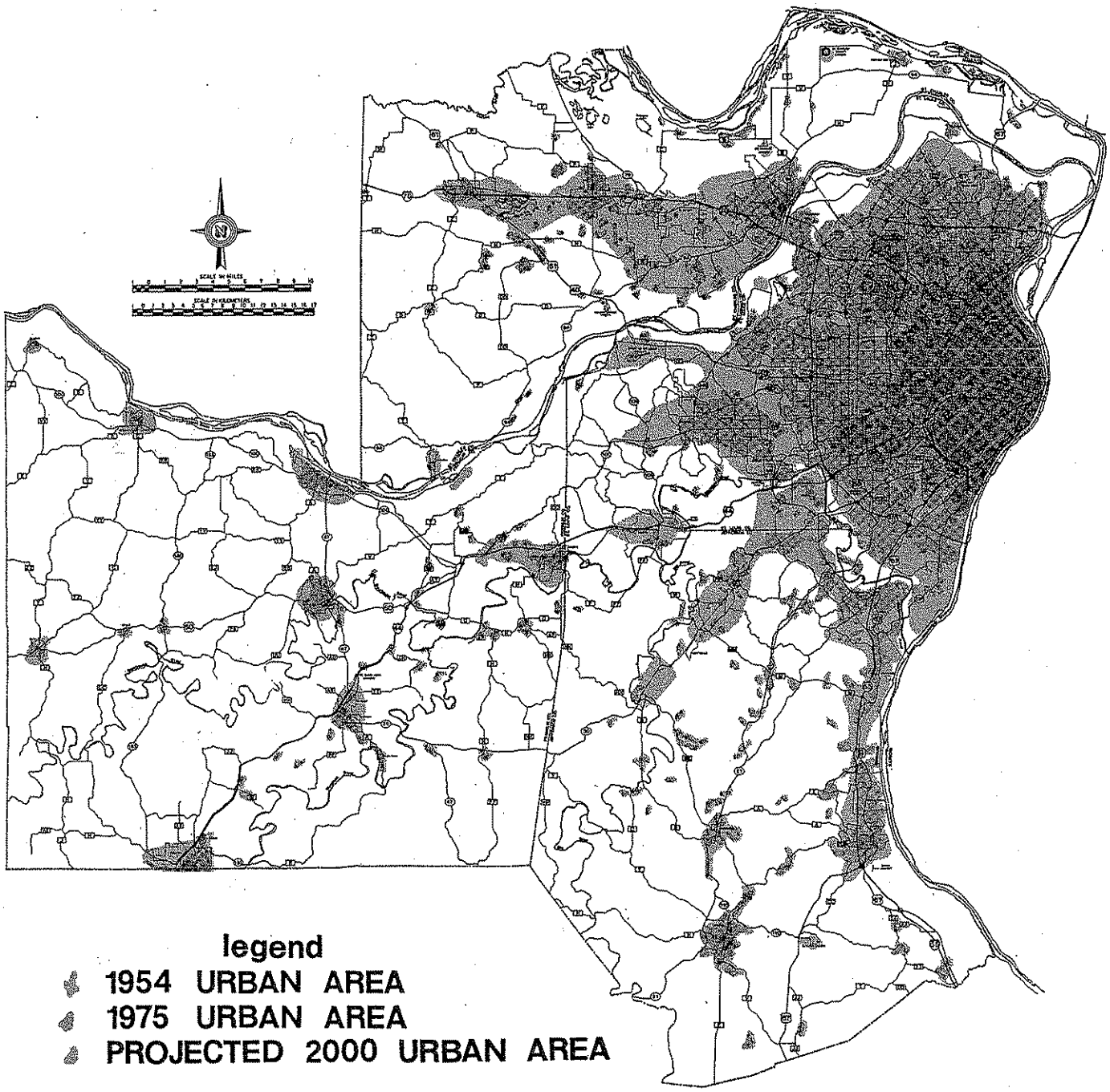

figure 7

point source recommendations. In these areas, interim management agencies--in all cases the County Courts--are designated the responsibility for developing management agencies. These interim management agencies are not eligible for 201 funds.

B. Section 3: Nonpoint Source Control Recommendations

Nonpoint sources of water pollution are all sources of pollution other than point sources. In the St. Louis area, the major nonpoint sources are individual home treatment systems (septic tanks), urban stormwater runoff, and agricultural runoff.[3] This section advances recommendations for controlling nonpoint source pollutions through structural and nonstructural controls.

There are major differences between the impacts of the Plan's point and nonpoint source recommendations. As mentioned above, the point source recommendations will help determine federal and state policy for distributing 201 grants. The nonpoint source recommendations, with the recent exception of septic tank control, do not set policy for any grant programs. Neither urban stormwater runoff nor contruction site runoff controls are eligible for construction grants. Acceptance by local communities of the controls, therefore, is voluntary.

The other major problem with the nonpoint source control, as also mentioned above, is their implementability in second class counties. This issue will be resolved by an opinion from the Missouri Attorney General (see Appendix F).

C. Section 4: Residual Waste Control Recommendations

Residual wastes, commonly referred to as sludges, are the by-products of the wastewater treatment process. They are the inorganic and organic materials removed from the wastewater concentrated into a semi-solid form. Residual wastes must be disposed of in an environmentally suitable manner, or else the organic materials will find their way into streams and pollution will once again result. This section describes the Plan's recommendations for the disposal of residual wastes.

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[3]Agricultural nonpoint source controls are being addressed on a statewide basis by the Missouri Department of Natural Resources.

D. Section 5: Water Quality Effectiveness

An important aspect of 208 planning has been the ability to estimate the future water quality of this area's rivers and streams by using sophisticated computer models. This section describes these models and summarizes the expected water quality of this area's rivers and streams as the recommendations of the Plan are implemented.

E. Section 6: Plan Implementation

This section develops the management system of the Plan--it describes which local governments shall have the responsibility for implementing the Plan's pollution control recommendations; how the recommendations are to be financed; and when the controls are to be implemented. Issues dealing with implementation, which are mentioned elsewhere in the report, are described in detail. This section should be read very carefully because it gives an in-depth analysis of the Plan, its opportunities, and its limitations.

Developing a management system for implementing the pollution control recommendations has been one of the challenges of 208 planning. The current management system wastewater treatment (see Figures 8 through 11) is uncoordinated and in many areas inefficient. The Plan recommends measures to coordinate these management activities, plug gaps in management responsibilities, and upgrade the competence of existing management agencies.

PRESENT WASTEWATER TREATMENT AGENCIES: FRANKLIN COUNTY

legend

PRIVATE

PUBLIC:

MUNICIPALITY

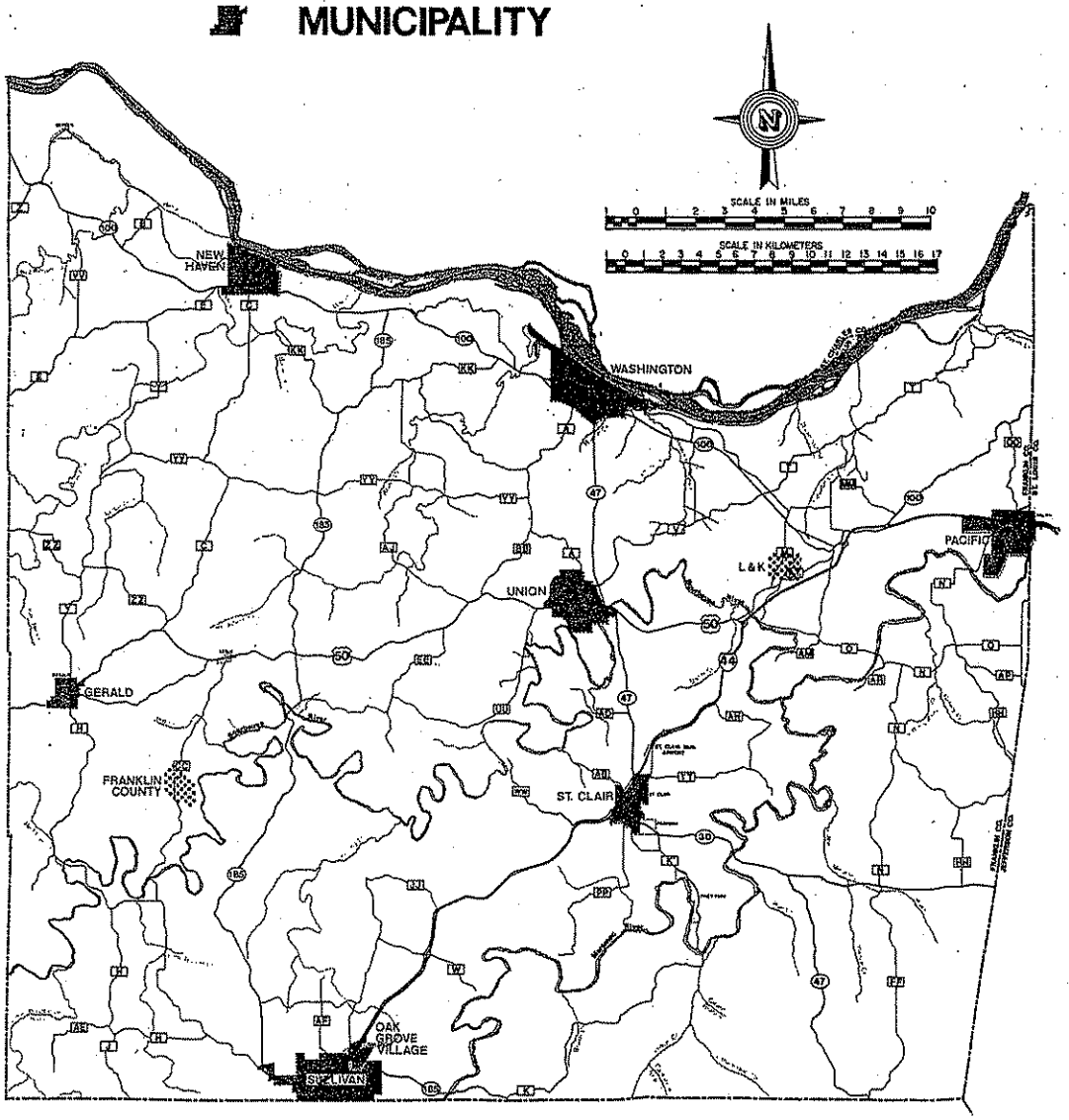


figure 8

PRESENT WASTEWATER TREATMENT AGENCIES: JEFFERSON COUNTY

legend

PRIVATE

PUBLIC:

MUNICIPALITY

SEWER DISTRICT

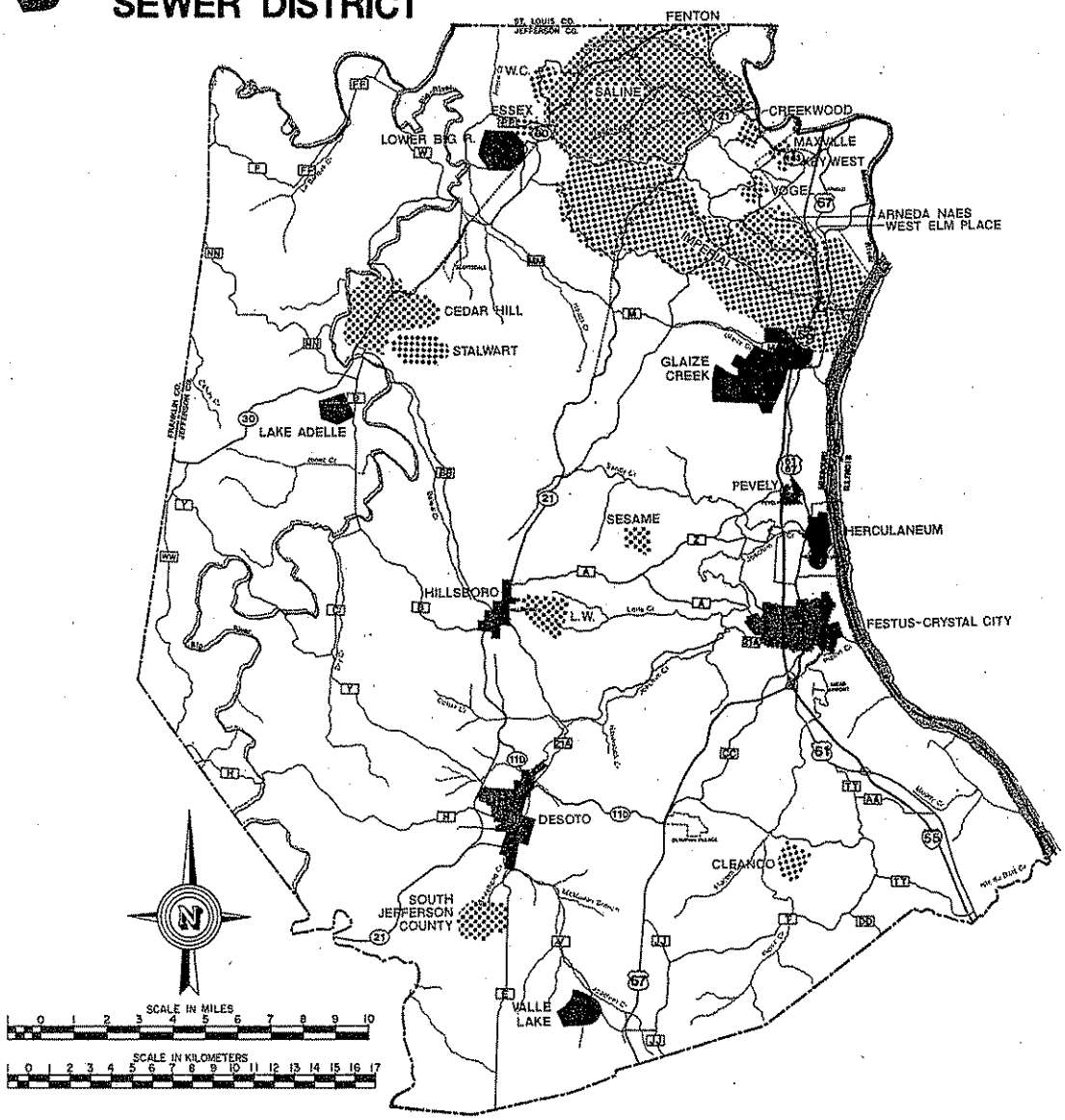


figure 9

PRESENT WASTEWATER TREATMENT AGENCIES: ST. CHARLES COUNTY

legend

PRIVATE

PUBLIC:

MUNICIPALITY

SEWER DISTRICT

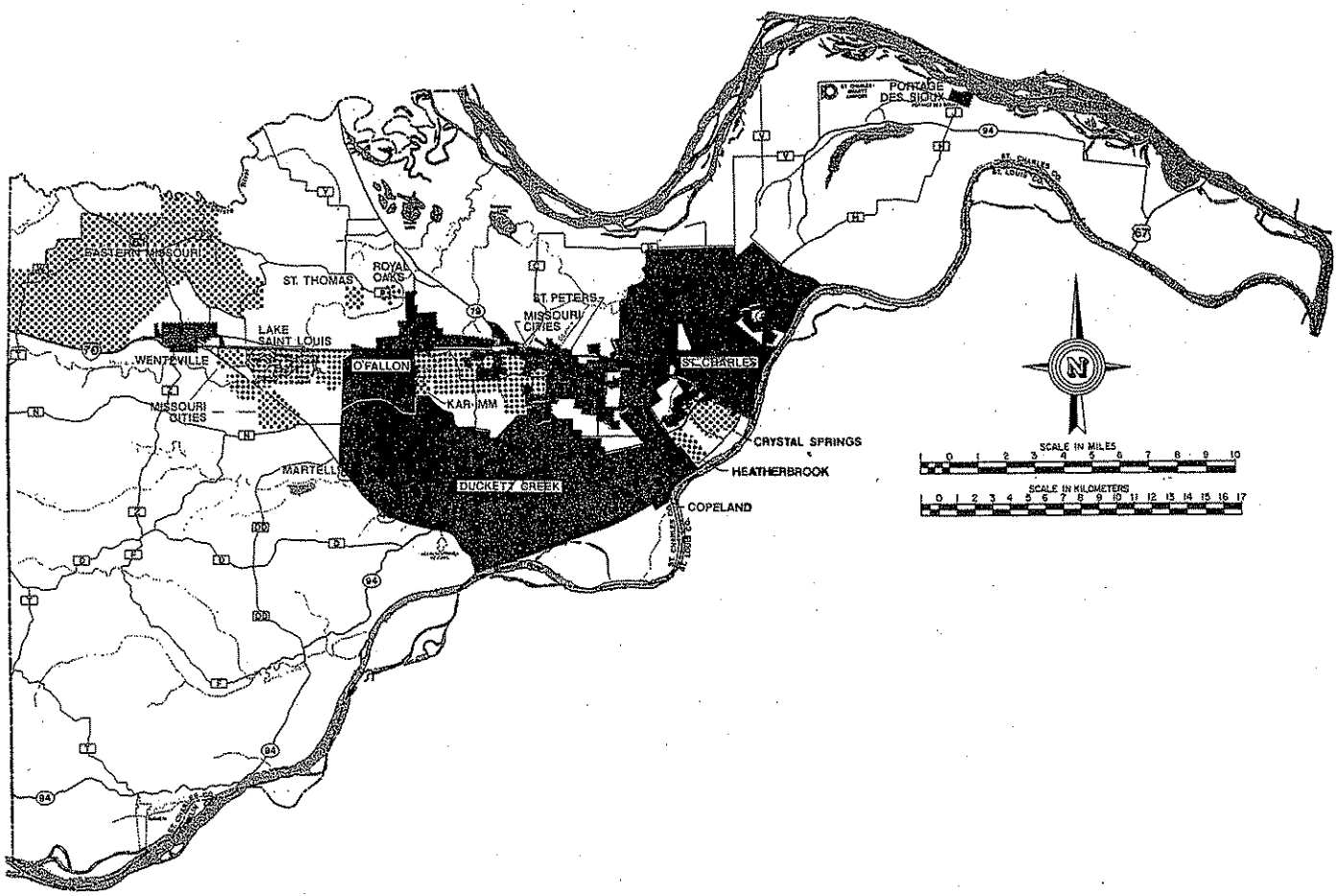


figure 10

PRESENT WASTEWATER TREATMENT AGENCIES: ST. LOUIS CITY/COUNTY

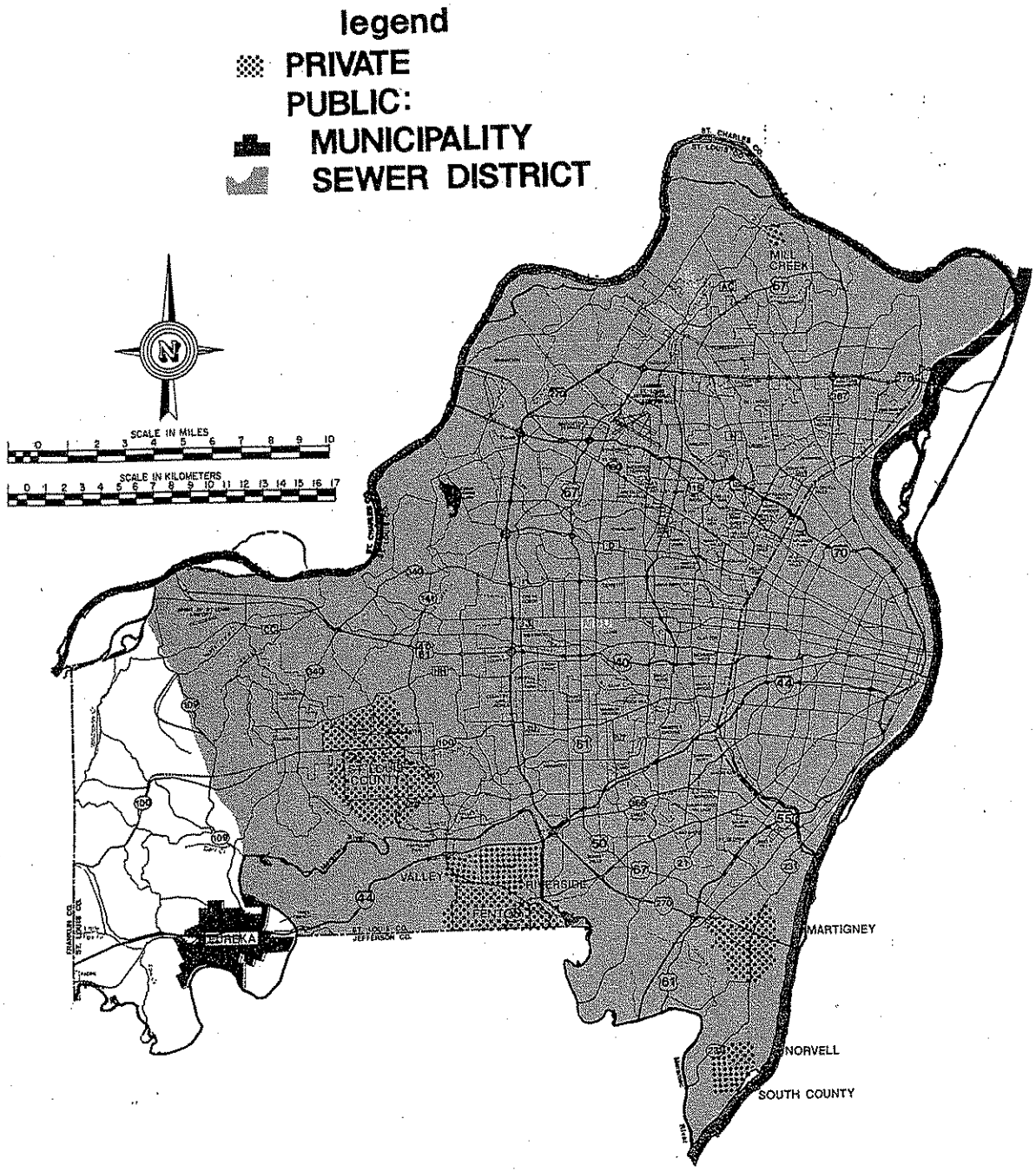


figure 11

2. POINT SOURCE CONTROL MEASURES

I. INTRODUCTION

Growth trends in the St. Louis Region have often resulted in the development of land for residential, commercial and industrial purposes prior to the extension of central sewer systems and treatment. In many areas this has resulted in a proliferation of small treatment facilities located in close proximity. Since these "clusters" of small systems were generally constructed in the absence of overall regulation and coordination, significant technical problems such as inadequate capacities can hinder efforts toward providing more efficient and larger systems through integration of these areas and systems.

Many of the small treatment facilities were initially designed and constructed to meet loading requirements and specifications at that time and due to population growth and stricter stream requirements are no longer adequate. As a result of this overloading and upgraded requirements, they are discharging improperly treated effluent into nearby waterways that do not meet current water quality needs. This situation is further compounded by the general practice of providing inadequate operation and maintenance on the collection system and at the plant sites.

Severe pollution and health problems exist in some areas as a result of the above practices. Many of these problems of surface and underground water pollution involve localized hydrologic and geologic conditions. Many point sources discharge into intermittent, low flow streams. The effluent discharges may, therefore, constitute the entire stream flow during dry periods. The pollution problems are obvious under these circumstances. Groundwater is also endangered in areas where effluents are discharged to watercourses classified as "losing streams." These streams impact some or all of their flow directly into the groundwater.

The water quality of larger streams and rivers is also affected by point source discharges. For example, investigations have shown that a significant portion of existing phosphorous and fecal coliform criteria violations which exist in the study area's larger streams (i.e., Meramec and Missouri Rivers) can be directly attributed to discharges from point sources such as, municipal and industrial treatment plants (see Element 8, 11, 21 and 23 Reports).

II. METHODOLOGY FOR DEVELOPING POINT SOURCE CONTROLS

A. Alternative Development

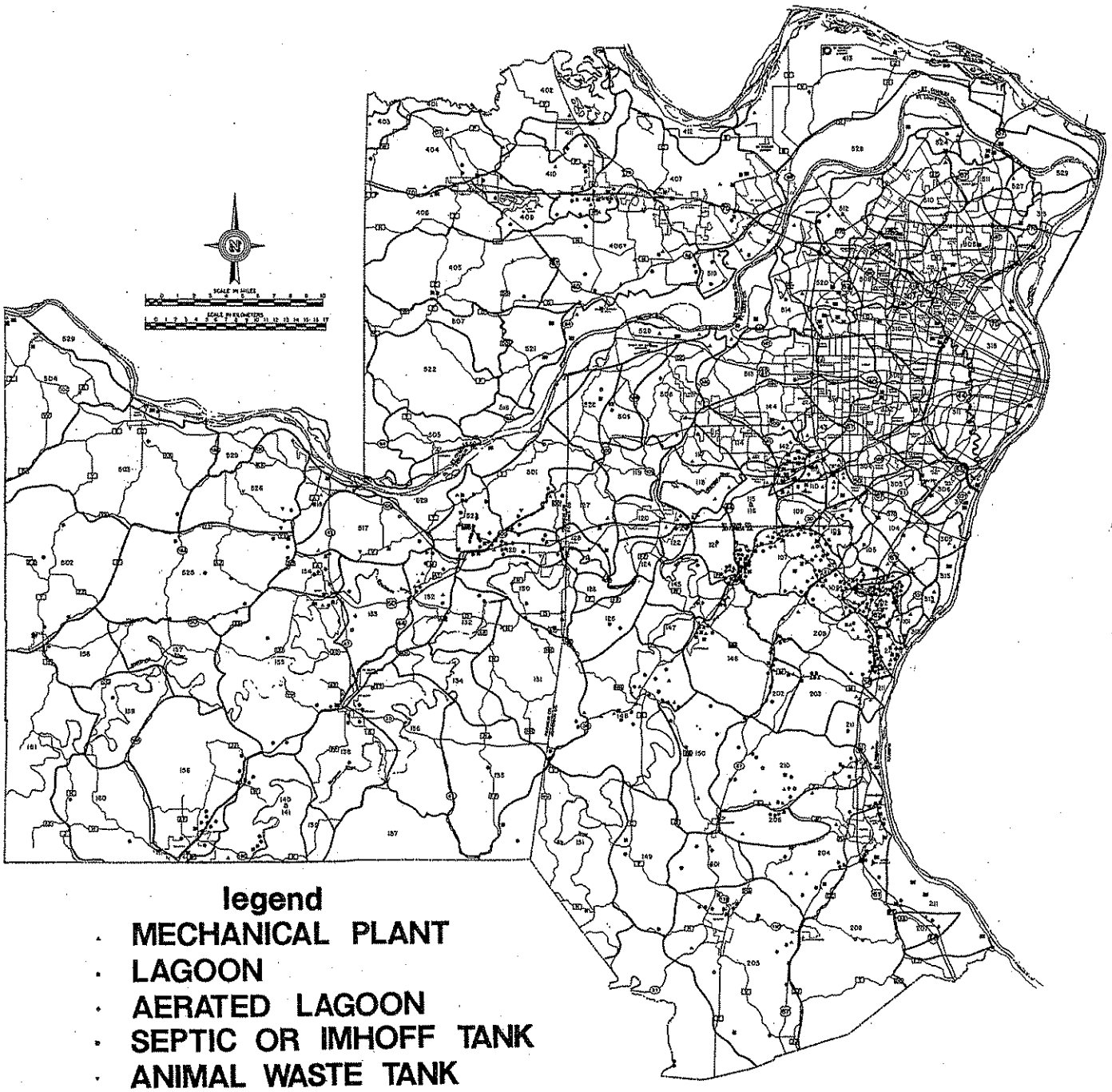
In order to generate and evaluate alternative point source control measures, a determination of the quantity and quality of wastewater to be transported and treated as well as the location of all discharges was necessary. Information on existing discharges was collected from available operating records, EPA storet data, NPDES data, existing sewer studies, onsite interviews and the Missouri Public Service Commission files. This information was assembled onto large scale work maps which provided the baseline data for the alternative evaluation process (see Figure 12).

The methodology for establishing future wastewater flows involved the assessment of, and extrapolations from, data on flows to existing treatment facilities and water consumption figures of waterworks systems. Future industrial flows were based on existing industrial flow contributions plus a nominal allowance for additional land projected to convert to industrial usage. These flow factors were then applied to service area population and land use data to provide projected wastewater flow (see Element 10 and 14 Reports). A fifteen percent projected increase in domestic wastewater flow has been assumed to occur during the planning period. Also, projected flows have an allowance for average infiltration/inflow.

To provide a method of grouping possible individual structural solutions, six general alternative classifications were utilized:

1. Continue Present Trends Plus NPDES Compliance
2. Provide Service to Smaller Communities
3. Consolidation of Systems to Improve Extent and Level of Service
4. Consolidation Toward Regionalization

POINT SOURCE DISCHARGES



legend

- MECHANICAL PLANT
- LAGOON
- AERATED LAGOON
- SEPTIC OR IMHOFF TANK
- ANIMAL WASTE TANK
- INDUSTRIAL PROCESS OR COOLING WATER

figure 12

5. Full Watershed Area Service
6. Full Compliance with Water Quality Goals Criteria

It should be noted that these are general classifications only, and that specific alternatives for individual systems and facilities have been developed. The individual system alternatives have been considered on their own merits and not as just a component of the six general solutions listed above (see Element 10 and 14 Reports).

B. Alternative Evaluation

The point source recommendation summary (beginning on page 42) presents in tabular and narrative form outputs from the alternative evaluation and selection process. Each alternative was analyzed using four major criteria; 1) cost-effectiveness; 2) water quality effectiveness; 3) management/ institutional constraints; and 4) environmental considerations (see Element 24 Report). A major factor common to all four criteria was regional population dynamics. High growth watersheds were identified and these areas underwent small area analysis which involved the development of population dot maps (see Figure 13). The most recognizable use of population dot maps is the development and evaluation of regional alternatives. Technical considerations for regional solutions involve the treatment plant size and location, interceptor routes and size, and economies of scale. A reliable population projection is essential for determining the cost-effective treatment approach. In conjunction with engineering considerations, projections are also a strong determinant in formulating management/institutional arrangements. When presented graphically, they allow the planner to develop future annexation policies and determine possible new management arrangements. Projections also involve costs to be allocated to the individual household, which can determine the cost-effectiveness of a given point source alternative.

Cost-Effectiveness Analysis

U.S. EPA requires that cost-effective analysis be presented on a present worth basis: future costs for construction and operation and maintenance of treatment facilities and collection systems should be expressed in terms of their current cost, as if these expenditures were being made at the present time. In the cost analysis, the total capital investment in

WATERSHEDS DOT-MAPPED

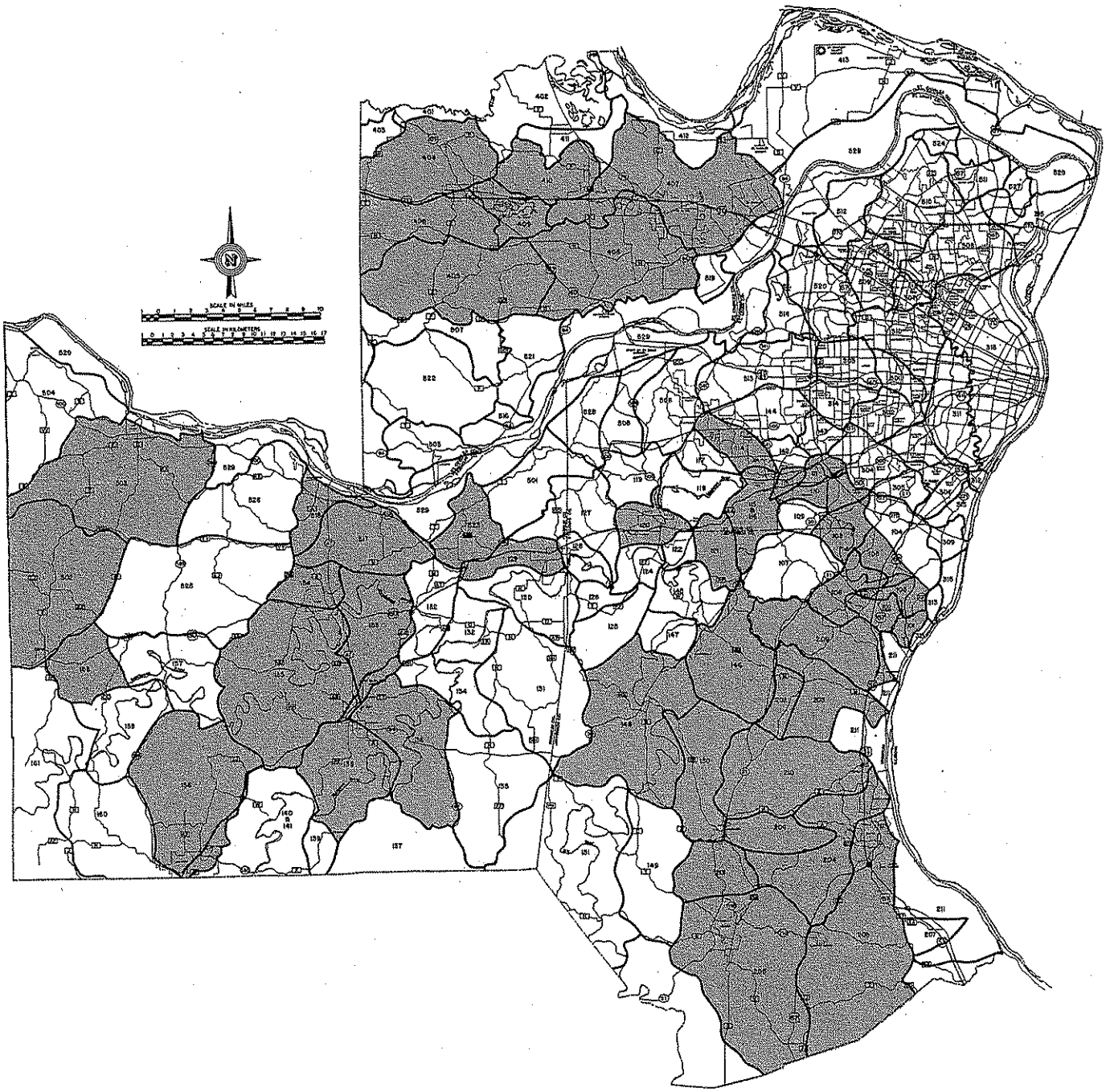


figure 13

wastewater treatment plants and interceptors over the next 25 years have been totaled and an amortized annual estimate has been calculated. This estimate is based on June, 1977 dollars and does not include any inflation factor. Likewise the operation and maintenance cost figures for a typical year in the life of the system are expressed in June, 1977 dollars. Present worth cost estimates allow local residents to evaluate the future value of these systems by comparing present worth to other current expenses. People only compare what it costs them as an individual in each case. When a person takes a bus, for example, the fare put in the box is important, not the total cost of the bus system.

The household cost for the proposed water quality management activities has always been a major concern of the 208 project. Thus, the development of user cost on an annual household basis has been a critical step in the comparative evaluation of all point source alternatives, both in terms of water quality levels and the plans to achieve these levels of water quality. The water quality levels used in evaluating point source alternatives in the St. Louis 208 program were:

> Level 1--Whatever instream conditions would result if only secondary treatment of point sources of pollution were applied;
>
> Level 2--Water quality which meets the State of Missouri's proposed water quality standards* and criteria; and
>
> Level 3--Water quality which meets criteria developed specifically for the St. Louis 208 program which will assure control of algal growth and achievement of the national goals of fishable and swimmable water.

These household cost estimates, therefore, provide a means of choosing from the various plans proposed by the technical consultants. Also, the household cost analysis has helped to answer the question--what level of water quality can the region afford?

The annual estimates of costs for new and expanded treatment systems also provides an indication of the most cost-effective consolidation of treatment plants. Within a

---

*the State of Missouri adopted new water quality standards in December, 1977.

given services area, the number of treatment plants and the design of the interceptor system can vary considerably from one alternative to another, though all systems provide comparable levels of treatment service. There also may be large cost differences between the proposed plans as in the Lower Meramec. In that system, 6 different point source alternatives were developed with a $20 spread in the annual household cost figures. Such cost differentials make it essential to evaluate the fiscal impacts associated with each system on both the total project cost level and the household cost basis.

Water quality effectiveness is discussed in greater detail in Section 5. Management considerations are discussed in Section 6; and the environmental factors are contained in the Environmental Impact Assessment (Element 35 Report).

C. Integration of Ongoing Facility Planning Activity

Another important factor incorporated into the point source alternative development is the status of ongoing 201 studies within the 208 planning area (see Figure 14). 201 Facility Planning refers to that section of P.L. 92-500 dealing with the planing and construction of wastewater facilities. Ideally, 208 planning should be completed before the initialation of 201 Facilities Planning. Because of critical water quality problems, this delay was not feasible for the St. Louis 208 region. Whenever possible, however, 208 population and land use has been utilized by the 201 agencies. Further, if 201 planning was in the initial stages of development, 208 planning and the 201 agency have coordinated their activities and outputs as closely as possible (i.e. MSD Lower Meramec Study). In areas where 201 Facilities Planning is anticipated, the 208 point source recommendation should be considered as the framework for future alternative development. A 201 Facilities Plan, however, may preempt a 208 point source recommendation if the 201 plan demonstrates overriding cost-effective considerations. In this sense, the 208 Plan is not a static list of recommendations but represents a dynamic and progressive policy for guiding future wastewater construction activities.

D. Alternative Selection

The original 6 alternative classifications were evaluated at a series of countywide workshops. Further review and evaluation based on workshop outputs was completed by consultants, staff and 208 citizen committees. From this cycle of public workshops, in-house review and 208 committee

FACILITY PLANNING (201) AREAS

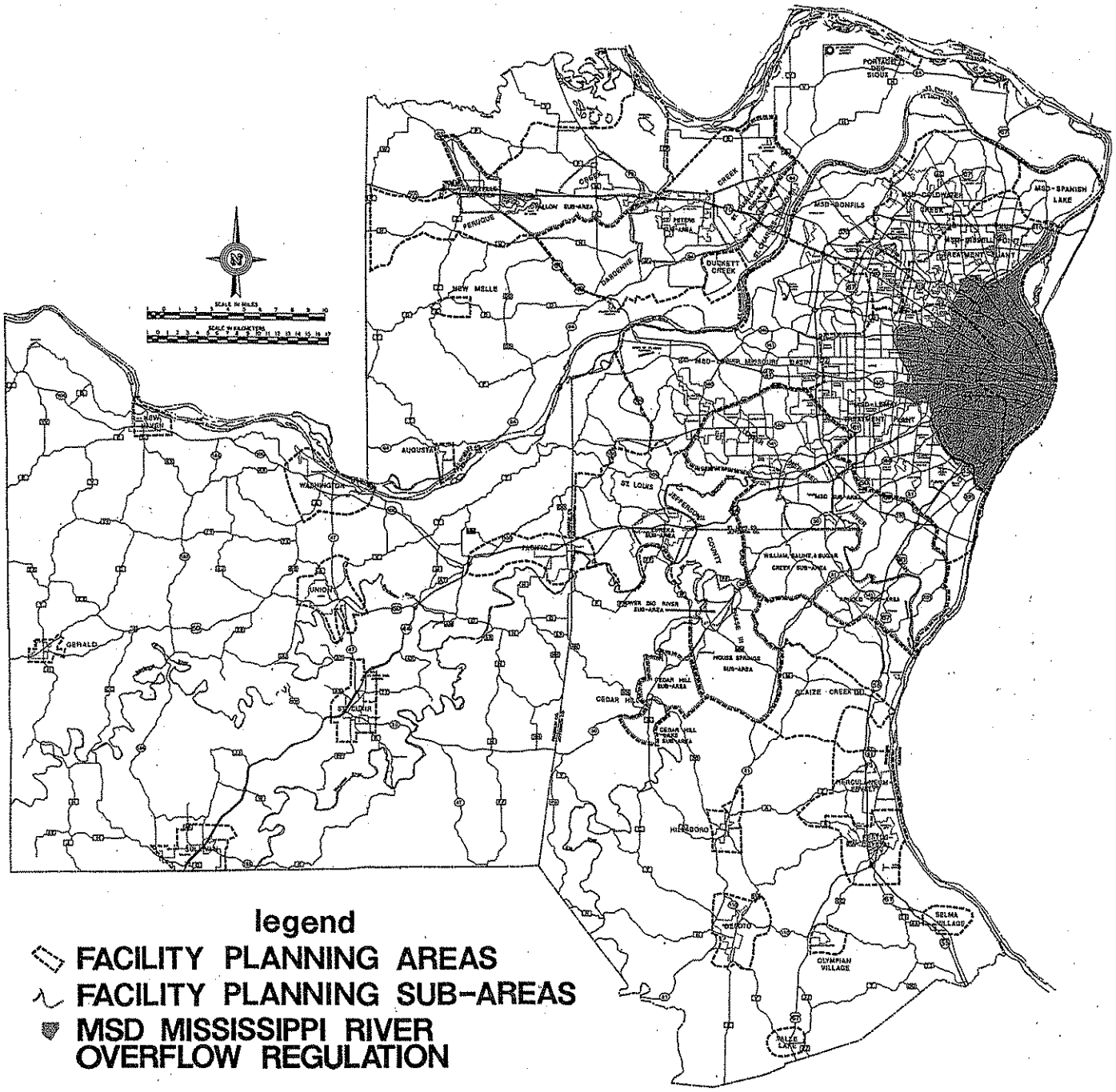


figure 14

review, a narrowing down from the original 6 classifications to about two or three alteratives occurred (see Element 18 Report). The final alternatives were analyzed in depth for cost, management/institutional and water quality factors (see Element 24 Report). The alternatives were recycled again through the above review process: workshop to consultant/staff to 208 committees (see Element 25 Report). Also, all alternatives underwent extensive federal, state and local review. Through this selection process, those alternatives that have been deemed economical and implementable are presented for final consideration.

The point source recommendations are organized by community and by county. Each community recommendation includes a brief description of the proposed system, design considerations, cost summary, management/institutional issues, and an implementation schedule. The community recommendations are classified into two general groups: sewered and nonsewered approaches. Generally, small rural communities have high household costs for conventional sewage treatment projects. Where this situation has occurred, the recommendation will include nonsewered options along with the conventional structural solutions. The following section describes in detail the nonsewered alternative approach. Following this section, there will be a discussion in industrial pretreatment requirements and industrial cost recovery.

III. NONSEWERED ALTERNATIVES IN SMALL COMMUNITIES

Conventional wastewater treatment systems which use gravity collection systems and mechanical or lagoon treatment plants are usually prohibitively expensive for small communities or areas with low population densities. Presently, the U.S. EPA suggests a limit of the annual user charge to one percent of the median annual household income in the area. Based on a national household income average, the annual user charge would be limited to $130 a year, or approximately $11 per month. Many of the small community wastewater systems, even with substantial federal and state grants, result in user charges in excess of $11 per month.

The major causes of the high user fees in small communities are:

1. Small communities do not have collection systems constructed, and the capital costs of these systems are often excessive.

2. Small wastewater treatment plants are expensive to operate. Small wastewater treatment plants have a higher cost per unit of flow than do larger facilities.

3. Small communities usually have lower population densities resulting in a system with a lower contributing population per mile of sewer required to serve a given area. Larger communities are able to construct collection systems with a greater number of users to share in the cost of the collection system increasing the overall efficiency.

4. Most larger communities have already paid for a substantial portion of their wastewater collection and control system. Much of this cost can be included in the property values of the various homes found in larger areas. Small communities without a major collection facility are required to pay for the construction of collection systems at today's higher costs.

5. Several of the small communities are located on streams with a limited flow which requires much higher levels of treatment than larger communities along major rivers such as the Mississippi and Missouri. The water quality and wastewater treatment problems found in small communities are distinctly different than those of the larger cities. Wastewater problems in small communities often are the result of local septic tank failures which effect a limited number of neighbors. These problems are characterized by surface failures of septic systems which may result in the discharge of improperly treated wastewater to ditches, streets, or groundwater systems. The impact of one small community on regional water quality may be minimum and probably will not involve a serious impact on the environment. Collectively, the impact of all the small communities on regional water quality may become significant.

Many small communities do not have the capabilities to develop, analyze, and implement effective wastewater control programs. Federal and state grants are usually not available

to small communities since they lack sufficient priority, based upon the effect on water quality, to be included on current grant lists. Studies of alternative wastewater management procedures for small communities may also be a financial burden since the "economic" technology for small community wastewater treatment systems is not well developed. Small communities do not have the resources to support major research programs to aid in the development of effective small community treatment systems. Much of the federal grant program is directed at helping larger communities provide better wastewater treatment and are not geared toward specialized problems of the small community. The Clean Water Amendments of 1977 point toward a change in federal policy with the institution of the Innovative and Appropriate Technology Program. Under this program, a small community may receive up to 85 percent federal funding for low technology treatment approaches.

A. Technical Alternatives for Wastewater Treatment in Small Communities

Alternative wastewater control systems for small communities or areas with low population densities generally fall into two broad classifications: onsite and offsite. Onsite alternatives usually involve the construction of some form of individual home treatment system; and as such, they should be governed by the design criteria presented in the Element 21 Report, Appendix B (see Table 1). Individual home wastewater treatment can be adequately performed by numerous systems which were outlined in the Element 11 Report. However, a septic tank and soil absorption system which is adequately designed and located in areas with suitable soil provides probably the best and cheapest method of individual home wastewater treatment. Septic tanks also will accumulate sludge from the wastewater and must be periodically cleaned. Costs for such disposal of septage represents an additional wastewater treatment cost and environmental problem which must also be included in the comparison of alternatives. The major thrust of our onsite home treatment program is to insure proper design, location, construction, and operation of all septic tanks in the study area.

Alternatives for offsite wastewater systems in small communities can be grouped into three general combinations of low technology: 1) treatment; 2) collection and treatment; and 3) IHTS, collection and treatment (see Table 1). The first utilizes conventional wastewater treatment technologies but

TABLE 1

ALTERNATIVE APPROACHES:
WASTEWATER TREATMENT IN SMALL COMMUNITIES

On-Site Disposal and Treatment

* Septic tanks -- soil absorption systems
* Septic tanks -- mound soil absorption systems
* Septic tanks -- evapotranspiration soil absorption systems
* Septic tanks -- sand filters with subsurface discharge
* Other individual home treatment systems -- soil absorption systems.

Off-Site Wastewater Treatment, Collection, and Disposal Systems

* Conventional gravity and lagoon treatment systems
* Individual home grinder pumps with pressurized sewer systems and lagoon treatment systems
* Conventional septic tanks with small diameter gravity sewers and lagoon treatment systems. (Septage from septic tanks to be hauled to a central treatment facility.)
* Vacuum sewers with community wastewater treatment
* Septic tanks and soil absorption systems serving several households jointly
* Package wastewater treatment plants

tries to reduce the user charge by providing waste treatment in low operating and maintenance facilities (i.e., lagoons, etc.) A second alternative seeks to reduce the user charge by developing collection systems which are substantially less expensive and also utilizes lagoon treatment systems to reduce operation and maintenance costs. The third group of alternatives tries to reduce the user charge by using a combination of individual home treatment systems with centralized collection systems to reduce operation and maintenance costs. This group of alternatives involves using septic tanks to reduce volume and pumping the effluent in small diameter pipes for central treatment. The two most important factors in an offsite program are design and operation.

Other "nonstructural" controls could be developed by small communities to reduce the overall cost and size of their wastewater treatment facilities. Such controls include the reduction of waste flows and loads through water conservation and waste load reduction. Water conservation measures such as the requirement of low volume flush toilets, low water usage appliances, water restrictors on showers, and other methods designed to reduce water usage should be encouraged or required.

When a small community is considering a new sewer system (including sewers and treatment), it should evaluate the economic feasibility of such an often expensive improvement and compare the cost to the cost of upgrading its existing septic tank system. Other low technology alternatives should also be evaluated. The State of Illinois has recently made such a cost-effective analysis of alternative treatment technology mandatory for all small communities submitting 201 Facility Plans.

IV. INDUSTRIAL COST RECOVERY AND INDUSTRIAL PRETREATMENT

Municipal wastewater treatment systems provide wastewater treatment for several classes of users. The various dischargers are usually grouped into three classes: (A) domestic dischargers such as single family residents and apartment complexes, (B) commercial dischargers such as shopping centers, restaurants and governmental institutions, and (C) industrial dischargers such as manufacturing and processing facilities. The waste discharges from each of the various classes have their own unique characteristics which often dictates not only the type of treatment but also

effects the size and operating cost of the wastewater treatment plant. A major part of a municipal wastewater control program is an effective rate structure which distributes cost to all classes of users uniformly, and a control program which limits the type of waste discharged to a municipal system that could detrimentally effect the treatment methods, capacity and the hydraulic loadings.

Industrial cost recovery and industrial pretreatment requirements, while two separate subjects, must be considered jointly. The objectives of industrial cost recovery (ICR) and industrial pretreatment requirements (IPC) are distinctly different. The objective of ICR is to equally distribute the cost of all classes of users usually based on actual pollution load. On the other hand, the objective of IPR is to control or limit discharges to a municipal system in order to protect that system and to restrict the discharge of pollutants to the environment.

A waste-producing industry, located with access to a public sewerage system and also to a watercourse, has several options regarding the disposal of its wastes. It can:

1. Discharge all wastes to the outlet watercourse following adequate treatment;

2. Discharge its domestic wastes wastes to the public sewerage system and its treated wastes to the watercourse; or

3. Discharges all wastes to the public sewerage system.

The decision is usually an economic one, i.e., providing capital and operational costs for its own treatment facility or pay the public agency facility for treating its wastes.

This latter option may require pretreatment at the industry before discharge to the public facility, again, often an economic decision. If necessary pretreatment to meet limitations is not contemplated, the entire industry's load must be considered in the design of the public treatment facility (IPR).

Limitations requiring pretreatment are usually the result of ordinances placing such limitations on the public sewerage facility discharges. In lieu of pretreatment, an industry may be permitted to pay the public facility for treatment of its entire waste load for any surcharge over the limitations (industrial cost recovery, ICR).

Public sewerage agencies such as municipalities, sanitary districts or other governmental bodies, have the authority to "control" the use of its sewerage system which includes prohibiting any wastes that are not compatible with its treatment processes or involve a hazard such as gasoline to its facilities. Upon such authority, it can prescribe regulations for wastes discharged to its sewerage facilities.

Such regulations can require wastes discharged to meet such limitations as volume of flow, biochemical oxygen demand, suspended or disolved solids, pH, toxic substances, etc. It can charge for the treatment of wastes discharged to its facilities that exceed these established limitations. When a municipality, for example, accepts wastes, it accepts the responsibility for their treatment to meet their planned effluent requirement.

Court decisions have indicated such regulations cannot be general or vague, but must be specific regarding the effect of the wastes in question in relation to the treatment provisions involved.

Where federal grants to public facilities are involved in financing the collection and/or treatment facilities, it requires that an industry pay its share of the capital, operation and maintenance costs through an industry-cost recovery schedule (ICR). Such costs can include credits for the industry's ad valorum tax, if the public facility has an EPA approval user-charge program.

Federal guidelines have been prepared to supplement and interpret regulations with emphasis on the scope of the provisions and criteria for acceptable compliance. Charges are usually based upon volume of flow and constituents that provide organic loadings on the treatment plant. These charges include: 1) economy of scale, 2) improved reliability of treatment through multiple plant units, 3) qualified operational staff, 4) ability of the public agency to acquire adequate land for construction of treatment facilities, 5) value of domestic sewage in providing essential nutrients to make industrial wastes biologically treatable, ability to

select ultimate discharge point to minimize effect of waste discharges on the environment, 7) economy of scale for processing waste sludges generated from treatment processes, and 8) establishment and maintenance of relationships between local government and industry in that they are acting jointly to handle a problem with mutual benefit.

Monitoring of industrial discharges to the public sewers includes several programs. Usually, a municipality relies on the monitoring results submitted by the industry, but with sufficient checks to determine the validity of such reporting. These can be made conditions in the ordinances establishing such a control program.

A relatively new concept is emerging, directed toward regional waste water treatment facilities for only industrial wastes. This is especially adaptable to an industrial complex or area. Some disadvantages may include the high cost of transporting such wastes. No such applications in this 208 area are proposed. It is again desired to emphasize the need for considering all of the above prior to the design of new or expanded public facilities.

Planning a joint municipal/industrial treatment system requires close cooperation between municipal and industrial officials. The planning process involved can be characterized by eight steps outlined below:

1. The municipality should identify and contact all industrial dischargers.

2. A joint study team made up of both industrial and municipal officials should be formed to review and direct future planning efforts.

3. The information requirements of the municipal and industrial officials must be clearly defined. Additionally, raw data inputs must be clearly defined which may require sensitive information from various industrial dischargers. Provisions to protect the industries from disclosure of this information may be necessary.

4. The development and analysis of alternative wastewater treatment systems must be accomplished in a manner which allows a clear

identification of advantages and disadvantages to both industry and municipality involved in joint treatment.

5. All alternative wastewater treatment systems must include estimates of capital costs, operation and maintenance costs, and a preliminary definition of industrial rates.

6. Guidelines for defining the industrial rate structures should be jointly defined by municipal and industrial officials.

7. Drafts of all contractual agreements, regulations, and ordinances should be prepared to eliminate any uncertainties and to provide a clear definition of municipal and industrial roles.

8. The final step of the preliminary planning process should be an adoption of a specific plan with both industrial and municipal agreement.

The development of an industrial cost recovery system requires a detailed knowledge of each individual treatment system and the makeup of the wasteloads to that waste treatment facility. Usually industrial cost recovery systems will be defined by an operating agency for each individual wastewater treatment plant. Industrial cost recovery systems are generally not defined on an areawide basis.

The industrial sewer users rate contains three major parts: 1) local bond retirement or capital recovery; 2) local treatment of plant operation and maintenance cost; and 3) federal grant payback. Table 2 presents a short description of how industrial users fees are determined and the allowable uses of the money.

Effective control of industrial pretreatment requirement must be accomplished by a combination of a good monitoring program and voluntary compliance. The function of the monitoring program should be to spot-check discharges for compliance and to identify unacceptable waste discharges once a particular problem has become known. An extensive education and voluntary compliance program must be developed by the operators of the waste treatment plant. An effective public information and education program must be a continuing

TABLE 2

DETERMINING INDUSTRIAL USER FEES

TYPICAL ELEMENTS IN AN INDUSTRIAL DISCHARGES FEE	BASIS OF FEE	USES OF MONEY
Local Capital Recovery	Based on the relative industrial component of the total wasteload, i.e., 25% of the total wasteload is from industrial dischargers--25% of the local capital recovery is charged to industrial dischargers. Annual payments are also based on the interest rates obtained for local bonds.	Retire local bonds
Local Wastewater Treatment Plant Operation and Maintenance Cost	Based on the relative industrial component of the total wasteload, i.e., 25% of the total wasteload is from industrial dischargers --25% of the total operating and maintenance costs is charged to industrial dischargers.	Provide Operating Funds
Federal Construction Grant Payback	Based on the relative industrial component of the total wasteload, i.e., 25% of the total wasteload is from industrial dischargers-25% of the total federal grant must be paid back by industrial dischargers. Payment of the industrial portion of the construction grant may be accomplished by a single lump sum or paid on equal installments with no interest over 30 years.	Fifty percent of the grant from industrial dischargers must be submitted to the federal treasury. Forty percent of the industrial grant payback must be invested in the U.S. securities for future use by the local authorities. Use of the restricted funds must be approved by the regional administrator of EPA. Ten percent of the industrial construction grant payback may be used in any manner deemed appropriate by the local officials except to reduce industrial users fees.

process in order to insure the integrity of a wastewater treatment facility.

V. POINT SOURCE CONTROL RECOMMENDATION SUMMARY

The following point source control recommendations are organized by county and by proposed service area. The service areas--watersheds, cities, and sewer districts--are the areas that by the year 2000 should be serviced by centralized wastewater collection and treatment systems (see Figures 15, 16, 17 and 21). Portions of many year 2000 service areas are currently "sewered"; in these areas, the 208 Plan recommends that expanding sewer service to the current unsewered areas so that by the year 2000 sewer service is provided to the entire delineated area.

Preceeding each group of county recommendations, a table (Tables 4, 5, 6 and 8) describes the treatment process for each service area which is necessary to meet the Level 2 water quality criteria--the State of Missouri water quality standards of the receiving stream. Certain proposed wastewater treatment facilities will require nitrification to insure meeting state criteria for ammonia (0.1 mg/l NH_3-N un-ionized for A, B, and C streams). The point source summary tables will include nitrification where deemed necessary. In instances where criteria violation is uncertain, the state may require the community to construct a secondary wastewater treatment facility with design flexibility for the addition of nitrification units at a future date. Coupled with this phased construction approach would be an instream monitoring program downstream from the proposed facility. The monitoring program would measure specifically for ammonia violations. Descriptions of the resulting water quality improvements are found in Section 6 of this report.

Each service area recommendation is presented in a format which includes the following items:

- -- A brief description of the service area and recommended point source control
- -- A design table indicating population projections; the control recommendation; and discharge stream
- -- A cost summary table which shows the total project cost, the annual operation and maintenance cost and the annual household cost. All of these costs are in 1977 dollars.

-- An identification of existing sewer agencies and the recommended management agency

-- A brief description of steps necessary to implement the proposal. A more detailed discussion of implementation issues is presented in Section 6.

Table 3 offers brief explanation of the format for presenting the recommendations. For a more detailed discussion of IV and V, see Section 6.

TABLE 3

HOW TO USE THE POINT SOURCE RECOMMENDATION SUMMARY

I. Brief description of recommendation (a more detailed description can be found in the Element 20 Reports)

2000 POPULATION PROJECTION FOR SERVICE AREA

TYPE OF TREATMENT FACILITY CURRENTLY OPERATING IN SERVICE AREA

DESIGN FLOW FOR PROPOSED TREATMENT FACILITY IN MILLION GALLONS PER DAY

SERVICE AREA ANALYZED

1970 POPULATION FOR SERVICE AREA

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream

TOTAL PROJECT COST (1977 DOLLARS)

ANNUAL OPERATION AND MAINTENANCE COST

ANNUAL COST TO USER IN 1990 (1977 DOLLARS)

III. Costs

Total Capital	Annual O&M	Annual Household

EXISTING SEWER AGENCIES WITHIN SERVICE AREA

208 RECOMMENDED AGENCY FOR SERVICE AREA

IV. Management/Institutional

Existing Agency	Recommended Agency

V. Implementation Schedule

Brief timetable for bringing proposal into operation.

RECOMMENDATIONS FOR WASTEWATER TREATMENT: FRANKLIN COUNTY

legend

- ■ UPGRADE AND EXPAND CAPACITY OF PRESENT FACILITY
- ⊖ NEW FACILITY
- ● NEW FACILITY OR NONSEWERED APPROACH
- ⁄ AREAS TO BE SERVICED: YEAR 2000

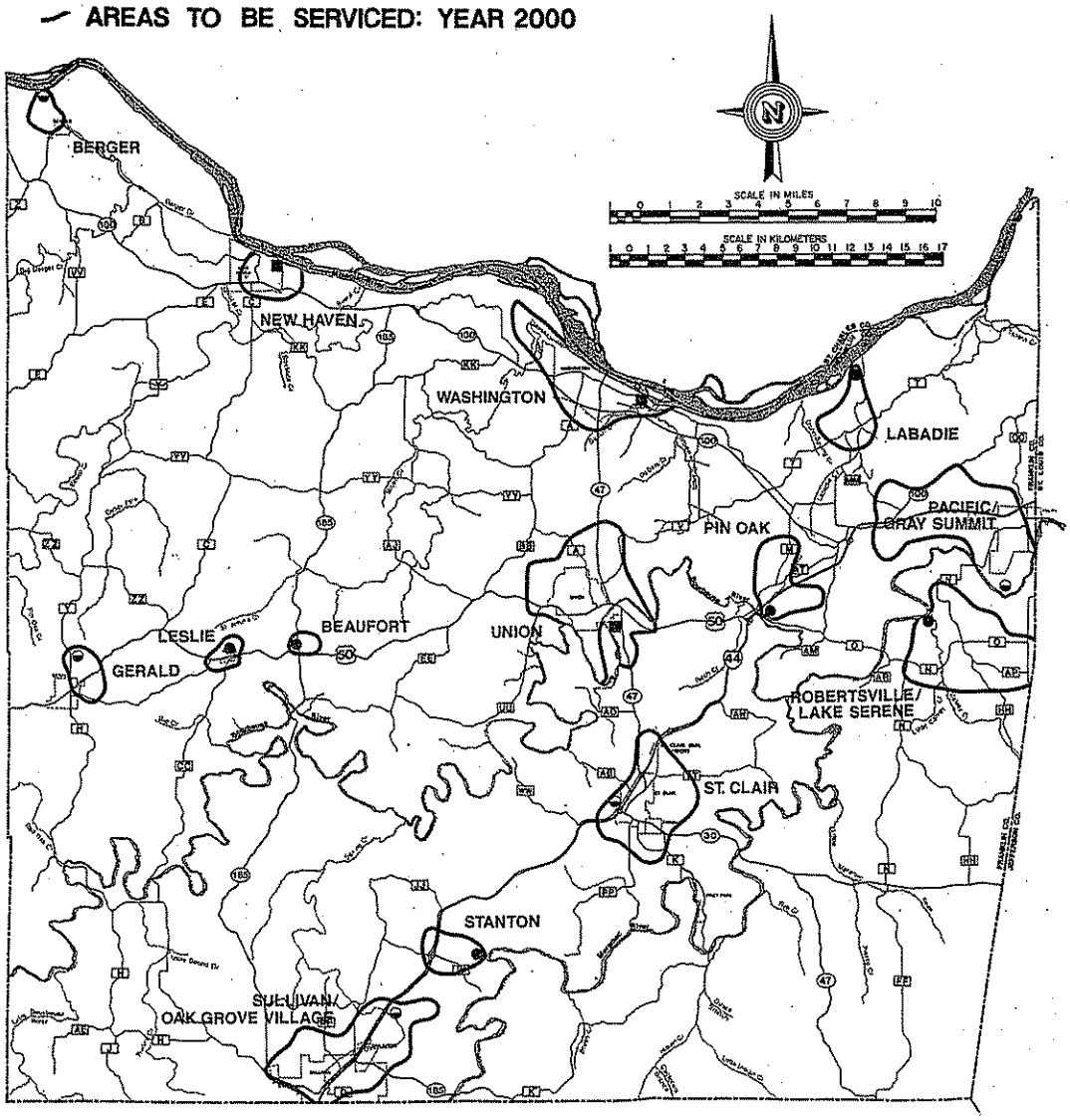


figure 15

TABLE 4

FRANKLIN COUNTY POINT SOURCE
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Pacific-Gray Summit	Secondary treatment plant with nitrification and disinfection	Meramec River
Beaufort	3-cell lagoon with disinfection	St. John's Creek
Berger	3-cell lagoon without disinfection	Berger Creek
Gerald	3-cell lagoon with disinfection	Bourbeuse River
Labadie	3-cell lagoon without disinfection	Missouri River
Leslie	3-cell lagoon with disinfection	St. John's Creek
New Haven	3-cell lagoon without disinfection	Missouri River
Pin Oak	3-cell lagoon with disinfection	Bourbeuse River
Robertsville/Lake Serene	3-cell lagoon with disinfection	Meramec River
Stanton	3-cell lagoon with disinfection	Meramec River
Sullivan/Oak Grove Village	3-cell lagoon with disinfection	Iron Hollow Creek
St. Clair	Secondary treatment plant with nitrification and disinfection	Happy Sock Creek
Union	Secondary treatment plant with nitrification and disinfection	Bourbeuse River

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Washington	Secondary treatment plant without disinfection	Missouri River

PACIFIC/GRAY SUMMIT

I. Description

Pacific is located north of the Meramec River in eastern Franklin County and Gray Summit is an unincorporated area directly north of Pacific. Pacific currently operates a 3-cell lagoon and a privately owned single cell lagoon is located within its city limits. Gray Summit has no centralized sewer system; septic tanks and a subdivision lagoon provide inadequate treatment. The proposal is to build a new treatment facility which would serve both Pacific and Gray Summit.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Pacific/ Gray Summit	3,500	8,958	Lagoons, Septic Tanks	Construct a new treatment facility	0.85	Meramec

III. Costs

Total Capital	Annual O&M	Annual Household
$7,712,000	$206,200	$128

IV. Management/Institutional

Existing Agency	Recommended Agency
Pacific	Pacific

V. Implementation Schedule

Create Gray Summit Sewer District -- January 1979
Intergovernmental Agreement -- October 1979
Initiate 201 Facility Planning -- June 1980
Start Construction -- January 1982

BEAUFORT

I. Description

Beaufort, an unincorporated community in west central Franklin County, currently has septic tanks and a one-cell lagoon. The proposal is to build a central sewer system and a new sewage treatment facility. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Beaufort	125	250	Septic Tanks; One-Cell Lagoons	Construct new treatment facility or non-sewered approach	0.02	Tributary to St. John Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$545,000	$4,960	$141

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a sewer district

V. Implementation Schedule

Establish Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Construct Project -- January 1984

BERGER

I. Description

Berger, located in the northwest corner of Franklin County, has no central collection system. Berger is scheduled for slow to moderate growth during the planning period. The proposal is to construct a collection system and a new wastewater treatment facility for the community. This would eliminate numerous septic tanks which now serve individual homes. Because of the high household costs, a nonsewered approach may be necessary.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Berger	226	440	Septic Tanks	Construct new facility and sewer system or nonsewered approach	0.04	Berger Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$1,218,000	$950	$145

IV. Management/Institutional

Existing Agency	Recommended Agency
Berger	Berger

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Construct project -- January 1984

GERALD

I. Description

Gerald is located on a ridge between Boeuf Creek and the Bourbeuse River. The City is presently served by two single cell lagoons which discharge into branches of each of the major watersheds mentioned above. It is proposed to combine all of the town's flow and treat it at a new wastewater facility in the location of the existing north lagoon.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Gerald	762	1,100	Two 1-cell Lagoons	Construct new facility	0.10	Bourbeuse River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,378,000	$8,940	$121

IV. Management/Institutional

Existing Agency	Recommended Agency
Gerald	Gerald

V. Implementation Schedule

Initiate 201 Facilities Planning -- January, 1978
Begin Construction -- January, 1981

LABADIE

I. Description

Labadie, located in the Missouri floodplain of northeastern Franklin County, is an unsewered rural community that will experience slow growth. This alternative proposes building a central sewer system and a secondary treatment facility discharging to the Missouri River. Because of the high household costs, a nonsewered approach may be necessary.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Labadie	275	300	Septic Tanks, Lagoons	Construct new treatment facility or non-sewered approach	0.02	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$573,000	$5,000	$210

IV. Management/Institutional

Existing Agency	Recommended Agency
L & K Sewer Co. (private)	Franklin County form sewer district

V. Implementation Schedule

Establish Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Begin Construction -- January 1984

LESLIE

I. Description

The Village of Leslie is located in the southwest portion of Franklin County at the intersection of Highways 50 and CC. Presently, Leslie has no central sewer system with the majority of homes utilizing septic tanks. The recommendation is to build a central sewer system and a sewage treatment facility. Because of the high projected household cost, a nonsewered approach may be more practical for the area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Leslie	81	200	IHTS	Construct new facility and sewer system or nonsewered approach	0.02	Tributary to St. Johns Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$717,000	$5,960	$227

IV. Management/Institutional

Existing Agency	Recommended Agency
Leslie	Leslie

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Begin Construction -- January 1984

NEW HAVEN

I. Description

New Haven, located in northwest Franklin County along the Missouri River, is a rural community. New Haven will experience moderate growth during the next 25 years with most of the growth occurring within the existing corporate limits. Presently, the community is served by a single cell lagoon and the proposal is to expand and upgrade this facility.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
New Haven	1,474	2,550	1-Cell Lagoon	Upgrade and expand lagoon and sewer system	0.19	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,562,000	$13,640	$39

IV. Management/Institutional

Existing Agency	Recommended Agency
New Haven	New Haven

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1981
Begin Construction -- January 1984

PIN OAK

I. Description

Pin Oak is an unincorporated rural area west of Pacific. The existing treatment facilities consist of septic tanks and lagoons with effluent discharging into either wet-weather streams or Pin Oak Creek. It is proposed to construct a central sewer system and a new treatment facility on the Bourbeuse River, downstream from the mouth of the Pin Oak Creek. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Pin Oak	N/A	817	Septic Tanks; Lagoons	Construct a new facility and sewer system; or nonsewered approach	0.06	Bourbeuse River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,856,000	$10,880	$135

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a Sewer District

V. Implementation Schedule

Create Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Begin Construction -- January 1984

ROBERTSVILLE/LAKE SERENE

I. Description

Located in the east central portion of Franklin County, these unincorporated areas will experience rapid development during the planning period. Present sewage treatment consists of lagoons and septic tanks. The proposed plan would involve the consolidation of the existing treatment facilities into a single treatment facility located in the vicinity of the confluence of Calvey Creek and the Meramec River. Due to the high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Roberts-ville/Lake Serene	725	1,500	Septic Tanks Lagoons	Construct a new facility or non-sewered approach	0.13	Meramec River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,273,000	$22,900	$164

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a Sewer District

V. Implementation Schedule

Create Sewer District or Incorporate -- January 1981
Begin 201 Facility Planning -- January 1982
Begin Construction -- January 1984

STANTON

I. Description

Stanton is a small unincorporated community located near the Meramec State Park. The present population is served by septic tanks and lagoons. It is proposed that these facilities be eliminated and replaced by a sewer collection system and a new sewage treatment facility. The treatment facility will be located to the east of the community on a wet-weather tributary of the Meramec River. Due to the high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Stanton	160	250	Septic Tanks; Lagoons	Construct a new facility or non-sewered approach	0.04	Meramec River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,405,000	$9,900	$300

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a Sewer District

V. Implementation Schedule

Create Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Begin Construction -- June 1984

SULLIVAN/OAK GROVE VILLAGE

1. Description

Sullivan is located in southwestern Franklin County; Oak Grove Village is a small community located just north of Sullivan. The population of this area is projected to almost double by 2000. Sullivan is currently served by two lagoons and Oak Grove Village has a small lagoon and numerous septic tanks. The recommendation is to construct a new facility located just north of Oak Grove Village on Spring Creek. The existing point sources in the area, including the Sullivan and Grove Village lagoons, will be eliminated.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Sullivan/ Oak Grove Village	5,400	10,250	Sullivan-2 Lagoons; Oak Grove Village-1 Lagoon	Construct a new treatment facility	1.1	Iron Hollow Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$6,052,000	$47,800	$31

IV. Management/Institutional

Existing Agency	Recommended Agency
Sullivan and Oak Grove Village	Sullivan

V. Implementation Schedule

201 Facility Planning has started -- June 1977
Formal Intercity Agreement -- January 1979
Begin Construction--January 1980

ST. CLAIR

I. Description

St. Clair, located in the south central portion of Franklin County, will undergo rapid development in the next 20 years. The City of St. Clair is served by five city operated lagoons and one trickling filter plant. The proposal is to construct a new wastewater treatment facility northwest of the City. The new facility would phase out inadequate lagoon treatment in the projected service area. Sewer service should also be provided to the Village of Parkway.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
St. Clair	2,978	8,000	5 Lagoons and trickling plant	Construct new facility and extend service	0.60	Happy Sock Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$2,500,000	$197,000	$121

IV. Management/Institutional

Existing Agency	Recommended Agency
St. Clair	St. Clair

V. Implementation Schedule

Construction (Step 3) to Begin June 1978
Develop Intercity Agreement With Parkway -- June 1979

UNION

I. Description

Union, in central Franklin County, will experience rapid growth during the next 20 years. The city is served by a 1-cell lagoon and the surrounding area is served by small lagoons and septic tanks which discharge into various wet-weather streams.

The recommendation is to extend the existing sewer system to provide service for outlying areas surrounding the city and to expand and upgrade the existing lagoon to treat all anticipated flows.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Union	5,183	10,500	1-cell lagoon; Septic tanks	Expand and upgrade existing lagoon	1.05	Bourbeuse River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,917,000	$162,400	$89

IV. Management/Institutional

Existing Agency	Recommended Agency
Union	Union

V. Implementation Schedule

201 Facility Plan (Step 1) Completed March 1978
Formalize projected service area -- January 1979
Begin Construction -- January 1981

WASHINGTON

I. Description

Washington, located in the north central portion of Franklin County, will undergo rapid development during the planning period. The city is presently in the process of extending its existing sewer system to unsewered areas to the southwest and northwest portions of the city. Washington is also planning to upgrade and expand its existing primary treatment plant to secondary treatment.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Washington	8,499	14,775	Primary Treatment Facility	Upgrade to secondary treatment and expand sewer system	1.80	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$3,112,000	$113,000	$68

IV. Management/Institutional

Existing Agency	Recommended Agency
Washington	Washington

V. Implementation Schedule

Upgrade to secondary treatment--to be completed November 1978
Formalize service area -- January 1979

RECOMMENDATIONS FOR WASTEWATER TREATMENT: JEFFERSON COUNTY

legend

- □ PRESENT FACILITY ADEQUATE
- ■ UPGRADE AND EXPAND CAPACITY OF PRESENT FACILITY
- ◒ NEW FACILITY
- ● NEW FACILITY OR NONSEWERED APPROACH
- ⌣ AREAS TO BE SERVICED: YEAR 2000

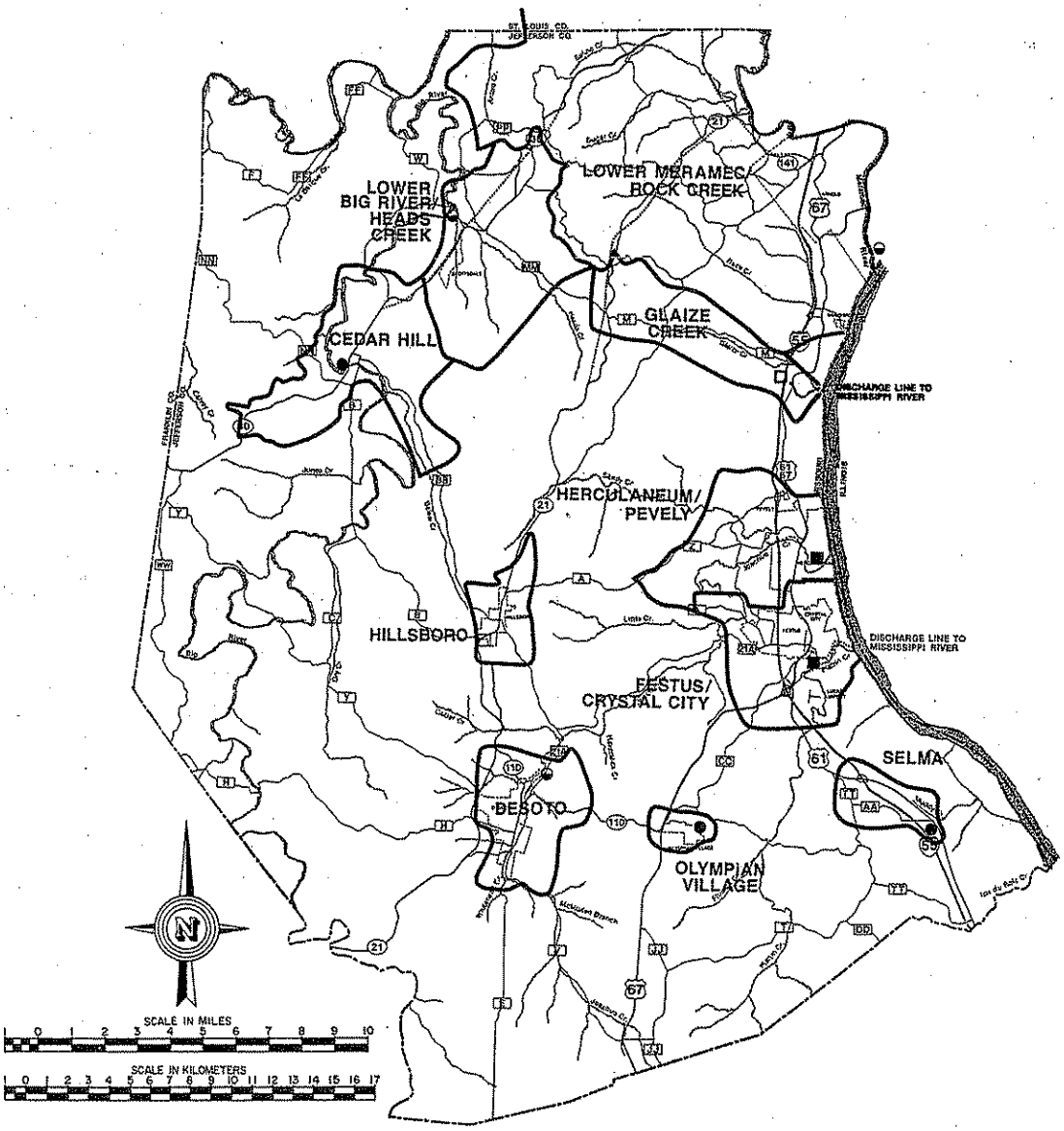


figure 16

TABLE 5

JEFFERSON COUNTY POINT SOURCE
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Lower Meramec (including Rock Creek Watershed	Secondary treatment plant without disinfection	Mississippi
Herculaneum/Pevely	Secondary treatment plant without disinfection	Joachim Creek
Lower Big River/ Heads Creek	Secondary treatment plant with nitrification and disinfection	Tributary of Big River
Olympian Village	Secondary treatment plant with nitrification and disinfection	Plattin Creek
Cedar Hills	Secondary treatment plant with nitrification and disinfection	Big River
Desoto	Secondary treatment plant with nitrification	Joachim Creek
Festus/Crystal City	Secondary treatment plant without disinfection	Mississippi River
Glaize Creek Watershed	Secondary treatment plant without disinfection	Mississippi River
Selma	Secondary treatment plant with nitrification	Muddy Creek

LOWER MERAMEC SYSTEM
(Including Rock Creek Watershed)

I. Description

Currently, the Lower Meramec region is experiencing rapid urbanization with numerous inadequate treatment facilities prevalent in the area. The proposal involves the construction of a regional secondary treatment facility in St. Louis County near the confluence of the Meramec and Mississippi Rivers. This regional facility would provide sewer service via major interceptors for the Lower Meramec area (southern St. Louis County and northern Jefferson County) and the entire Rock Creek watershed in Jefferson County.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lower Meramec	Approx. 140,000	263,281	Numerous Discharges; Septic Tanks	Construct new MSD St. Louis County Facility	30.90	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$89,106,000	$1,092,000	$39

IV. Management/Institutional

Existing Agency	Recommended Agency
Arnold and Private Sewer Companies	Jefferson County form a sewer district

V. Implementation Schedule

Arnold
Interceptor Construction Underway -- January 1977

Unincorporated Area
Organize Sewer District -- June 1979
Initiate 201 Facility Planning -- January 1980
Start Interceptor Construction -- July 1981

CEDAR HILLS

I. Description

Cedar Hills is located in the northwestern portion of Jefferson County on Highway 30. The proposal is to construct a new mechanical treatment plant. The service area would include Skullbone Creek, Isum Creek and Sand Creek watersheds, and the Belew Creek watershed including Lake Tishomingo. Due to high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Cedar Hills	300	6,110	Lagoon and Septic Tanks	Construct a new facility or non-sewered approach	0.50	Big River

III. Costs

Total Capital	Annual O&M	Annual Household
$7,127,000	$140,600	$150

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Jefferson County form a sewer district

V. Implementation Schedule

Organize Sewer District -- January 1979
Initiate 201 Facility Planning -- January 1981
Start Construction -- January 1983

DESOTO

I. Description

DeSoto, located in the southern portion of Jefferson County, will experience rapid growth during the next 25 years. Currently, DeSoto has a central sewer system with a lagoon providing sewage treatment. The proposal is to upgrade and expand the existing facility for processing anticipated flows. The service area would be expanded to include growth areas.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
DeSoto	5984	11,000	Lagoon	Upgrade and expand facility	1.68	Joachim Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$3,656,000	$170,000	$98

IV. Management/Institutional

Existing Agency	Recommended Agency
DeSoto	DeSoto

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1980
Start Construction -- January 1982

FESTUS/CRYSTAL CITY

I. Description

Festus/Crystal City, located in the east central portion of Jefferson County will undergo moderate development during the planning period. The existing Festus/Crystal City plant is located 1.5 miles upstream of the Mississippi River along Plattin Creek. The proposal is to expand the existing treatment facility, and to add an outfall to the Mississippi River. The outfall construction is more cost effective than upgrading the existing facility to meet new State standards ($707,000 vs. $1,180,000).

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Festus/ Crystal City	11,428	16,000	Secondary treatment plant	Expand existing facility add discharge line to Miss. River	2.0	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,699,000	$124,800	$70

IV. Management/Institutional

Existing Agency	Recommended Agency
Festus/Crystal Sewage Commission (not grant eligible)	Festus Grant Recipient*

V. Implementation Schedule

Complete 201 Facility Planning -- October 1978
Start Construction -- July 1979

*Festus/Crystal City Sewage Commission: Operating Agency

GLAIZE CREEK WATERSHED

I. Description

The Glaize Creek Sewer District is located in the north eastern portion of Jefferson County along Highway M. It presently serves the lower portion of the Glaize Creek watershed. The existing plant is located along Glaize Creek one mile upstream of the Mississippi River. The proposal is to provide treatment service to upper Glaize Creek above Barnhart and to construct an outfall to the Mississippi River. The outfall construction is considerably less expensive than upgrading the existing facility to meet new state water quality criteria ($472,000 vs. $1,110,000).

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Glaize Creek	Approx. 3,800	9,000	Secondary Treatment Facility	Expand Sewer System and construct outfall to Miss. River	1.0	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$3,636,000	$129,000	$111

IV. Management/Institutional

Existing Agency	Recommended Agency
Glaize Creek Sewer District	Glaize Creek Sewer District

V. Implementation Schedule

Expand Glaize Creek Sewer District -- January 1980
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

HERCULANEUM/PEVELY

I. Description

Herculaneum/Pevely, located in the eastern portion of Jefferson County, will experience rapid development during the planning period. The original 208 proposal of a regional facility for the area in all likelihood will be overridden by current 201 Facility Planning. Based on more recent cost effective considerations, the 201 plan will recommend upgrading the operation at the existing Pevely plant; expanding the treatment facility at Herculaneum; and constructing a new facility to serve Horine. These recommendations are subject to 208 review and approval.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Hercula-neum/Pevely	4,526	15,000	Treatment facility and lagoon	Contingent upon recommendations of facility planning study now underway	1.50	Joachim Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$12,786,000	$144,800	$81

IV. Management/Institutional

Existing Agency	Recommended Agency
Herculaneum Sewer District; Pevely	Contingent upon 201 facility planning

V. Implementation Schedule

Facility Plan Completed -- May 1978
Start Construction -- January 1980

LOWER BIG RIVER/HEADS CREEK

I. Description

The Lower Big River/Heads Creek area, located in the northwest portion of Jefferson County, will develop rapidly during the planning period.

The project area is fragmented into multiple service areas and treatment facilities. The proposal is to construct a treatment facility to combine the service areas of Lake Montowese, Heads Creek and Lower Big River.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lower Big River/Heads Creek	Approx. 3,750	8,500	Lagoons and septic tanks	Construct new facility	0.69	Tributary of Big River

III. Costs

Total Capital	Annual O&M	Annual Household
$6,173,000	$171,700	$113

IV. Management/Institutional

Existing Agency	Recommended Agency
Lower Big River Sewer District	Lower Big River Sewer District

V. Implementation Schedule

Expand Sewer District -- January 1979
Initiate 201 Facility Planning -- January 1981
Start Construction -- January 1983

OLYMPIAN VILLAGE

I. Description

Olympian Village is located in the southern portion of Jefferson County on Highway 67. The proposal is to construct a new treatment facility discharging into Plattin Creek. The service area will include those portions of Olympian Village and surrounding areas within the Plattin Creek watershed. Due to high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Olympian Village	Approx. 750	1,735	Numerous Discharge Septic Tanks	Construct a new facility or nonsewered approach	0.18	Plattin Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$2,387,000	$73,600	$202

IV. Management/Institutional

Existing Agency	Recommended Agency
Olympian Village	Olympian Village

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

SELMA

1. Description

Selma, located in the southeast portion of Jefferson County, will develop slowly during the planning period. The existing treatment facility (Imhoff tank and sandfilter) is nearing capacity and would have to be expanded to accommodate the projected growth. The proposal is to construct a new treatment facility at the existing plant site. Due to the high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Selma	Approx. 100	560	Treatment Facility	New 50,000 GPD facility or nonsewered approaches	0.05	Muddy Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$260,000	$35,700	$182

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Jefferson County form a sewer district

V. Implementation Schedule

Organize Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

RECOMMENDATIONS FOR WASTEWATER TREATMENT: ST. CHARLES COUNTY

legend

- PRESENT FACILITY ADEQUATE
- EXPAND CAPACITY OF PRESENT FACILITY
- UPGRADE AND EXPAND CAPACITY OF PRESENT FACILITY
- NEW FACILITY
- NEW FACILITY OR NONSEWERED APPROACH
- AREAS TO BE SERVICED: YEAR 2000

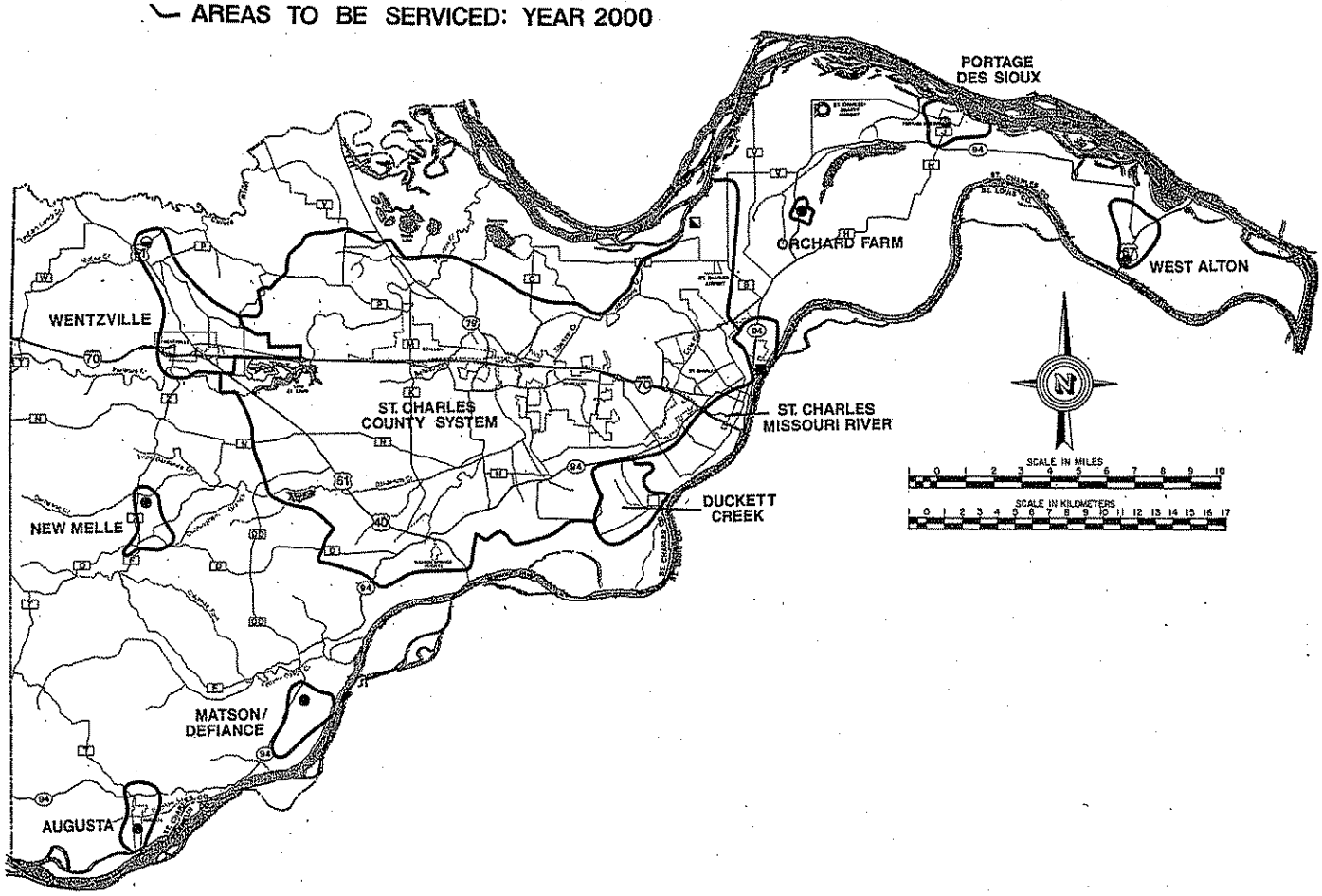


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TABLE 6

ST. CHARLES COUNTY POINT SOURCE
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
St. Charles Consolidated System	Secondary treatment plant with disinfection (operate existing carbon system)	Mississippi River
Augusta	3-cell lagoon without disinfection	Missouri River
Duckett Creek Watershed	Secondary treatment plant without disinfection	Missouri River
Matson/Defiance	3-cell lagoon without disinfection	Missouri River
New Melle	3-cell lagoon with disinfection	Dardenne Creek
Orchard Farm	1-cell lagoon with disinfection and land application	Tributary to Mississippi River
Portage Des Sioux	Secondary treatment plant with disinfection	Mississippi River
St. Charles/ Missouri	Secondary treatment plant without disinfection	Missouri River
West Alton	3-cell lagoon without disinfection	Missouri River
Wentzville	Secondary treatment plant with nitrification and disinfection	McCoy Creek

ST. CHARLES CONSOLIDATED SYSTEM

I. Description

The secondary stage of the St. Charles Mississippi River Plant would be expanded to treat all wastewater from the following watersheds: Spencer Creek, Cole Creek, Sandfort Creek, lower Dardenne Creek, lower Peruque Creek, and the Belleau Creek. All wastewater discharges to streams in the service area would be eliminated. The following communities would be connected: St. Charles (Mississippi watersheds), St. Peters, O'Fallon, Lake Saint Louis, Harvester, Weldon Spring Heights, Kampville, South Shore, and Lake Village Harbor.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
St. Charles Consolidated System	N/A	147,300	Individual community system & private sewer companies	Regional system	16.5	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$69,832,176	$1,736,632	$60

IV. Management/Institutional

Existing Agency	Recommended Agency
St. Charles, O'Fallon Duckett Ck., St. Peters	To be determined by 208 continued planning

V. Implementation Schedule

Organize Sewer District -- October 1979
Initiate 201 Facility Planning -- July 1980
Start Construction -- July 1982

VI. Additional Description

Because the recommendation for a consolidated system represents a major departure from present wastewater treatment practices in St. Charles County, it is necessary to further explain how the recommendation was arrived at. Three alternatives for providing wastewater treatment were evaluated during Phase 3 of the 208 program. These alternatives had survived the Phase II alternative analysis and were judged to be the most cost-effective alternative for further evaluation (see p 23 to 30 of this section). Besides the consolidated system (Alternative 3), the other two alternatives were:

Alternative 1: The City of St. Charles, St. Peters, O'Fallon, and Lake Saint Louis would continue operating their own treatment facilities, expanding their systems to service their immediate unincorporated areas. No watershed-wide treatment would be provided for the lower Dardenne Watershed. The St. Peters, O'Fallon, and Lake Saint Louis facilites would be upgraded to meet State water quality standards and their capacities would be expanded.

Alternative 2: The City of St. Charles Mississippi treatment plant would service the same area as in Alternative 1. A new facility would be built to service St. Peters, the lower Dardenne watershed and Weldon Springs Heights. A new O'Fallon facility would be built which would extend service to Lake Saint Louis.

Alternative 1 was judged as being the least cost-effective alternative. The difference between Alternatives 2 and 3, however, was much smaller. As can be seen in Table 7, the two alternatives are very close in terms of capital outlay. There is a decrease in annual operation and

maintenance costs with Alternative 3. However, the consolidated system (Alternative 3) would provide a water quality advantage since it eliminates all discharges to St. Charles' County streams within the service area. Alternative 3 would also provide some insurance against more stringent water quality standards being imposed at some future date. Staff and consultants, therefore, recommended Alternative 3, the consolidated system.

TABLE 7

Alternative	Capital Costs	Annual O&M	Total Annual	Annual Household
2	$65,721,140	$1,940,526	$2,531,097	$64.89
3	69,832,176	1,736,632	2,364,144	59.91

During the second phase of "bridge-building meetings" (see Section 1) and during the Phase III St. Charles County Workshops, a number of concerns were expressed regarding implementation of Alternative 3. These concerns included who will be the management agency for the service area; how will ongoing facility planning activities be phased into implementation; what type of user cost arrangements would be developed; and, perhaps most important, what powers will the component municipalities and sewer districts have over sewer extensions within their areas of jurisdiction.

Figures 18 and 19 shows two major obstacles to implementation - the current facility planning areas within the proposed service area, and the current management agencies within the proposed service area. Figure 18 shows that current facility planning areas are not coterminous with the service

ST. CHARLES COUNTY CONSOLIDATED SYSTEM: PRESENT FACILITY PLANNING AREAS

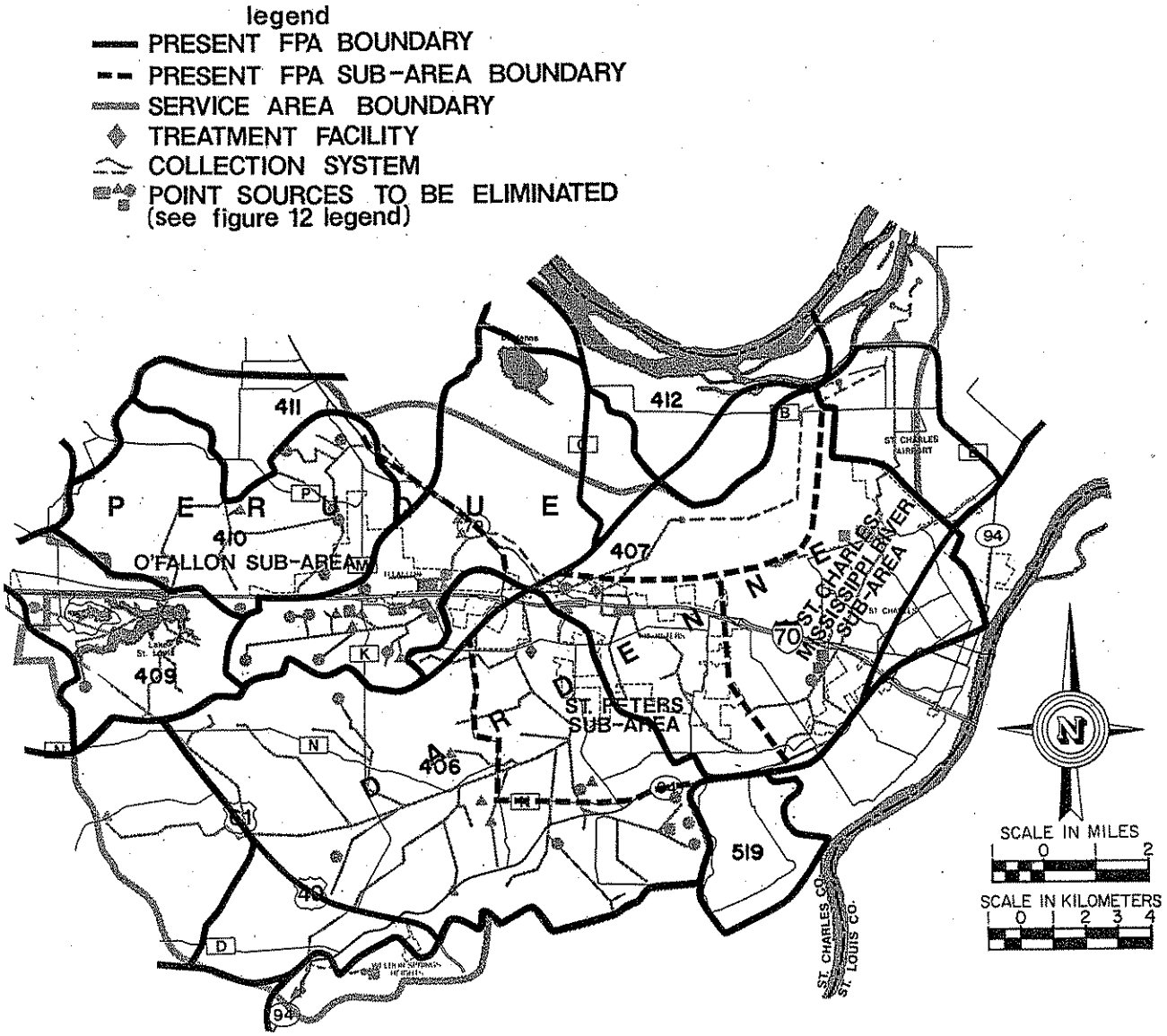

figure 18

ST. CHARLES COUNTY CONSOLIDATED SYSTEM: PRESENT MANAGEMENT AGENCIES

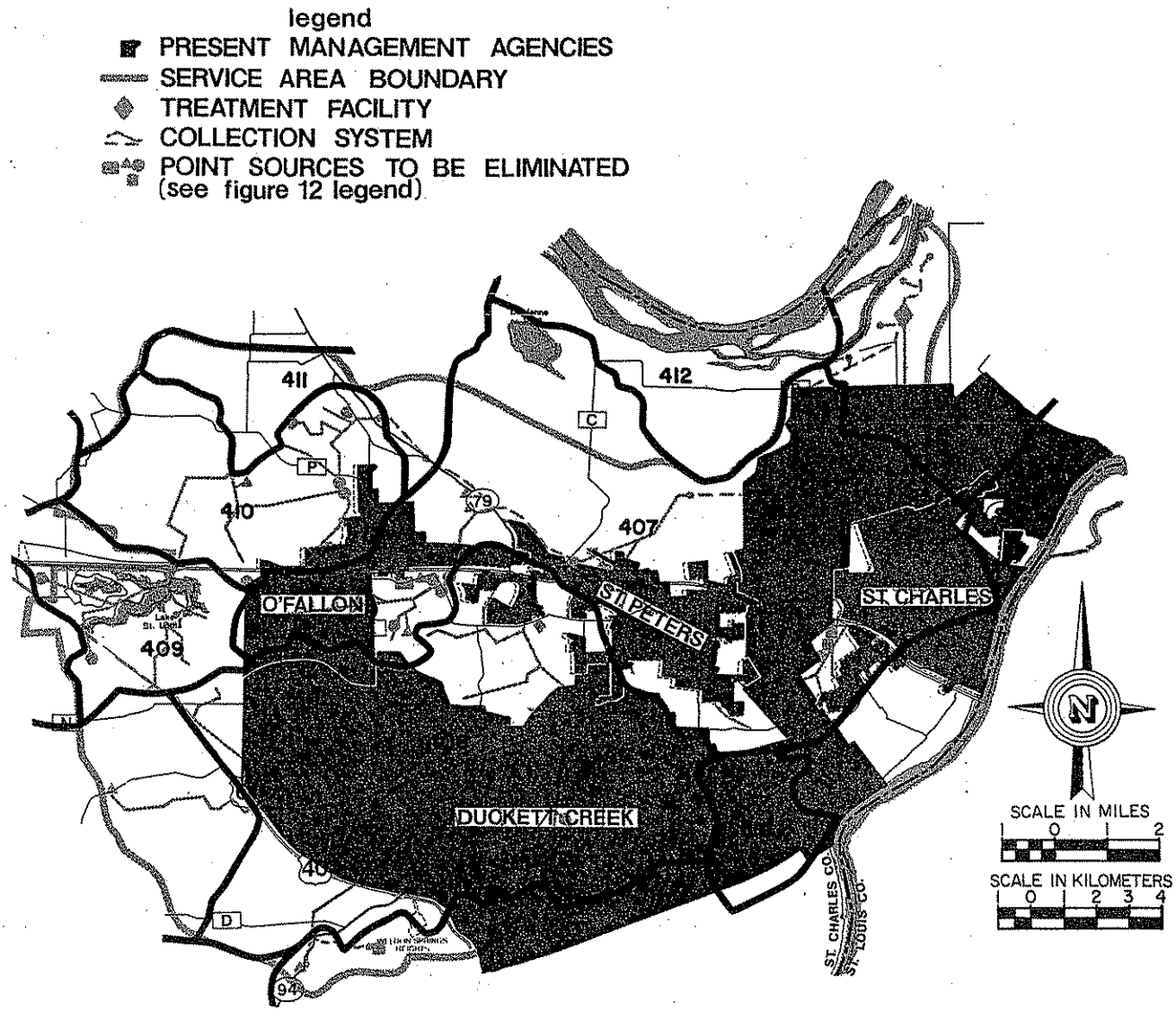

figure 19

area. Facility planning within this area, has not been done in a coordinated manner (Draft Plan, Appendix A); some areas are in Phase 3, others Phase 1, others inactive. A major challenge that emerged from staff discussions, therefore, was to develop an implementation strategy which would address these concerns.

The recommended strategy is the following:

1. The service area should be subdivided into three subdistricts: St. Charles, St. Peters/Duckett Creek, and O'Fallon (see Figure 20). For each subdistrict, the above-mentioned communities and sewer district are recommended to be designated to receive 201 facility planning grants. All future and ongoing facility planning within these subdistricts should be directed at eventually merging into the consolidated system. Based on our recommendation, only trunk sewers and interim facilities would be eligible for Step 2 and 3 grants.

   The jurisdictions within the subdistricts would have total control over the development of subtrunk sewers. Local areas would, therefore, have control over the direction and magnitude of development within their jurisdictions.

2. An agency to manage the trunk and treatment component of the system will not be designated until a consensus is reached among St. Charles County and the component service area jurisdictions. This consensus should be reached by October 1978 in order to meet the implementation schedule.

   208 continued planning funds should be used to help the entities involved reach this important consensus. It is, therefore, recommended that a project commence as as soon as funding is available, that will result in the implementation of this overall management agency. Once the agency is formed, it should immediately initiate facility planning to detail the specific steps necessary toward consolidation.

ST. CHARLES COUNTY CONSOLIDATED SYSTEM: SUBDISTRICTS

legend
- TREATMENT FACILITY
- SUBDISTRICT COLLECTION SYSTEM
- MAJOR CONNECTING TRUNK SEWER
- SUBDISTRICT BOUNDARY
- SERVICE AREA BOUNDARY
- POINT SOURCES TO BE ELIMINATED (see figure 12 legend)

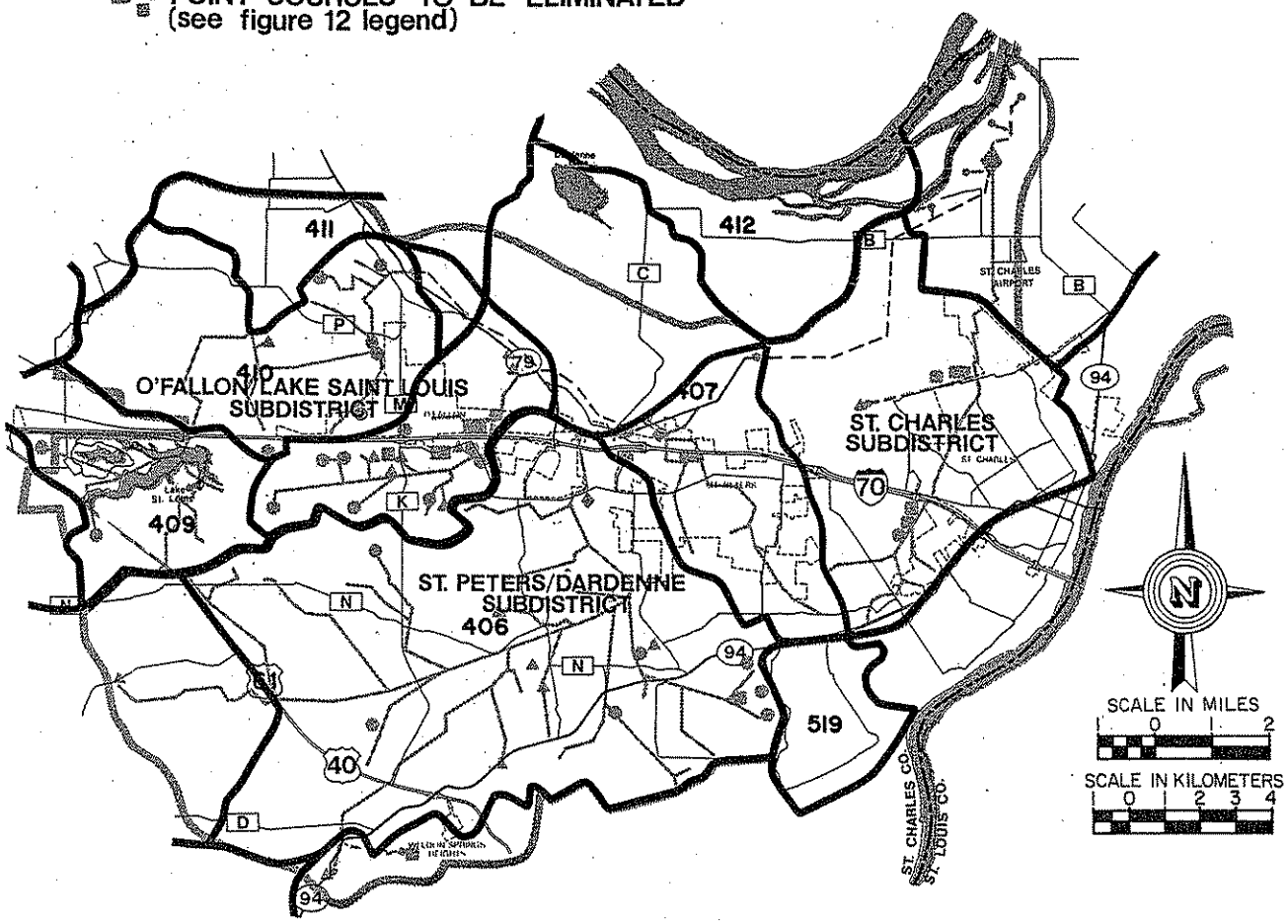

figure 20

AUGUSTA

I. Description

Augusta is located in the southwestern portion of St. Charles County. Presently, Augusta has no treatment system. The proposal is for a secondary treatment facility to serve the main area of the town as well as areas to the north. Discharge from the facility would be through an outfall sewer directly to the Missouri River. Due to the high household costs, a non-sewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Augusta	259	400	IHTS	Secondary treatment facility or non-sewered approaches	0.03	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,342,000	$8,900	$164

IV. Management/Institutional

Existing Agency	Recommended Agency
None	St. Charles County form sewer district

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

DUCKETT CREEK WATERSHED

I. Description

Duckett Creek watershed, located in the eastern portion of St. Charles County, will experience rapid growth during the planning period. The existing secondary treatment facility will have adequate capacity through the next 25 years. The proposal is to extend the existing sewer system to provide treatment for the entire watershed.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Duckett Creek Watershed	Approximately 2,200	7,097	Secondary treatment facility	Expand sewer system	0.61	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,499,000	$58,500	$59

IV. Management/Institutional

Existing Agency	Recommended Agency
Duckett Creek Sewer District	Duckett Creek Sewer District

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

MATSON/DEFIANCE

I. Description

The communities of Matson and Defiance are located on the southeastern tip of St. Charles County. These two small communities have individual septic tank systems and a secondary treatment facility is proposed to serve both communities. Wastewater from Matson would be pumped via a force main to the new plant. Due to the high projected household costs, a non-sewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Matson/ Defiance	175 (est.)	300	Septic Tanks	Construct a new facility or non-sewered approach	0.030	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,248,000	$7,900	$263

IV. Management/Institutional

Existing Agency	Recommended Agency
None	St. Charles County form sewer district

V. Implementation Schedule

Organize Sewer District -- January 1981
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

NEW MELLE

I. Description

New Melle, located in the central western portion of St. Charles County, will remain rural in character over the planning period. Presently, New Melle has no collection and treatment system. A new secondary facility is proposed and will discharge to a tributary stream of Dardenne Creek.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
New Melle	300	550	Septic Tanks	Construct new treatment facility	0.05	Dardenne Creek Tributary

III. Costs

Total Capital	Annual O&M	Annual Household
$995,000	$8,900	$195

IV. Management/Institutional

Existing Agency	Recommended Agency
New Melle	St. Charles County form sewer district

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

ORCHARD FARM

I. Description

Orchard Farm is a small rural community, located in the eastern portion of St. Charles County. The community is presently served by individual home treatment systems. It is proposed to construct a sewer system and storage lagoon for the community with the effluent being utilized for irrigation purposes. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Orchard Farm	175	200	Septic Tanks	Construct a storage lagoon or nonsewered approach	0.01	None

III. Costs

Total Capital	Annual O&M	Annual Household
$554,000	$5,000	$144

IV. Management/Institutional

Existing Agency	Recommended Agency
Orchard Farm	St. Charles County form sewer district

V. Implementation Schedule

Organize Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

PORTAGE DES SIOUX

I. Description

The community of Portage Des Sioux, located in eastern St. Charles County will undergo moderate growth in the next 25 years. Portage Des Sioux is presently served by a community septic tank. A new secondary facility discharging to the Mississippi River, is proposed for the service area. Due to space limitations, a 3-cell lagoon system is not a feasible alternative.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Portage Des Sioux	509	759	Community Septic Tank	Construct a new facility	0.06	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$760,000	$16,100	$97

IV. Management/Institutional

Existing Agency	Recommended Agency
Portage Des Sioux	Portage Des Sioux

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1978
Start Construction -- January 1981

ST. CHARLES-MISSOURI RIVER

I. Description

The city of St. Charles is currently in the process of expanding and upgrading its Missouri River primary treatment plant to a secondary facility to meet effluent discharge requirements. This would also include expanding the existing sewer system to include developed areas to the northeast of the city.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
St. Charles-Missouri River	N/A	22,600	Primary treatment facility	Upgrade to secondary treatment and expand	3.33	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,579,000	$185,000	$60

IV. Management/Institutional

Existing Agency	Recommended Agency
City of St. Charles	City of St. Charles

V. Implementation Schedule

Completing 201 Facility Planning -- July 1978
Start Construction -- July 1979

WENTZVILLE

I. Description

Wentzville has recently received funding to construct a 1.0 MGD capacity contact stabilization plant that will treat all wastewater from the Wentzville/Flint Hill area. Effluent will be discharged directly to McCoy Creek. Under new State standards (208 Level 2 criteria), the facility under construction will eventually require upgrading which involves nitrification and disinfection.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Wentzville	3,223	10,000	2 lagoons & trickling filter	Upgrade facility	1.00	McCoy Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$2,200,000	$147,000	$87

IV. Management/Institutional

Existing Agency	Recommended Agency
Wentzville	Wentzville

V. Implementation Schedule

Complete Construction -- January 1979

WEST ALTON

I. Description

West Alton is located in the eastern portion of St. Charles County. The only facility operating in the area presently is a small package plant serving the West Alton Recreation Area west of town. The proposal is to construct a new secondary facility and central sewer system to serve the area. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
West Alton	425	675	Septic Tanks	Construct a new facility or non-sewered approach	0.05	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,736,000	$9,800	$123

IV. Management/Institutional

Existing Agency	Recommended Agency
None	St. Charles County form sewer district

V. Implementation Schedule

Incorporate or Form Sewer District -- January 1981
Initiate Facility Planning -- January 1982
Start Construction -- January 1984

RECOMMENDATIONS FOR WASTEWATER TREATMENT: ST. LOUIS CITY/COUNTY

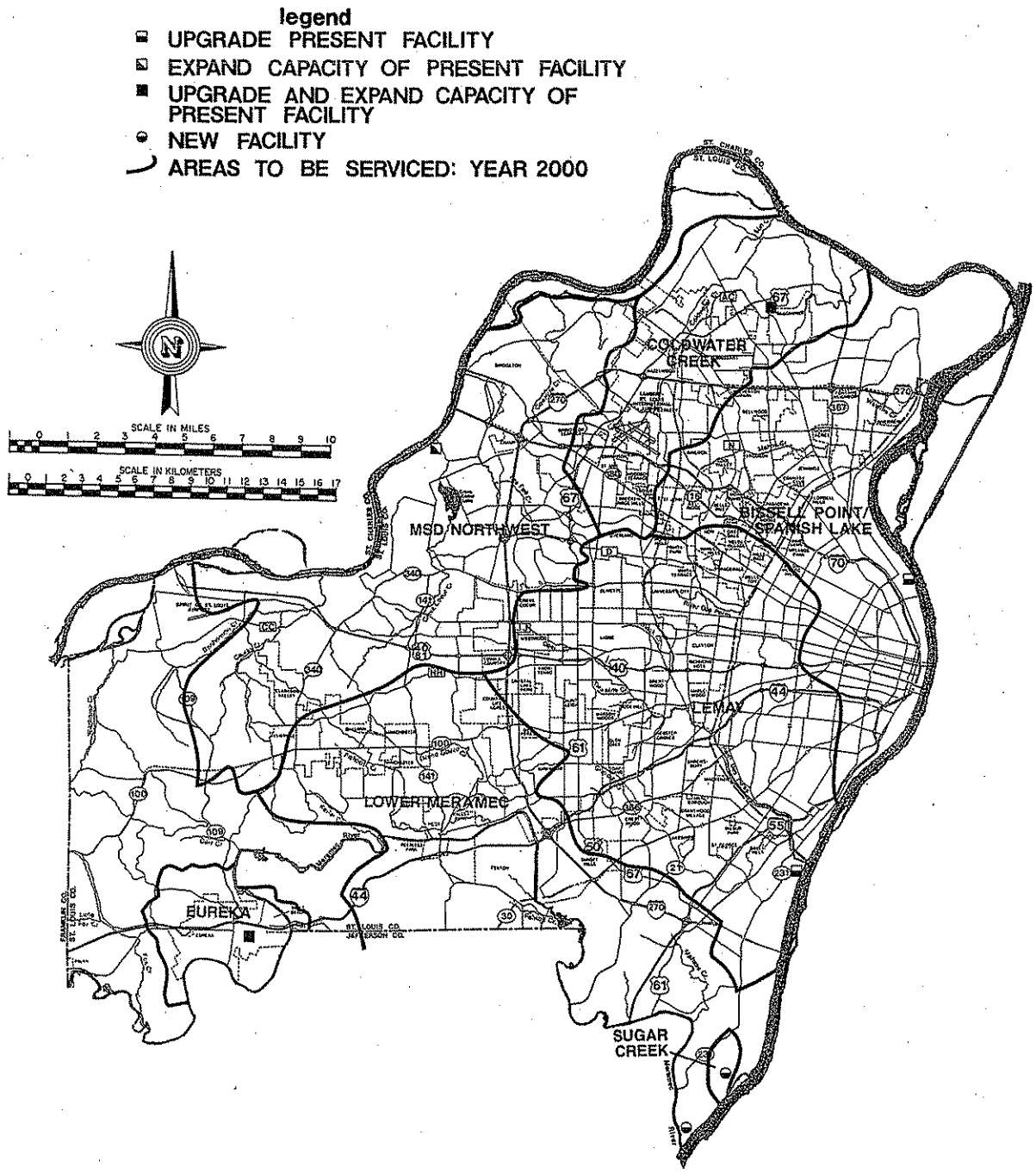

figure 21

TABLE 8

ST. LOUIS CITY/COUNTY
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Lower Meramec	Secondary treatment plant without disinfection	Mississippi River
Caulks, Creve Coeur, Cowmire Creeks (MSD Northwest)	Secondary treatment plant without disinfection	Missouri River
Bissell Point(including Spanish Lake)	Secondary treatment plant without disinfection	Mississippi River
Coldwater Creek Watershed	Secondary treatment plant with nitrification and disinfection	Coldwater Creek
Lemay (including Martigney Creek Watershed)	Secondary treatment plant without disinfection	Mississippi River
Eureka/Times Beach	Secondary treatment plant with nitrification and disinfection	Meramec River
Sugar Creek Watershed	Secondary treatment plant without disinfection	Mississippi River

LOWER MERAMEC SYSTEM
(Including Rock Creek Watershed)

I. Description

Currently, the Lower Meramec region is experiencing rapid urbanization with numerous inadequate treatment facilities prevelant in the area. The proposal involves the construction of a regional secondary treatment facility in St. Louis County near the confluence of the Meramec and Mississippi Rivers. This regional facility would provide sewer service via major interceptors for the Lower Meramec area (southern St. Louis County and northern Jefferson County) and the entire Rock Creek Watershed in Jefferson County

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lower Meramec	Approx. 140,000	263,281	Numerous Discharges; Septic Tanks	Construct new MSD St. Louis County Facility	30.90	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$89,106,000	$1,092,000	$39

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Facility Plan Completed -- May 1978
Start Construction -- January 1979

BISSELL POINT

I. Description

The existing MSD primary treatment plant located along the Mississippi River north of downtown St. Louis currently serves approximately 60% of the City of St. Louis and a portion of St. Louis County. The present flow to the 250 MGD plant is approximately 130 MGD. The proposal is to upgrade the existing primary plant to secondary treatment and to expand the existing sewer service area to include flow from the Spanish Lake area in north St. Louis County.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Bissell Point/ Spanish Lake	N/A	579,031	Primary Plant; Spanish Lake facility	Upgrade and expand Bissell Point plant expand sewer system	132.1	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$56,800,000	$2,500,000	Bissell Pt. - $33 Spanish Lake - $14

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Design (Step 2) to be Completed -- September 1978

Start Construction -- January 1979

CAULKS CREEK, CREVE COEUR, COWMIRE CREEK WATERSHEDS
(MSD NORTHWEST)

I. Description

The existing Fee Fee treatment facility (10 MGD rated capacity) serves Fee Fee Creek and Creve Coeur Creek watersheds. The Caulks Creek area is presently served by several small treatment facilities and Cowmire Creek area contains two major treatment facilities: Bonfils and Berry Hills, and other smaller facilities. The Fee Fee treatment plant will be expanded and trunk sewers will be constructed to phase out the existing facilities in Caulks Creek and Cowmire Creek watersheds.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Caulks Creek Creve Coeur Cowmire Creek	N/A	151,510	Fee Fee Master Plant	Expanded Fee Fee Plant and construct new trunk sewers	20.59	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$26,340,000	$739,500	$40

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- June 1978
Start Construction -- January 1980

COLDWATER CREEK WATERSHED

I. Descirption

The Coldwater Creek secondary treatment plant, operated by MSD, is approaching overloaded conditions. The alternative of pumping effluent to the Missouri River from this facility versus upgrading the facility to meet new State standards are analyzed. A slight cost advantage toward upgrading the facility was indicated; however, both alternatives should be studied in greater detail during 201 Facility Planning. The proposal is to expand and upgrade the existing facility and to include the entire Mill Creek watershed in the service area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Coldwater Creek	N/A	194,000	Secondary treatment facility	Upgrade and expand existing facilities	28.30	Coldwater Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$9,746,000	$1,121,000	$29

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- May 1978
Start Construction -- July 1979

EUREKA/TIMES BEACH

1. Description

The Cities of Eureka and Times Beach, located in the western portion of St. Louis County, will experience rapid growth during the planning period. The City of Eureka is served by a secondary treatment facility followed by a polishing pond. The City of Times Beach has no central sewer system and relies mainly on septic tanks. The proposal is to upgrade and expand the existing facility and to expand the service area to include Times Beach and Six Flags' commercial area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Eureka/ Times Beach	2,384	4,700	Treatment plant and polishing lagoon	Upgrade and expand facility	0.67	Meramec River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,791,000	$144,200	$29

IV. Management/Institutional

Existing Agency	Recommended Agency
Eureka/Times Beach	Eureka

V. Implementation Schedule

201 Facility Planning to be Completed -- June 1978
Formalize Intercity Agreement -- October 1978
Begin Construction -- January 1980

LEMAY

I. Description

The existing MSD primary treatment facility serves south St. Louis and southwestern portions of St. Louis County. The proposal is to upgrade the Lemay facility to secondary treatment and to include Martigney Creek watershed in the service area. Plant capacity would be decreased from the 175 MGD to the secondary treatment design of 125 MGD. The new plant design would utilize existing structures as much as possible.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lemay	N/A	644,777	Primary Facility (175 MGD)	Upgrade facility to secondary treatment	125.00	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$53,600,000	$2,254,000	$29

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Construction (Step III) started -- January 1977

MARTIGNEY CREEK WATERSHED

I. Description

The Martigney Creek watershed, located in the southeastern portion of St. Louis County, will undergo moderate growth during the next 25 years. The area is currently served by 2.0 MGD secondary treatment facility. Due to the proximity of a MSD pump station, the plan is to phase out the existing facility and route the flow through the pump station to MSD's Lemay treatment plant.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Martigney Creek	8,060	11,951	Two contact stabilization facilities	Expanded sewer system and connect to MSD's Lemay plant	1.40	Martigney Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$894,000	$110,000	$38

IV. Management/Institutional

Existing Agency	Recommended Agency
Martigney Creek Sewer Co. and MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

SPANISH LAKE

I. Description

The Spanish Lake area, located in northern St. Louis County, is served by a MSD secondary treatment facility. Approximately 48 percent of the Spanish Lake service area is presently unsewered. The proposal is to abandon the Spanish Lake treatment facility and pump the flow to the MSD Bissell Point secondary treatment plant. Sewer service would be provided for the entire Spanish Lake Creek watershed area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Spanish Lake	N/A	8,080	Treatment Plant	Abandon facility and pump flow to Bissell point	1.40	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,908,000	$16,000	$14

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- June 1978
Start Construction -- July 1980

SUGAR CREEK WATERSHED

I. Description

The Sugar Creek watershed located in southeastern St. Louis County, will develop rapidly over the planning period. Currently, the area has a secondary treatment facility. The proposal is to extend service to the remainder of the watershed. During 201 Facility Planning, the alternative of routing sewage flow to the proposed Lower Meramec treatment plant should be examined closely.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Sugar Creek	1520	3140	Extended aeration plant	Expand sewer system to entire watershed	0.40	Sugar Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$1,012,000	$28,600	$63

IV. Management/Institutional

Existing Agency	Recommended Agency
South County Sewer Co.	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984