

*An Innovative Organizational
Arrangement for Comprehensive
Water Services: The Thames Water
Authority as a Model for Complex
Urban Areas of the Great Lakes*

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September 1975

Research Project Technical Completion Report
OWRT Project No. A-083-MICH
Grant No. 14-31-0001-5022

Program in Resource Policy and Management
School of Natural Resources



Department of Civil Engineering
College of Engineering

AN INNOVATIVE ORGANIZATIONAL ARRANGEMENT
FOR COMPREHENSIVE WATER SERVICES

The Thames Water Authority as a Model for Complex
Urban Areas of the Great Lakes

by
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Research Investigation Period: January - September 1975

Submitted to the
Office of Water Research and Technology
U.S. Department of the Interior
Washington, D. C.

Program in Resource Policy and Management
School of Natural Resources
Department of Civil Engineering
College of Engineering
The University of Michigan
Ann Arbor, Michigan

September 1975

ABSTRACT

A need exists for regional consideration and evaluation of comprehensive water services in complex urban areas. The Thames Water Authority (TWA) in England provides such comprehensive water services to the entire Thames River Basin including metropolitan London; an area of 5000 square miles with a population of 12 million. In recognition of the possible application of such a concept to complex urban areas of the Great Lakes, the principal investigator spent six months as a participant-observer with the Authority and provides a detailed description of its organization and operation. In addition, criteria are established by which water services in complex urban areas may be evaluated and the TWA is so evaluated. Preliminary evaluations are also provided for Chicago, Detroit and Cleveland, although a more thorough analysis is left to interested persons in each region. If sufficient interest in the Regional Water Authority concept results from the evaluations within each region, it is recommended that a conference be held which would bring together personnel from the three regions along with invited guests from other Great Lakes states and representatives from one or more

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Regional Water Authorities of England and Wales

Descriptors: *Water resources management, *Urban areas, *Institutions, *Foreign activities, Cities, Public utilities, Innovation, Water policy, Public utility districts, Municipalities, Planning, Organizing, Organizations

Identifiers: *Thames Water Authority, *Comprehensive water services, *Chicago, *Detroit, *Cleveland, Great Lakes, Water Authorities in England and Wales.

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ACKNOWLEDGEMENTS

This report is one of a series reporting the results of research related to enhanced water quality management in the Great Lakes Region. The work upon which this report is based was supported in part by funds provided by the United States Department of the Interior, Office of Water Research Technology as authorized under the Water Resource Research Act of 1964. Partial support was also provided by the University of Michigan.

A special appreciation and thanks is given to all of the individuals of the Thames Water Authority who assisted in the research effort. These people were exceptionally helpful and generous in giving of their time and expertise to our inquiry. Mr. Alex Morrison, the Chief Executive of TWA provided encouragement at a critical point in this research project. His interest and support was reflected in the subsequent contacts with Authority members and staff throughout the organization. Also, Mr. Peter Black, Chairman of the Authority, took time from his extremely busy schedule to see that matters and issues before the Authority were clarified and fully explained. By citing the Chairman and Chief Executive, it must be realized that we are wanting to recognize all who assisted in this effort.

Many people reviewed an early draft of this report. Their comments and criticisms have certainly contributed to improving the final report. In particular, we would like to thank the following individuals for their review effort:

Professor Daniel Okun, The University of North Carolina,
Chapel Hill

Mr. Raymond J. Smit, MacNamee, Porter and Seeley,
Consulting Engineers, Ann Arbor, Michigan

Mr. Julian LePatourel, Thames Water Authority, London

Mr. Jerry Brown, Thames Water Authority, London

Mr. Trevor Fuzzey, Thames Water Authority, London

Professor Ben Ewing, Director, Institute for Environmental
Studies, The University of Illinois, Urbana

Mr. Fred Moseley, Center for Urban Regionalism, Kent State
University, Kent, Ohio

Mr. Dick Reilly, Northeastern Illinois Planning Commission,
Chicago

Mr. Paul Cella, Metropolitan Sanitary District of Greater
Chicago

Mr. Dave Fisher, Detroit Metro Water Department

Mr. Kenneth Bonin, Wayne County Road Commission, Detroit

Mr. Richard McDonald, Corps of Engineers Institute for
Water Resources, Fort Belvoir, Virginia

Of course, all responsibility for statements within the report
remains with the Authors.

We also wish to acknowledge the interest and encouragement
of Dr. Thomas Bahr, Director of the Institute for Water Resources
at Michigan State University. He provided encouragement at an
early stage of our effort and it is very much appreciated.
Finally, we wish to thank our secretary, Diane M. Rumps, for
her dedicated secretarial support throughout the course of this
study.

Jonathan W. Bulkley

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PREFACE

Effective and efficient planning and management of water resources in complex urban areas has been a topic of interest for many years. As demands for water use increase, the problem becomes more severe since issues of water re-use, pollution control, ground water, recreation, flood control all impact upon the overall development of the urban area. Federal legislation has encouraged and now requires consideration of wastewater treatment plans on an area-wide basis.

These problems of comprehensive water management are not unique to our own country. Indeed, all nations are having to take action to provide for the effective and efficient utilization of their water resources. For example, innovation in water resource management has been an ongoing activity in England and Wales since 1945. This report is designed to present information about an ongoing innovative approach to comprehensive water management. The Regional Water Authorities of England and Wales represent an advanced organizational approach for provision of water services. With an overall population of 48 million and population density of nearly 950/sq. mile, it was essential that more effective means be developed for management and conservation of their water resources. In America we have an overall population density which is 17 times less than England and Wales, i.e. 56/sq. mile. However, certain urban complexes in this country

have population densities which are comparable to urban areas of Great Britain. Accordingly, it is important to be aware of the developments which have taken place elsewhere and evaluate these concepts and ideas for possible application in this country.

The Regional Water Authority approach which is currently operational in ten regional areas for all of England and Wales represents a drawing together of functional water service activities. As such, it is worthy of our close attention and examination. It is hoped that this report will make a contribution toward furthering this examination and evaluation.

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Chapter I
INTRODUCTION

A. Background

Federal legislation in the United States has established incentives for creating and implementing "regional" plans for wastewater collection and treatment since 1966. The most recent of these, Section 208 of the Water Quality Control Act Amendments of 1972 (P.L. 92-500), is currently generating a flurry of activity in many metropolitan areas. Furthermore, the National Water Commission issued its final report in 1973¹ calling for regional water supply and wastewater treatment plans to be managed at the lowest level of government that may effectively implement such plans. The difficulty lies in making these concepts operational. Traditionally, established political boundaries between cities, villages, townships, counties and states have provided the basis for independent provision of both water and sewer service. The idea of giving up this service provision capability to some larger political body has been strongly resisted in practice.²

In England and Wales, a new and innovative organizational arrangement for provision of multiple water service activities has been established. On 1 April 1974, ten regional water authorities came into existence. They are responsible for providing all aspects of water service throughout England and Wales. One of these ten regional water authorities is the Thames Water Authority.

It is charged with providing water supply, sewage disposal, prevention of pollution, navigation, land drainage, flood protection, recreation, fisheries and amenities for the Thames River Basin. The Thames Water Authority is the successor to over 180 individual operating agencies which provided services of river management, water supply, sewage collection, and sewage disposal. The service area is over 5,000 square miles and the service population is nearly 12 million. The area includes the greater London metropolitan area, but 50% of the service area is agricultural as well. Accordingly, the Thames Water Authority is faced with providing all of these services in a complex urban-rural region which may be similar in certain respects to complex urban areas of the Great Lakes.

A brochure prepared by the Thames Water Authority in April, 1975, to commemorate its first year of operation is enclosed as Appendix C of this report.

B. Purpose.

This report provides information on a new and currently operational system for comprehensive water management; namely, the Regional Water Authorities of England and Wales. The purpose is to provide a preliminary evaluation of the Regional Water Authority concept through application of a set of evaluation criteria for comprehensive water management. Furthermore, the report provides information to facilitate in-depth evaluations of the Regional Water Authority Concept by individuals in each

of the metropolitan regions studied; namely, Chicago, Detroit, and Cleveland. It is important to consider innovative organizational management for regional water services as federal, state, and local units of government are acting to comply with the requirements for area and basin planning under sections 208 and 209 of PL 92-500.

It would be extremely beneficial to convene a special meeting in the near future to consider the results of the individual metropolitan region assessments. At such a meeting, it may be appropriate to arrange for participation by a small number of the officers, staff and members of one or more British Regional Water Authorities.

C. Method

The principal investigator spent six months (January through June, 1975) as a participant-observer with the Thames Water Authority. The operation of the Authority was studied and the problems encountered and the techniques employed in their solution were identified. The finance mechanisms for water and sewer service were examined along with the methodology for rate determination and charges. In addition, the accountability of the Authority and the relationship between the Authority and the existing units of government, who traditionally provide water services, were examined.

The three stateside regions addressed by this report, Chicago, Detroit and Cleveland, have each been the subject of a comprehensive wastewater management survey scope study by the Army Corps of Engineers. The institutional components of these studies were used as a basis of information regarding the three regions and are reviewed in Appendix A. In addition, agencies involved in water services in the three regions were visited in order to determine the institutional arrangements by which water services are currently provided.

Synthesizing ideas from a number of related studies, a set of criteria was established by which institutional arrangements for water services may be evaluated. The Thames Water Authority was then evaluated using these criteria. It is beyond the scope of this report to perform similar evaluations for the three stateside regions. That exercise is left to individuals who may draw on their own experience and knowledge with regard to a particular region. The results of such an evaluation can then be compared with the assessment of the Thames Water Authority provided herein.

Chapter II

EVALUATION CRITERIA

A. Literature Review. A study of the recent literature concerning urban water services reveals several recurring concepts that together provide a base for the present investigation. The specific works cited in the footnotes provide further discussion of the ideas presented and are not necessarily the sole or original sources of these ideas.

The increasing study and discussion of water institutions in the past several years has necessitated a more precise definition of the term "institution". Past usage often made it synonymous with "agency" or "organization". There is now general agreement that "institution" includes not only these entities, but also the processes or rules that guide or influence their behavior.^{1,2} The study of institutions includes such things as laws, customs, regulations, subsidies, taxes and penalties. It should be noted, therefore, that institutional change involves more than the mere reorganization of agencies and personnel.

One characteristic of present institutional arrangements for comprehensive urban water services that is receiving much attention is fragmentation, the deeply rooted American system of local autonomy. This factor has led to widespread development of community-sized water service systems that lack the economies of scale that may accrue to larger systems.^{3,4,5} The relatively small communities are also characterized by short time horizons,

limited planning competence and precarious fiscal capabilities. These characteristics are related in that the limited economic base inhibits the hiring of planners. This leaves the planning function to politicians, whose time horizons often extend only to the next election. The fragmented system also results in jurisdictional gaps and overlaps (both areal and function) and a lack of regional planning stemming from the lack of any central coordination.^{8,9,10,11} Community independence leads to inequitable rate and service structures throughout a region,^{12,13} and the inequitable distribution of financial resources that gives us rich and poor communities.

The obvious solution to the problems of fragmentation is regionalization; the consolidation of small operations into larger ones. But this, too, has its drawbacks. The historical conflict between large cities and their suburbs is one major obstacle to regional cooperation. Not only do suburbs fear the big city, but the Black communities, which are just gaining voting majorities in some large cities, view regionalism as an attempt to dilute their political strength.¹⁴ It is also believed that big government agencies are not conducive to public input and participation^{15,16} nor are they as responsive to public needs as local agencies. While economic and administrative criteria strongly favor regionalization, it is deemed politically undesirable and, therefore,^{17,18} unfeasible in many cases.

Political feasibility notwithstanding, the studies advocating the provision of services on a regional basis are often confronted by the issue of the appropriate area to be served by a regional agency. In water services, there is much evidence that the river basin should be the focus of management efforts, but even the most ardent advocates of river basins recognize the need to account for other factors when dealing with an urban area. There, established political boundaries and demographic patterns generally ignore basin boundaries but must be considered in the establishment of service districts in order to account for the hydrologic interdependencies of all water services (i.e., the several uses of water as it goes through the hydrologic cycle).¹⁹ While rural river basin districts can provide a wide range of services, the urban basin may only be appropriate for flood control and pollution control with other service agencies based on traditional political boundaries.²⁰

Despite the hydrologic interdependencies of water service, several authors minimize the role of the river basin; saying only that the area served should be appropriate to the function.^{21,22,23} To many, this means internalizing costs and benefits or, at least, accounting somehow for the spillover effects.²⁴ Area/function compatibility often means that each function or service would have a unique set of boundaries, although there is much sympathy for combining water supply and sewage treatment under a single agency.^{25,26,27} One additional thought with regard to service

areas is that they should be flexible in order to accommodate changes in the factors under which they were initially established.^{28,29}

Additional common themes relate more specifically to the criteria for evaluating water service institutions.³⁰ These criteria constitute a portion of a Master's thesis now in preparation.³¹ The criteria are discussed below under the following classifications: Financial Criteria, Administrative Criteria, Political Criteria and additional Criteria Related to the Area of Jurisdiction.

B. Financial Criteria

1. All costs and benefits should accrue within the district served and should be equitably distributed therein.

Absolute satisfaction of this criteria is impossible, but an effort should be made to approach the ideal. Even a cursory study of water and sewer rates in the three regions studied reveals a lack of correlation between the service provided and the rate charged. Spillover effects, both costs and benefits accruing to persons outside a service district, should be avoided either by: 1) changing the district boundaries, 2) modifying the practice that causes the spillover; or 3) otherwise charging beneficiaries or paying those adversely affected by the practice.

None of these solutions is easily implemented and compliance is expected only where the spillover effect is great. This criteria is confounded by the provision of more than one service, since optimum boundaries are likely to differ among services.

The extensive fragmentation of responsibility for providing water services to consumers has resulted in great inequities in charges for these services throughout a metropolitan area. Not only do actual costs vary between communities, but most add on a profit margin that also varies greatly.³² The result is a complete lack of correlation between the service provided and the rate charged.

This is not to suggest that rates should be uniform throughout a region, nor that actual costs should be the sole basis for rates. Water service rates may be used as a tool for land-use planning (e.g., very high rates in remote areas) or for the redistribution of wealth (e.g., based on property values) but such schemes should be derived from regional plans and goals. Water rates might also recognize the finite nature of the resource in that higher rates might discourage waste; the excess revenue to be used for recreation or open space amenities.

Several factors contribute to the persistence of widely varying water and sewer rates. One is the perceived desirability of local control over the local elements of the systems. The local politicians like it because it is a visible example of their authority; - something they can usually point to as a benefit they provide to the community. Consumers are generally

satisfied with the present arrangements; - a condition that helps perpetuate the status quo. Even the highest water rates in the areas studied are low in comparison with most areas of the country³³ and water and sewer rates are not a significant portion of most people's budgets. Service is generally good and both politicians and consumers like the high visibility and responsiveness afforded by local control over construction and repair activities. Even where rates for services are perceived as high, the public may not be willing to give up local control in exchange for lower rates.

2. Agencies should have the power and authority to raise adequate capital, and the flexibility to select the best means to secure funds.

Service charges cannot provide the capital necessary for large construction projects. Sources of revenue for such projects include: revenue bonds, general obligation bonds, and grants from the state or federal government. Grants usually do not require repayment, but they sometimes require matching funds that must be raised by other means. Organizations should be able to select the best (least expensive/most equitable) means of both raising the capital and paying off the incurred debt. Options might include property taxes and special assessments in addition to rates for service. Consideration should be given to making the cost of expanding service into new areas fall most

heavily on those new customers by means of special assessments, rather than placing a burden on older residents of an area that happens to be experiencing growth.

C. Administrative Criteria

1. The authority of an organization should be broad enough that it has the power to resolve conflicts among all users and to balance governmental needs and resources.

Local communities functioning independently often do so at cross-purposes, resulting in conflicts among them. Regional planning agencies do not generally possess the power to implement regional solutions that might resolve such conflicts between communities or that would result in the balancing of the needs and resources of the region as a whole.

2. Organizations should have the legal and administrative authority to perform the functions assigned to them.

Despite the self-evident nature of this criterion, it has been observed that legislation authorizing certain responsibilities will limit the means for accomplishing same; often to avoid stepping on the toes of an existing agency. In essence, agencies should be flexible enough to adapt to different circumstances and to avoid arbitrary and capricious actions which result simply because they have no authority to act otherwise. They should be able to express and consider the entire range of values rele-

vant to a water management decision. An example of this is found in the promulgation and enforcement of rules and regulations. Where the two functions are in different agencies, it is more difficult to fix responsibility for the results than if they are under one roof.

3. Links of communication and the process of coordination should be formalized.

The problems resulting from insufficient communications and overly independent operation have been somewhat mitigated by the requirements of the National Environmental Protection Act and the Federal Water Pollution Control Act. Recognition of this need should not be limited to projects of federal concern. No agency will ever be so comprehensive as to be self-contained. The interrelationships among all aspects of water resources, and between water resources and other fields such as land use, transportation, and air quality, require that the activities of any agency be known to all in a timely fashion that would permit suggested changes. In other words, the communication should begin during the planning process and continue throughout the entire period of decision-making.

D. Political Criteria

1. An agency should be accountable to the public.

Policy formulation, direction and control should express the will of the people and be subject to their control through the political process. Too often, the boards and commissions that oversee water services are appointed by general-purpose government executives and are thus insulated from the public. The relatively low visibility of water services in most areas often makes direct election of board members impractical,* but since such boards commonly meet only infrequently, it would be desirable to require that board members be selected from elected government officials. The entire population of the service area should be represented by such officials.

2. Water service agencies should be responsive to the public.

The decision-making process should be open to public scrutiny and input. Public hearings should be a meaningful facet of the decision-making process and public involvement should be encouraged. The dissemination of information should be a conscious function of any agency.

* A noteworthy exception is the Metropolitan Sanitary District of greater Chicago with its elected Board of Trustees.

3. A new organization should be compatible with the overall governmental structure.

The idea is to minimize the disruptive friction between agencies and maximize the support given a new agency to assure its success. A mutual understanding of responsibilities is one prerequisite. State agencies should generally maintain regulation assistance and equalization within a state and provide coordination and expertise for regional/local agencies.

E. Criteria Related to Area of Jurisdiction

Note: Some of the above criteria also relate to the proper area of jurisdiction. The internalization of costs and benefits requires proper selection of the boundaries of the service area. Boundaries will most likely be different for different services, as in a proposal for the New York City region that would include distant reservoirs in a water supply district but not in any other service district.³⁴ Land disposal of wastewater would also involve territory not necessarily appropriate to other functions. The political criterion regarding public involvement demands recognition of the fact that great size in any organization tends to alienate the public and discourage their participation. Creation of smaller sub-districts may be one possible solution to the problem of effective public involvement.

1. The service region should be large enough to realize economies of scale.

The combination of suburban growth and community independence has led to a situation in which some densely populated areas consist of several small communities, each providing their own water services in highly inefficient manners.³⁵ As the size of an individual community grows and the population density of the surrounding area decreases, it becomes increasingly efficient for that community to maintain its own facilities. Decisions regarding the relative efficiency of any service can best be made at the county or regional level, provided that the institutional arrangements provide adequate public accountability and public involvement.

2. Agencies should be able to consider and adjust (or adapt to) externalities stemming from hydrologic interdependencies.

As discussed in section II-A, river basin boundaries, which are generally ignored by present institutional arrangements, deserve to be the central focus in the establishment of service areas. A large urban area will often encompass parts of several river basins. Where practical, the entire basins which impinge on the urban area should be included in the service area. Where this is impractical (Akron, Atlanta and Chicago are good examples), arrangements should be made to minimize downstream impacts and compensate or charge downstream users for imposed costs or benefits. Even within the jurisdiction of an agency, there may

be costs or benefits that accrue to customers of another agency that require similar compensation.

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Chapter III

REGIONAL WATER AUTHORITIES IN ENGLAND AND WALES

A. Background.

Since 1945, the water management arrangements in England and Wales have been undergoing periodic change and reorganization in response to the problems of providing water services. The most recent and most comprehensive institutional reorganization for provision of water services in England and Wales took place on 1 April 1974. It is beyond the scope of this report to provide the detailed account of the factors leading to this reorganization.* It may be helpful however to have the following summary of major events which, in fact, did directly lead to the creation of Regional Water Authorities in England and Wales:

* Interested persons should obtain the following: Okun, Daniel A., The Story of a Revolution - Water Reorganization in England and Wales, the University of North Carolina, Chapel Hill, North Carolina, (in preparation)

In addition, see Craine, Lyle E., Water Management Innovations in England, Resources for the Future, Washington, D.C., 1968.

- September 1969: Central Advisory Water Committee asked to consider the best organizational arrangements for carrying out comprehensive water services and to make recommendations.
- February 1971: Central Advisory Water Committee completes its investigation - reports to Central Government.
- December 1971: Central Government announces its intentions to reorganize the water industry. Its recommendations were based primarily on the findings of the Central Advisory Water Committee.
- January, 1973: The Bill to reorganize the water industry is introduced in Parliament.
- January, 1973: Central Government publishes further information on the pending reorganization proposal. The report is entitled A Background to Water Reorganization in England and Wales.
- July, 1973: The Reorganization Bill passes Parliament.
- April 1, 1974: R-Day (Reorganization is implemented).

The important point is that in a period of less than five years a major reorganization plan for provision of comprehensive water services was conceived, evaluated, modified, and implemented. The problems facing the provision of such water services in England and Wales prior to reorganization may be summarized as follows:¹

- (1) The projected increase in demand for water by the year 2000 would pose severe difficulties under existing organizational arrangements.
- (2) It is anticipated that water re-use will increase and therefore a much greater concern will be required for treatment provided water after use.
- (3) There should be a sweeping reduction in the number of separate operating units providing sewage disposal and a further reduction in the number of separate operating units providing water supply.
- (4) There were increasing conflicts of interest between the various authorities (local units of government, water undertakers, etc.) and inadequate mechanisms for resolving them - apart from intervention by Central Government. The most important areas of conflict included the following:

- (a) Inflexibility in the use of existing water resources
 - (b) Divided responsibility for new sources of water
 - (c) Difficulty in the promotion of joint or national schemes
 - (d) Conflicts of interest with regard to water reclamation and water reuse.
- (5) There was a need to be able to implement plans once they had been agreed upon. Previous management and financial arrangements made implementation most difficult.
- (6) A need existed to improve planning and coordination.
- (7) It was deemed desirable to have both a five year capital works plan for each area plus a long term (20 year) water plan for each area or region.

Given this host of problem areas, the Central Advisory Water Committee became convinced that the establishment of strong regional bodies was absolutely necessary in order to effectively solve the current and future tasks.

The committee could not agree on the precise form such regional bodies should take. One idea called for multi-purpose organizations, Regional Water Authorities, which would be directly responsible for water supply, sewage disposal, river

management, planning and coordination within their region. The other idea was to have a system of single-purpose authorities covering a specific region. It was left to the Central Government to propose a specific organizational form.

In December, 1971 the Central Government published its proposal for the reorganization of water and sewage service. Basically, the Central Government concurred with the findings of the Central Advisory Water Committee. The Central Government stated that the time had come to bring together, under all-purpose management structures, all aspects of the hydrological cycle. The Central Government found that insufficient progress had been made in overcoming the problems arising from the separation of responsibility for water supply, river management, water conservation, pollution control, sewerage, and sewage disposal. Prior to reorganization, the primary weakness of the system for the provision of water services was that the interests of water supply groups (water undertakers) and sewage authorities (as then constituted) conflicted with one another over the best overall solution. The Central Government concluded that an urgent need existed for the creation of Regional Water Authorities (multi-purpose organizations) with a clear sense of purpose and able to take a comprehensive and long-term view of all the relevant aspects of water management. At the same time, the Regional Water Authorities needed to be capable of taking

successful and cost-effective action to safeguard water supplies and protect the environment.²

B. The Water Act of 1973

In January 1973, the Bill to reorganize the water industry was introduced in parliament. It differed from previous statements by the government in several major respects. For example, local authorities could continue to exercise certain functions with regard to sewage collection in their own areas as agents for the new water authorities. Also, the local government members would constitute a majority membership within the Regional Water Authorities; that is, there would be more members appointed by local governments than appointed by both the Secretary of State for the Environment and the Minister of Agriculture, Fisheries, and Food. The Bill passed Parliament in July 1973.

In terms of the Water Act of 1973 the following point is of critical importance:

"It should be emphasized that the primary purpose of the New Act is to transfer functions from the existing authorities to the new water authorities and to define the power of the Ministers in relation to the new authorities. The Act does not make any substantial changes in these functions. In other words, the new water authorities

will largely inherit the functions of existing authorities³"
(emphasis added)

In essence, the impact of the Water Act of 1973 is to provide a new organizational mechanism to provide continuity of ongoing services. The unique change is that now, instead of fragmented, uncoordinated efforts, the potential for a region-wide perspective has been created. Clearly, problems have arisen and will arise in developing effective management and administration of these new large organizations - namely, the Regional Water Authorities. However, many of the previous constraints first cited by the Central Water Advisory Committee as impediments to more rational water use have now been removed.

It is beyond the scope of this report to provide a detailed, section by section analysis of the Water Act of 1973. Rather, it is appropriate to highlight certain major provisions of the Act and then, in the specific case of the Thames Water Authority, observe the actual functioning of a Regional Water Authority in practice.

- (1) The Act creates 10 Regional Water Authorities which effectively cover all of England and Wales. These authorities are multi-purpose organizations responsible for public water supplies, sewage collection and sewage disposal, pollution control, control of water withdrawals (both surface and ground), land drainage (including provision of

flood protection), fisheries and recreation.*

- (2) The membership of the Authorities is a combination of Central Government appointed members and members appointed by local authorities. The local authority members are in a majority over the ministerial appointed members. The exact number of local authority members is determined by population of the region served by the Authority. The Minister then decides as to how many appointments he will make so long as the local government members maintain a majority. Each of the local government members of the Regional Water Authority is an elected official. Each has been elected from a specific geographical area to serve on a county council or on a local district council. In this manner, the majority of the Water Authority members are, in fact, elected. The expectation is that elected individuals have a tie to the public or are accountable to the public which an appointed person simply does not possess.

* Figure 1 shows the ten Regional Water Authorities for England and Wales.

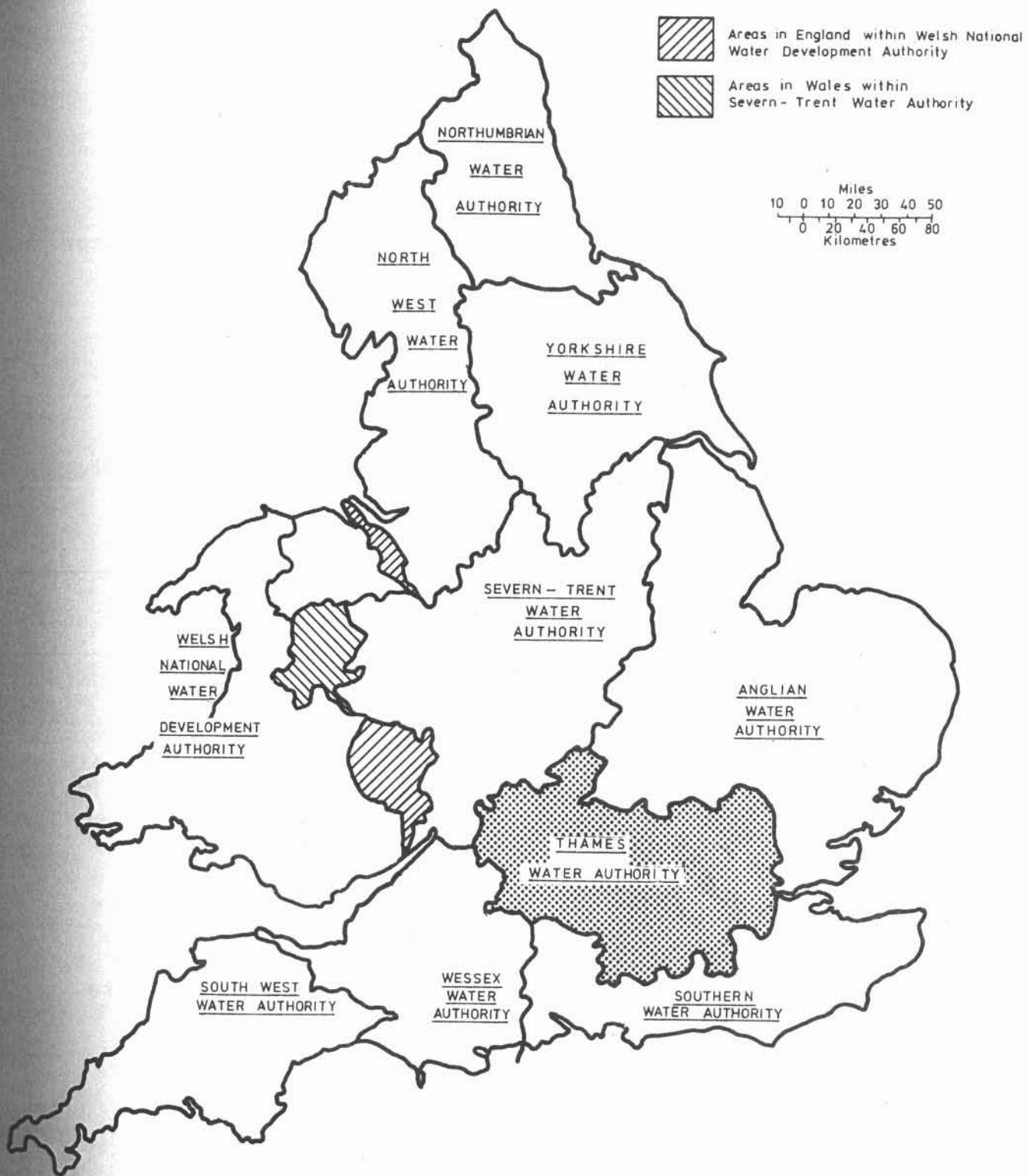


Figure 1. Regional Water Authorities
- England and Wales

- (3) The Secretary of State for the Environment is the key government Minister interacting with the Regional Water Authorities. He is charged with directing the implementation of national policy with regard to water supply, sewage disposal, restoration and maintenance of water quality, and recreation. The Minister of Agriculture, Fisheries, and Food has specific contribution to make in the area of land drainage and fisheries.
- (a) The Chairmen of the Regional Water Authorities are appointed by the Secretary of State (Environment).
- (b) The Ministers (Environment and Agriculture, Fisheries and Food) are enabled under the provisions of the Act to give directions of a general nature to water authorities.
- (c) The Ministers have substantial policy control over financial matters especially in limiting the amount of reserves which may be built from revenue and in establishing the terms and conditions for the loans for the capital projects.
- (4) Water Supply: The new water authorities are to be responsible for water supply in each of their areas from 1 April 1974. Private water companies remain

in existence. Water supply facilities of local units of government and joint water boards (two or more local units of government) are now owned and operated by the Regional Water Authorities.

- (5) Sewage and Sewage Disposal: The Regional Water Authorities must provide those public sewers as are necessary to effectively serve their area. Local authorities may act as agents for the Regional Water Authorities for the sewage collection function at the local level. This means that the local authorities control the location of collecting sewers within their area and secure funds for both operation and maintenance of these sewers as well as capital funds for new sewers from the Regional Water Authority operating in their area. In some cases, local authorities have requested that the Regional Water Authority perform the sewage collection function instead of themselves. The Regional Water Authorities have the responsibility for installation plus operation and maintenance of all trunk and interceptor sewers as well as sewage disposal plants.

Prior to reorganization, a mixed situation existed regarding sewerage and sewage treatment. If the area served had a sufficient population base upon which to charge for the service, the treatment facilities tended to be excellent. For example, in London, the Metropolitan Public Health Division has provided secondary treatment at the Crossness plant since 1963. This sewage treatment plant serves a population of 1,600,000 in 70 square miles south of the Thames. Another example of high quality service would be where a number of smaller units of government agreed to form a single unit to provide sewage treatment service to their combined populations. In contrast to the water supply situation, only a few of these joint sewage boards had come into existence prior to 1974. One of these was the West Hertfordshire Main Drainage Board which is now a part of the Chiltern Division of TWA. West Herts Main Drainage treated the sewage of more than 500,000 persons from four communities outside London. This treatment included a tertiary treatment facility to serve 100,000 as well as a secondary treatment facility to serve 433,000. Included in the West Herts program was the agricultural marketing of processed sewage sludge to farmers in the area.

On the other hand, prior to reorganization there were many small sewage treatment works which were operated by local units of government. With all of the other demands for services, sewage treatment tended to receive a low priority. For example, one of the Regional Water Authorities inherited from a local

government unit a trickling filter plant with a 4" diameter tree growing up through the filter bed.

Under the provisions of the Water Act of 1973 it is possible for owners of land or premises and local authorities to requisition new sewers from the Regional Water Authorities. This step overcomes past difficulties in obtaining planning approval for development because of a lack of sewerage and/or sewage disposal capability. This power to requisition requires the owners or local authority to meet certain financial guarantees. A similar capability exists for the requisition of water supply.

- (6) Pollution and Water Quality Control: Under the provisions of the Water Act of 1973, the Regional Water Authorities will have the responsibility for the prevention of pollution in the rivers and adjacent coastal waters in their areas. One mechanism for the Regional Water Authorities to implement this task is through the specification of effluent discharge limits for both the industrial and municipal point sources together with control of new point source discharges. The RWA's themselves operate sewage disposal plants and thus are potentially a major source of river pollution. Accordingly, the Act provides that the Secretary of State for the Environment may step into the picture to assure that appropriate levels of effluent discharges are being implemented. A further safeguard is the recently enacted Control

of Pollution Act of 1974 which provides that the public has the right to examine the data related to water quality and effluent discharge limitations.

- (7) Fisheries: The Act specifies that it is the duty of every Regional Water Authority to maintain, improve, and develop the salmon fisheries, trout fisheries; freshwater fisheries, and eel fisheries in their individual areas.
- (8) Land Drainage: While each Regional Water Authority is approved to exercise general supervision over all matters relating to land drainage - the actual discharge of land drainage functions (excepting financial) is in the hands of the regional land drainage committee. The major function of land drainage is to remove unwanted water from the land and promote optimum soil - moisture relationships for increasing agricultural productivity. Included in this broad set of tasks is flood prevention in both rural and urban settings.
- (9) Recreation and Amenity: The Water Act makes it a duty for all Regional Water Authorities to put their water resources and land associated with this water to the best use for recreation purposes. Such recreation uses will be consistent with the ultimate use of the water resource as a public water supply. The Act further provides that the Secretary of State for the Environment has the power, when authorizing construction of a reservoir, to require provisions for recreational use of the reservoir. The growth in demand for

water based recreation in England and Wales has been most dramatic over the past 25 years. Reservoirs near urban centers offer an attractive possibility for meeting a portion of this demand. Preservation of the natural aspects of water courses is highly valued as an amenity in Great Britain. Accordingly, the Regional Water Authorities are charged to take the following into consideration as they formulate proposals for carrying out their duties:

- (a) the preservation of natural beauty
- (b) conservation of flora, fauna, and geological and physiographical features of special interest.
- (c) protection of buildings and other objects of architectural or historic interest.
- (d) preservation of public rights of access

(10) Planning Requirements: The Act specifies that each Regional Water Authority must undertake as soon as practicable after 1 April 1974 a series of steps which are essential to the comprehensive planning of the water industry. First, the RWA's are required to perform a survey of the water in their area - the purposes for which it is being used, the quality of the water in relation to both current and anticipated future uses, and the existing management structures. This report is essentially a current status report on the water resource. The second planning report required under the

provisions of the Act is to make an estimate of demand 20 years into the future (beyond the date on which the current status is completed). The third planning report is a rolling 5-7 year capital works plan which is designed to provide more efficient management of the water service, to meet anticipated demand, and to restore the water quality in the rivers and coastal waters.

The long-term demand plan must be updated at a minimum of once every seven years. The rolling capital plans are to be prepared in consultation not only with appropriate ministers but also it will be necessary that these plans be coordinated with every local authority throughout the region that has responsibility for structural plans, local plans or development plans. The Regional Water Authorities may require the private water companies within their area to prepare comparable reports.

(11) Financing

- (a) Capital Works⁴: In the past, capital projects in the Water Industry were financed in a variety of ways; including direct grants and sources of capital generally available to local units of government. Under the new Act, the capital expenditure of the Regional Water Authorities is controlled in a way similar to nationalized industries in Great Britain. Namely, each year a capital ceiling will be set by

Central Government; each RWA may then borrow from the Central Government funds up to the ceiling limit. Subsequently, these funds must be repaid at a fixed interest rate (currently 14 1/4%) for a fixed time period (25 years). The thrust of this capital finance mechanism is to combine 5-7 year rolling capital plans together with the long-range 20 year demand studies and attempt to use more systematic means of analysis in order to optimize the utilization of resources.

- (b) Revenue Finance: In order to evolve from the prior charging practice, the Act provided for a two-year transition period. Prior to reorganization, revenue financing for Water/Sewer service basically came from charges/rates (taxes based on assessed value), precepts (lump sum amounts charged to local units of government) and rate support grants* from Central Government (in effect - a subsidy from Central Government to pay a portion of the direct costs of service and in turn reduce the direct charge to rate-payer). These rate support grants from Central Government were used only for sewerage and sewage

* Rate support grants from Central Government terminated with the reorganization, 1 April 1974

treatment. During 1974-1976 these revenue charges are to be continued with the addition of a levy covering sewage and other services - i.e., pollution prevention, fisheries, recreation, and navigation. Prior to reorganization, the charge for water/sewer service was essentially hidden in the taxes paid by each property owner. In some cases, the charge for water service was billed directly, and thus separately, by the water supply agency. Traditionally, water supply charges have a separate line item for the property owner. Following reorganization, the intent is to have both of these charges separated from general property taxes and paid either as a separate line item on the tax bill or on a bill sent directly from the Regional Water Authority.

After 1976 the revenue financing will be as follows:⁵

- (i) Charges for direct abstraction (surface & ground)
- (ii) Land-drainage precepts on County Councils and London Boroughs (at least until 1978).
- (iii) For domestic consumers and certain business premises - a charge covering water supply, sewerage and sewage disposal and all other services provided by water authorities other than 1 and 2 above:

- (iv) For industries:
 - (a) Water supply metered (present practice)
 - (b) For industrial effluent - (transmission and treatment) charges sufficient to cover the estimated or actual costs will be levied.
- (v) The charges for other facilities and services provided including fisheries, recreation, and amenity uses would be levied according to the classes of user.

Since water meters are not currently utilized for domestic service, the whole basis of charges is under investigation. A recent legal decision in England has made it imperative for the Regional Water Authorities to reconsider their basis for charging prior to 1976. The Act itself provides that the authorities may devise new methods for charging which could include, but not be limited to, the introduction of water meters.

C. Thames Water Authority: A specific example of the Implementation of the Water Act of 1973

The Thames Water Authority serves a total population of 12 million people in the 5,000 square mile area of the Thames River basin. This service area includes the greater London metropolitan region with a total population of over seven million. However, the service area extends from Aveley Marshes at Gravesend in the East out to the Cotswold Hills in the West. The Northern boundary passes above Banbury and Luton and the southern limit

is formed by the North Downs, Hampshire Downs, and Marlborough Downs. The principal urban communities in addition to London are Watford, St. Albans, Luton, Slough, Reading, Guildford, Oxford, Swindon, and Basingstoke.⁶

The land use within the region of the Thames Water Authority is as follows:⁷

Agricultural	50%
Woodland	10%
Heath	5%
Open Water	1%
Houses, gardens, Industry, trans- port parks, etc.	34%
	<u>100%</u>

Representative populations of certain of the principal communities in addition to London is as follows:

Luton	162,930
Reading	135,000
Oxford	111,686
Swindon	90,330

Within this entire region, 99% of the population receives piped water and 98% of the population are connected to central sewers. In 1973, the estimated average water use was 1,200 MGD. (US gallons). This overall demand figure had the following components:

Domestic Use	620 MGD
Metered Industry:	206 MGD
Direct Industrial Use	<u>336 MGD</u>
	1,162 \approx 1,200 MGD

Prior to reorganization, the institutional arrangements for providing not only the water supply but also sewerage and sewage disposal, pollution control, and all aspects of water management were fragmented. In Thames, the fragmentation was as follows:⁸

<u>Type</u>	<u>Number</u>
River Authorities	2
Water Supply	18
Sewerage and Sewage Disposal	163
Total	<u>183</u>

After reorganization (1 April 1974) - The Thames Water Authority took over the provision of these services (except for private water companies and agency agreements with local authorities for sewerage). Basically the Thames Water Authority provides the daily comprehensive water services through nine operating divisions. Six of these divisions are multi-purpose; i.e., they may provide both water service and sewage disposal. Three of the divisions are single-purpose and represent historic strength in particular service areas - water supply, sewage disposal, and river management. In place of the 183 separate organizational entities - there is now the single over-all regional unit - Thames Water Authority. The Water Authority has agency agreements with 94 local authorities for provision of sewerage. Seven private water companies operate within the Region under the provisions specified in the Water Act.

In order to assist the formation of the new Regional Water Authorities, the Secretary of State for the Environment appointed a special committee in June, 1972. The terms of reference which guided the activities of this committee were as follows:

"To consider possible forms of management structure with a view to producing guidance on this matter for Regional Water Authorities".

The committee was further directed to complete its work during the first half of 1973 in order to be responsive to the expectation that the Regional Water Authorities would come into existence in shadow form during the summer of 1973. The timely completion of the Committee report was essential in order to allow the Authorities time to consider the content of the report prior to their coming into operational existence on 1 April 1974.

The committee chairman was Sir George Ogden, Town Clerk of Manchester. Its report⁹ was completed in June, 1973 and is entitled "The New Water Industry - Management and Structure". Its short title is simply, "The Ogden Report". It is important to emphasize that the Ogden Report established certain formats and guidelines for the management structure for Regional Water Authorities. However, a certain flexibility remained for each Regional Water Authority to tailor a structure which seemed most appropriate in its own region. This flexibility

has allowed the personnel on the ground to decide on what appears to be the best choice in their own particular situation. As an example, the Ogden Report recommended that the reorganization proceed in a two-step manner. First, provisional management units (PMU) would have been created. These would be largely single-purpose units; i.e., a PMU for water supply in a section of the region. The second step, which would have occurred after 18-24 months, would have been to combine the PMU's and obtain multi-functional divisions. In the case of Thames Water Authority, the officers decided to directly implement the multi-functional divisions at the outset. In essence, let everyone know what the situation actually is and eliminate the two step consolidation processes. In the Ogden report, it was recommended that large water authorities have a Director of Administration. Within the Thames Water Authority, the officers finally determined that they would split up the functions of the office among themselves and get along without a Director of Administration. These two examples serve to point up the fact of flexible interpretation regarding the content of the Ogden Report. The spirit of the report is what is important, not the exact literal implementation of each and every recommendation.

The Ogden Report outlines a management structure for the Regional Water Authorities. The components of this management structure are as follows:

- (1) The Authority - members representing local governments and special capabilities
- (2) The Corporate Team
- (3) The Divisions

The Authority

The Thames Water Authority has the largest authority membership; a Chairman, and 57 members (36 local government members and 21 appointed by Central Government). The Authority itself operates through a committee structure in order to concentrate expertise and interest as well as to have units of reasonable size to deal with the complex issue. Following the Ogden Report, Thames Water Authority has five main committees:

[Note: the figure in () is the number of members.]

Policy and Resources (23). The key committee where planning and policy direction are approved. There are two sub-committees - one dealing with all matters of finance. - one dealing with personnel.

Water Management (19). This committee is primarily responsible for recommending programs of capital investment for all aspects of water supply and sewage treatment and disposal.

Fisheries and Recreation (16). This committee is concerned with the policy formulation for matters related to fisheries within the TWA region. Increasing pressure exists to utilize reservoirs in urban areas for a variety of recreational purposes. This committee has

the responsibility for recreation policy formulation as well.

Regional Land Drainage (21). This committee monitors and deals with all issues related to flood prevention as well as land drainage.

Quality Advisory Panel (9). In the organizational chart for Thames, the QAP is shown on the same level as the Policy and Resources Committee. In the Ogden Report, it recommended that the Quality Advisory Panel report directly to the Authority itself. However, within Thames, because of the large size of the Authority and because of the key role of the Quality Advisory Panel as a watchdog over the water quality in the Thames Basin, it reports to the Policy and Resources Committee.

From June 1974 through June 1975, there were seven meetings of the Authority and seven meetings of the Policy and Resources Committee. All other committees and the Quality Advisory Panel had five meetings. Overlapping membership on committees exists. The Policy and Resources Committee is composed of 15 members of the Authority plus the Chairmen and the Vice-Chairmen of all committees and the Quality Advisory Panel. It is the primary concern of the members to determine the policies of the Authority and to approve plans to implement these policies. In carrying out their duties, the members

are encouraged to view issues from the perspective of the region as a whole.

As a specific example of a region-wide policy decision, the Thames Water Authority has adopted a policy to move toward charge equalization throughout the region. This action has been accomplished in the case of industrial metered supplies by fixing the charge throughout the region at \$.63/1000 gallons (US). Charge equalization is a more difficult task for water service and the general services charge. The general services charge includes sewerage, sewage treatment, pollution prevention, navigation, amenities and fisheries. Both the water service charge and the general service charge are levied on the individual property owner according to the ratable value of the property. This ratable value is not the estimated value for which the property could be sold; rather, it is the estimated value for which the property could be rented for one year. The objective is to equalize the rate per pound charged for the services throughout the region. In the case of TWA, this move towards equalization of charges will be carried out over a period of several years. Other Regional Water Authorities went for instant equalization of charges. The resulting public reaction from the high increases in charges, especially in Wales, has caused the Central Government to move forward the previously scheduled review of the Water Authorities by six months.

The Corporate Management Team

For Thames Water Authority, the corporate management team

is composed of the chief officers whose responsibility is to implement the policies and plans approved by the Authority.

Chief Executive: The individual whose main task is to provide overall leadership, coordination, and control within the water authority.

Director of Finance: The main advisor on economic and financial matters. He is responsible for all the operational management functions relating to economics and finance including like standards of financial administration at all levels.

Director of Operations: The individual ultimately responsible for water supply, sewerage, and sewage disposal. He is the primary individual concerned with the implementation of capital works programs.

Director of Resource Planning: This individual heads a multi-functional, multi-disciplinary group composed in TWA's case of engineers, planners, economists, operations research specialists, and management personnel. Their tasks include the development of alternative means of achieving objectives. They are not bound to traditional solutions to water resource problems but are encouraged to investigate innovative ideas and concepts as well.

Director of Scientific Services: This individual bears the responsibility for monitoring the water quality throughout the region as a means of maintaining and restoring water quality. In addition, the Director is responsible for water-based recreation and fisheries. This responsibility is one of the innovations of the Water Act of 1973. By providing a specific recreation response to the TWA's there may be some trade off between the provision of reservoirs for water supply purposes and increasing the recreational facilities. He is also charged to report on the anticipated environmental impact associated with the implementation of future development plans within the region.

Each of these Directors has a staff organization to accomplish the assigned tasks. These Directorates, plus the legal department, property office, and personnel department, constitute the Regional Headquarters. The Regional Headquarters staff consists of 400 out of a total of 12,000 employees for TWA as a whole. A number of these staff are engaged in common services for divisions such as legal and properties services, financial audit, and water examination. Their primary functions are planning and monitoring as opposed to service delivery. The service delivery function is performed through responsibility delegated to the nine operating divisions within the Thames Water Authority.

The Divisions*

Single-Purpose Divisions

- (1) Metropolitan Water Division: Water supply to 6,000,000 - London.
- (2) Metropolitan Public Health Division: Trunk and Interceptor sewers plus sewage treatment and disposal for 8,000,000 - Greater London.
- (3) Thames Conservancy Division: River Management - Thames River Basin (Non-tidal Thames plus certain functions in the tidal Thames).

Each of these divisions has a long history of distinguished public service in its respective area of water resources. Rather than dismantle these existing organizations and reconstitute them in some multi-functional form, TWA decided to maintain their previous arrangements.

Multi-functional Divisions

- (1) Lea Division: Sewage Disposal and River Management in the Lee Valley (North of London). Population served - 2.5 million.
- (2) Chiltern Division: Water supply and sewage disposal population served - 920,000.
- (3) Cotswold Division: Water supply and sewage disposal population served - 240,000.

* Figures 2 and 3 show the Divisional responsibility within TWA for water supply and sewage disposal, respectively.

Figure 2. Water Divisions - Thames Water Authority

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1" ~ 12.5 Mile

Figure 3. Sewerage and Sewage Disposal
Divisions - Thames Water Authority



- (4) Lambourn Division: Water supply and sewage disposal population served - 920,000.
- (5) Southern Division: Water supply and sewage disposal population served - 924,000.
- (6) Vales Division: Water supply and sewage disposal population served - 520,000.

Note: Water supply and sewage disposal areas are not exactly the same in each of the multi-functional divisions. The population served figures represent the maximum figure of either water supply or sewage disposal for each division - Accordingly, the total figure is not accurate since it would reflect the effect of double counting.

It is important to emphasize that while the Water Act of 1973 did not change the technical functions related to water, it did dramatically alter the institutional arrangements for providing these services. The Ogden Report emphasized that the task facing the Regional Water Authorities is more than a simple aggregation of the previously separate functions. It was seen that new skills and management techniques to provide for the optimum use of water for all the varied purposes to which it might be put. The water cycle itself becomes a focus of attention, rather than one narrow aspect of it such as a source of supply. The structure of the Regional Water Authorities is designed to facilitate the consideration of the interdependencies which are crucial for utilization of water resources.

Through the planning and budgeting processes, the Thames Water Authority has the means to come to grips with such interdependencies. As pointed out in the Ogden Report:

"When planning development of a new water resource, it will not be sufficient just to make provision to meet future demands; it will also be necessary to have regard for the resulting need for additional sewage treatment works and means of disposing of the effluent. In turn, when planning new sewage treatment works, it will be essential to consider how effluent might be discharged to give maximum benefit or cause minimum injury, to rivers and hence the effects such effluents will have on the resources of the rivers downstream. At all times, it will be necessary to assess the effects and possible benefits of new development in relation to river quality, amenity, land drainage, flood protection, fisheries and recreation.¹⁰"

The six-months experience as a participant-observer with the Thames Water Authority provided the opportunity to learn how the staff from locations throughout the service area viewed reorganization. The following are examples cited by TWA personnel of what they have been able to do or accomplish since the reorganization that would not have been possible prior to the 1 April 1974 reorganization. Personnel engaged in the provision of water services in this country may find it helpful

to compare their situation with this list.

- (1) Since reorganization it is possible to consider the entire basin as a whole with a more comprehensive view than previously possible. For example, fiscal resources for upgrading and improving the level of sewage treatment are being concentrated in the upstream portions of the basin where the need is greatest.
- (2) The single banking facility enables the fiscal resources of the Authority to be utilized in the most economical and efficient fashion.
- (3) The Assistant Division Manager (Finance) meetings provide an opportunity for effective communications between Divisions and Region.* It is an opportunity to work through issues which are common to all of the Divisions. (Note - several people in divisions felt that this type of regular meeting should be extended to other areas in addition to Finance).
- (4) Prior to reorganization, a river had served as the boundary between two political units. One of the units developed a proposal to construct a new sewage treatment plant across the river from an

* Region means the headquarters and headquarters staff of the four directorates - namely, Finance, Operations, Resource Planning, and Scientific Services.

- (4) existing sewage treatment plant which could have been expanded. Following reorganization, the existing site is being expanded, and the plan to build the additional plant across the river has been dropped.
- (5) Reorganization has brought new and challenging employment opportunities for staff. As a consequence of retirements, advancements, and movement to fill positions in other water authorities, very capable staff have been moved forward into positions of responsibility. This action served as a very positive morale boost to staff.
- (6) Since reorganization it has been possible to obtain decisions much more rapidly (in general) from TWA than under prior arrangements. If an issue arises within a division which requires Region decision, a position paper to Region by Friday should make the agenda of the Management Board the following Wednesday. In some cases the Management Board may make the decision that day, in which case the division may press on, following the guidance of the Management Board.
- (7) The new arrangements provide more discretionary choice to the Divisional Manager than existed prior to reorganization. Internal Division reorganizations may be implemented in a timely and

effective fashion.

- (8) The new organization provided the opportunity for a Division to draw upon the resources brought together within the Authority. In one case in particular (prior to 1 April 1974) a sewage treatment plant simply had not been properly taken care of by the predecessor agency. Following reorganization, the Divisional Manager was able to call upon two other divisions within TWA which had special equipment, manpower, and other resources to make immediate temporary modifications to the plant. Furthermore, the staff of the plant realized that at last their work was recognized and that someone really cared whether or not their plant operated effectively.
- (9) Since reorganization it has been possible to bring uniformity to the personnel policies of the vast number of antecedent groups.
- (10) The reorganization has provided the opportunity to bring staff together to work on problems in a way which had not been done previously in the Water Industry. Not only were engineers and finance people working together, but also social scientists and planners have been brought in to assist in the

problem solving activities as well.

- (11) The reorganization has made it possible to consider the whole question of sludge disposal and sludge utilization not only from the perspective of the operating sewage treatment facility but also from the perspective of resource planning - where under certain conditions one might envision the sewage sludge serving as ballast in oil tankers on their way back to the oil producing countries with an ultimate use as a soil conditioner in those countries. Another example would be to pick up on the current research effort* and remove the toxic elements from the sludge and utilize the sludge (after processing) as animal food. The important point is that the structure exists for innovative thinking about very basic problems associated with the provision of comprehensive water services.

There are many tasks yet to be accomplished, but the Thames Water Authority is representative of a functioning unit within a large complex urban - rural area designed to accomplish the aims and objectives of the Water Act of 1973.

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Chapter IV

ASSESSMENT OF THE REGIONAL WATER AUTHORITY APPROACH

A. General.

This chapter provides an evaluation of the Thames Water Authority model with respect to the criteria established in Chapter II. The intent is to show how the Authority has succeeded in achieving the goal of high quality and efficient water services, and where it has failed to do so. Interested persons are invited to perform a similar evaluation for their own region and compare that with the following assessment.

B. Financial Criteria

1. All costs and benefits should accrue within the district served and should be equitably distributed therein.

By making the boundaries of the Regional Water Authorities essentially the same as those of the river basins, the first part of this criterion is satisfied. The equitable distribution of costs and benefits is more difficult to achieve but the Thames Water Authority at least is moving in that direction. Government grants for both construction and rate support have been eliminated so that all costs will be borne within the Authority. The charges for water services vary widely, but current policy provides for increasing only those charges which are under 6% (of the presumed annual rent) while

holding higher charges constant. In this way, the charges will become more equal, though rural areas may still pay higher charges than cities. This is justified by the higher cost of providing services in low density areas.

2. Agencies should have the power and authority to raise adequate capital and the flexibility to select the best means to secure these funds.

At present, England's Regional Water Authorities fail to meet this criterion. All borrowing must be done from the Central Government. Interest rates are fixed at the time of the loan and are constant throughout the fixed 25 year term of the loan (no acceleration clause). In the past six months, the rate of interest has varied between 14 1/2% and 17 1/4%. Loans may be obtained from other governments with the approval of the Central Government Treasury. This situation is deemed unacceptable in the United States and would surely be changed to the standard bonding practices.

C. Administrative Criteria

1. The authority of an organization should be broad enough that it has the power to resolve conflicts among all users and to balance governmental needs and resources.

This is one of the strengths of the Water Authority concept. By encompassing both an entire river basin and the complete range of functions related to water, the Thames Water Authority is able to make decisions that result in an efficiency of resource utilization not possible otherwise. One example of this is that money spent on pollution control is placed where it will accomplish the most efficient reduction of pollution, whereas, in this country, the setting of uniform standards may result in inefficient solutions to pollution problems in certain specific geographic areas.

2. Organizations should have the legal and administrative authority to perform the functions assigned to them.

Regional Water Authorities generally have such authority, but there are two notable exceptions. The first is that sewerage is still in the hands of local government councils who receive funds from the Water Authorities to provide and maintain sewerage. These funds are spent by local prerogative and misuse is possible. The Thames Water Authority is now attempting to rationalize the allotment of these funds for operation and maintenance based on the population and area served by each local government council.

The second exception is that private water companies persist as autonomous, unregulated water supply agents. However, there is general agreement that these may be eliminated following

a performance review by the Central Government which is currently underway.

3. Links of communication and the process of coordination should be formalized.

Again, by making the Authorities comprehensive with regard to both area and function, this criterion is essentially satisfied. The organizational structure entails very little separation of functions and most committees must consider the entire range of services for the whole area. Furthermore, the preparation of both long-range and rolling-capital plans assures coordination with other responsible governmental units.

D. Political Criteria.

1. An agency should be accountable to the public.

Accountability is achieved by the fact that a majority of the members of an Authority must be elected public officials. While no members are elected to the Authorities directly, the record of their performance on the Authority becomes a part of their total record to be judged by the electorate. While direct election of all members would provide the ultimate satisfaction of this criterion,* that is not always practical and the English method may be an acceptable alternative.

* The Metropolitan Sanitary District of Greater Chicago has an elected Board of Nine members serving 5,500,000 people.

2. An agency should be responsive to the public.

The scheduling of frequent public hearings is more a matter of agency policy and not an inherent feature of a specific agency. In the specific case of the Thames Water Authority, the researchers believe that more public hearings might be in order, and awareness of the need for public input is on the increase within TWA.

3. A new organization should be compatible with the overall government structure.

The birth of the ten RWA's in England and Wales was concurrent with a general reorganization and consolidation of local governments. Although there appears to have been no effort to coordinate boundaries between the two, the required coordination may proceed afresh, unencumbered by pre-established procedures. The local government units have retained responsibility for sewerage and they play a major role in the appointment of the members of the Authorities; the majority of each Authority being appointed by the county councils and the local district councils.

E. Criteria Related to Area of Jurisdiction

1. The service region should be large enough to realize economies of scale.

The extensive consolidation under the Regional Water Authorities leaves little doubt that great economies will be realized under this system. The costs of high quality management are borne by an entire regional population; the smallest Regional Water Authority has a population of 1.3 million. Operations are carried out by several districts within each basin, but are still quite large compared to the size of most service areas before April 1974 or to the size of most service areas in the United States.

2. Agencies should be able to consider and adjust (or adapt to) externalities stemming from hydrologic interdependencies.

Here again, the use of river basin boundaries and the inclusion of all water services eliminate hydrologic externalities. The question of inter-basin transfers, especially from Wales to the upper Thames, is an unresolved issue. Current policy within Thames Water Authority is to improve and enhance the existing water resources within the catchment through groundwater recharge and groundwater pumping rather than inter-basin transfer.

Chapter V

ATMOSPHERE FOR INSTITUTIONAL CHANGE

A. General.

This chapter is intended to facilitate the 208 planning process by discussing the system of water services in each of the three regions, pointing out some of the most obvious problems facing each region, and assessing the ability of each system to solve these problems. The institutional arrangements by which water services are provided in Chicago, Detroit and Cleveland are now being reevaluated under the provisions of Public Law 92-500. Section 208 of this act requires the integration of wastewater management with fiscal planning, land development, regulatory mechanisms, non-structural pollution control methods, etc., as well as the development of a management structure within each region to insure that the plan may be implemented effectively. 208 Planning is being performed by regional agencies with responsibility for an entire metropolitan area. Effective implementation of a 208 plan will require a level of coordination not presently found among the water service agencies in the three subject metropolitan regions.

Section III-A above includes a list of seven problems that the English water service system was faced with prior to the Water Act of 1973 and which led to the establishment of Regional Water Authorities. The first six of these problems are dis-

cussed below with regard to the three stateside regions studied.

- (1) The projected increase in demand for water by 2000 would pose severe difficulties under existing organizational arrangements.
 - The problems in the Detroit and Cleveland regions are more current and are not directly related to projected increases in demand. Around Chicago, however, water supply shortages are projected for several communities now tapping groundwater sources (see Section B below). The problem is complicated by the fact that the agency that treats the wastewater does not return it to the Great Lakes and the U.S. Supreme Court has imposed a limit on the amount of water Illinois can divert from the Great Lakes. The result is that many communities will be looking for a new source of water in the not-too-distant future and the existing organizational arrangements will require modification.
- (2) It is anticipated that water re-use will increase and therefore a much greater concern will be required for treatment provided after use.

While this may be applied to the Great Lakes in general, it is especially important with regard to the more typical river basin. The Cuyahoga

River of Ohio is an obvious case, although each region has its examples. The newly created Cuyahoga Valley National Recreation Area will place greater emphasis on the treatment provided by Akron and other communities upstream from the park since there are times when essentially the entire flow of the river is extracted for use by Akron and nearby communities.

- (3) There should be a sweeping reduction in the number of separate operating units providing sewage disposal ... and water supply.

-All three stateside regions have numerous municipal sewage treatment facilities outside the urbanized core. The result is an unnecessary duplication of many functions and a less-than-optimal level of efficiency. The unregulated extraction of groundwater by each community in densely populated areas of DuPage County, Illinois, also deserves close study, as does the water supply situation in Summit County, Ohio.

- (4) There were increasing conflicts of interest between the various authorities... and inadequate mechanisms for resolving them - apart from intervention by Central Government. The most important areas of

conflict include:

- (a) Inflexibility in the use of present water resources.

- Another Northeast Illinois example. The Supreme Court limit on Lake Michigan diversion, the fact that no water is returned to the Lake after use, the State's role in allocating the Supreme Court allotment and the lack of ground-water regulation all contribute to this inflexibility. (See Section B, below)

- (b) Divided responsibility for new sources of water.

- Again, the Illinois situation stands out (See (a) above). Those communities seeking a new Lake Michigan source must contend with the U.S. Supreme Court allotment to Illinois and the Illinois Division of Waterways' allocation of that allotment among all potential users. Once an allocation is obtained by an inland community, it must then contend with the problem of transporting the water through all of the communities between itself and the lake. The problem is complex.

- (c) Difficulty in the promotion of joint or national schemes.

- The improvement of water quality and national, state and local plans for recreation are sometimes difficult to implement under the present arrangements. Attempts to implement innovative schemes for recycling the nutrients in wastewater are also complicated by the divisive nature of present arrangements.

(d) Conflicts of interest with regard to water reclamation and re-use.

- Should high levels of waste treatment be required when the receiving waters are polluted by non-point sources to a degree incompatible with desired recreational purposes? Should upstream users be forced to maintain high quality water for one small downstream extractor when all other communities have found another source? These are among the questions raised in the Super Sewer controversy in the Detroit region for which no adequate resolving mechanism exists.

(5) There was a need to be able to implement plans once they had been agreed upon. Previous management and financial arrangements made implementation most difficult.

- The highly fractionated nature of water services in all three regions at present makes the implementation of newly developed regional plans most difficult. Plans developed under Section 208 will require some form of new arrangements for implementation.

(6) A need existed to improve planning and coordination.

- It is becoming increasingly evident that water service problems and issues are not confined by the boundaries of communities or the present service areas. Section 208 of P.L. 92-500 is an expression of the recognition of this need, which by now should be self-evident.

The three stateside regions are found to have certain common features with regard to water services. Each has one or two large agencies that provide water services in the densely populated urban core of the region with literally dozens of agencies providing water supply and sewage treatment to the remainder of the region. Some coordination of effort is achieved through regional planning agencies and through state and federal regulation and requirements, but the decisions and operations of the multitude of agencies remain largely independent of any regional concern. A preliminary comparison of the

stateside regions with that of the Thames Water Authority, using the criteria established in Chapter II, is provided in Table 1. While a more thorough assessment of each region is left to individuals in that region, there appears to be room for improvement in each of the stateside regions. The Corps of Engineers' Wastewater Management Studies' Institutional Arrangements Appendices, reviewed in Appendix A, illustrate the great magnitude of the problem with regard to this aspect of water services.

B. Chicago Metropolitan Region.

In the six-county region of Northeastern Illinois, one factor affecting the quality of water services is population density. Of the seven million people in the region, almost half (48%) live in the City of Chicago and fully 78% live in ¹ Cook County. This large population concentration enables the financing of large projects for pollution control and flood control and provides generally higher levels of wastewater treatment than are found elsewhere in the region.

The Metropolitan Sanitary District of Greater Chicago (MSD) is one of the largest water service agencies in the world. Established by the state legislature in 1889 in response to a health crisis, the MIS is authorized to include all of Cook County. Today, only small portions of the County

Table 1. Comparison of Regional Water Services

	Internal & Equitable Costs and Benefits		Financial		Administrative			Political		Area of Jurisdiction	
	+	0	Adequate capital - flexible sources	Balance Regional Needs/Resources	Ability to Perform Assigned Functions and Coordination	Formal Communication to Public	Accountable to Public	Responsive to Public	Compatible with Government Structure	Economies of scale	Consider/Adjust Hydrologic External.
Thames Water Authority	+	0	+	-	+	+	-	+	+	+	
Chicago Region	0	+	0	+	-	-	-	+	-	0	
Detroit Region	0	+	0	+	-	-	-	+	-	0	
Cleveland Region	0	+	0	+	-	-	-	+	-	0	

Key: + = criteria met satisfactorily
 - = criteria met in part - not wholly satisfactory
 0 = criteria not met

in the south and northwest have not joined the District. The MSD is run by a nine member Board of Trustees elected from the District at large. To protect the Lake Michigan water supply, the District has reversed the flows of the Chicago and Calumet Rivers so that all runoff and effluent from the District now flows to the Mississippi River. To dilute this effluent and to maintain navigation in its channels, the MSD withdraws water from Lake Michigan at an average rate of 1000 cfs.² The MSD provides interceptor sewers and sewage treatment throughout the District as well as flood control and pollution control along the waterways in the District. Its Tunnel and Reservoir Plan (TARP), now under construction, should eliminate the occasional combined flow discharges to Lake Michigan, and its Prarie Plan to reclaim strip-mined land using sewage sludge is innovative, though not especially popular in downstate Fulton County. Essentially all operating funds for the MSD are derived from a property tax, with sewage volume rates applied only to larger customers.

Outside Cook County, only Lake and DuPage Counties have any sort of regional sewage treatment. The North Shore Sanitary District (NSSD) manages eight treatment plants in eastern Lake County while the Public Works Department manages five plants in south-central Lake County.³ The DuPage County DPW has been managing nine plants scattered throughout that county,⁴ but the situation there is currently undergoing change.

The Chicago Department of Water and Sewers supplies Lake Michigan water to the city and 74 suburbs in Cook County, serving over 4.5 million people in 440 square miles.⁵ Several lakeside communities north of Chicago also extract Lake Michigan water and some sell water to adjacent inland communities. Otherwise, the region taps groundwater sources for its water, with each community drilling its own wells. Groundwater extraction is wholly unregulated. Those suburbs receiving Chicago water directly must come to the Chicago city limits for their water. Non-adjacent suburbs must obtain easements through intervening ones for their transmission mains. In several cases, suburbs have joined together to form water commissions to purchase water from Chicago, and, in other cases, suburbs buy from suburbs who in turn buy from Chicago.

Water supply is a potential problem in Northeastern Illinois. Groundwater shortages are predicted for several townships in Cook and DuPage Counties immediately west of the present Chicago Water Department service area.⁶ One possible solution is the expansion of Chicago's service area. The authority exists for such an expansion but there are two problems: a limit in Illinois' withdrawal of Lake Michigan water and suburban disdain for big city association. A 1967 U.S. Supreme Court decision limits total extraction and diversion of Lake Michigan water by Illinois to 3200 cfs.⁷ Municipal water supplies currently extract 1700 cfs, the MSD extracts 1000 cfs for dilution/navi-

gation and the remaining 500 cfs is runoff that is diverted
as a result of the reversal of the rivers.⁸ Thus, the entire
allotment is presently accounted for by existing users. However,
completion of the Tunnel and Reservoir Plan by the MSD is
expected to reduce dilution water requirements making more
water available for public supply.⁹ The U.S. Supreme Court
might also increase the total allotment to Illinois.

Once the water is available, the problem becomes one
of arranging for its transportation from source to user. The
suburbs, especially those outside Cook County, do not appear
overly anxious to buy water from Chicago, nor is the City
aggressively expanding its service area. Water Commissions
and Districts have been formed in eastern DuPage and northwestern
Cook Counties as well as in Will and Lake Counties. To date,
the Lake County district is the only one that has proceeded
with actual construction. The Elmhurst-Villa Park-Lombard
Water Commission (E-VP-LWC) of eastern DuPage County is con-
sidering three plans, including purchase from Chicago.¹⁰
The most recent study indicates that purchase from Chicago
would be the cheapest alternative and the Commission seems to
be leaning toward that option. This would require an alloca-
tion of Lake Michigan water by the State, as would the other
two plans.

Sewage treatment epitomizes the dichotomy between populous

Cook County and the surrounding region. Although the waterways of Cook County still require large volumes of fresh water for dilution, innovative and expensive programs are underway to alleviate pollution problems. In the rapidly urbanizing areas of Lake and DuPage Counties, where independent municipal treatment plants have proliferated, pollution is bad and getting worse. The state Pollution Control Board has recently ordered DuPage County wastewater agencies to implement the Regional Wastewater Plan of the Northeastern Illinois Planning Commission¹¹ (or a reasonable variation thereof). Part of the Plan calls for division of the county into ten sub-regions and reduction from the present forty-nine municipal treatment facilities to fourteen.¹²

The Regional Wastewater Plan has northeastern Illinois moving in the direction of areawide (sub-county) management of the interception, treatment and disposal of wastewater. The Plan indicates that county boundaries may be transcended by county districts where appropriate. The Plan is an element of the Comprehensive General plan for Northeastern Illinois, lending it an aspect of comprehensive coordination. As a practical matter, this may be the greatest extent to which water services may be regionalized in Northeastern Illinois. Notice that the Chicago water department does not function at all outside its city limits as its counterparts in Detroit and Cleveland do. Also noteworthy is a recent referendum establishing

a regional transportation authority. The measure passed despite rejection rates as high as 7-1 in Will and Kane Counties and 10-1 in McHenry County.¹³ Anti-regional sentiment is probably as high in suburban Chicago, especially outside Cook County, as anywhere in the country.

Despite possible political drawbacks, the Thames Water Authority deserves consideration as a model for water services in northeastern Illinois. Several points are offered in support of this view:

- a) Creation of the Thames Water Authority involved concessions to London including: specified representation of 20 members (of the total 57); the promise to keep one headquarters in London; and the retention of certain recreation, amenity and land drainage functions by the Greater London Council. As in most stateside regions, the construction and maintenance of sewerage remains a local government function, unless relinquished to the Authority.
- b) Three of the nine divisions are single-purpose and represent historic strength in particular service areas. Thus, an agency such as the MSD might be accommodated within a region-wide authority.

(c) The bulk of the service delivery remains at the division level, which can be reasonably responsive to local needs. As a practical matter, divisions might be drawn along present county boundaries. One employee in thirty works in the central organization, which provides legal and property services, financial audit and water examination as well as overall planning and financing for all other units.

C. Detroit Metropolitan Region

The populations of Detroit and Wayne County are less formidable than their Chicago area counterparts, comprising only 32% and 55% of the region's population, respectively.¹⁴ Both Oakland and Macomb Counties border on the City of Detroit and together account for another 32% of the region's population. Outmigration from Detroit effectively stopped Wayne County's growth between the 1960 and 1970 censuses, while Oakland and Macomb Counties both grew rapidly.¹⁵ The greater balance in population (i.e., political strength) is reflected in current events with regard to water services in the Detroit region.

Detroit is somewhat unique in that the largest sewage treatment agency in the region is also the regional water supply agency, the Detroit Metro Water Department (DMWD). An arm of the city government, the DMWD is run by a seven-member

Board who serve at the pleasure of the mayor and at least four of whom must be Detroit residents. DMWD maintains interceptors throughout Detroit and Dearborn and northward into Macomb County, but also treats sewage from Wayne County Road Commission interceptors in northwest Wayne County and from Oakland County DPW interceptors throughout much of that county. Within the service area there are two large islands of independence, Pontiac in Oakland County and Warren in Macomb County. The DMWD operates just one sewage treatment plant, which has recently been upgraded to secondary treatment.

Sewage treatment in southern Wayne County is provided by the Wayne County Road Commission (WCRC). Outside the DMWD and WCRC service areas, sewage treatment is performed by municipalities.

Water pumped by the DMWD serves over 4 million people, 45% of the state's population, in 96 communities.¹⁶ The service area now includes Flint, which is the sole agent for DMWD water in Genesee County. Flint retails water to several other communities, as does the Southeastern Oakland County Water Authority (SEOCWA) which serves nine communities immediately north of Detroit. Otherwise, each community served by DMWD has a contract by which water is received at an agreed upon point within that community. DMWD water reaches essentially all of the urbanized area of SE Michigan and into sparsely populated townships in all directions. Among the exceptions

are Ann Arbor, Ypsilanti, and Rockwood on the Huron River and four communities with their own Great Lakes supplies. Reasons for its expansive coverage include the paucity of groundwater and river sources in the region and the aggressive expansion policies of the Department since the late 1950's.

There are several problems facing the region despite the comprehensive nature of water supply and sewage treatment services. One involves the operations of the DMWD under Detroit control. Mayor Coleman Young has appointed three representatives of suburban interests (the maximum allowed under Detroit's Charter) to the seven-member Water Board, while approximately 65% of the customers are suburban. Bills have been introduced in the state legislature to change the composition of the Water Board and also to limit the rate that Detroit may charge its suburban customers to the actual cost of providing the service.¹⁷ Other proposals for legislation would require an annual outside audit of the DMWD and public hearings for all rate changes.¹⁸ These bills and proposals were prompted by efforts on the part of the Detroit members to implement rate increases by unorthodox means on more than one occasion in early 1975.¹⁹ The root of these problems seems to be the lack of adequate and assured suburban representation.²⁰

Another problem involves the provision of sewage treatment in western Wayne and eastern Washtenaw counties. A 1964 study²¹ proposed a large interceptor sewer for the Huron River from Ann Arbor to Lake Erie with an arm running generally northward

through the Rouge basin of western Wayne County and into the upper Huron basin in southwestern Oakland County. Treatment would be provided by one large plant at the mouth of the Huron River. This plan, known as the "Super Sewer", is being promoted by the Wayne County Road Commission, which would like to expand its authority to include such a project.

One source of trouble in this matter is the fact that there is no real mechanism for making the decision on whether or not such a project should be built. The Wayne County proponents are powerful enough within their county, but they require the population concentrations of Washtenaw County to make the project economically feasible. Ann Arbor opposes the project on environmental and economic grounds and is averse to Wayne County control over any aspect of their services. In addition, Ann Arbor opposes the Super Sewer because construction of the project would probably force the city to contract with the DMWD for Detroit water. This expense has not been included in the cost analysis of the Super Sewer alternative. Unfortunately, Ann Arbor is currently exceeding the capacity of its own wastewater treatment plant, but cannot receive the necessary permission to expand it before the Super Sewer issue is resolved.

At this writing, Ann Arbor is restricted in the extension of its sewer service for new development, but the economic situation has already reduced new development. A construction ban is being considered for the entire region to be served by

the super sewer until the issue is resolved. In light of its failure to serve their interests, on this and other issues, Ann Arbor and Washtenaw County are considering withdrawal from SEMCOG. SEMCOG has favored the Super Sewer in the past, but while amendments to the Sewer and Storm Water Drainage plan have recently been approved, that approval does not include Super Sewer or any other specific plans. It now appears that the Super Sewer issue may not be resolved before completion of the 208 plan in mid-1977.

The Super Sewer controversy focuses attention on some of the problems that result from the lack of a forum to deal with problems that cross county boundaries. Also notable in this controversy is the lack of coordination among various services; water supply, sewage treatment and recreation agencies are all seen acting independently and often at cross purposes. An agency modelled after the Thames Water Authority would be inherently qualified to deal with both of these problems.

Returning to the water supply issue, a region-wide, comprehensive agency would provide a more equitable representation of all customers within the region. The proposed Detroit region (SEMCOG counties) would exclude present water supply customers in Genesee and Lapeer Counties, but coordinated operation with representatives of these customers could be continued and perhaps even formalized under a new arrangement. Customers in these two counties (Genesee and Lapeer) are not now represented on the Detroit Metro Water Board, nor are customers in Washtenaw and Monroe Counties.

D. Cleveland Metropolitan Region.

The seven-county region around Cleveland contains only 2.75 million people²² and is the smallest of the three regions studied. Although the largest city in Ohio, Cleveland is not so singularly important to its state as Chicago or Detroit. The central city comprises only 27% of the population of the region partly because of the proximity of another major urban center, Akron, with 275,000 people. The result appears to be less animosity between city and suburbs and greater coordination of water services. Before 1972, the situation was not so peaceful. Conflicts between Cleveland and several suburbs over sewage treatment had reached the crisis stage in the early 1970's, with lawsuits initiated by both sides.²³ With an eye on the Cleveland situation, the state acted in 1971 to rewrite Chapter 6119 of the Ohio Revised Code to enable Courts of Common Pleas to establish Regional Sewer Districts. Consolidating the lawsuits, the Cuyahoga County Court of Common Pleas brought the city and thirty-three suburbs together on an agreement creating the Cleveland Regional Sewer District (CRSD) in June of 1972.

The CRSD is divided into Cleveland and Suburban subdistricts. The agreement features the purchase of Cleveland's treatment plants by the District through a special assessment on Suburban members, and a complex representation scheme that will change as the suburban members surpass Cleveland in population and volume of sewage. Service is currently confined to Cuyahoga County,

although some communities in northern Summit County have recently joined the District in anticipation of service. Plans call for extension of service throughout Cuyahoga and northern Summit Counties and into parts of Medina, Portage and Lorain counties.²⁴

Elsewhere in the region, other municipalities operate sewage treatment plants, but only Akron does so on anything approaching a regional basis. Small, independent plants also proliferate here, though Summit County has at least begun planning consolidation.

The Cleveland Department of Water and Heat is the most comprehensive of the three city water departments in terms of service. They supply water from Lake Erie to the tap for some 1.8 million people in Cleveland and 64 suburbs;²⁵ including all of Cuyahoga County and parts four adjacent counties. Financial matters are handled by a separate city Fiscal Department, which also provides billing service for the CRSD since sewage charges are based on water supply meter readings. Cleveland water is only supplied to communities with sewage treatment facilities, though not necessarily through the CRSD. In addition to the 64 suburbs receiving full water service, there are seven that buy the water at their boundary under agreements that date back to the early part of the century.

Akron supplies itself and several suburbs from the Cuyahoga River, which it may and does exhaust at times. One of the

communities supplied by Akron is unique and may indicate coming events. Stow buys its water from Summit County which buys it from Akron. The County operates and maintains the pumping, storage and distribution facilities more cheaply than Akron would.

The success of the CRSD and the fact that the water supply system is already regional in its operation appear to indicate that the water supply, too, will soon have a regional administration. A recent article in the Cleveland Plain Dealer supports this view.²⁶

The extent of regional cooperation on water services taking place in the Cleveland area is surprising in light of the fractionated general planning efforts. Apparently County Planning Commissions have A-95 authority within their county while the newly formed Northeast Ohio Areawide Coordinating Agency (NOACA) has authority over intercounty matters only, and is the 208 Agency for the region. Of the seven counties in NOACA, two (Portage and Summit) also pay dues to the Northeast Four County Organization (NFCO), which is an A-95 Agency and is seeking 208 designation. The probable result will be the division of Summit and Portage counties, with that portion of both counties in the Ohio River Basin coming under NFCO jurisdiction (except that all of Akron, which sits on the divide, will stay in NOACA). NOACA has not yet developed its water services planning to anywhere near the levels of SEMCOG (Detroit) or NIPC (Chicago).

In one sense, the situation in the Cleveland region is encouraging. The Regional Sewer District seems to have provided a satisfactory solution to sewage treatment for much of the region's population and there is talk of establishing a similar regional authority for water supply. But the problems of water services are not limited to the densely populated, urban core of a region. Federal requirements under Sections 201 and 208 of P.L. 92-500 are forcing some intercommunity cooperation, but the fact remains that a community may be adversely affected by the decisions of a second community in which the first has no voice. One example from Summit County concerns an attempt by the County to include Richfield Village and Township in a water service contract. Negotiations with Akron broke down "basically because of broad socio-economic reasons"²⁷ with the result that "the water line from the Akron-Peninsula Road to the Ohio Sports Center was constructed along a less desirable route than the County would have preferred."²⁸ Similar situations may be found throughout the three regions studied.

Chapter VI

SUMMARY AND RECOMMENDATIONS

The increasing importance of coordinated and effective planning for comprehensive water services together with the need to be able to translate such plans into implemented projects has been established. A set of evaluation criteria have been specified. The purpose of these criteria is to assist in the assessment of both current and future institutional arrangements for provision of comprehensive water services in complex urban areas of the Great Lakes. These evaluation criteria are grouped under four major headings: financial, administrative, political, and jurisdictional. An innovative organizational arrangement for provision of comprehensive water services in complex urban areas is presented. The new organizational arrangement is the Regional Water Authority model currently operational in England and Wales. More specific and detailed information on the Regional Water Authority approach is presented in the context of the Thames Water Authority. The Thames Water Authority - one of the ten R.W.A's - provides comprehensive water services to 12 million people in an area of 5,000 square miles.

The Regional Water Authority approach to provision of comprehensive water services has been evaluated against the criteria developed for this research effort. This evaluation was performed in the context of the Thames Water Authority since the size and scale of its operations are roughly comparable to complex urban areas on the Great Lakes.

At present, in considering the financial criteria, the Thames Water Authority provides the framework to assure that all costs and benefits accrue within the region and it is a policy of the Authority to move towards an equalization of charges throughout the Region. The method of financing capital projects in the reorganized water industry of England and Wales by loans from the Central Government is undesirable, but is specific to their economic situation. It does not appear appropriate for application in this country.

In terms of the administrative criteria, the Thames Water Authority has the authority and power to resolve conflicts of interests among all its users. Furthermore, since the activities are basically throughout the Thames River Basin and include practically the complete range of functions related to water, TWA is able to make decisions that provide an efficient allocation of resources. The planning procedures assure that effective communication takes place between the regional water authority and units of government at both the country and district level.

With regard to the political criteria, the Thames Water Authority (as do all of the Regional Water Authorities) has the majority of its membership appointed from elected representatives of local units of government. This fact, coupled with public hearings related to major authority proposals, assures that the Authority will be responsive to the public. The Regional Water Authorities came into being at the same time as

a major reorganization of local government. The Regional Water Authorities have responsibilities which cross the established political boundaries. Proper planning coordination between the Regional Water Authorities and the local units of government is essential to ensure that services are provided as needed and that the Regional Water Authorities perform in a manner which is compatible with and complementary to the local government system.

Finally, in terms of jurisdictional criteria, it is clear that economies of scale have resulted in terms of both technical components as well as financial and administrative areas. The costs of quality management are now borne by an entire regional population. Since resources are now considered from a regional or basin-wide perspective, alternatives to inter-basin transfers may now receive careful evaluation.

Through utilization of the evaluation criteria, a preliminary review has been performed upon each of the three complex areas investigated, namely, Chicago, Cleveland, and Detroit. It appears that certain conditions which are unique to each of these metro areas may be resolved by a more effective institutional arrangement for comprehensive water services in each of the areas. However, as the reports summarized in Appendix A clearly demonstrate, institutional issues are extremely complex. Accordingly, those individuals actively engaged in providing the water services in Chicago, Cleveland, and Detroit are in a

better position than ourselves to accurately assess the applicability of the Regional Water Authority approach to each of their specific areas. We have provided data on a specific innovative organizational arrangement for provision of comprehensive water services. A set of criteria has been specified which should assist in the evaluation of both existing and proposed institutional structures for such service provision. Preliminary evaluation of existing conditions in the three areas of Chicago, Cleveland, and Detroit indicates possible need for improvements in terms of more effective institutional arrangements for provision of comprehensive water services in each of these areas. In addition, the Section 208 and Section 209 planning requirements for Public Law 92-500 underscore the importance of effective regional and area-wide considerations of wastewater management.

All of these factors lead to the following set of recommendations:

1. Personnel at the federal, state, regional, and local level in each of the three complex urban areas - Chicago, Cleveland, and Detroit should evaluate the Regional Water Authority approach for specific application in their area.

2. Following the timely completion of such reviews, a conference should be held which would bring together the personnel from the three areas along with invited guests from other Great Lakes States plus representatives from one or more Regional Water Authorities in England and Wales. The holding of

such a conference would be predicated upon reasonable interest in developing further information about the practical aspects of implementing a form of the Regional Water Authority approach in one or more of these urban areas.

3. Whether or not the finding is favorable in terms of additional interest in the Regional Water Authority concept, it is recommended that the basis for the findings for each area be clearly specified.

4. It is recommended that the findings of each assessment plus the proceedings of the conference (should it be held), be widely disseminated throughout the country. Since the British example is new and innovative, it does deserve careful attention from all who are engaged in similar practice and activities in this country.

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APPENDIX A
CORPS OF ENGINEERS'
WASTEWATER MANAGEMENT STUDIES SYNOPSES

1. General.

The Army Corps of Engineers has performed a wastewater management study for each of the three regions that are subjects of the present study and each includes an appendix on institutional arrangements. These appendixes describe the existing agencies and the statutory authority appropriate to wastewater management in each of the three regions. The ultimate focus of these appendixes is on the most desirable organizational arrangement for the implementation of the several area-wide alternatives for wastewater management developed in each study. The objectives are to identify the impacts of the alternatives on the institutions and vice versa, and to provide a basis for selection of the best organizational arrangements. The three documents differ greatly in size and content.

2. Detroit.

The Detroit Institutional Arrangements Appendix was written by the Detroit District staff and is by far the largest of the three appendixes. Charts and matrices are used extensively for the presentation and analysis of data. Large sections are devoted to discussion of both existing and potential (legislative authority exists) agencies having wastewater responsibilities at the

national, state or local level, and the appropriate legislation. The strength of this document lies in its collection of data on all existing legislation related to wastewater management in Southeast Michigan, including federal programs related thereto. This is done, however, without regard for the ways in which agencies actually function in the region or the interrelationships between the various agencies.

The Detroit appendix is confusing because it is neither well written nor well organized. The eleven technical alternatives developed by the study are described briefly. In part of the analysis, all eleven alternatives are included, while in one particular section only three representative alternatives are discussed. One chapter provides an "example" of the impacts of the eleven technical alternatives on five types of existing agencies whose authority could be expanded to include areawide wastewater management. The analysis is based on a set of parameters "which have been determined to comprise comprehensive wastewater management. These parameters include the following: planning, financing property acquisition, construction/ facility maintainance, administration and system operation. Certain of these parameters agree with the criteria established in Chapter II of this report. However, the manner in which they are presented is not conducive to sufficient understanding of the example to permit its use as intended. Furthermore, although it is only an "example", the analysis is performed for five agencies with the tabulated

results showing that either the Detroit Metro Water Department or the Wayne County Road Commission could most easily implement any of the eleven alternatives.

The discussion of possible new institutional arrangements includes nine representative forms that have either been proposed or implemented elsewhere and also an informative discussion of various studies into the matter, including two recent Governor's Commissions in Michigan and another study in the New York metropolitan area. The analysis of the nine agency types lists the type that might best implement each of the technical alternatives, without explanation, and provides a general discussion of these agency types (advantages, disadvantages, examples) without regard to specific alternative.

Two criteria are provided for considering the technical alternatives in light of several possible management schemes. The criteria are: land treatment area and plant phase-out. Based on these criteria, the eleven alternatives are categorized as to "institutional flexibility", those being most flexible that maintain existing treatment plants and do not require spray irrigation of municipal sewage. Lists are then provided of the types of agencies most suited to operate under the various degrees of flexibility. They conclude that only a state utility, regional government or sewage authority has the capability to implement all of the technical alternatives.

The final section involves financing. Matrices show how various federal, state and regional agencies may provide financing for various aspects of comprehensive wastewater management. Explanatory discussion of this material is minimal.

Since all of the technical alternatives have a regional scope, it is justifiably presumed that the management agency will also be regional in nature. But the problems that would ensue from any attempt to implement an area-wide agency are ignored save for one sentence, which concludes that "the need exists for units of government small enough to enable the recipients of such government services to have some voice and control over the quality and quantity of these services". The complex institutional arrangements implied by this statement receive no further consideration.

The lack of depth of analysis in this appendix reflects the political atmosphere in which it was written. The Detroit Metro Water Department and the Wayne County Road Commission are trying for control of new territory in the "Super Sewer" controversy (see Section III-B) and the Corps of Engineers had to be careful not to step on the toes of either agency. The result avoids any indication of favoritism and includes an "example" that should placate both sides.

3. Cleveland.

The Institutional Evaluation Appendix to the Cleveland-Akron Three Rivers Watershed study was written by the firm of Linton, Miels and Coston, Inc. for the Buffalo District. L, M & C also wrote the "Methodology and Procedures for Analysis of Institutional

Arrangements for Survey Scope Studies-Wastewater Management Program" for the Corps of Engineers, which provided the guidelines for all institutional appendixes. The Cleveland appendix is orderly and concise. In contrast to the Detroit appendix, it is easy to understand despite an almost total lack of tables and matrices.

The first three sections of the appendix describe the existing federal, state and regional/local agencies with wastewater responsibilities. While the federal agencies and their programs are described briefly, the state and local agencies receive extended coverage; including sections on the following where appropriate: wastewater treatment functions, other functions, legal and administrative constraints, relationships with other organizations, present programs, future plans and programs, and financial capability.

The Cleveland appendix shuns any attempt at describing or evaluating potential management agencies; rather, providing a discussion of the impacts of some aspects of the technical alternatives on four factors that are important to the selection of a management scheme: financial, regionalization, re-use, and land. The re-use factor involves other resource (water, land, people) programs such as flood control, recreation, etc. and is concerned with the interrelationships of all uses of water. A previous section includes discussions of the major obstacles to institutional modification (home-rule and urban-suburban conflict) and major opportunities for institutional change as well as extensive coverage of the financial and manpower requirements of the technical

alternatives. The final section provides a summary discussion of all factors to be considered in selecting an institutional arrangement to implement the technical proposals and concludes with a set of criteria for evaluating institutional arrangements similar to that found in Chapter II of the present study. The criteria are used to indicate the relative strengths of local and regional approaches and, as expected, the regional approach was deemed superior with respect to economic and administrative criteria, while the local approach was favored by political criteria. Again, selection of a specific institutional arrangement is left to others.

The appendix does suffer from an overuse of the term "critical factor". The term quickly becomes meaningless and its constant use detracts from the readability of the material.

It seems reasonable to suggest that the analysis and discussion could have been carried one step further, to include some of the possible arrangements that could best implement the technical alternatives. While the Detroit appendix seems to overstep its responsibility in this area, the Cleveland appendix takes the opposite tack; avoiding specific proposals at every turn.

4. Chicago.

Brevity characterizes the Chicago Institutional Considerations appendix, also prepared by Linton, Miels, and Coston. The bulk of the appendix is an analysis of the impacts of the five technical alternatives with respect to six factors; four

of which are also found in the Cleveland appendix. Tables are used to some extent to summarize the data. The home rule issue receives far greater attention in this appendix than in either of the other two. This may indicate its strength as an issue in the greater Chicago area. Some awareness of the literature is indicated by the delineation of "institutional requirements" which are essentially criteria for evaluating institutions. In fact, they bear a strong resemblance to the criteria in the Cleveland appendix. However, these institutional requirements receive no discussion and are simply used in a matrix indicating whether a local, regional or areawide agency would satisfy the various criteria for each of the five technical alternatives. An examination of the matrix reveals that it is mostly "L"'s, indicating that the local approach is favored. The local approach involves the expansion of existing jurisdictions to cover areas where treatment plants are eliminated under the five alternatives. This is the extent of the institutional analysis.

Possible institutional arrangements are discussed only in the most general terms under the following headings, which indicate degrees of consolidation: local, regional and areawide. Again, discussions are brief and analysis minimal. Two Addenda cover the types of existing institutions, in general terms, and their associated financial factors. Illinois and Indiana coordinate their transportation planning through a Regional Transportation Planning Board and this finding was viewed by the Corps of Engineers

as an encouraging sign for interstate wastewater management. Since the Corps study, the Illinois-Indiana Bi-State Commission has been established to coordinate overall regional planning.

While there are no easy answers to the problems of wastewater management for the south end of Lake Michigan, this appendix offers little guidance in the search for such answers. There are similarities between this appendix and the one for Cleveland, but they are merely superficial; again reflecting the political situation of the region.

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APPENDIX B

DEFINITIONS AND ACRONYMS

1. Definitions

a. Institution. In this investigation and report, institution includes not only agencies and organizations, but also the rules, processes, attitudes and customs which determine and describe their behavior.

b. Water services. In general, this term is used to denote all the functions performed on or with water in a geographical urban area, including: water supply, sewage collection and treatment, pollution control, flood control, land irrigation and drainage, stormwater collection, recreation, fisheries and wildlife habitat. In practice, usage is often limited to the two most important services; water supply and sewage treatment.

c. Sewerage. The dictionary indicates that this term may be used to mean sewage. That will not be the case here. Sewerage is the system of sewers that provides the collection of sewage. Sewerage may be tributary to interceptor sewers that feed into a sewage treatment plant.

d. Township. The political unit known as the township has different status in Illinois from that in Michigan or Ohio. In the latter two states, townships disappear as cities are created from their territory, but in Illinois, the township boundaries are constant. The township unit is the property tax billing unit there, and school districts often conform to township boundaries. In effect, the township adds another layer of govern-

ment within Illinois.

e. Metropolitan Region. For purposes of this report, the area included in each region addressed is essentially that covered by the agency with the appropriate designation under Section 208 of Public Law 92-500. For Chicago, this includes six counties: Cook, DuPage, Kane, Lake, McHenry and Will; for Detroit, seven counties: Wayne, Oakland, Macomb, Monroe, Washtenaw, Livingston and St. Clair; and for Cleveland, seven counties: Cuyahoga, Geauga, Lake, Lorain, Medina, and parts of Portage and Summit.

2. Acronyms and Abbreviations

cfs = cubic feet per second. 1 cfs = .648 mgd
CRSD = Cleveland Regional Sewer District
DMWD = Detroit Metro Water Department
DPW = Department of Public Works
mgd = million gallons per day 1 mgd = 1.54 cfs
MSD = Metropolitan Sanitary District of Greater Chicago
NIPC = Northeastern Illinois Planning Commission (Chicago)
NOACA = Northeastern Ohio Areawide Coordinating Agency (Cleveland)
RWA = Regional Water Authority - ten such in England and Wales
SEMCOG = Southeast Michigan Council of Governments (Detroit)
TWA = Thames Water Authority - one of the RWA's
WCRC = Wayne County Road Commission (Detroit)