

URBAN-METROPOLITAN INSTITUTIONS FOR WATER  
PLANNING, DEVELOPMENT AND MANAGEMENT:  
AN ANALYSIS OF USAGES OF THE TERM "INSTITUTIONS"

by

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**COLORADO WATER RESOURCES**



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A STATE-OF-THE-ART REVIEW: FINAL REPORT

URBAN-METROPOLITAN INSTITUTIONS FOR WATER  
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AN ANALYSIS OF USAGES OF THE TERM "INSTITUTIONS"

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September 1972

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The project reported on in this document resulted in two additional reports which may be of interest to the reader:

1. Searching the Social Science Literature on Water: A Guide to Selected Information Storage and Retrieval Systems (Preliminary version), and
2. Institutions for Urban-Metropolitan Water Management: Essays in Social Theory.

## CHAPTER I

### INTRODUCTION

The idea for this state-of-the-art review grew out of several discussions, participated in by the principal investigator, in which "institutions" and "institutional factors" were analyzed and examined. It was recognized that many research reports, articles, and books, as well as numerous conference papers on water frequently used the term or its several variants (e. g., "institutional," "institutional factors," "institutional arrangements," "institutional processes," etc.). The principal investigator had himself used the term "institutional constraints" as applied to water management in the Detroit metropolitan area.<sup>1</sup> Yet as discussion proceeded, it became apparent that there were diverse meanings for the term and that these were often unclear and uncertain. Hence it seemed challenging to explore what was known on the subject of institutions particularly as related to urban-metropolitan water management.

In a background memorandum prepared in the formulation of this project it was suggested that most of what has been and will be done with respect to urban-metropolitan water planning, development, and management has and will be done through social institutions, both private and public. It was also suggested that much of what has not or cannot be done will, in turn, reflect a variety of institutional constraints. Implicit in these statements was the idea that institutions provide the basis for human collaboration in regular and systematic ways, both formal and informal, and that water planning, development, and management in the urban-metropolitan context has to be based on such collaboration. Although this view of institutions is broader than that which is frequently encountered in the literature, it is clear, now that the study has been completed, that even this view represents a partial and too limited a conception of what institutions are and how they relate to water management.

It was recognized from the beginning of the project that the term institution and its several variants were often used as a kind of "black box" to explain away human dimensions of particular situations (the socio-political and socio-psychological). Thus failures of plans or programs were often simply labelled as due to "institutional inadequacies." Problems were designated institutional when they seemed to involve intransigent socio-political perversities, or reflected conflicts among deep-seated social values and beliefs. Thus, it appeared from the beginning of the project that there were many uses of the term "institution" and probably considerable ambiguity and even confusion over its meaning. In any case, the reconnaissance of the subject in connection with planning the project, indicated that the formal study of institutions and

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<sup>1</sup>"Institutional Constraints on the Development of a Regional Water Supply System: The Case of Detroit," by Norman Wengert and George M. Walker, Jr., in Proceedings, 4th American Water Resources Conference, New York 1968.

institutional processes, particularly as related to urban-metropolitan water, had not been extensive, even though the term was used frequently.

It was in this context that the idea of doing a "state-of-the-art survey and literature review" seemed useful, and this then led to the formal proposal for the project.

### State-of-the-Art Investigations

"State-of-the-art" surveys have been developed and used most frequently in the engineering and the "hard" sciences. They are often a preliminary step to the preparation of research plans and proposals. Formal state-of-the-art surveys have been less frequently used in the social, behavioral, and management sciences. This is not to say that in these disciplines research goes forward without first determining what may be known on the subject, but the formalized procedure involved in a state-of-the-art survey is not as yet frequently followed in these disciplines. It may, therefore, be useful to describe what a state-of-the-art report is, and how one may be developed. One of the more careful articles on the subject, written by Ralph L. Darby and Walter H. Veazie entitled "Writing a State of the Art Report,"<sup>2</sup> stated:

"More and more, scientists and engineers are using state-of-the-art reports as a means of summarizing the current knowledge in specific areas of science and technology. Such reports, when published in journals or as books, are often called 'critical reviews.' Although the literature refers with increasing frequency to state-of-the-art reports, there are few guidelines to their preparation, content, or purpose."

From their experience these authors defined a state-of-the-art report as follows:

"A state-of-the-art report is a comprehensive analysis of available knowledge (published and unpublished) on the status of a particular subject, area or mission, frequently written for the use of a specific reader audience."

Approaches to studying the state-of-the-art on any subject today is quite different from what it might have been a quarter century ago. That difference is primarily to be found in the extent to which information storage-retrieval systems of aid to the researcher have been developed. In the late 1940's the scholar might have used the traditional library card catalog, and one or two indexes that were then available,

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<sup>2</sup>"Writing a State of the Art Report," Materials Research and Standards, by Ralph L. Darby and Walter H. Veazie, May 1953, pp. 28-32.

supplemented by an issue by issue search of particular journals. Since then there has been not only an information explosion, but also an explosion in the techniques for discovering relevant information.

It is important to emphasize that the present scientific communication network (information system) is extraordinarily complicated and constantly developing. In the last decade, a large number of information finding systems have evolved, which suggest the scope of activity in this field. With respect to water, the programs of the American Water Resources Association and the efforts of the Water Resources Scientific Information Center represent major efforts at improving information systems with respect to this subject.

It is clear, moreover, that useful information is not confined to conventional primary and secondary publications (books and journals), but includes government reports, conference proceedings, and similar materials. These more fleeting sources are particularly difficult for libraries to store and even more difficult for scholars to retrieve, since they do not usually enter into the normal stream of publication. Yet often such materials may contain significant and valuable information.

The information explosion in the field of water (reflecting increased research) was significantly encouraged by the creation of the state water resources centers under the Water Resources Research Act of 1964.<sup>3</sup> These centers have supported a variety of studies and sponsored a variety of professional conferences, all of which have contributed to the increase in information in this field, and to the intensification of the information storage and retrieval problems associated therewith.

### Concept Clarification

Since a state-of-the-art report may represent the starting point for a research project, it is of limited usefulness, if it simply is a list of published data and information on a particular subject. Often its primary contribution may be in identifying gaps in existing literature and in revealing conceptual deficiencies in existing information on the subject. An important function of a state-of-the-art review should therefore, be the clarification of concepts and definition of terms. The results of any particular literature survey may reveal very little directly relevant to the search topic, or may indicate an absence of tightly knit concepts and ideas, and a great deal of confusion. It will also help identify research needs.

As will be documented in this report, this present survey on water institutions proved to be particularly difficult. First, the quantity of literature dealing explicitly with the subject of urban-metropolitan water institutions was limited. Although the term is used with some frequency, little attention has been paid to its definition or to an

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<sup>3</sup>42 USC 1961. (P.L. 88-379, as amended by P.L. 89-404 and P.L. 92-175.)

elaboration of a conceptual framework which might be associated with the term. Second, actual usage of the term institution (and its several variants) revealed a great deal of confusion and inconsistency. These problems were clearly more complex than had been initially anticipated. The very fact that the term institution appeared frequently had led to the assumption that there would be a more-or-less clear cut body of information, if not literature, on the subject. This proved not to be the case. The results are, therefore, essentially negative. This is just another way of saying that the "art" was less developed than anticipated when the state-of-the-art study was initiated. But, as with any research, negative results may be significant.

On the basis of this experience, it seems a reasonable generalization that this situation may be encountered more frequently in social science fields, simply because the social sciences are less tightly structured than are most of the so-called "hard" sciences. In addition, for complex reasons, there is often far less precision in the social sciences in the use of terms and concepts. The experience in conducting this study has led to the tentative conclusion, then, that in social science areas, one of the major contributions of a state-of-the-art review must often be clarification of terms and giving substance to concepts.

#### Problems in Defining Concepts and Terms

Where terms are concrete, and meanings well established, the conduct of a state-of-the-art study would seem to be a fairly routine procedure. For example, the identification of literature on a topic like "reservoirs for urban water supply" or "urban water supply rates and pricing" or "urban storm water management" or "urban flood plain zoning" should be fairly straight forward. These examples, it might be noted, could include both technical engineering references as well as references to management or social science literature. In either case, the literature search would be direct and explicit. It would be necessary to determine what journals to search and what other sources to consider, but even this procedure would seem to be quite straight forward. Some complexities might arise in deciding whether to search the "urban problem" literature extensively, or to limit the search to "water information." Similarly, the investigator would need to determine how thoroughly to search engineering and scientific literature, or how thoroughly to review the social science literature. The purpose of the review would help in deciding these issues. There would, of course, be no assurance that a body of literature on the subject in fact existed.

Similarly, where the field or problem area surveyed fits into a well structured discipline, or subject matter area, such as urban water law, urban hydrology, sewage treatment, cost-benefits analyses,

or project evaluation, the survey would also probably be more-or-less straight forward.

Through application of a systems approach, the state-of-the-art study would focus on the defined system and relevant linkages. While every system is an intellectual construct, if it is to be useful and to communicate to others, it must identify the specific relationships to conventional treatment. This imperative of systems analysis, even in the social sciences, is the emphasis on logical relationships.

There is always a temptation, particularly in social science research, to follow the "Alice in Wonderland" approach of giving such meanings to words and concepts as suit the convenience of the researcher. On occasion, where the stature of the author or the overwhelming logic of his presentation is apparent, this may represent intellectual innovation. But in most situations existing meanings and customary usages would seem to be the most appropriate starting point.

But the difficulty with the word "institution" (and its several variants) stems in part from the fact that it has traditionally been used in several disciplines with related but not entirely consistent meanings, connotations, and implications. Although not fully realized when this study was begun, it is now clear that the term is not specific or concrete, but that in many uses its meaning is vague and ambiguous. Hence one of the contributions of this state-of-the-art review includes describing the situation with respect to the use of key terms, indicating the need for more rigorous definitions and concept formulations and suggesting the utility of particular definitions.

To summarize, then, the initial assumptions of this study were that while the meaning of the term institution in the several disciplines in which it was most frequently used would differ, the problem would be one of relating, reconciling, and clarifying. These disciplines were sociology, economics, law, political science, public administration and management, and perhaps certain engineering areas. And it was assumed that in management and in engineering literature, the term institution would, to a large extent, reflect the conceptualization in the other fields. However, no body of literature directly and specifically on the subject of urban water institutions could be identified so that this literature could readily be abstracted and given meaningful structure.<sup>4</sup>

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<sup>4</sup>It might be noted that a significant body of literature focusing on rural institutions, including irrigation institutions, has been developed, but this is only indirectly relevant to the present study.



## CHAPTER II

### PROCEDURE AND METHODOLOGY

A state-of-the-art review is an exercise in research. In some situations, as indicated in the previous chapter, the methodology may be simple and straight forward. But in the case of this study, because of the definitional and conceptual difficulties, it became necessary to experiment with a wide range of approaches. Thus, experience during the initial three months of effort in 1970 (which had indicated that the subject was not well structured, that meanings of the term "institution" were often unclear, and that the literature explicitly dealing with urban water institutions was very limited) pointed to the need to re-examine the methods to be used, and ultimately resulted in a more complicated approach.

One of the conclusions reached was that it would be necessary to utilize a number of information storage and retrieval systems in the hope that these might provide leads to significant literature on the subject of institutions for urban-metropolitan water planning, development and management. It was hoped that various organized storage and retrieval systems would help identify literature of possible significance, and thus permit exploration in greater depth of actual usages and applications, as well as meanings of the concepts associated with the term "institution." Thus, a systematic review of information retrieval systems in several fields of possible relevance to the subject, and of the literature from a number of disciplines was undertaken in order to try to locate relevant materials, and in order to be reasonably certain that significant sources would not be overlooked. Research was broadened to include the general topic of "institution," even when water was not particularly involved, and more general "urban" and "metropolitan" sources were also considered.

One result of the exploration of information storage and retrieval systems was the preparation of a set of notes, which in turn became a report entitled "A Preliminary Guide, was developed. It is hoped to expand and develop this guide in the belief that it may be a useful research tool to others working in various fields of water research. A copy of this "Preliminary Guide" is included as a part of this report.

It should perhaps be noted that the search would have been considerably different had the topic simply been "Urban Water Management." But others had explored the state-of-the-art with respect to urban water management, both at the general level and in considerable detail on a special topic basis. It was the term "institutions" which created the primary difficulty; and it was this term which initially posed the critical problem for this state-of-the-art project.

#### Search Techniques Used

The several retrieval systems which were utilized are indicated in the "Preliminary Guide." Some indication is also given in that Guide as

to the varying utility of the several systems, so this information is not repeated here.

A second technique utilized was that of informal conferences and seminar discussions with knowledgeable people. During the first three months of the project, informal conferences were held at the University of Michigan; at Michigan State University; at the University of Wisconsin; at the University of California, Los Angeles; and at Resources for the Future, Inc. These preliminary discussions, as well as the reconnaissance of the literatures, began to suggest the difficulties which were to be encountered as the study progressed.

### Essays on Water Institutions

In the original proposal a small working conference was suggested to focus on two or three exploratory papers prepared by competent specialists. But as it became clear that the state-of-the-art was highly unstructured, the proposal was changed and instead arrangements were concluded for the preparation of a set of essays by persons from various disciplines, who had had experience with urban water problems and had given thought to the subject of institutions from the point of view of their particular interests. This set of essays, also a supplement to this report, is intended to provide some clarification of the concepts, and where disagreements exist, perhaps to crystallize such differences. The topics covered and the contributions are indicated in the following table of contents:

#### TABLE OF CONTENTS

Preface	
Chapter 1	Introduction, by Norman Wengert (Political Science, Public Administration, Colorado State University).
Chapter 2	Social Institutions: A Conceptual, Contextual and Case Analysis, by Ed Knopp (Sociology, Colorado State University).
Chapter 3	Institutional Effectiveness and Accountability, by W. Keith Warner (Sociology, Brigham Young University).
Chapter 4	Institutions and Urban Water Management, by Robert J. Kowitz (Public Administration and Political Science, Pennsylvania State University).
Chapter 5	Measurement of the Institutionalization Process in Urban-Metropolitan Water Supply and Waste Water Treatment, by Edward R. Kaynor (Political Science, State Government Study Commission).

- Chapter 6 A Note on Institutions and Urban Water Management, by Maynard M. Hufschmidt (Engineering, Public Administration, Planning, University of North Carolina).
- Chapter 7 Some Problems of Institutional Analysis, by Vincent Ostro (Political Science, Indiana University).
- Chapter 8 Geographic Factors in the Design of Urban Water Management Institutions, by Leonard Zobler (Geography, Columbia University).
- Chapter 9 Institutions and Urban Water Management: A Systems View, by Jonathan W. Bulkley (Engineering, Political Science, University of Michigan).
- Appendices: A. Condensation of "Institutions for Managing Lakes and Bays" by Lyle E. Craine (Geography, Public Administration, Natural Resources, University of Michigan).  
B. Condensation of "Institutional Arrangements for the Great Lakes," by Lyle E. Craine.

#### Computer-Assisted Searches

Two computer assisted searches of specialized data collections were also undertaken. One of these was the DATRIX search which sought to identify doctoral dissertations of possible relevance to the subject.

DATRIX, the acronym for "Direct Access to Reference Information: A Xerox Service," was developed by University Microfilms, which since 1938 has been microfilming almost all doctoral dissertations from North American universities. The number of such dissertations is over 126,000, with approximately 18,000 from nearly 200 institutions being added annually. The DATRIX information storage and retrieval system is based on dissertation titles. Retrieval is initiated by submitting a description of the search interest and purpose, which is then put into appropriate form by the staff of University Microfilms. This computer assisted storage and retrieval system is in addition to but compatible with Dissertation Abstracts (and its accompanying index), also published by University Microfilms.

A request was made for a DATRIX search of doctoral dissertation titles going back to 1945. The key words used in the search were: water, flood, storm, sewage, drain and waste, institution, organizations, municipal, drainage, urban, city, management, plan, social, behavior, law, legal. "Metropolitan" is not in the DATRIX key word list. Excluded were: engineering, irrigation, agriculture, rural, international, and world.

Of the 38 references found, four seem to have more or less direct relevance (based on a reading of the dissertation abstracts), 16 were



- |    |                                                                                                                      |                                                     |
|----|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
|    | Ph.D.                                                                                                                | North Texas State University                        |
|    | 1969                                                                                                                 | Page 2204 in Volume 3006A of Dissertation Abstracts |
|    | Subject                                                                                                              | Business Administration                             |
| 3) | AN ANALYSIS OF MUNICIPAL WATER DEMAND IN THE PHOENIX METROPOLITAN AREA                                               |                                                     |
|    | Bruner, John Marston                                                                                                 | D.B.A. Arizona State University                     |
|    | 1969                                                                                                                 | Page 1289 in Volume 3044A of Dissertation Abstracts |
|    | Subject                                                                                                              | Economics, General                                  |
| 4) | TOWARD THE OPTIMIZATION OF INVESTMENT-PRICING DECISIONS A MODEL FOR URBAN WATER SUPPLY TREATMENT FACILITIES          |                                                     |
|    | Riordan, Courtney                                                                                                    | Ph.D. Cornell University                            |
|    | 1969                                                                                                                 | Page 0848 in Volume 3002A of Dissertation Abstracts |
|    | Subject                                                                                                              | Sociology, Regional and City Planning               |
| 5) | AN ECONOMIC INVESTIGATION OF THE PROBLEM OF WATER QUALITY MANAGEMENT IN THE TWIN-CITIES UPPER MISSISSIPPI RIVER AREA |                                                     |
|    | Wu. Carson Kung-Hsien                                                                                                | Ph.D. University of Minnesota                       |
|    | 1969                                                                                                                 | Page 0028 in Volume 3001A of Dissertation Abstracts |
|    | Subject                                                                                                              | Economics, General                                  |
| 6) | AN INQUIRY INTO THE PROBLEMS OF MUNICIPAL WATER PRICING                                                              |                                                     |
|    | Mann, Patrick                                                                                                        | Ph.D. The University of Indiana                     |
|    | 1967                                                                                                                 | Page 3321 in Volume 2809A of Dissertation Abstracts |
|    | Subject                                                                                                              | Economics, General                                  |
| 7) | THE ECONOMICS OF URBAN SEWAGE DISPOSAL                                                                               |                                                     |
|    | Downing, Paul Butler                                                                                                 | Ph.D. The University of Wisconsin                   |
|    | 1967                                                                                                                 | Page 2840 in Volume 2803A of Dissertation Abstracts |
|    | Subject                                                                                                              | Economics, General                                  |
| 8) | ECONOMIC EVALUATION OF PRICING WATER SUPPLY IN ILLINOIS                                                              |                                                     |
|    | Afifi, Hamdy Hessien Hessien                                                                                         | Ph.D. University of Illinois                        |
|    | 1967                                                                                                                 | Page 2838 in Volume 2803A of Dissertation Abstracts |
|    | Subject                                                                                                              | Economics, General                                  |
| 9) | THE POLITICS OF WATER RESOURCE MANAGEMENT IN THE TUSCON, ARIZONA S.M.S.A.                                            |                                                     |
|    | STRAAYER, JOHN ADRIAN                                                                                                | Ph.D. University of Arizona                         |
|    | 1967                                                                                                                 | Page 1491 in Volume 2804A of Dissertation Abstracts |
|    | Subject                                                                                                              | Political Science, General                          |

- 10) WELFARE AND INSTITUTIONAL ECONOMICS AS TOOLS IN THE ANALYSIS OF AN  
AREA WATER RESOURCE MANAGEMENT PROBLEM  
Sokoloski, Adam Anthony      Ph.D.      Oregon State University  
1967      Page 0856 in Volume 2803A  
of Dissertation Abstracts  
Subject      Economics, Agricultural
- 11) AN INVESTIGATION OF THE EMPLOYMENT OF MULTIPLE OBJECTIVES IN WATER  
RESOURCES PLANNING  
Werner, Robert Rehn      Ph.D.      State University of South  
1968      Page 3500 in Volume 2710A  
of Dissertation Abstracts  
Subject      Economics, General
- 12) INTEGRATED MANAGEMENT OF GROUND AND SURFACE WATER IN RELATION TO WATER  
IMPORTATION: THE EXPERIENCE OF LOS ANGELES COUNTY  
Leonard, Robert Lindsay      Ph.D.      University of California,  
1964      Berkeley  
Page 1622 in Volume 2503  
of Dissertation Abstracts  
Subject      Economics, Agricultural
- 13) THE DEVELOPMENT AND ADMINISTRATION OF WATER SUPPLY PROGRAMS IN THE  
DENVER METROPOLITAN AREA  
Cox, James Lee      Ph.D.      University of Colorado  
1965      Page 816 in Volume 2703A  
of Dissertation Abstracts  
Subject      Political Science, Public  
Administration
- 14) AN ANALYSIS OF STATE REGULATIONS OF SURFACE-GROUND WATER DEVELOPMENT  
AND USE IN COLORADO  
Johnson, Kendall Leroy      Ph.D.      Colorado State University  
1966      Page 786 in Volume 2703A  
of Dissertation Abstracts  
Subject      Law
- 15) WATER AND SEWER SUPPLY DECISIONS: A CASE STUDY OF THE WASHINGTON  
SUBURBAN SANITARY COMMISSION  
Tannian, Francis Xavier      Ph.D.      University of Virginia  
1965      Page 5111 in Volume 2609  
of Dissertation Abstracts  
Subject      Economics, Finance
- 16) THE ADMINISTRATION OF WATER LAW IN THE CENTRAL UNITED STATES---A LEGAL-  
ECONOMIC CRITIQUE OF LAWS AND ADMINISTRATIVE PROCEDURES IN COLORADO,  
KANSAS, NEBRASKA, AND IOWA

Ph.D.	The University of Nebraska
1966	Page 1496 in Volume 2706A
Subject	of Dissertation Abstracts Economics, Agricultural

PROBABLY RELATED

- 1) WATER AND PLANNING  
El Sadek, Muhammed Taker Muhammed  
Ph.D. Illinois Institute of  
Technology  
1968 Page 0846 in Volume 3002A  
of Dissertation Abstracts  
Subject Sociology, Regional and  
City Planning
- 2) THE ORANGE COUNTY PUMP TAX SYSTEM: A CASE STUDY IN GROUND WATER  
BASIN MANAGEMENT  
Weschler, Louis Fredrick Ph.D. University of California,  
Los Angeles  
1966 Page 3500 in Volume 2710A  
of Dissertation Abstracts  
Subject Political Science, General
- 3) LAW AND THE ECONOMICS OF GROUND WATER MINING IN A PUMP IRRIGATED  
AREA OF NEBRASKA  
Hanson, Marlin Lewis Ph.D. The University of Nebraska  
1966 Page 3189 in Volume 2710A  
of Dissertation Abstracts  
Subject Economics, Agricultural
- 4) THE POLITICAL ECONOMY OF WATER USE TRANSFER AND INTEGRATED WATER  
RESOURCE MANAGEMENT IN THE SALINAS VALLEY, CALIFORNIA  
Ditwiler, Cortlandt Dirck Ph.D. University of California,  
Berkeley  
1966 Page 3188 in Volume 2710A  
of Dissertation Abstracts  
Subject Economics, Agricultural
- 5) THE SPANISH ELEMENT IN TEXAS WATER LAW  
Dobkins, Betty Brooke Eakle  
Ph.D. The University of Texas  
1956 Page 2591 in Volume 1711  
of Dissertation Abstracts  
Subject History, Modern
- 6) MARGINAL-COST PRICING OF WATER WITH SPECIAL REFERENCE TO THE CITY  
OF EVERETT, WASHINGTON  
Macfarlane, Dougland Allen  
Ph.D. University of Washington  
1965 Page 4 in Volume 2701A  
of Dissertation Abstracts  
Subject Economics, General

- 7) WATER UTILITY PERFORMANCE: SOME FACTORS RELATED TO WATER RESOURCE MANAGEMENT IN A SMALL CITY  
Moffitt, William John      D.P.A.      University of Southern California  
1966      Page 7435 in Volume 26121 of Dissertation Abstracts  
Subject      Political Science, Public Administration
- 8) PUBLIC ENTREPRENEURSHIP: A CASE STUDY IN GROUND WATER BASIN MANAGEMENT  
Ostrom, Elinor      Ph.D.      University of California, Los Angeles  
1965      Page 7364 in Volume 25121 of Dissertation Abstracts  
Subject      Political Science, Public Administration
- 9) THE ECONOMIC PLANNING OF WATER SUPPLY SYSTEMS WITH PARTICULAR REFERENCE TO WATER CONVEYANCE  
Taylor, Gary Charles      Ph.D.      University of California, Berkeley  
1964      Page 3883 in Volume 2507 of Dissertation Abstracts  
Subject      Economics, Agricultural

A computer search was also made by the Water Resources Scientific Information Center (WRSIC) of its data base, made up of the titles listed in Selected Water Resources Abstracts (published twice a month). The WRSIC search produced 231 entries, of which more than half seem to have some relevance to this project. Because the search failed to exclude non U. S. place names, a number of the titles retrieved related to water problems in other countries, as well as to international topics. Subsequently, with a minimum of editing, WRSIC published the results of this search as one of its regular bibliographies entitled:

Institutional Aspects of Water Resources Development: A Bibliography, September 1971.

This Bibliography, as well as the printout, have the advantage of including a good abstract with each title, so that it is relatively easy to determine the possible relevance of a particular publication. At the same time, this Bibliography reveals one of the deficiencies of a search based partly upon ambiguous or undefined terms, such as "institutions." In one sense, this deficiency applies not so much to the Bibliography as to the key word structure, which was the basis of the search, and ultimately to the use of the term "institution" in many of the abstracted articles.

Another limitation in a machine produced bibliography is its lack of structure. Thus, although the bibliography on Institutional Aspects of



Water Resources Development runs to almost 300 pages, entries are simply listed in the order indicated by the accession number. Yet such difficulties are more than outweighed by the advantages and the convenience involved in such a machine produced bibliography. A thirty page KWIC (key word in context) index is included which provides easy access to the contents. In compiling this bibliography over 31,000 abstracts were searched, covering material through September 1, 1971.

### State Water Centers and the National Water Commission

Two other sources should be noted, which are each discussed more fully in subsequent chapters. First, as the location of relevant information became more-and-more difficult, it seemed desirable to inquire of each of the State Water Centers as to what they may have published of relevance to the topic even though this tended to duplicate the WRSIC search. The Center Directors were also asked to suggest names of persons who might have an interest in the subject of urban-metropolitan water institutions. Second, since the studies of the National Water Commission were beginning to be made available during the life of this present study, and since the statute establishing the National Water Commission specifically directed it to consider "institutions," it seemed important to review those studies which seemed most directly related to the topic of this present review.

### Project Staff

The project began in June 1970 and was completed September 30, 1972. During that time the principal investigator devoted eight weeks full-time to the project in the summer of 1970, eight weeks in the summer of 1971, and approximately four weeks (equivalent) during the 1971-72 academic year, to the project as provided in the Grant Agreement. Funding for a greater time input was not provided, but in fact because of his interest in the project the principal investigator devoted a substantial amount of his research time to the project on a "cost-free" basis.

During the life of the project at different times three graduate research assistants worked with the principal investigator:

1. Mr. William Osmon, from September through December, 1970.
2. Mr. Fred Hogge, from January through September, 1971.
3. Mr. Gary Fortner, from July through December 1971.

A number of undergraduate and graduate students also worked with the principal investigator on an hourly basis.

In addition, a three-credit seminar was devoted to an investigation of the topic "institutions and urban water management." In this class six students learned about information storage and retrieval and how to utilize the various finding systems. As part of their assignments, the students conducted systematic searches of journals in which it was thought relevant articles might be located and attempted to prepare abstracts on relevant articles. Although the results (in terms of literature discovered) were meager, it was the consensus of the students that they learned a great deal about how to use the library and retrieval systems more effectively.<sup>1</sup>

<sup>1</sup>When this class was organized, it was hoped that it might be possible to do with respect to urban water institutions what Professor William Welsh (of the University of Georgia Political Science Department) and his colleagues and students had done in information retrieval with respect to Eastern European Political Systems. See American Behavioral Scientist, Volume 10, Number 5, January 1967, pp. 11-23. But, as indicated, the literature on water institutions was too sparse and too difficult to locate.

## CHAPTER III

### THE CONCEPT OF "INSTITUTIONS" AND A SUGGESTED DEFINITION

While it was not assumed at the start of the project that the topic "urban-metropolitan institutions for water management" would be neatly packaged, for then there would have been little justification for the project, it was assumed that some degree of structure and order would be found. But as investigations into the state-of-the-art progressed, it became increasingly evident that:

1. Many uses of the term, particularly with reference to urban-metropolitan water problems, did not include careful definitions;
2. Many users of the term were unaware of the general, theoretical, literature (particularly in sociology) on the subject of institutions, and did not seem particularly concerned with what that literature may have said on the subject;
3. There was little harmony or consistency among uses, either in the practical literature dealing with water problems, or in the theoretical literature dealing more generally with institutions;
4. Many usages of the term were in fact without significant meaning (e.g., one article reviewed suffered little when the word "institution" was systematically deleted!);
5. When the term institution was used it expressed or connoted many different ideas, one of the most frequent being as a synonym for "organization."

The term was often used as a kind of "black box" to account in an undifferentiated and unanalyzed way for behavioral, societal, or managerial factors which were obviously present, but which the writer did not propose to examine. In other cases, particularly in documents and reports produced by Federal agencies, the term institution tended to be used simply as a convenient synonym for "organization" in its narrowest sense of administrative structure, i.e., a unit on an organization chart.

Among the social sciences, sociology has perhaps been most concerned with the theory of institutions and with institutional processes; political science and sociology with organizations and administrative processes; and law with the forms of responsibility and control. Economics has given special meaning to the term as applied to a school of economic thought designated "Institutional Economics." Some of the usages in these disciplines will be examined in a subsequent chapter.

The search for precision and intellectual content with respect to the term "institution" is not simply a semantic quibble. It is a premise of

this present state-of-the-art review, that the term "institution" and its several variants has utility, and that this utility can be increased if the term can be given more precise meaning, particularly as it relates to urban water management. It is recognized, of course, that words take on meaning, not by the command of a researcher, but through usage. But perhaps the efforts of a researcher can contribute to refining the meaning, to alerting those who use the term to its ambiguity, and to urging that those who use the term define what they mean by it.

In the opinion of the principal investigator the most unfortunate usage is that which equates institution with organization, because it leads to misconceptions with respect to institutional development and social change, and implies simplistically that institutions, like organizations, can be altered, adapted, or abolished at will. Organizations can be established by legislative or executive command. In some states, the people, through referenda techniques, may change organizational arrangements, e.g., a city may move from a mayor system to a city manager system. But such changes are often superficial, and may not prove viable, unless related to fundamental changes in attitudes, perceptions, and expectations of the affected citizens (including employees). Putting a uniform on a man does not make him a policeman. To start from the premise that organizational tinkering will solve urban-metropolitan water problems may lead to a serious misdiagnosis of the nature of the problems involved.

It must be conceded that using the word institution as a synonym for organization is widely supported in practical usage. At the same time, the argument presented here is that if an institution is no more than an organization established by administrative or legislative fiat, then one of the very rich and significant dimensions of the sociological meaning of the term has been lost, for in sociological usage not all organizations are automatically "institutions." Perhaps one might suggest that an organization becomes an institution when it begins to have a life independent of its creators or initiators. Thus, in the private sphere, a corporation is not an institution so long as its activity simply depends upon the incorporators. The legal fiction of personality to the contrary notwithstanding, the corporation becomes an institution when it takes on an existence separate from those coming in contact with it.

But perhaps more important is the danger that when the distinctions between institutions and organizations are obscured or lost, then it is so easy to misread the nature of socio-political and socio-economic problems and to lose sight of deeply rooted social causes. The result, then, may often be to apply the wrong prescriptions, to formulate the wrong solutions.

Many administrative studies, such as those by the Advisory Commission on Intergovernmental Relations, have identified the fact that water functions are highly fragmented in many metropolitan regions. There is evidence, moreover, that such fragmentation increases costs, creates a variety of problems, and may be generally dysfunctional. It is common, therefore, to

suggest that the solution to these problems is to eliminate fragmentation by establishing new area-wide institutions. In most cases, this solution is too simple. The fragmented system which exists in so many metropolitan areas reflects deeprooted values, as well as long established traditions, which provide rhetorical justification for a host of economic, political, and other interests. In short, fragmentation is institutionalized, and to overcome fragmentation it is not sufficient simply to pass a law or issue an administrative order.

So long as acute water shortages are absent, the general citizenry is not deeply interested in water problems. One might hope that rational arguments for efficiency and lower cost would appeal to citizens, but in fact these issues are rarely presented for decision, and when presented are beclouded with the rhetoric of local control and democratic participation, that efforts at consolidation usually fail. The point to emphasize, is that the institutions are not simply the current organizational pattern, but include socio-political value systems (norms) on which the exaggerated adherence to localism is based. Unless these values are changed, altering organizational arrangements will be neither easy nor effective. The institutional problem is not simply a matter of organizational mechanics. Experiences with reorganizations at all levels of government seem to emphasize that unless one deals with more fundamental value problems, simply reshuffling functions and agencies is not likely to bring about very significant change or improvement. The solution lies in socialization, in building understanding, confidence and support for change. The unsatisfactory results of the attempts to organize metro governments can only be explained in terms of the failure to deal with these aspects of the situation.

Perhaps many of the problems in definition revolve around the attempt to define an institution as a specific, concrete entity. Professor Ed Kaynor called attention to this in correspondence on this subject:

"I believe that much confusion would dissipate if we stopped using institution as a thing. It is too easy to fall into habits of equating institution with organization or structure. It would help me if we restricted ourselves to use of institutionalization as a process or institutional as an adjective. Thus the law would not be an institution, but rather would be thought of as institutionalized rules governing certain types of behavior. As Sumner would have said (see Folkways), mores are institutionalized in the law. Random acts are not institutionalized; habits are quasi-institutionalized ways of behaving. Local government is not an institution, but local governmental processes are the institutionalized means for planning, developing, and managing certain public services. The process of institutionalization is a process of firming up Patterns of behavior. Institutional arrangements could be a descriptive

phrase connoting extensive coordination of diverse behavior patterns."<sup>1</sup>

From the variety of views on the definition of the term institutions it is evident that Kaynor comes close to reflecting operationally acceptable views. But it is not possible to assert that a closely reasoned consensus exists. In some cases "institution" is a body of laws, in others it is an organization, in still others the term may refer to a group of individuals. But in the classification of institutions as people, agencies, pressure groups, etc., little may be gained by way of analysis; nor does this usage provide much in the way of predictive power. Thus it seems less useful to speak of institutions as "entities" than to define the ways and means by which behavior is influenced and altered through institutional processes.

If institutions are not to be defined and classified according to their structure, neither should they be defined and classified by their goals. In a study released by the University of Wisconsin entitled "Public Water Resource Project Planning and Evaluation: Impacts, Incidence, and Institutions," the point was made that goals in water management are instrumental in nature. Even flood control, as broad as that may seem, is basically a means rather than an end. When one gets to final goals and objectives, they are often so general and ill defined that it is not possible to classify institutions according to them.<sup>2</sup>

In proceeding to a preliminary definition and classification scheme, it is well to quote another comment by Professor Kaynor on the use of the institutional concept:

"I find it interesting that those who use the concept . . . seem almost inadvertently to link it with constraints as though institutionalization is akin to a straightjacketing process restricting the range of possible alternatives and freedom of action. Is there nothing to be said for the concept of a bureaucratic vehicle which maximizes coordination of specialties to achieve a goal by most efficient means?"<sup>3</sup>

Institutions and institutional processes may perhaps be better understood in the sense of function and not purpose. Writing 40 years ago, Walton Hamilton caught the breadth and complexity of institutional

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<sup>1</sup>Letter from Professor Ed Kaynor, University of Massachusetts, Amherst, December, 1971. Professor Kaynor has contributed an essay to the volume of essays which are a product of this project.

<sup>2</sup>Daniel Bromley, A. Schmid, and William Lord, "Public Water Resource Project Planning and Evaluation: Impacts, Incidence, and Institutions." University of Wisconsin, School of Natural Resources, 1970, p. 8.

<sup>3</sup>Letter from Ed Kaynor, University of Massachusetts, Amherst, December 1971.

processes when he wrote:

"Institution is a verbal symbol which for want of a better word describes a cluster of social usages. It connotes a way of thought or action of some prevalence and permanence, which is embedded in the habits of a group or the customs of a people. In ordinary speech, it is another word for procedure, convention or arrangement; in the language of books, it is the singular of which the mores or folkways are plural. Institutions fix the confines and impose form upon the activities of human dealings. The world of use and wont to which imperfectly we accommodate our lives is a tangled and unbroken web of institutions."<sup>4</sup>

An operationally useful and somewhat briefer definition is:

An institution is the structured result or outcome of a process by which values are articulated, arranged and communicated, having continuity over a period of time, with the effect of influencing or controlling the behavior of persons involved with it and who did not necessarily participate in formulating those values (norms).<sup>5</sup>

With this provisional definition, a taxonomy of institutional processes for a better understanding of how institutions affect water management, can be attempted.

#### TAXONOMY

Classification of institutional processes in water management is important for the purposes of information retrieval, and also as a foundation for any ongoing analysis of institutional activity. As a preliminary taxonomy, institutions may be classified according to the ways in which they influence behavior.

(1) Legal Processes: The ways in which behavior is influenced through legal processes is through Common Law and legislation concerning water and water rights, the enforcement of that law and those rights, and also through the resolution of conflict through the adjudicative mechanisms of the law. Water law is not the institutional process; it is the result or outcome of that process, thus the way in which water law is used to influence behavior is the important dimension in understanding institutions and in their classification.

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<sup>4</sup>Walton Hamilton, "Institution," in Encyclopedia of the Social Sciences (Edwin R. A. Seligman, editor), Volume 8, p. 84. The MacMillan Company, New York 1932.

<sup>5</sup>Recognition is given to Robert Schmidt, whose assistance with this portion of the definitional problem has been invaluable.

(2) Economic Processes: These are the ways in which behavior is influenced and directed positively through market transactions, through subsidies, negatively through taxes or through other forms of economic action. In this classification would fall most private sector activity including that of developers, financing agencies, and industry. Government agencies, and all taxing units of government in the public sector have far reaching impact on individual and collective behavior concerning water. It is interesting to reflect on the fact that the most important determinants of water management behavior may be economic interests that have no direct or primary relationship with water, such as housing developers who influence patterns of urban growth, and hence the demand for water supply and waste water services.

(3) Administrative Processes: Administrative regulations and policies differ from water law in that they are more variable and not necessarily codified. They would include procedures by which an organization, public or private, does its work. In this classification would fall the ways in which irrigation companies, municipal water systems, state agencies, and other organizations operate, the policies and procedures they follow, etc.

(4) Persuasion Processes: The power of persuasion is a common way of influencing behavior particularly by those without direct legal or economic control over a situation. In some cases the persuasive power forms the basis for bargaining. Congressional delegations, communities, governmental sub-units use tradeoffs to come to decisions which are mutually beneficial. In other cases an educational campaign may be waged to inform and influence public or official behavior. This works both ways. A community organization or pressure group may seek to influence legislators or regulatory agencies. Conversely, an agency may seek to influence water users. Where these processes are regularized or patterned they may be designated as institutionalized.

(5) Administrative Reorganization Processes: A subtle, but nevertheless potent form of influencing behavior may be through the practice (or threat) of administrative reorganization--and this may account in part for the frequent identification of "institutions" with "organizations." For the common complaint of the lack of coordination in water management, the almost universal cure has been to propose administrative reorganization, on the assumption that this could result in coordinated policies and lead to a more rational way of achieving goals. Although such reorganization to be effective must affect behavior, through law or administrative regulation, it is so important in the literature that it deserves a special category. But by emphasizing the processes of reorganization rather than the result, the stress is more readily placed on the behavioral aspects of the situation.

(6) Planning Processes: Another significant way in which behavior is influenced is through the functions of planning. This is a major way by which federal, regional, and state agencies influence behavior. Once a plan has been drawn up and formalized, it has become institutionalized.



when it is often too late to object to it or to some of its implications, that individuals and organizations are at that point limited by the plan, the boundaries drawn or policies decided upon, even though neither the law nor any administrative regulation is directly invoked to coerce behavior.

7) General Social Processes: Most commonly this covers those social outputs which evolved over time and become part of the culture of a particular society, comprised of traditions, accepted usages, and customary ways of looking at things, which can often be invoked to prevent innovation, protect interests, and add to the reputation of those individuals who have been around the longest and know the customs of the community, the agency, the organization or department. Even though these are unwritten, they can often be more pervasive and stronger than law or administrative order. In short, they become institutionalized. (This suggests one reason why reorganization which does not take either behavioral or institutional dimensions into account often fails.)

(8) Miscellaneous: This is a catch-all which picks up those ways of influencing behavior which are combined or included in all of the above. For example, an article may speak of the way in which economic interests lobby for the passage of certain legislation. This may involve economic bargaining, as well as legal processes. Or again a report may speak of the institutional aspects of water quality in a certain river basin. This may refer to many, if not all, of the outputs of the institutional processes which have been mentioned.

This chapter concludes with another quotation from Professor Kaynor:

"Institutional analysis rests on the assumption that there is order and regularity in human behavior akin to that found in the natural world. To the extent that human behavior is not patterned, it is unpredictable. Much behavioral science theory is directed at justifying the proposition that significant behavior is indeed patterned and regular (i.e., institutional), hence subject to (a) classification, (b) variable analysis, and (c) prediction. If, in fact, significant human behavior was based on whim or circumstantial accident, theory would be a futile exercise in logic and deduction, and would bear little relationship to the real world."<sup>6</sup>

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<sup>6</sup> Edward R. Kaynor and Irving Howard, "Limits on the Institutional Framework of Reference," Water Resources Bulletin, Volume 7, Number 6, December 1971, pp. 1117-1127, (at p. 1126).

## CHAPTER IV

### A REVIEW OF USAGES

It has been suggested that there is little agreement on the usage of the term "institutions" and its several variants. The suggested definition in the previous chapter is a kind of composite, combining some of the principal ideas on the subject. But no consensus can be found. In this chapter, therefore, a variety of usages are examined and quoted to suggest the range of meaning encountered.

#### GOVERNMENTAL USAGES

It is, of course, impossible to review even a small part of the government documents and reports in which the term "institution" occurs. A subsequent chapter will examine the uses of the term by the National Water Commission, focusing on its work because it represents a kind of synthesis, is very current, is concerned specifically with water, and was instructed in its statute to include institutional factors in its review of national water policies and problems.

An examination of a considerable number of Federal government reports, however, leads to the conclusion, that most frequently the term is used simply as a synonym for organization--and organization in its simplest meaning of structure (organization charts, with little or no recognition of the social-psychological, and value aspects of organizational behavior (i.e., how people behave in a work situation in relation one to another). A body of organizational theory has been developed but this finds little application in Federal administrative action. Federal bureaucrats dealing with water institutions usually think in terms of river basins (often larger than most European countries), and of government programs with budgets and staff of tremendous size. Federal water interests have only rarely focused on urban problems, water pollution being a recent exception. But whatever the explanation or reason, it is clear that in Federal usage most often institutions are equated with organizations.

The following paragraphs, then, present an overview of governmental approaches to the use and meaning of the term institutions.

#### The Office of Science and Technology (Executive Office of the President)

In July, 1968 a special panel of consultants to the Office of Science and Technology recommended that research on water resources policy and institutions should be expanded. The panel (consisting of William C. Ackermann, Chairman; John R. Borchert, Maurice Goddard, Jerome W. Millikan, Robert L. Smith, Calvin D. Trowbridge, and Abel Wolman) discussed institutions in the following terms:

"The importance of institutional considerations has long been tacitly recognized in the sense that over the years a complex system of water law and policy has developed in each state and in the federal government. These policies, and accompanying institutional arrangements, play an increasingly important role in shaping water development plans. It is quite conceivable that the enactment of one piece of federal legislation, whether the latter relates to pollution abatement or flood insurance, could have more impact on the nature and extent of future water management than any single scientific gain of the next ten years."

Although in its report the panel of consultants did not stop to describe specifically what they meant by institutional arrangements, it is possible to infer from the quoted paragraph that they started with a conception that was considerably broader than simply organization. But when the panel listed eight topics requiring research, they moved more in the direction of considering institutions as simple equivalents of organizations. The eight topics or questions to which they felt attention needed be directed were:

1. Is the river basin a valid water management unit?
2. Does multi-purpose planning produce concurrent multi-purpose benefits?
3. What key ingredients make trans-basin diversion mutually advantageous to the participating parties?
4. Where and how is it shown that existing water rights doctrines have limited or otherwise impaired needed water resources development?
5. What type of grant programs are most effective and efficient?
6. Does failure to provide equitable allocation of financial responsibility inhibit or facilitate the resolution of water management problems?
7. How do institutional arrangements affect the role of the private sector in water resources development?
8. Are there basic principles of resources management which could provide guidance or insight in the decision-making process?

Of these eight questions, numbers 4 and 7 quite obviously are broader than simply organizational, while questions 6 and 8 are sufficiently open-ended to permit the inclusion of more broadly oriented approaches; but failing to define their terms, they did not indicate the implications

of this list for water research, or suggest more specifically the kinds of research needed.

### The Water Resources Council

As the top Federal Water Policy Coordinating Agency, with membership from the departments with major roles in water activities, and relationships with state and regional agencies, the Federal Water Resources Council is an important spokesman on many water issues. Its position with respect to institutions is reflected in a report entitled Alternative Institutional Arrangements for Managing River Basin Operations. This report, prepared by a Council Task Force made up of agency representatives, was issued in August 1967.

The extent to which the Task Force, and by implications the Council, regarded institutional arrangements as synonymous with organizational arrangements--i.e., structural linkages among those having some kind of responsibility for river basin action--is suggested by the first sentence of the Forward which stated:

"Within the creative federalism that has become a distinguishing characteristic of the governmental structure of the United States, the responsibility for managing the water and related land resources of the nation's river basins is shared among federal, state and local governments and private enterprise."

Elsewhere in the report "administrative patterns" is used, and it is emphasized that there is no one best administrative pattern. The report lists, with very brief description, eight organizational arrangements. But it loses none of its meaning if, where the word "institution" or "institutional arrangements" appears, one were to substitute the words "organization" or "organizational."

### The Great Lakes Basin Commission.

The statute establishing the Water Resources Council gives it a kind of general supervision over river basin commissions established pursuant to the same statute. But in much of what they do, the river basin commissions are independent. Thus the Great Lakes Basin Commission collaborated with the Committee on Multiple Use of the Coastal Zone (of the National Council on Marine Resources and Engineering Development) in preparing and issuing a report in June 1969 entitled, Great Lakes Institutions: A Survey of the Institutions Concerned with Water and Related Resources in the Great Lakes Basin.

This survey report equates institutions with organizations without qualifications, stating in the introduction:

"As the problems concerning the lakes have increased, so have the interests and concerns of people and organizations. This has resulted in increased activity by governments, organizations, and private citizens. In recent years, the number of institutions concerned with the Great Lakes has increased dramatically . . . .

"The purpose of this review is to prepare a contemporary survey of institutions having responsibility for or interest in the Great Lakes which can be used as a tool by these institutions to aid in reducing confusion and improving communications and coordination. . . ."

The report is a catalogue of the agencies and a description of their programs as related to the Great Lakes, and in tone it might well have been a part of the U. S. Government Organization Manual.

This approach should be contrasted with the report prepared by Professor Lyle Craine<sup>1</sup> (referred to briefly below and condensed in the essay volume of this report), which recognizes the complexities of the institutional problem as it relates to change and action.

#### Research Requirements in the Great Lakes Region.

Although not a government report (except in the sense that public universities may be regarded as government, and that funding came from the Office of Water Resources Research), it seems appropriate to review at this point in the analysis the document submitted to OWRR by the Council on Economic Growth, Technology, and Public Policy of the Committee on Institutional Cooperation ("CIC"). The Committee on Institutional Cooperation is a consortium of the so-called "Big Ten" Universities plus the University of Chicago. This report on Research Requirements is significant because it contrasts so sharply with that of the Great Lakes Basin Commission, prepared a year later (and one would think that the Commission would have had the "CIC" report available to it, particularly since the Great Lakes Commission is located in Ann Arbor, Michigan, and maintains many contacts with the University of Michigan, a member of CIC.)

A good deal more precision in the use of the term "institutions" is found in the CIC report. It distinguishes (and discusses) social organization separate from institutions and institutional processes, stating:

"The nature and degree of social organization related to water resources in such areas as the Great Lakes region is yet another topic meriting investigation. Such relevant questions

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<sup>1</sup> Professor Lyle E. Craine, School of Natural Resources, University of Michigan. Professor Craine has had considerable experience with the Federal government.

as the following might be raised: (1) In what way and to what extent can social systems analysis be applied to the entire region and/or to its parts? (2) How extensively are the people of the region organized with reference to water resources? (3) Which organizations are more interested and more powerful in water resource decisions? (4) What are alternatively useful ways of studying parts of society relevant to particular programs and policies, e.g., community power structure, organizational sets? (5) What are the region's peculiar problems of coordination (or rivalry) among institutions and agencies concerned with water resources?

"Allied with this research would be that on the advantages and disadvantages of alternative forms of organization and decision-making. . . ."

"The organizational patterns and performance of water resource agencies should be examined and evaluated. . . ."

In speaking about institutions this report stated:

"During the considerations of a systems analysis approach to research on the Great Lakes, discussion frequently turned to 'institutional constraints.' There was general recognition that no matter how 'right' a physical and economic solution might be, there were often institutional obstacles to its adoption, and that research on such institutional problems is urgently needed."

At this point the report does what is so frequently not done, namely, define what was meant by institutions and institutional systems, stating:

"The terms 'institutions' and 'institutional systems' are here used to designate a web of poorly defined interdependencies among law, agency operations, and public finance as these activate and constrain federal, state, and local governments in formulating and implementing water policies and programs. . . . While it may be said that social, economic, legal, and political forces do interact to constitute a type of institutional system or systems which may determine whether actions indicated by physical and economic considerations will be taken, it is apparent that these interactions are not readily amenable to quantitative systems analysis."

There is thus in this brief treatment a clear recognition of the importance of values to institutions. It is also clear that those preparing this part of the report recognized the purposefulness of social institutions. They, thus, rejected the simple idea that institutions

were equivalent to organizations.

The report then proceeds to identify limitations of systems analysis in studying institutions, continuing:

"A systems approach in considering water and related resources in the Great Lakes region will emphasize that there are institutional values important for reasons other than water-related considerations and that these must therefore be balanced against specific water-related benefits and costs associated with alternative institutional arrangements. Research in this area, then, must involve not only water agencies, but the whole range of institutions affecting decisions on water policy, and management institutions directly concerned with water resources are not separable from the entire spectrum of institutions relied upon to achieve a wide range of social purposes. Particularly in the humid eastern portion of the country specific water agencies must be considered a small part of the total institutional environment significant in water-resource problems.

"Within this frame of reference, several areas of institutional research emerge as important: (1) Analysis of the institutional systems through which water policies and programs are formed and implemented. Studies of specific agencies should document differences and relationships among their objectives, legal authority, financing methods, and staff needs. In short, this research should illuminate these agencies' capacity to deal with problems of the Great Lakes, the clientele they serve, and the influences to which they respond and the interactions among agencies required in attacking the region's water-resources problems. (2) Identification and analysis of the institutional implications of interaction between water-centered decisions and related environmental factors, e.g., land use, industrial development, suburbanization, recreation, and transportation. (3) Studies of indirect factors affecting water-related decisions, such as the operations of realtors, organized industrial and conservation interests, engineering consulting firms, and news media. (4) Studies to develop ways of identifying the community of interests which institutional arrangements should serve by water resource decisions. Research is needed on the decision structures required by specific water problems and on identifying the beneficiaries, cost sources, and principal participants associated with specific actions. (5) Studies to illuminate different perceptions of the nature and seriousness of water-related problems so that political demand, as distinguished from economic demand, may be better expressed.

Such studies can also guide the design of institutional arrangements to properly articulate these value judgments along with other factors with which they must interact. (6) Analysis of the relative roles of the professions and politics in water policies and programs. There is general agreement that fundamental water decisions today involve balancing conflicting social values and that these decisions must ultimately be made through political processes. Studies that will clarify the need and methods of maintaining clear channels of political responsibility should be encouraged. Analyses of existing independent water agencies to determine the extent and significance of political responsiveness to them would throw light on the kinds of institutional adjustments which would promote more responsible political action. (7) Analysis of emerging legal-institutional problems associated with enforcing water regulations under current federal law. For example, enforcement patterns between state agencies and public (municipal) corporations are fairly well established, but those for private corporations, an area of considerable importance in the immediate future, are less well developed."

#### More on the Great Lakes

The following material, from the writings of Professor Lyle E. Craine, is also not directly and specifically governmental, although the work<sup>2</sup> for the second source was in part financed by the Great Lakes Commission. These excerpts are from two of his writings: (1) "Institutions for Managing Lakes and Bays" which appeared in The Natural Resources Journal, Volume 11, Number 3, July 1971, pp. 519-546, and (2) Final Report on Institutional Arrangements for the Great Lakes: A Report to the Great Lakes Commission, March 15, 1972. Both of these are condensed in the essay volume of this report.

With respect to the desirability of defining terms--a point made frequently in this present report--Professor Craine very early in his article states:

"As used here, 'institutions' and 'institutional arrangements' refer to a definable system of public decision making, one that includes specific organizational entities and governmental jurisdictions, but transcends conventional emphasis upon definition of agency structure per se. In addition to being concerned with component organizational entities, the term 'institutions'

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<sup>2</sup>Both articles were the results of research work also supported in part by Resources for the Future, Inc.



suggests special attention to the configuration of relationships (1) established by law between individuals and government; (2) involved in economic transactions among individuals and groups; (3) developed to articulate legal, financial and administrative relations among public agencies; and (4) motivated by social-psychological stimuli among groups and individuals. Specific relationships falling in any or all of these four categories, constrained and shaped by the natural and social environment weave a web which describes the institutional system for decision making. Thus, institutional studies focus on the linkages which tie authority and action centers together into a public decision making system which is responsive to the environment within which it must operate."

In considering problems of institutional change, under the heading "Institutional Design Processes," Professor Craine states:

"The process of designing institutions for Lake/Bay management as set forth herein is built upon expansion of the idea of public intervention in the production of goods and services from lakes and bays. Existing institutional arrangements represent particular forms of intervention and the present consensus of dissatisfaction includes demands for change in the extent and the manner of that intervention. New forms of intervention, if they are to result in improved lake/bay decisions, should compensate (1) for lack of private enterprise's capacity to deal with certain environmental problems, and (2) for the fragmentation of public authorities, which are relevant to lake/bay management. It is here postulated, first, that public support for changes . . . will be based on the belief that the present output is sufficiently inconsistent with public expectation regarding efficiency and distribution to justify intervention and second, that the judgment of 'sufficiency' involves three specific considerations: (1) the social costs of status-quo; (2) the social costs of intervention proposed; and (3) the degree of certainty that the output consequent of the proposed change will be more satisfactory. None of these factors is subject to absolute measurement. Public perception of these factors should nonetheless be controlling as to whether an intervention proposal finds support or not."

And in his conclusions Professor Craine clearly recognizes the distinction between organizations and institutions. He states:

"The adequacy of the nation's public institutions is being called into question in many if not most areas of public affairs. Organizational tinkering no longer satisfies the

the discontent. The questioning goes to basic premises of our culture and it calls for a fundamental reassessment of the institutions needed to respond to contemporary problems and challenges."

He further emphasized this distinction by stating that:

"It might be claimed that organizational reform has in the past mistakenly sought to sharpen the differentiation of function, instead of accepting a concept that functions may appropriately be shared if operational linkages are prescribed to govern the interagency behavior in specified decisional processes."

In his report to the Great Lakes Basin Commission, Professor Craine emphasizes the same concepts as in the article from which the previous quotations were taken. For example:

"Public concern about the Great Lakes is often expressed by a call for new institutional arrangements. . . Institutions and institutional arrangements by their very nature are complex, and those engaged in directing the use and development of the Great Lakes are no exception. Furthermore, the state-of-the-art regarding the role of institutions in society, their structure, and their behavior is not far advanced. Institutional investigations such as reported here, in an effort to cut through the complexity, run the risk of oversimplification and/or dealing in generalities and ambiguities."

Under the heading "Guidelines for the Study" he states:

"The term 'institutional arrangement' is distinguished from concern about organizations and agencies by its emphasis upon interactions among agencies, law, political electorates, governmental procedures, and informal behavioral patterns in the process of arriving at a specified set of public decisions relevant to the use and development of the resources within the Great Lakes Basin."

#### Alternatives in Water Management

In 1966 a joint committee of the National Academy of Sciences and the National Research Council reported briefly on Alternatives in Water Management. It is perhaps significant that this report, which certainly discussed in considerable detail what might be called the institutional factors which would affect water management, did not use the term institutions or institutional arrangements. Whether the committee was aware of the ambiguity

in these terms, or whether it found it desirable to discuss institutional factors in more concrete terms is not clear. But it is clear that they recognized that water management was not simply a matter of organization.

#### Soil and Water Conservation for a Better America

In October 1971 the U. S. Soil Conservation Service issued a report entitled Soil and Water Conservation for a Better America, A Framework Plan. This report has little direct relevance to the problems of metropolitan water management, but it does have a significant chapter entitled "Institutional Arrangements for Implementing the Plan." After stating that "Institutional arrangements are of paramount importance," this document proceeds to list institutional factors that affect the management of natural resources. Included in this list are:

- (1) Private ownership of resources or private rights to use resources.
- (2) A federal form of government in which most of the authority over property is vested in state and local governments.
- (3) Public ownership of unique, fragile, or scarce resources.
- (4) A competitive economy in which the market place guides economic production, allocates resources, and distributes income.
- (5) A complex system of federal, state, and local laws, regulations, and public programs that are designed to correct or improve the performance of the market place.
- (6) A broad system of public education from elementary school through college.
- (7) Private and semi-private conservation organizations and associations designed to generate voluntary cooperative action by resource users to advance both private and public interest.
- (8) Citizen participation through public advisory groups.

The report then discusses the relationship of institutional factors to pressures for change and suggests the importance of certainty to viable resource oriented society. A similar analysis of urban water related institutions would seem fruitful, and it is for this reason that this particular report is referred to at this point.

#### GOVERNMENTAL USAGES IN NON-WATER FIELDS

Reports of the Federal Government in fields not directly related to water seem also frequently to equate institutions with organizations, as

illustrated in the following instances.

#### Electric Power and the Environment

In August 1970 the Energy Policy Staff of the Office of Science and Technology issued a report intitled Electric Power and the Environment. This report was prepared in cooperation with the Atomic Energy Commission, the Department of Health, Education and Welfare, the Department of the Interior, the Federal Power Commission, the Rural Electrification Administration, the Tennessee Valley Authority, and the Council on Environmental Quality. Two chapters, deal explicitly with institutional problems, and include the term institutional in their titles. Chapter two is "Present Institutional Arrangements and Standard Setting Considerations" and chapter three is "New Institutional Arrangements." But it is clear that the term organizational could be substituted for institutional without changing the sense or meaning of the discussion.

Although this report does not deal with water as such, it is significant that this impressive alignment of federal agencies, many concerned also with water, regard the term "institutional arrangements" as involving simply organization and reorganization--a shuffling of the boxes on organization charts.

#### Institutions and Public Expenditure Policy

Congress holds hearings and publishes reports and background information papers on many subjects without assuming any responsibility for the specific content. This is the case even when a particular volume or set of volumes were, in effect, planned by the issuing committee and its staff. The next reference is to such a Congressional publication on the subject: The Analysis and Evaluation of Public Expenditures: The PPB System, The Joint Economic Committee of the Congress of the United States, 91st Congress, First Session, Washington, 1969. The compendium of papers published under this title was issued in three volumes, Part II of the first volume being subtitled: "Institutional Factors Affecting Efficient Public Expenditure Policy."

Part II, in turn, was divided into five sections entitled respectively:

- A. The Making of Public Expenditure Decisions and the Implementation of Public Policy;
- B. The Efficiency of Government Expenditures: The Pricing of Public Output and the Evaluation of Their Worth;
- C. Attaining Public Expenditure Efficiency in a Federal System;

- D. Limits on the Consideration of Expenditure Alternative: The Budget and the Bureaucracy;
- E. The Lack of Knowledge and Data as a Constraint on Effective Policy Analysis.

Most of the articles in these five sections, and particularly those in sections A, B, C, and E were written by economists, several of whom have written extensively on problems of water. Curiously, however, the articles contain very little discussion of either institutional or organizational questions. Perhaps the article coming closest to institutional analysis is that entitled "Systematic Analysis of Grants in Aid in a Federal System" by Selma Mushkin and John Cotton, which deals in an indirect way with some of the constraints of the Federal system.

#### Urban Research and Development

In 1969 the National Academy of Science published a report for the National Research Council entitled A Strategic Approach to Urban Research and Development, Social and Behavioral Science Considerations. This report was prepared by a special committee on social and behavioral urban research. It is important in connection with this review of the uses of the term institutions for urban water management largely because it reflects the fact that among social and behavioral scientists the term (concept) institution is not presently popular. In discussing "strategic considerations" the committee stated:

"The urban problems of the nation will not succumb rapidly to new social programs, to technological innovations, or to new administrative arrangements; nor will the resources of knowledge and manpower in the social and behavioral sciences, which are required for the understanding and resolution of these problems, be quickly developed and effectively deployed. Yet, unless their effective development and utilization are made major goals, the nation will be deprived of essential means for managing urban affairs better in the future."

The term institutional is used at several points with fairly typical ambiguity. Thus the report states that "HUD must also create new institutional capabilities to achieve those mission-oriented research objectives for which existing resources are likely to be unresponsive or unsuitable." And in a list of specific research projects, one is described as: "The social and institutional setting of housing programs. . . ."

Under a heading "Instruments and Goals" this report states:

"Identification and specification of the causal links between instruments and goals . . . will . . . enable researchers . . .

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to generate as outputs (1) measures of the impacts of instruments on the urban environment, (2) measures of the performance of instruments in terms of goal achievement, and (3) translation of the measures into sensitive social indicators for monitoring urban programs."

One is inclined to feel that had this paragraph been written by persons specializing in water problems the word "institutions" would have been used instead of instruments.

Another significant portion of this report is found under the heading "Systems Approaches." This section is worth careful reading by those interested in water problems if for no other reason than that a so-called "systems approach" is often suggested as the way in which to deal with water problems. In this connection the report suggests that if a systems approach is broadly construed, it can be applied to urban problems. The Report continues:

"To say this, however, is to recognize that the various parameters of social units and the variables by which the parameters are made operational are inter-connected at many points. . . . An important task for social science research is to search for those linkages and to assess their interactive effects."

The committee is critical of the over-simplified application of systems approaches to the solution of urban problems. They provide a definition for an urban system to the effect that: "an urban system is the total set of urban units among which there are more orderly flows of raw materials, finished products, information, and people." The committee then points out: "the local unit that most nearly approximates an urban system is the metropolitan area" and suggests that it is possible to identify a number of system sectors as the components of this urban system. It then points out that "these sectors may be classified as "(1) utilities, (2) territorial, and (3) institutional." The further elaboration of these three categories is of interest.

"In the utilities sector are the transportation networks, including the street pattern and its traffic, the water-sewage system, the power and communications systems, and various other installations for distributing services and for linking activities. . . .

"The territorial sector comprises all those spacial clusters of activities together with the buildings that house them. Thus there are central and subsidiary business districts with their mixes of activities and the external economies engendered thereby, industrial districts with broadly similar features, and residential districts. . . .

"Finally, overlaying territorial units are various institutional networks differing from place to place in composition and in number. Every urban unit, of course, has its governmental structure with its many agencies. That structure is disconnective and duplicative in the metropolitan area with ad hoc linkages here and there. Less obvious are other networks. One, for example, is that involving lending agencies, builders, realtors, municipal planning agencies, and the courts, which regulate housing and land development policy. Another consists of private welfare agencies, and so on, which administer aid. . . Still another is formed of Chambers of Commerce, Associations of Manufacturers, City Clubs, businesses, and industrial establishments, which influence, if not regulate, labor and wage policy. These networks are illustrative, not exhaustive. The point is that such networks exist and exercise important influence on how an urban unit operates."

#### THE LITERATURE OF SOCIOLOGY

The literature of sociology dealing with institutions and institutional processes is perhaps the most extensive among the social sciences. At the same time, it is clear that even in this field, agreement by no means exists as to what the term means nor how it should be used.

A few years ago Professor Thomas W. Martin wrote, in an article entitled "Social Institutions: A Reformulation of the Concept" (11 Pacific Sociological Review, 100-109, Fall 1968):

"The concept of social institution is perhaps one of the oldest and most widely used terms in the vocabulary of the social sciences. Its origins trace back to the works of Plato; its treatment as a social variable to the works of Montesquieu; and its usage as a major concept of social order to the 18th century Contract, Moral, and Utilitarian,

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<sup>3</sup>The essays by Ed Knop and Keith Warner in the volume of essays which are a part of this report should be examined in this connection. See also Harold E. Smith, "Toward a Clarification of the Concept of Social Institution," in Sociology and Social Research, Vol. 48, #2, pp. 197-206 (1964); Howard B. Kaplan, "The Concept of Institutions: A Review, Evaluation, and Suggested Research Procedure," in Social Forces, Vol. 39, pp. 176-180 (1960); Don Martindale, Institutions, Organizations, and Mass Society, Houghton Mifflin Company, Boston (1966). These references are but a sampling.



Schools of Social Philosophy. With the development of 'positivistic organicism' in the 19th century, the concept rapidly became a central conceptual device for describing and explaining fundamental characteristics of social structure and order. Later, with the vigorous growth and elaboration of sociology, anthropology, as well as other related behavioral sciences, the concept quickly developed into a virtual theory of social order.

"Today, despite its continued wide currency, the term social institution has become the object of severe criticism regarding both its present theoretical importance and its operational utility. The question has been raised: what does the concept mean; and, if it means anything, how can it be used to test social reality?"

"That institution means something is evident when one examines current basic texts in sociology and anthropology, for here is found an abundance of explanation and applications of the term. So too its utility is apparent in that most behavioral scientists continue to commonly employ it to order segments of social reality..."

"...Notably absent...is a clear and up-to-date definition of the concept institution, at either a theoretical or, significantly, an operational level. Rather, it seems that the concept has steadily come instead to serve as a catchword, an heuristic device, or a 'primitive term' to be used as a means for generalizing specific research findings to the level of system operations..."

A somewhat more positive discussion of the concept "social institutions" was written in the late 1960's by Professor Shmuel N. Eisenstadt in the International Encyclopedia of the Social Sciences (under the topic "Social Institutions"). To a large extent, Eisenstadt advances his own conceptions of institutions and institutional processes, but he also reviews ideas found in the literature generally. Thus, he states:

"Social institutions are usually conceived of as the basic focuses of social organization, common to all societies and dealing with some of the basic universal problems of ordered social life. Three basic aspects of institutions are emphasized. First, the patterns of behavior which are regulated by institutions... Second, institutions involve the regulation of behavior of individuals in society according to some definite, continuous and organized pattern... Finally, these patterns involve a definite normative ordering and regulation..."

Eisenstadt suggests that institutionalization can be defined as the development of regulative principles which organize most of the activities

of individuals in a society into definite patterns. He recognizes that societies develop different institutions and seek different goals through their institutions. At the same time, citing Parsons, he emphasizes that institutions constitute a part of the basic definition of society, and are a concomitant of the very existence of ordered social life.

Eisenstadt examines several explanations of institutional emergence. His own concept involves viewing processes of institutionalization as processes of exchange which he defines rather explicitly. The following excerpts from his article suggest, in very brief form, the nature of his analysis.

"One rather common explanation (of institutional emergence) is in terms of the needs of individuals and of societies... and their interrelations. . . ."

"Other common explanations. . . . have been couched in terms of needs of other institutions; of broad sociodemographic and technological trends, or what can be called 'ecosystems,' and conditions; or of some basic, universal psychological laws governing human behavior. . . ."

"All these varied (functional) explanations, however fruitful they may be as starting points. . . , do not provide adequate explanations. . . . they usually do not go beyond the mere restatement of the basic emergent quality of institutions. . . . they tend to explain the particular by the more general. . . . such explanations are usually ad hoc and not subsumed under more general principles. . . ."

"Instead of speaking of institutions as given, constant, self-contained entities, it might be more profitable to talk about the process of institutionalization and to look on it as a process of continuous crystallization of different types of norms, organizations, and frameworks which regulate the processes of exchange of different commodities. The latter term, "commodities," is not used in the narrow economic sense, but more in the sense of "quid pro quo.". . . ."

"Any institutional system regulates and organizes patterns of behavior of the individual members of society or its component groups. . . ."

"Studies of social determinants of behavior and attitudes have rarely attempted to analyze how these attitudes and behavior affect the process of setting up new norms and organizations. . . ."

"The possibility of innovation and change is not something external or accidental to any institutional system. It

is given in the very nature of the process of institutionalization, and in the workings of institutional systems. . . ."

"Just as the predilection for change is necessarily built into any institutional system, so the direction and scope of change is not random. Rather, they depend on the nature of the system generating the change; on its values, norms, and organizations; on the various internal forces operating within it; and on the external forces to which it is especially sensitive because of its systemic properties. . . ."

### The Function of Social Behavior in Water Resource Development

The title of this section is from a book by Wade H. Andrews and Dennis C. Geersten (Institute for Social Science Research on Natural Resources and Center for Water Resources Research, Utah State University, December 1970). This is a behavioral study comparing metropolitan-urban people with rural people. It is an attempt to measure attitudes towards social change, particularly that involving water use. One chapter dealt with water institutions including in this definition water rights, and water measurement. The definition of institution in this chapter is:

"a complex normative pattern governing behavior in certain fundamental and recurring situations, perhaps better understood as traditional, accepted and established patterns of organization or procedure."

The process whereby the system of water rights became an institution is briefly sketched. Indicating their concept of institution as it related to water rights, the authors stated "the institution of water rights is one that farmers apparently have little specific knowledge about, but strong institutional acceptance for, and have given little thought about changing." And in talking about changing water rights the authors stated "the level of knowledge will likely be inversely related to the level of emotionalism, fear of change and of the unknown. There will need to be a sound understanding of rights in order to provide the sense of security needed to change long standing, patterned institutions. . . . The implications of this may well be that raising the level of knowledge could be a major force in the implementation of social change in water institutions." Here, then, is a clear recognition of the complexity of social change where institutionalization is involved.

Another chapter in this book is entitled "Basic Institutions, Social Systems and their Perceived Functions in Water Resource Development." Included among the institutions considered are local governments, politics and water, educational systems, religious social systems, influential groups, and government agencies including the Bureau of Reclamation. As sociologists, the authors give evidence of the complexity of institutional

processes and in this particular chapter make a significant contribution to the concept of institutions by recognizing the relationship of social systems to the institutional structure. It would seem, however, that for analytical purposes the authors found the concept of social systems more useful than the more general term institutions.

### THE LITERATURE OF ECONOMICS

Although those who write about institutions in the literature of sociology are by no means in agreement as to its meaning, there is a general recognition of the importance of the term, and of the need for trying to make it operational, by deliberate analysis and conceptualization. This need is not fully recognized in the literature of other social science disciplines, where a similar diversity exists, but where attempts to clarify the term are indeed rare.

In economics, the term "institutional" has its most common application to a school of economic thought which originated during the first quarter of the 20th century under the leadership of Thorstein D. Veblen, John R. Commons, and Wesley C. Mitchell. Writing in the International Encyclopedia of the Social Sciences, Professor Allan G. Gruchy, himself an institutional economist, stated:

"Institutional economics is very largely an American intellectual product stemming from the work of Thorstein Veblen and other economists working in the Veblenian tradition. The term 'institutional' was applied to this type of economics early in the current century because it examines the economic system as a part of human culture, which is a complex of many institutions. The concept of an 'institutional school' can be used only very loosely--in the sense that the members of this school have the same philosophical orientation, the same broad cultural approach to economic studies, and the same way of viewing the American economic system."

Gruchy divides institutional economics into three time periods, suggesting that among contemporary institutionalists are Clarence Ayres, John K. Galbraith, Leon H. Keyserling, Gardiner C. Means, and Gerheart Colm.

In closing his article, Professor Gruchy suggests:

"Should national economic planning cross the Atlantic, the institutional school could very well gain much more influence on the development of both economic theory and economic policy than it has at present."

It is significant to note that this seems to be happening, not through the means of economic planning in general, but in relation to the concern

over environmental degradation and the need for environmental protection.

In an article entitled "The Institutional School of Economic Thought Reconsidered," Professor Louis E. Hill (in the Rocky Mountain Social Science Journal, Vol. 8, No. 2, October, 1971, pp. 113-117) comments:

"The dedicated neo-institutionalists who have organized the Association for Evolutionary Economics and who are publishing the Journal of Economic Issues have a great opportunity to extend the frontiers of economic science to include new creative methods and new important applications, but if they would realize the promise of these new ~~methods~~ and applications, they must refrain from destructive criticism of conventional theory...Rather, they must accept that which is valid in the heritage of the orthodox tradition and build their new and original approaches, methods, techniques, and applications upon the foundation of this tradition. If the neo-institutionalists can seize these opportunities, then they may be able to realize the potential inherent in a creatively pragmatic institutionalism, which will open new vistas for the economic science."

Superficially, it would seem, that the institutional economists might have devoted some attention to the problems of definition and meaning of the term. But as Professor Gruchy suggests, the institutionalists are unified, not so much by concept definitions, as by philosophical outlook. At the same time, when economists, who do not consider themselves institutionalists, have used the term, they have not often stopped to define it. And the way in which it is used is often neither clear nor consistent.

Not infrequently economists also use the term as a designation for organization, without much attention to the kinds of factors referred to above which are important to sociologists. Several illustrations indicate this type of usage.

Allen V. Kneese is an economist whose contribution to thinking about water pollution problems has indeed been significant. In a recent book (1968) which he co-authored with Blair T. Bower, his belief that institutions are significant was suggested by his use of the term in the title; Managing Water Quality: Economics, Technology, Institutions (The Johns Hopkins University Press, Baltimore, Maryland, 1968). Part IV of this study is specifically entitled "Institutional and Organizational Approaches to Regional Water Quality Management." The fact that institutional and organizational are both used in the title would seem to suggest that distinctions would be drawn between these two terms. But this is not the case.

The authors begin by stating:

"Studies of the economic-engineering aspects of water quality management have demonstrated that a regional system can achieve major economies that cannot be realized by the conventional approach to water quality control. But little is known about how to devise legal and institutional arrangements that will permit efficient and politically responsible implementation of water quality management programs. Compared with engineering and even economic studies, institutional studies of water quality management are in their infancy."

This seems to suggest that the authors were considering a broad sociological analysis, rather than simply discussing organizational arrangements, but the ensuing pages, unfortunately, do not live up to the expectations created by these lead sentences. Although the organizations discussed involve complex interrelationships, the description is largely in terms of simply legislating new organizations, with only occasional references to social processes by which organizations become institutions. The proposed organizations would be vitally "affected with the public interest," but there is little discussion of the nature of these relationships, either in the sense of constituency, or in the sense of legitimizing organizational actions. The normative function of organizations is not discussed, and one is left with the feeling that the authors believe that rational decisions will create consensus, and that these automatically emerge from the creation of the organizational order.

It is clear that the authors tend to regard institutional and organizational as equivalent terms, and leave the reader with the impression that change is a matter of simply deciding to do things differently. The case studies of the Ruhr and of the River authorities in England and Wales, as well as of the French Basin agencies, and of the Delaware River authority strongly suggest that better water quality management can be achieved by means of organizational change. That the way in which things are done at any particular time may reflect deeper societal problems is not recognized. The result is too simple an approach to the resolution of problems which may be involved.

A specialized, but at the same time broader approach, is found in an article by Jerome W. Milliman entitled "Economic Considerations for the Design of Water Institutions" which appeared in the December 1965 Public Administration Review (Volume 25 beginning on page 284). Professor Milliman bases his analysis on his conclusion that

"The water problem then, is not primarily one of water but instead is one of institutions, management, and of economic principles."

He deals with both law as an institution (i.e., a normative system affecting and controlling human behavior) and with the economic market

as an institution. His recognition that institutions are not equivalent to organizations is indicated in his discussion of the functions of public agencies. He suggests that such agencies should: (1) establish a system of law that permits a clear definition of property rights; (2) provide certainty of tenure for these rights and a clear basis for their transfer; (3) provide a procedure whereby rights to own water may be acquired; (4) establish rules and procedure for the protection of outside parties against spillover effects; and (5) develop and provide information regarding the extent and quality of water resources. These five public agency missions thus require the establishment of a system of law with supporting norms (values), and although Professor Milliman does not discuss how government would institutionalize these functions, he clearly indicates that simply creating organizations by legislative or administrative command would not be sufficient.

Another economist who deals with the problem of institutional design is Roger Sherman in the February, 1970 issue of Land Economics (Volume XLVI, Number 1). His article, entitled "The Design of Public Utility Institutions," while not directly concerned with water, is nevertheless useful as suggesting an approach to institutionalization. In it he takes issue with those economists who see in the simple application of market institutions the complete solution to allocation problems, including water allocation. Although in parts of the article Sherman seems to equate institutions with organizations, a closer reading indicates that he has a broader conception in mind, focusing on the use of organizations to accomplish social purposes. Thus it is the purpose that is a dominant consideration. And he is concerned about how people (i.e., individuals and groups) relate to organization. He states:

"The main issue, then, is not which pricing rule is best, but what organization can give consumers who are willing to bear public costs an opportunity to agree on how to share them. Publicness in the cost relationship calls for this shift in emphasis. But the publicness can be traced to uncertainty and asset durability which can result in an efficient short run price that fails to cover total costs...The presence of publicness creates a collective choice problem; the set of public utility consumers must agree on a way to share the costs that cannot be identified or imputed to units of service or to customers...Compared with possible alternatives, the ordinary corporation may, therefore, be an inappropriate form of public utility organization."

The dynamic aspects of the institutional problem is suggested in the following quotation:

"One difficulty is that sophisticated cost sharing arrangements aimed at minimizing exclusion may break down as a result of bargaining strategies that are made available to the consumers. The other is that uncertainty may not be borne by the 'right' persons. With these two problems in mind, let us examine an alternative consumer-investor institution."

This Sherman proceeds to do.

Another study, although not urban in its orientation, serves to underline the dominant approach of economists to the concept of "institutions" (L. M. Hartman and Don Seastone, Water Transfer: Economic Efficiency and Alternative Institutions). The authors state:

"The basic question to which this book is addressed is: To what extent do existing organizational arrangements for the management of the water resource permit reallocation to take place efficiently? The transfer arrangements analyzed consist of the market possibilities for water transfers which exist under different legal systems and within various prominent types of water organizations."

This is clearly the work of two institutional economists, but one might wish that they had devoted somewhat more attention to the definitional problem. This is not simply a matter of whim but goes to the heart of understanding their approach and emphasis. This may perhaps be illustrated in the following paragraph:

"Thus, particularly with respect to water use, economic development involves not only development of the resources and related capital facilities but also institutional development. Changing the forms of organizations is a fundamental part of economic growth, for the correlates of growth involve an increasing complexity of relations among economic agents. Institutional development for water use has proceeded to an advanced stage in some geographic areas. In other areas, use and development are still performed primarily within the traditional property-rights market-system rules. The state of institutional development appears highly correlated with the state of economic development and population and, consequently, with the relative scarcity of the resource. Economic development and population growth tend to result in a predominantly urban culture, which tends to be more traditionally oriented. In the industrial sector, progress in the form of technological innovations and capital growth has been facilitated by widespread organizational innovations."

Chapters two and three of the Hartman-Seastone study deal with institutional aspects of water rights as measured by efficiency criteria for market transfers. Chapter 4, 5, and 6 deal explicitly with water organizations and there is only slight reference to the sociological aspects of these organizations. Such an orientation might have permitted a more effective discussion of the institutional problem. This book includes a case study of a municipal transfer of irrigation water to domestic use. But like so many others, it does not define what is meant by institutions and in many places by inference suggests that the term is simply a substitute for "organizational arrangements." For example, it is stated:



"Evaluation of an institutional system requires measurement of the degree to which the system performs functions in accord with community goals." This is an interesting sentence since the goals are viewed as affecting the institutional system whereas most sociological treatment of the subject suggest that the goals are in fact an important part of the institutional arrangement. The dichotomy here suggested flows naturally from equating institutions with organizations.

Professor Allan Schmid (of the Department of Agricultural Economics, Michigan State University) has also written extensively on various aspects of the institutional problem from the viewpoint of "institutional economics." Dean Stephen C. Smith of the University of Wisconsin has similarly written about institutions for water development from the viewpoint of the "institutional economist." But neither has dealt explicitly with urban-metro water management problems.

#### THE LITERATURE OF POLITICAL SCIENCE

Among the social sciences the terms institutional and institutions are perhaps used with least discrimination and least consistency in political science. No article or book has been discovered in which these terms were defined, although they have been used with some ease and frequency.

An example of common usage in political science is a recent book edited by Allen P. Sindler, entitled American Political Institutions and Public Policy: Five Contemporary Studies. In the preface the editor states: "Our case studies treat the major institutions of American national government--Presidency, Congress, Supreme Court, the Bureaucracy, and the Parties--as they grapple with problems of high contemporary importance." The focus of the case studies is in each case indicated by the subtitle, thus the discussion of Congress is in terms of Medicare politics and policy. The discussion of the Presidency is in terms of the war in Viet Nam. The discussion of the Bureaucracy is in terms of the Anti-poverty and Community Action Program, focusing particularly on the city of Durham, North Carolina. The discussion of political parties focuses on House Republican leadership, and the chapter on the Supreme Court on reapportionment litigation. There is in the book no explicit discussion of institutions, nor is there any attempt to define what is meant by political institutions. In fact, the book might just as well have been titled The Political Process or The Political System. Other references in the field of political science would reveal similar ambiguities and lack of precision.

#### A Study of the Washington Metropolitan Area

In March 1971 the Institute for Defense Analysis, as a part of its independent research program, released a report entitled An Analysis of

Alternative Institutional Arrangements for Implementing an Integrated Water Supply and Waste Management Program in the Washington Metropolitan Area, by Paul S. Hughes. The first sentence of the first chapter states:

"In recent years a considerable amount of study has been devoted to the economic and technological aspects of environmental management, but relatively little attention has been given to the institutional mechanisms necessary for implementing advances in these areas..."

The author then states "This paper focuses on integrating water supply and waste management programs..., examines several existing and proposed institutional arrangements for achieving such integration, and suggests an alternative model." The study next proceeds to examine a variety of coordinative organizational arrangements including the Interstate Commission on the Potomac River Basin, the Metropolitan Washington Council of Governments, Maryland Environmental Services, the Potomac River Basin Commission, the Metropolitan Washington Waste Management Agency, and describes the relationships among these various organizations.

The third chapter entitled "An Institutional Model..." proposes how the author believes the problems of the Potomac should be dealt with--emphasizing organizational approaches.

Appendix A, entitled "Summary of Institutional Criteria Suggested in Selected Studies," reviews a number of studies including the Syracuse University study of the Delaware River Basin and several reviewed in this present chapter, i.e., the Water Resources Council study of "A Alternative Institutional Arrangements," the Kneese and Bower study, and the Craine study.

#### Limits on the Institutional Frame of Reference

This is part of a title of an article by Edward R. Kaynor and Irving Howard cited in Chapter III. Mr Kaynor is also a contributor to the volume of essays which have been produced as a part of this present project. The authors deal with the fee system for consulting engineers, the funding for certain agencies, the institutionalization of equity concerns, overrepresentation of interests, and incompatibility of agency goals. These constraints are then attributed, in part, to broadly based value orientations of American society, such as its pragmatic traditions. Their concern is with social processes and human behavior and in this connection the following paragraph deserves quoting:

"The findings from this study of water resource decision-making in Massachusetts indicate that in this one area of the public decision-making process at least, institutions are less important than other variables. Even when one is

looking for institutionalized ways of doing things, the outcomes attributable to institutional influences appear less important than the outcomes attributable to such variables as 'good sense'."

It is rather significant that the research which their article reviews was designed to demonstrate that institutionalized patterns of behavior are critically important elements, but the authors concluded "what we consider our most important findings do not support the institutional type of explanation we anticipated." This negative finding is not directly relevant to the present study, but its quotation here is designed to suggest the need for and nature of institutional analysis, whatever the conclusion may be.

#### A Political Theory for Institutional Analysis

Two political scientists, strongly influenced by economic theory and analysis, have written several articles and papers on a variety of institutional problems, including explorations of theoretical aspects of political institutions and institutionalization. They are Drs. Elinor Ostrom and Vincent Ostrom.<sup>4</sup> In an unpublished paper ("A Political Theory for Institutional Analysis") in which their concern is for institutions to manage so-called "common pool" resources, they state:

"The existence of intensive competition does provide an incentive for a community of affected users to seek some common solution to their problems. The reduction of spillover costs for the community of users by adopting policies that take each other's interests into account represents a potential to be captured. This benefit can be captured if a community can have recourse to appropriate institutional arrangements normally found in the public sector. . ."

Here the terms "institution" and "organization" seem almost to be interchangeable, except that the Ostroms are concerned with the dynamic aspects of organization and with the function of the institution in its relationship to individuals and groups.

This dynamic appraisal is further evident in the following quotation:

"Even where an existing public jurisdiction has boundaries that include the relevant public affected by utilization of the common-pool resource, it may not possess the necessary decision-making capabilities."

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<sup>4</sup> Dr. Vincent Ostrom has contributed to the essay volume of this report.

This orientation, which extends considerably beyond traditional organizational approaches, is summarized in the following paragraph:

"Institutions of government are formalized ways of arranging for the availability of third party offices when individuals are not able to reach a satisfactory resolution of a conflict. Courts have frequently appointed impartial, disinterested third parties to supply information on utilization of the common-pool resource. . . . In the absence of formalized governmental institutions, parties to conflicts may act jointly to employ the services of a third-party intermediary. Lawyers have traditionally performed such services. In an era of collective bargaining in labor management relations, the services of labor mediators are often jointly procured by labor and management. . . ."

In thus focusing on function and on particular (and peculiar) social problems which need to be solved, the Ostroms avoid a simple organizational approach. It would not, therefore, be possible to substitute the word organization for the word institution in their article without destroying the sense of what is being written.

Another relevant paper is "Institutional Arrangements and the Measurement of Policy Consequences in Urban Affairs" by Elinor Ostrom published as one of the Studies in Political Theory and Policy Analysis by the Department of Political Science of the University of Indiana. This deals with the Southern California water situation.

#### OTHER USAGES

In this section of this chapter, other usages of the term "institutions" will be examined, without particular reference to the discipline represented by the writer.

In connection with the problems of Water Quality Management, reference might be made to the ORSANCO Story (By Edward J. Cleary). This is the story of the Ohio River Valley Water Sanitation Commission (ORSANCO) which has recently come under criticism for not being effective enough in "cleaning up the Ohio River." The study does not purpose to be institutional, but it might well have been, since many of the problems associated with the Ohio River are institutional in character. This means simply that they are not going to be solved by organization or reorganization, but by much more basic social processes involving changing of public values and attitudes and redirecting ways of approaching problems of pollution.

The many conflicting interests involved in the management of the Ohio River must be dealt with, and this is hardly feasible in terms simply of organization or even coercive Federal authority. What is involved in the Ohio River (and in many major rivers) is an intricate web of social

relationships, patterns of behavior, and societal values. Solutions which do not identify these but seek to deal with them by simple organizational changes will inevitably fall short.

The ORSANCO Story suggests that attention to institutional processes is important, although seldom considered. The argument of this present report is that the concepts of institutionalization and institutional constraints are important for an understanding of various aspects of the urban water situation. But to be effective, institutional concepts must be defined and dealt with in depth. In a sense, the questions must be asked as to why certain things are done as they are, and if the explanation suggests particular institutionalization, then the resolution of difficulties requires unraveling these factors, showing how they developed, their roots and support structures, and then considering what it may take to achieve change. The issues are issues of social and political processes and of socialization, and not simply of organization or reorganization.

For at least 25 years the contributions of Professor Gilbert F. White to thinking about water problems and policies has been significant. In a recent book (Strategies of American Water Management, the University of Michigan Press, 1969) Professor White confronts the problem of institutions, distinguishing his focus on social institutions from what he calls the "engineering approach, economic analysis, the sociological approach, the ecological approach, and the political science approach." He emphasizes that decision making is conditioned by the perceptions of water managers. Social institutions, in turn, "are seen as affecting both perceptions and the freedom or incentives with regard to which individuals have to operate." Perceptions of (1) range of choice, (2) water resource, (3) technology, (4) economic efficiency, and (5) spacial linkages are the chief components, each influenced by social institutions.

In February, 1969, the Cornell University Water Resources and Marine Science Center (publication #23) outlined an Agenda for the National Water Commission. Included in this volume of papers and essays was one by Phillip L. Bereano entitled "The Adequacy of Institutional Arrangements for Water Resources Management." A statement on the title page of the entire volume indicates that Mr. Bereano's paper is an outgrowth of a project entitled "Government Institutional Arrangements and Allied Law to Facilitate Water and Related Land Resources Planning, Development, and Operational Management." This project is concerned with organizational problems in the Hudson River Basin. Mr. Bereano's contribution, however, tends to equate institutions with organizations. Thus, he states:

"The major area of concern, therefore, is how to best organize our government so we can effectuate these policies. . ."

He concludes:

"If one believes that the problem should define the organizational pattern, then the first step is obviously to ascertain

the goals or needs in a given area. One must ask whether the suggested institution is the only or the best way of meeting these needs. . . ."

In a study entitled The Range of Choice in Water Management by Robert K. Davis (The Johns Hopkins University Press, Baltimore, Maryland, 1968), under a section heading "The Institutional Task" appears the following statement:

"The question of what constitutes an appropriate set of procedures and organizational arrangements for water resources management goes well beyond the scope of this study. But our study does show that water management organization must have a different set of capabilities than they now have, if certain kinds of alternatives are to receive consideration."

#### Institutions and Clean Water

In the summer of 1971 a faculty fellowship program in engineering systems design sponsored by Old Dominion University Research Foundation and the National Aeronautics and Space Administration produced a report entitled Clean Water: Affluence, Influence, and Effluents: A Design for Water Quality Management. Chapter 2 of that report was entitled "The Societal Influence on Clean Water." It dealt with social and cultural factors affecting water use and quality standards, fragmentation both between and within levels of government, and the results of this fragmentation for administrative enforcement. It also reviewed the need for citizen education.

While the focus was not specifically on urban water problems, nor on institutions, pollution of water is primarily an urban phenomenon, and the approach of the report to institutions is indicated in the following quotation from the synopsis of chapter two.

"It will be asserted in this chapter that our political, governmental, and legal structures are merely institutional embodiments of societal attitudes, which in turn are a product of our historical traditions and cultural values. These latter are important, for in the area of natural resources use and allocation, there are historical, cultural, and societal values which place definite limitations on our freedom to bring about changes in the area of water resources management. . . ; thus, any recommended adjustments of a political or legal nature must be worked out within the constraints of these more fundamental attitudinal determinants."

Several additional quotations from this chapter are significant:

"Water institutions, like other aspects of our culture, have emerged through the convergence of a number of forces including ethnic traditions governing water use, circumstances in the natural environment, plus a most basic feature of our culture--the ethos

defining man's relationship to nature. . . . In short, the roots of American water institutions are very deep, and under these circumstances the process of change is very difficult to perceive. Indeed, water rules do not appear simply as a matter of snap decision, by accident, by deliberate rational process or by the force of tradition, but rather out of a convergency of all these forces. It is a gradual process, and one that is undergoing constant change."

The report then examines, first, the extent to which the existing culture operates as an "idea filter." And second, the extent to which change will be resisted where it conflicts drastically with existing cultural values. In this context, then, the consequences of traditional legal institutions are examined as well as the extent to which values of society with respect to development shape and limit approaches to water pollution.

Obviously this approach regards institutions as considerably more complex than what are normally designated as organizations. Moreover it recognizes the extent to which institutional change cannot be accomplished in the mode of organizational change by simply issuing an order or passing a law. As has been suggested in previous comments, this is not simply a matter of semantics but deeply affects the kind of research and analysis which will be considered necessary to accomplish institutional changes. To regard the matter as simply one of organizational change is to overlook many significant aspects of the arrangements vitally affecting urban-metropolitan water management. In this connection, it is to be noted that although the report is concerned with the problems of jurisdictional fragmentation, it recognizes that this situation has deep roots in American culture and history. Hence, improvement or change involves more than simply establishing a super government or clarifying responsibility.

#### Studies of Institutional Factors in Texas

In recent years the Water Resources Institute of Texas A & M University has published a number of studies with the phrase "Institutional Factors" in the title. Much of the work upon which these publications were based was supported in part by funds provided by the Office of Water Resources Research. The publications produced as a result of the research project include the following:

"Institutional Factors in Water Development," Proceedings, 12th Water for Texas Conference, Warren Trock, Water Resources Institute, Texas A & M University, College Station, Texas.

"Institutional Factors Affecting Land and Water Development, Lower Rio Grande Valley, Texas," Water Resources Research, Warren Trock, Journal of the American Geophysical Union, Volume 5, Number 6, December 1969.

"Institutional Factors and the Texas Water Plan," Proceedings, 42nd Annual Meeting, Western Agricultural Economics Association, Warren Trock, published by Oregon State University, Corvallis, Oregon.

A Study of Institutional Factors Affecting Water Resource Development in the Lower Rio Grande Valley, T. Casbeer and W. Trock, Technical Report Number 21, Water Resources Institute, Texas A & M University, College Station, Texas.

"Institutional Factors and the Texas Water Plan," Water Resources Bulletin, W. Trock and C. Jensen, Journal of the American Water Resources Association, Volume 6, Number 2, April, 1970.

Organization of Agricultural Resources in the Lower Rio Grande Valley of Texas with Limiting and Non-Limiting Water Supply. A Dissertation by Abdullah T. Thenayan, Department of Agricultural Economics, Texas A & M University, College Station, Texas.

A Study of the Effects of Institutions on the Distribution and Use of Water for Irrigation in the Lower Rio Grande Basin. A Dissertation by Roy M. Gray, Department of Agricultural Economics, Texas A & M University, College Station, Texas.

As these titles suggest there is an emphasis upon the total water situation and particularly the Texas Water Plan which includes considerable attention to agricultural uses of water. At the same time, none of the titles deal explicitly with Institutional Factors related to Urban-Metropolitan Water Management. Nevertheless, this series of studies sheds considerable light on particular usages of the term "institution." The most general of these studies is Institutional Factors Influencing Water Development in Texas, by Dr. Warren L. Trock (March 1971).

The concept which underlay this particular study (and probably the others as well) is set forth in the first paragraph of the "abstract" where it is stated:

"The development and use of land and water resources has been and will continue to be significantly affected by institutions-- legal, cultural, economic, political, and religious. Institutions are the organizing and directing mechanisms by which we achieve an organization of resources in productive activities which satisfy human needs. They are essential to individual and collective activity and thus must be understood and managed to achieve our purposes."

In the body of the report there is a heavy reliance upon sociological concepts (particularly as expressed by Kimball Young) and also references



to the writings of institutional economists (as associated with the work of John R. Commons).

The viewpoint shifts considerably, however, in the second chapter where "Institutional Arrangements for the Texas Water Plan" are reviewed. This shift is suggested in the following quotation from the "abstract:"

"Numerous political and economic institutions must be changed or newly developed to provide for (1) the Interbasin Diversions proposed by the Texas Water Plan; (2) the creation and management of transfer systems; and (3) distribution of water within importing areas and fulfillment of financial obligation."

Here the emphasis is on deliberate action creating institutions, rather than on institutional processes relating to human values and behavior.

However, water rights are regarded as significant institutional factors, and it is stated:

"An examination of the water rights and institutions produced the conclusion that the efficiency of water use can be increased by making water rights or annual allocations freely negotiable."

By ignoring the social processes and conflicts by which such alterations might be achieved, this study minimizes the nature of deeply held values with respect to water rights. The approach leads to an easy assumption that new legislation or administrative orders will bring about change. There is no reason to believe that this in fact is the case, particularly when it is recognized that the water rights system is so deeply imbedded in the value systems with respect to water which dominate Western thinking in irrigated areas.

In the study entitled A Study of Institutional Factors Affecting Water Resource Development in the Lower Rio Grande Valley, Texas, by Thomas Casbeer and Warren L. Trock (September 1969), chapter 5 is entitled "Classification of Valley Institutions." This is a brief chapter and significant portions of it (footnotes omitted) are worth reproducing here:

"Institutional factors are grouped into five classes: (1) Legal, (2) Political, (3) Cultural, (4) Economic, and (5) Religious. Within each class there are many specific factors. Some are ordinarily very important; others have negligible influence on man's affairs."

"Barlowe identified legal institutions as rules and regulations recognized as binding by man and nations. They are collective action in control of human behavior and include statutes, ordinances, administrative regulations, judicial interpretations

and decisions and some customs which have gained the sanction of legal authority. The political and governmental class of factors includes the policies and regulations, the powers and duties of federal, state, local and special governmental units. Important specific factors include taxes, eminent domain, police power, spending power, and proprietary power. The class of factors identified as cultural contains a wide range of institutions and includes customs, habits, traditions, tastes, preferences, goals and attitudes. These factors often greatly influence the economic and political institutions and always have great impact on human behavior. Economic institutions are numerous and are forces of significance in the operation of our economic system. They include fiscal policy, taxes, public and private property, inheritance, contract, vested rights, competition, monopoly, leasing arrangements, etc. They are 'social arrangements' by means of which business and economic life are organized, directed, conducted and regulated. Several of these factors are important in the Lower Rio Grande Valley. Religious institutions have been important to resource development and use in the past but have negligible significance today. They will not be considered in this study of the Valley."

A similarly broad approach to institutions occurs earlier in the introductory chapter where, among other things, it is stated:

"Contained within this broad framework are such things as the role of cultural environment and social forces ~~in~~ influencing the behavior of individuals, groups, or communities. Also included are cultural attitudes, customs and traditions, habitual thoughts or practices, legal arrangements, government activities, religion and other similar factors."

Specific chapters are devoted to legal institutions, to political institutions, to cultural institutions, to economic institutions, and to an examination of the impact of institutions.

This broad emphasis is more or less typical of the agricultural (irrigation) literature, but the approach is weakened in the final "Solutions" chapter which deals with organizational and administrative problems, and does not effectively confront the issues of institutional change, growth and development as identified in the quotations. There would thus appear to be a considerable gap between the descriptive and conceptual material, and the suggested solutions. This is perhaps best suggested in the final sentence of the report which reads: "When the people understand how inefficiently the water resource is being used, and how costly the floods and poorly drained lands have been, it is reasonable to suppose that their institutions will be altered to a point where, with the consent of the

people, effective action can be taken." (p. 127)

Another study published by the Water Resources Institute of Texas A & M University, although not a part of the previously referred to series, is worth referring to both because it explicitly deals with an urban problem, and because it avoids the conceptual baggage of institutional arrangements and concepts. This study is entitled Identification of Management and Planning Problems of Urban Water Resources in the Metropolitan Area of Greater San Antonio, by Joseph K. Garner and C. S. Shih. The first chapter of this study presents standard descriptive material on the San Antonio area. The second deals with "Governmental Organizations." The situation is described without reference to "The Institutional Situation." And yet the description might be utilized to indicate the intricate web of institutional factors. But those studying organization are not prone to use institutional terminology. At the same time there is recognition of process and of interrelationship as well as of constraining values which limit organizational approaches to water problems. Thus it might be suggested that the discussion does not suffer from being cast in an organizational rather than an institutional mode.

#### Other Institutional Perspectives

The title of the project suggests that in addition to "institutions," the literature of urban-metropolitan water planning, development, and management might fruitfully be explored. As one would expect, the literature dealing with the several terms contained in the title (namely, urban-metropolitan, water, planning, development, and management) is tremendous in scope, in detail, and in volume. But the initial expectation that the concept "institution" and "institutionalization" would serve as primary key words or limiting descriptors restricting the review of this literature dealing with these several terms has proved a vain hope.

To illustrate, a recent annotated bibliography prepared by Melville C. Branch, Professor of Planning, University of Southern California, entitled Comprehensive Urban Planning includes a tenpage chapter designated "Institutionalization." This chapter lists fifty-four titles, and most of these are annotated. But, in fact, the collection is a kind of "rag bag" of titles including a work by Chris Argyris, Integrating the Individual and the Organization; a vocational guidance manual by Margarie S. Berger entitled Opportunities in City Planning; a study of the British Civil Service; C. Northcote Parkinson's book Parkinson's Law; a standard textbook on public administration by John M. Pfiffner and Robert Presthus; as well as an administrative history of the Department of Housing and Urban Development by John B. Willmann.

Searches in the literature and bibliographies dealing with the other terms in the title have not proved particularly fruitful. There seems to

have been a general failure to give a precise meaning to the terms "institution," "institutional," and "institutionalization" in most of the literature.

## CHAPTER V

### STUDIES OF THE NATIONAL WATER COMMISSION:

#### A REVIEW AND CRITIQUE

The National Water Commission was created September 26, 1968 (Public Law 90-515). The duties of the Commission were specified in Section Three, subsection "a", of the Act as follows:

"The Commission shall (1) review present and anticipated national water resource problems making such projections of water requirements as may be necessary and identifying alternative ways of meeting these requirements--giving consideration, among other things, to conservation and more efficient use of existing supplies, increased useability by reduction of pollution, innovation to encourage the highest economic use of water, interbasin transfer, and technological advances including, but not limited to, desalting, weather modification, and waste water purification and reuse; (2) consider economic and social consequences of water resource development including, for example, the impact of water resource development on regional economic growth, on institutional arrangements, [emphasis added] and on aesthetic values affecting the quality of life of the American people; and (3) advise on such specific water resource matters as may be referred to it by the President and the Water Resources Council."

The section also indicated that the Commission would terminate five years from the effective date of the Act, namely, by September 26, 1973. Moreover, the Executive Director of the Commission has stated that the Commission does not intend to ask for an extension of this deadline.

Ten years earlier, under the leadership of Senator Robert S. Kerr, the Senate had conducted a review of water policy using a Select Committee for that purpose. And while some of the work of the Select Committee was obviously self-serving for Senator Kerr and other Senators active in its deliberations, it did produce a number of significant studies which influenced public policy throughout the 1960's. It was undoubtedly with this experience in mind that Congress in 1968 created the National Water Commission with the specific charge indicated above. Additional continuity with the earlier effort was provided in that the Executive Director of the present Commission Mr. Theodore M. Schad had also been Director of the Select Committee staff.

The specific reference to "institutional arrangements" in the statute led the Commission to establish a "Panel on Institutional Arrange-

ments,<sup>1</sup> one of six panels designed to provide expert, independent review and guidance. The Panels have met irregularly, as the occasion has demanded, for discussion and analysis of major interdisciplinary problems. Among the participants on the panel on institutional arrangements have been: Professors Dean E. Mann, David J. Allee, Lyle E. Craine, Irving K. Fox, N. William Hines, and Vincent A. Ostrom.

As in the case of most federal commissions, the National Water Commission is publishing a substantial number of studies. Some of these have been conducted by its own staff, others under contract with consulting firms, and still others by individual consultants. As of January 20, 1972 (the cutoff date for this analysis), 26 reports had been released to the public through the National Technical Information Service.

Two of these reports explicitly deal with "institutions." One of these is Metropolitan Water Institutions by Orlando E. Delogu and the other Institutions for Water Planning by Gary W. Hart.<sup>2</sup> Two others have considerable significance for this present state-of-the-art review. These are: Metropolitan Water Management by Urban Systems Research and Engineering, Inc., and Public Participation in Water Resources Planning by Kathryn P. Warner.

Three other reports have some institutional significance, although not directly related to urban-metropolitan water management. These three reports are: The Federal-State Regional Corporation by Richard A. Solomon; Interstate Water Compacts by Jerome P. Mays; and The New England River Basins Commission by Helen Ingram.

In addition, finally, nine of the 26 studies available as of January 20, 1972 dealt with various problems of water law, and have some legal/institutional significance.

In a letter to the principal investigator, the executive director explained that the reports (such as those listed above by title and author) were prepared for the National Water Commission to provide background for its consideration. They do not necessarily reflect the Commission's conclusions or recommendations.

Each of the above listed reports are reviewed in subsequent portions of this chapter, but first some general comments would seem to be in order.

Nowhere in these reports is there a definition or a discussion

<sup>1</sup>Perhaps the NWC recognized the difficulties inherent in the term "Institutional Arrangements" when it changed the name of this Panel to the "Panel on Decision Making Arrangements."

<sup>2</sup>A third, by Allen Schiff has not been available.

of the meaning of the term "institution" or "institutional arrangements" to cite the language of the statute. Throughout, the writers seem to assume that readers will know what institutions and institutional arrangements are. Actually, when the terms institution or institutional arrangements are used in National Water Commission documents, the inference is clear that they serve most often as general synonyms for organization. In a number of cases, where these words are used, they can in fact be stricken without changing the meaning of the sentences involved. In short, there is no clear evidence in these reports that consideration was given to the conceptual literature dealing with institutions, institutionalization, and institutional arrangements. Nor does it appear that those preparing these monographs sought to clarify the meaning of this term.

As indicated in previous chapters, the use of the term institution as a synonym for organization (institutional arrangements for organizational arrangements) is so frequent that one cannot fault the authors of the Water Commission reports, but it could have represented a significant contribution to the field, if they had defined their terms, and sought to determine whether any particular or specialized meaning might appropriately be given to them.

It may be argued that the problem of definition is not important. Since so many different uses of the term 'institution' occur in the literature, what difference does it make? In the following detailed analysis of the National Water Commission Reports, some attention will be directed to this specific question, to some extent emphasizing arguments presented earlier. The position here taken is that it does make a difference, both analytically, and in terms of more effective and more precise communication.

#### Metropolitan Water Institutions (by Orlando E. Delogu)

The subtitle of this report indicates more clearly what its subject matter is, namely, "legal and governmental structures for water management in metropolitan areas."

First, it should be noted that the report contains no definition of the concept "institution." Second, it is clear that in the author's usage, the term "institution" is primarily a synonym for organization. He relies heavily for his substantive information on several reports of the Advisory Commission on Intergovernmental Relations and on the report prepared by Urban Systems Research and Engineering (to be discussed below) entitled Metropolitan Water Management: Case Studies and National Policy Implications.

In his summary, Professor Delogu states:

"The institutional answer to metropolitan water problems does not seem to lie in the formation of new general-purpose metropolitan government....the answer may lie, however, in the development of metropolitan regional entities formed for the sole purpose of handling water supplies and sewage disposal."

In the above quotation, the word "institutional" can be dropped without changing the meaning of the sentence, or one might substitute "organizational" for "institutional", without altering the sense.

In the report proper (page 9) the author states:

"At some point one is led inexorably to the conclusion that existing local government water supply and waste water treatment programs and institutions are not working well, and that state and federal programs designed to give impetus and effect to these local efforts are not succeeding."

Again the term "organizations" or "organizational arrangements" can be substituted for the word "institutions." Moreover, it is not clear from the illustrations used in the report whether the problem lies in organization or in program, the coupling of the two terms in the key statement above creates an analytical ambivalence that is difficult to overcome. This is particularly true since no data is presented to suggest that there are inadequacies in water supply and waste water treatment or to indicate in very concrete terms the characteristics of these inadequacies.

An HEW Bureau of Water Hygiene Study is cited involving 969 public water systems serving 18 million people. This represents less than 10% of the total U.S. population, and the fact that 969 systems were involved suggests that these are not metropolitan communities but small cities and semi-rural communities. While the fragmentation of water supply and sewage handling systems in metropolitan areas lacks neatness, almost all major metropolitan areas have water supplies which generally meet Public Health Service standards for drinking water quality.

Most criticisms of sanitary sewer systems and sewage treatment facilities are concerned with the externality problem and not with the quality of services to the homeowners or other users of the sewer system. Failure to make distinctions of this sort tends to weaken the analysis of the report considerably.

After rather inadequately describing what is supposed to be the organizational and program problem (never distinguishing whether it is organizational or program) the report moves into examining "institutional mechanisms that have been and are presently being considered as vehicles for arresting these trends." Just incidentally since no trends have been established the logic of this transitional sentence is somewhat doubtful.

On the question of trends, it might be noted, for example, that



until 1935 the City of Milwaukee was pumping unfiltered Lake Michigan water in its water mains, the only treatment being chlorination. As late as 1920 the City of Knoxville, Tennessee, was pumping raw Tennessee River Water in its water mains, and drinking water was purchased by the more affluent from water wagons. Again, as of 1920 the number of cities that were dumping raw sewage into rivers and lakes was substantially greater than today.

When dealing with capital facilities that have life spans of from 40 to 80 years, it seems questionable to talk about trends in terms of five or ten years. While many problems remain to be solved, it is a fact that most American cities today have at least primary treatment facilities, many have secondary facilities, and others are considering construction of tertiary treatment plants. Moreover, the quality of drinking water in our major metropolitan areas, with several exceptions, is unequalled anywhere in the world. From the point of view of public health standards, it remains safe. The problems of storm water management and combined sewers deserve special attention.

The "institutional mechanisms" which the report considers to be among the more or less innovative approaches are metropolitan reorganizations and councils of governments. Then the report assesses the opportunities for improving existing government institutions, and finally it examines new approaches and institutions for water resources management. The report concludes that:

"Some urban problems, such as pollution control, mass transit, and highways can be dealt with adequately only if large land areas and populations are included in both the planning and implementation phases of programs addressed to these particular problems."

Thus, it is recommended that water resources problems require a large scale metropolitan approach. A distinction is not made between the organizational problems and the engineering problems. The situation in Detroit indicates, for example, that one can have an effective, integrated water and sewage system from an engineering point of view, while retaining an essentially fragmented pattern of administration. It might be noted, incidentally, that Detroit also pioneered in the Council of Governments movement, as the report notes (page 14) without turning water problems over to the Council for management.

The report concludes that the Councils of Government are "inextricably bound up in the regional planning process and that solutions to metropolitan water problems can and probably should include the Councils of Governments." At the same time, the report emphasized the necessity for some exercise of State or Federal power. In effect, therefore, the author expressed reservations with respect to the Councils of Government by themselves meeting the needs for metropolitan water supply and waste water treatment and handling.

In assessing the possibilities for improving the existing situation, the report cites Daniel Moynihan in his recent book, Toward A National Urban Policy, to the effect that we may not have the ability to create new or modernized institutions. Here again the term "institution" is used largely as a synonym for "organization", as is apparent from the following quotation from Moynihan:

"At least part of the relative ineffectiveness of the efforts of urban government to respond to urban problems derives from the fragmented and obsolescent structure of urban government itself."

The point which the author (Delogu) overlooks and which must be emphasized is that the institution is not the fragmented organization, but rather the value structure that supports what might be called the "localist" emphasis in American government. Thus, institutionalized values may result in fragmented organization, but it causes confusion to suggest that the institutions are fragmented. As the experiences of the Councils of Government indicate, and as anyone familiar with the processes of local government can testify, unless these institutionalized values which stress localism can be altered, tinkering with organizational structure will not result in change. The test of change must, of course, be changes in performance. This means changes in the way in which people behave and act.

The modern, behaviorally oriented literature of public administration and management is replete with references to the fact that simply issuing orders does not accomplish changes in behavior. Yet this is the implication of Professor Delogu's analysis, and a logical consequence of regarding institutions as simply organizations. It is necessary to deal with the social-psychological dimension, if change is to be effectuated, and the command approach even when supported or enriched with dollars will not necessarily bring about institutional changes.

The report's thrust would be more appropriate, if it simply dealt with organizational alternatives and then assessed the political acceptability of these alternatives, and attempted explicitly to deal with the question of how one influences the values, the ideology, the expectations, and ultimately the behavior of the people who would be affected by such change. If the problem is indeed institutional, then the solution is considerably different from that proposed in the report.

The conclusion of the report states:

"Existing governmental institutions, which traditionally have delivered water supplies and handled waste waters are being strained, and in many cases are unable to meet the water supply and treatment demands being made of them."

This statement is not supported by the facts. This is not to say that many problems do not exist, but the fact is that most of these problems are being dealt with. Reference might be made to the Outlook for

Water by Nathaniel Wollman and Gilbert W. Bonen, which clearly recognizes that the coming years will require increased expenditure for sewage treatment facilities, but suggests that these are more a reflection of population and economic growth than of alleged organizational deficiencies referred to in this report.

In any case, it should be seriously questioned whether organization or reorganization is the solution, or whether something more fundamental with respect to local attitudes, perceptions, values, and expectations may not be involved. If the latter, then, perhaps the problem is institutional. But if so, then solutions lie in the area of education and socialization.

#### Institutions for Water Planning (by Gary W. Hart)

The scope of this report is indicated by the chapter headings; the first chapter deals with the "Background of Modern Water Resources Planning", and the second chapter with "Legislative History". The discussion in these two chapters indicates that this report reflects very strongly the traditional federal bias in favor of: (1) river basins as the sound and proper approach to water planning; and (2) the leadership role of the federal government in the field of water planning. In these chapters and throughout the report, there is little reference to specific water problems at the urban-metropolitan level, and virtually no recognition of the extent to which the urban-metropolitan focus might be important.

In this connection it is of some significance to note that long before the national government was interested in water problems or was spending money for water capital facilities, local governments (i.e., cities) were investing thousands of dollars in water supply facilities and sewers, if not in treatment plants. Thus, for example, the water system of the city of Detroit goes back to the 1830's, and the water supply arrangements and drainage facilities in the older cities such as Boston, New York and Philadelphia go back at least that far.

Designating the Federal government's approach as a bias is not to suggest that this reflects prejudice, but rather that it reflects the Constitutional and traditional basis for Federal interest, as well as important political and economic factors. One cannot escape the fact the Federal water involvement moved from the urgent necessities of improving waterways for military defense purposes on the frontier, through the emphasis on distributing local benefits (pork barrel appropriations), in which dominant considerations were the distribution of federal construction expenditures among the several Congressional districts and States.

The development of irrigation programs which led to the enactment of the Reclamation Act of 1902 and the planning and policy study of the Na-

tional Waterways Commission in the first decade of this Century both reflected a new emphasis on public intervention for development purposes, although the demand for local benefits was never eliminated. This emphasis on development continued strong throughout the New Deal period, even as it does today. The concern for flood control was initially based upon a governmental responsibility to alleviate the hazards of floods and to minimize the dangers to citizens from flooding. Here, too, the interest in local benefits was and continues to be strong.

The particular approach which federal activities and programs took was founded on Constitutional powers which the federal government possessed (especially those listed Article I, section 8). Primary among these were the defense power, the commerce and postal powers, and more recently the spending power. It is on the basis of the last that the federal water programs have begun to be concerned about urban-metropolitan water problems.

As recently as the 1950's, President Eisenhower expressed the view that the handling of sanitary wastes was uniquely local, and water supply continues to be so regarded, the programs of HUD being of very limited scope in this respect. Thus, the report prepared by Mr. Hart reflects a historic emphasis in federal water involvement--one which has paid only indirect attention to urban water problems.

Chapter three is an analysis of the Water Resources Planning Act of 1965, and it is perhaps worthy of note that Mr. Hart was employed as an attorney by the Water Resources Council, so his discussion of this act and the organizations it created is authoritative.

Chapter four is entitled "A Description of Three Types of Water Resources Planning Institutions", namely, river basin commissions, inter-agency committees, and coordinating committees. Again the traditional Federal bias in the approach to water problems is clearly evident. Chapter five is entitled "Case Studies", chapter six, "Summary Evaluation of Strengths and Weaknesses of Principle Water Resources Planning Institutions". And chapter seven explores alternatives and outlines recommendations.

Although Mr. Hart uses the term institutions with some frequency, it is clear that he is talking about organizations and organizational processes and procedures. It might be noted, incidentally, that even in this connection, his analysis does not take into account the rich literature on organization theory and processes, instead his approach is legal in its orientation.

It is worth emphasizing again that if institutions are simply organizations, then the variety of alternatives which are available to decision makers is indeed tremendous. But the point is that organizational charts and legal statements of organizational responsibilities, authority, and inter-relationships, will not begin to deal with the important issues of effectiveness in the context of behavioral and political realities. Thus, even in the context of the subject matter with which

this report deals, it does not come to grips with the real-world questions of effectiveness of arrangements for water planning at the urban-metropolitan level.

Metropolitan Water Management - Case Studies and National Policy Implications (Urban Systems Research and Engineering, Inc.)

As the title indicates, the conclusions in this report are based upon case studies, twelve in number, four of which were very intensive and eight of which were less so. Most of the report is devoted to the case studies (approximately 263 of 398 pages). The report contains, first, a summary letter of twelve pages, followed by a 63-page summary chapter, and this chapter, in turn, is followed by what is titled "Introduction and Analysis". Then follow the case studies. The explicit reference to institutions and institutional problems are contained in the summary letter and in the first chapter entitled "Summary and Conclusions".

Three lead sentences from the summary letter dealing with institutional and legal framework problems are worth quoting:

- (1) Metropolitan water resource attitudes [sic] are typically carried out by a complex and fragmented structure of institutional arrangements.
- (2) Both the formal structure of the institutions and the technical decision rules utilized, lead to certain repeated patterns which impair the technical adequacy of decision making.
- (3) Our studies indicate that new administrative and institutional forms may well be required in many metropolitan areas. In particular, organizing metropolitan water resources management as part of the responsibility of a multi-function, river basin oriented, water resource agency seems a promising approach.

And the recommendation on this subject (again from the summary letter) are as follows:

--A variety of federal measures can be undertaken immediately to encourage the development of regional water resources institutions.

--Such measures include funds to support their creation and administration, and priorities in grant allocation, and a larger federal share for facilities constructed as part of such a system.

--Intrastate action to optimize institutional structures needs to be encouraged. Many improvements can and should be made by each State

In the institutions that operate within its own borders.

--The current standard setting process for water quality objectives, while basically sound, needs to be strengthened. More public involvement is required.

--Overly fragmented local water resources institutions in many areas might well be combined.

--Water laws and customs in many cases should be modified to encourage more rational allocation.

In the first chapter the problem of the institutional and legal framework is stated thus:

"An important component of this study was its analysis of the institutional and legal structure within which metropolitan water resource planning is conducted. Our field investigations revealed that an extremely wide variety of institutional arrangements are utilized in various metropolitan areas."

These two sentences lead to two comments. First, by combining institutional and legal in the first sentence, it is not clear whether the problem is in fact legal or whether it is institutional. Nor is this clarified in the subsequent discussion. Second, the reference to a wide variety of institutional arrangements suggests that what is really intended is organizational arrangements. Thus, on the following page, the report states: "...our studies showed a lack of adequate organizational basis for carrying out crucial water resource functions."

Again, a bit later the statement appears "We observe a pervasive isolation of the planning process from other water resource activities." This of course, is not a novel conclusion. Local planning tends generally to be separated from major decisional processes. It is worth pointing out, however, that if the study had, in fact, undertaken institutional analysis, perhaps some indication may have been developed which would have suggested why planning is thus isolated. The point is that the isolation of planning is not simply an organizational problem. If it were, executives, or legislators could simply issue orders changing the situation. Much more important is the political and social environment (values) which brings about and reinforces such isolation, and of course, may in the first instance lead to organizational structure which reinforces the isolation. But without support from the local value system, changes in organizational position alone would not be of primary significance. It is that Americans distrust planning. They often do not see where it can be used effectively. They feel that it will impinge upon political privilege, and so forth. These are the institutional factors and it is unfortunate to confuse them with simple problems of organizational structure.

Under the general heading, "Areas Requiring Action", the report states:

"Developing such an adequate institutional framework for the inter-related functions of water supply and water quality maintenance is one of the top priorities of improving our national system of metropolitan water resources activities."

and a few sentences further the statement is made:

"Hence, new institutional forms for inter-basin resolution of water supply claims and disputes is required."

If the problems thus referred to could be solved simply by organizational tinkering, then they obviously would not continue for long. The evidence of inadequacy, not only in this report but in much of the literature, is rather convincing. The institutional problem, provided the term is defined accurately and the concept confronted forthrightly, far transcends simple organizational shifts or the provision of coordinating mechanisms, however they might be designated. But the consequences of assuming that "institutional" and "organizational" are synonyms is that the real institutional problems are not dealt with. The host of coordinating committees in the field of water, including more recently established Councils of Government, suggest the extent to which organizational solutions are not adequate, and begin to indicate the extent to which considering institutions as synonyms for organizations in fact obscures the real problems and the points at which remedies must be initiated.

Under the general heading, "Specific Recommendations," there is some indication that the writers of this report did have glimpses of institutions as something other than simply organizations. For example, it is stated:

"There is no easily available, technically correct solution to the problem of the proper level of water quality in any given waterway. Instead, determining such levels requires a degree of social optimization which seems most appropriately done through the political process... After all only the political mechanisms of government are fundamentally competent to decide on the appropriate trade-off between increased resource expenditure on water quality enhancement and the opportunity costs of such funds."

The institutional problem which might be suggested is how to stimulate the political system or the political process into taking the necessary action. In some situations, the problem may be primarily organizational, but there is much evidence to suggest that this is generally an insignificant part of the total problem.

At a later point in this section, the report states, "Our researches revealed several instances in which water law and custom were clearly dysfunctional." Here, again, the authors approach a more comprehensive concept of the institutional factors. Even a superficial knowledge

of the problems of water law indicates that these problems are not to be resolved by organizational changes, nor simply by the enactment of new legislation. Water law, like most fundamental laws, is deeply imbedded in the legal and social system, and attempts to alter them require highly sophisticated processes extending over long periods of time.

These rather critical comments on the way in which the matter of institutions was dealt with should not be construed to depreciate the overall value of this report. Clearly, it is one of the better reports prepared for the National Water Commission. But it is a premise of this analysis that the report might have been improved had the concept of institution and institutional arrangements been more carefully developed so as to distinguish the organizational from the institutional and then to focus on the behavioral aspects of institutional patterns.

It should perhaps also be pointed out that this report is somewhat exceptional in that it deals with water problems in terms of the urban-metropolitan situation, where most Americans live and work, and where water is most relevant to day-to-day activities. In short, this report rises above the traditional Federal preoccupation with river basins.

In this connection, it is worth referring to the report entitled "The New England River Basins Commission" by Helen Ingram (discussed below) which points to two primary assumptions of the Water Resources Planning Act of 1965, namely; (1) that planning should emphasize basins, and ought to be comprehensive; and (2) that the hydrological unit ought to be the basis for planning, so that geography overshadows the boundaries of existing local government entities. These assumptions of the Water Resources Planning Act, in fact, have dominated most federal activity in the field of water resources, and seem also to be a major bias of the National Water Commission, if one is to judge by the studies here being reviewed.

#### Public Participation in Water Resources Planning (by Kathryn P. Warner)

This comprehensive review of the subject by Kathryn Warner represents a significant contribution to the literature. Ten pages of the report (185-195) deal with the topic "Institutional Modifications and Arrangements Needed."

Essentially, this section of the report deals with the administrative and organizational arrangements by which more effective public participation might be achieved. It is clear throughout the report that the author is convinced that greater public participation of various types and kinds is desirable. Fundamentally, her position rests on democratic doctrines with respect to the importance of the citizen in the governmental process. For her, and for many others who write on this subject, participation has strong value components.



The existence or lack of participatory opportunities reflects the values, and constraints of a particular system. These, in fact, are institutionalized factors, and again one does not change them simply by organizational gimmicks, such as holding meetings or workshops. Participation is a state of mind; it is the result of socialization; it rests on value premises. This is perhaps no better illustrated than in the New England town meetings. Somehow when the Congress tried to replicate this almost pure form of democracy in the Northwest territory, it did not work as planned. Jefferson, and those who shared his views about the desirability of participation in the pattern of the New England town meeting, probably relied too heavily upon legal structure and failed to recognize that the patterns of behavior which were found in the New England towns were the result of social evolution. In a sense, participation came before structure, or before legislation, or before administration. This is, incidentally, the way in which the Common Law developed in England. It is perhaps significant that the basic institutional aspects of the Common Law were not dependent upon legislation (i.e., on orders, on commands, on written procedures) but reflected the growth and development of patterns of human interaction over time, long before there was legislation or codification.

Again, apropos the problem of participation, it might be suggested that the report fails to identify institutional factors which contribute to a participatory situation, and, on the contrary, assumes that administrative orders, cooperative agreements, and similar trappings of the administrative process can bring about effective participation. It is no wonder that attempts to bring about more effective participation, however well meaning and sincere, have generally failed, or become manipulative devices for program legitimation and public relations techniques for building agency support. In some cases, participation is a cloak for cooptation or direct seizure of power.

There is certainly nothing wrong with the recommendations which Ms. Warner outlines, but whether they will work, whether they will contribute to more effective planning, or even to more democratic planning, remains unanswered and unanswerable from information contained in her report. The reason is that simply not enough attention has been given either to the social-psychological behavioral aspects of participation or to the political realities in particular situations.

### Three Other Reports

In this section, brief comments will be made on the three reports earlier identified as having some bearing upon institutional problems (although not directed explicitly to urban-metropolitan problems). These reports are: (1) The Federal-State Regional Corporation by Richard A. Solomon; (2) Interstate Water Compacts by Jerome P. Muys; and (3) The New England River Basins Commission by Helen Ingram.

The first two of these reports reflect the Federal bias with respect to watershed or river basin approaches referred to previously, and they deal simply with a variety of devices which, hopefully, might contribute to better regional coordination. Neither one deals with the kinds of water problems which dominate urban-metropolitan water management--it would almost seem as though urban-metropolitan population centers did not exist or as though they had no water problems. The study of The New England River Basins Commission, while also couched in the framework of traditional Federal approaches to water problems, provides a more insightful analysis of planning and coordination, recognizing some of the more important political and social-psychological factors that structure behavior vis a vis the river basin. An in-depth investigation of these factors, together with a systematic identification of the interplay of such influences, would make this report an even more significant contribution to institutional analysis. One might almost conclude that the ineffectiveness of the New England River Basins Commission lies in the fact that it is not yet an institution. That it is an organization is obvious. But somehow, it has not become an institution with influence on the behavior of those who are involved in water decisions in the New England region, except perhaps as that behavior is defensive--i.e. designed to minimize Commission influence.

How an organization becomes an institution might be a significant subject for investigation. It might be said, for example, that on May 18, 1933, the Tennessee Valley Authority was not an institution. It was simply an organization created by statute, enacted by Congress and signed by the President. This was a statute, moreover, that had more than 12 years of history behind it. And yet, as viewed in this state-of-the-art study, TVA was not at the instant of its creation an institution. But at some point, this organization created by legislative action did in fact become an institution. Perhaps a crude way of indicating the institutional character of TVA would be to say that at the point where its continuance was no longer dependent upon those who "created it", or those who were involved in its initial development, it became an institution and an integral part of life and living in the area with which it is concerned.

Again, in a somewhat superficial way, it seems clear that the U.S. Department of Agriculture is an institution, while it would be a stretch of terminology to characterize the Department of Transportation as an institution. At present one might even question whether it is an organization.

#### Other Studies of the NWC

The principal investigator has not had the opportunity to review all the studies of the NWC, available as of the cut off date for this report of January 20, 1972. An effort has been made to review those which seemed most directly related to this state-of-the-art review. References have been encountered to a study by Professor Allan Schmid

of Michigan State University, but it has not been possible to secure a copy of his study, since NTIS has reported that it has not been released.

## CHAPTER VI

### STATE WATER CENTERS: A REPUTATIONAL SEARCH<sup>1</sup>

This state-of-the-art review and literature search was premised on the fact that references to "institutions" appear frequently in various forms and places suggesting that among the critical variables in dealing effectively with urban-metropolitan water problems are social institutions and institutional arrangements. But as indicated, a rather thorough search produced limited results. It seemed prudent, therefore, before concluding that the field was almost totally undeveloped, to use a different approach in searching out what may have been written on the subject. This approach was what might be called a "reputational search," borrowing the<sup>2</sup> term "reputational" from power structure and influential survey research.

In addition to the standard search methods to identify the literature on institutions and institutional processes, therefore, it was decided to send a letter to the water research centers in all states (except Colorado). Each center was asked to contribute what it could in terms of definitions, literature references, and personnel leads. The letter was purposely open-ended so that the centers could respond as they thought appropriate. The letter commented on the current use of the institutional concept stating;

Using more or less conventional search methods, we have discovered that although the terms institution, institutional arrangements, institutional processes, and related words are used frequently enough

- (1) The literature dealing with the subject explicitly, as compared to more-or-less casual references, is very limited.
- (2) Conceptual formulation, theoretical analyses, and clarifying definitions are almost totally lacking.
- (3) The term "institution" is often not defined, and its usage is frequently imprecise and ambiguous. In many government reports the terms are used as synonyms for "organization;" economists refer to the "market" and the "price system" as institutions; lawyers apply the term to the legal system and its constraints including the way in which rights and duties with respect to water are set.<sup>3</sup>

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<sup>1</sup>This chapter was prepared with the assistance of Robert Schmidt, M.A., sometime graduate research assistant, Department of Political Science, Colorado State University. Appreciation for his help is hereby acknowledged.

<sup>2</sup>Undoubtedly, many of the titles listed in this chapter are also in the WRSIC Bibliography on the subject.

<sup>3</sup>Letter from Norman Wengert, November 1971..

The letter continued stating that more thought must have been given to the institutional concept than had been uncovered. To ascertain more precisely what was currently being done, the letter asked for:

- (1) Titles of studies your center has sponsored, both published and unpublished, both completed and underway, which deal with institutional aspects of urban-metropolitan water. I would, of course, also like the names of the authors and their present addresses. And if copies of such studies are available, please send them to me.
- (2) Names of persons who have an interest in, and/or who have done research on, and/or who have written papers, articles, or books bearing on institutional aspects of urban water. If it is possible to consult some of your knowledgeable colleagues in this connection, this would be appreciated. In effect in using this reputational approach, we are posing the question to you that if you wanted to support studies on urban-metropolitan water institutions, to whom would you turn. Again, we would like current addresses. And your suggestions should not necessarily be limited to your own institution.
- (3) Such suggestions, comments, and other leads as you may be able to give. In this connection, publication and research lists for your center would be useful, as would any bibliographies your center may have prepared related to the subject of urban water institutions, or just urban water.<sup>4</sup>

Thirty-four (sixty-eight percent) of the state water resources research centers replied. Some of them, in addition, asked interested faculty of their universities to reply. Nearly all of the centers which replied sent additional material. The majority sent lists of reports and research underway, and the names of persons working in the field. Some stated how they used the concept of institutions, and others sent along documents with definitions of institutions and institutional processes. Nearly all said they realized the importance of the institutional aspects of water management and requested copies of the completed study.

#### DEFINITIONS

Respondents who commented on the definition of institutions were almost unanimous in recognizing the ambiguities in the term. Nevertheless, they contributed their understandings of the term. In general there were two

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<sup>4</sup>Ibid.

types of definitions. One might be classified as the "narrow" or organizational definition. The other might be termed the "wider" or social process oriented definition.

An example of the narrow type definition is illustrated by the definition received from the center in Nevada: "An element of the political or the economic system which has an identifiable organizational structure with a legal basis such as a public utility district or duly licensed private corporation."<sup>5</sup> While this narrow definition was not given explicitly by other respondents who commented on definitions, it was clearly implied in several other replies which stated that their centers had not published anything dealing with institutions, but sent along a list of published reports which dealt with what others might have called organizational aspects of water management.

Far more centers defined institutions in the wider sense of social process. Understandably, the definitions were diverse. The Georgia Center defined institutions as a "cluster of values." They explained further what they meant by this when they wrote that values lead to the establishment of "institutions" such as:

- (1) A particular form of government
- (2) A way of doing things
- (3) Assignment of ascription of functions to particular individuals of groups (e.g., Mr. Aloysius Nutcracker is an institution in Walnut Creek.)
- (4) A set of personal and group relationships
- (5) An organization of agency
- (6) A set of laws, written and case.<sup>6</sup>

In a study received from the Texas Institute, Warren Trock defines institutions as "organizing and directing mechanisms by which we achieve an organization of resources in productive activities which satisfy human needs."<sup>7</sup> The Utah Center addressed the question of definition to include

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<sup>5</sup>Letter from the Center for Water Resources Research, Reno, Nevada, November, 1971.

<sup>6</sup>Letter from the Environmental Resources Center, Georgia Institute of Technology, November, 1971.

<sup>7</sup>Warren Trock, "Institutional Factors Influencing Water Development in Texas," B-025-TEX, Texas A&M. Water Resources Institute, 1970.

any kind of social arrangement including traditional custom as well as an irrigation district or government agency.<sup>8</sup> A report from Wisconsin included a section labeled institutions, in which private organizations, state law, tax policies, administrative agencies, and federal laws were all discussed.<sup>9</sup> Dr. Charles Smallwood of the University of North Carolina mentioned "established customs" as also coming under the general definition of institutions, citing the practice of many states not to legislate with respect to ground water usage because of "custom." He also refers to the "custom of not charging specifically for waste water disposal and the accepted usage of small communities to charge "less than cost" water rates to attract industry."<sup>10</sup> In a case study submitted by the New Mexico State University, various institutional means to influence behavior were cited. These included institutions specializing in communications such as Newspapers, Congressional delegations, Indian tribes, conservation groups and influential individuals.<sup>11</sup>

#### SURVEY OF REPORTED LITERATURE

The literature in the following list is in no way intended to be a complete inventory of State Water Center research relevant to the topic of urban water institutions. It represents a sampling, and no more. Sixteen centers made no reply. Others, using a narrow definition of institutions, reported no studies made. In some cases, studies which might have been related were not listed. Nevertheless, the titles listed give a reasonably good sample of work undertaken with some relationship to water institutions. Moreover, the topics and titles listed reinforce the conclusion of diversity in the meaning of the term. Where a report was sent with the reply rather than just cited, an attempt is made to give a brief statement of how the report dealt with institutions. Where studies were merely referred to, the classification was done on the basis of the title alone. Under each classification the authors are listed in alphabetical order. It is to be noted that the classification follows that suggested infra in Chapter III.

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<sup>8</sup>Letter from the Center for Water Resources Research, Utah State University, November, 1971.

<sup>9</sup>Irving Fox (Ed.), "Institutional Design for Water Quality Management: A Case Study of the Wisconsin River Basin," C-1228-WIS. University of Wisconsin, Water Resources Center, pp. 36-48.

<sup>10</sup>Letter from Dr. Charles Smallwood, University of North Carolina, December, 1971.

<sup>11</sup>Helen Ingram, "Patterns of Politics in Water Resource Development: A Case Study of New Mexico's Role in the Colorado River Basin Bill." University of New Mexico, Institute for Social Research and Development, 1969.

LEGAL PROCESSES

- Burch, Phillip. "An Analysis of New Jersey's Water Pollution Control Program." Rutgers University, Bureau of Government Research, 1970.
- Campbell, Charles, Hines, N. W., and Harris, Marshall. "Legal Aspects of the Small Watershed Program in Iowa." (A-010-IA) University of Iowa, College of Law, Monograph No. 6. 1965. 45p.
- Delogou, Orlando. "A State Approach to Effluent Charge" in Maine Law Review. (Vol. 23, No. 2) 1971, pp. 281-313.  
The study concentrates on the governmental-legal aspects of controlling Effluent Charge, with special references to definitions, state law, and legal constraints.
- Garvey, M.D. Morgan, J. D., and Schubert, K. L., "An Analysis of the Law Governing Six Selected Washing Water-Oriented Special Districts." Washington State University, Water Research Center, 1970. 364 pp. This is a legal study of how laws concerning water districts can be amended or revised for a more rational approach to dealing with districts.
- Kalinski, A. J. and Forste, R. H. "A Survey of New Hampshire Water Law I-The Riparians Doctrine-II. Recent Water Law Actions." UNH-WRRC-B3. University of New Hampshire, Water Resources Research Center. 1970.
- Kalinski, A. J. and Forste, R. H. "A Survey of New Hampshire Water Law III-The Revised Statutes Annotated." UNH-WRRC-B4, University of New Hampshire, Water Resources Research Center.
- Miller, W. Frank. "Ground Water Regulation in the Coastal Flatwoods of Mississippi." (Project Number A-005-MISS.) Mississippi State University, Water Resources Research Institute. 1966.
- Mitchell, Robert. "Public Support For Environmental Legislation." Research Reports in Social Science. Institute for Social Research, Florida Sate University. Vol. 14, No. 2 (Feb. 1972) pp. 22-31.
- Randall, C. Jr., "Legal Aspects of Water Use and Control in South Carolina." B-003-SC. Clemson University, Water Resources Research Institute, 1970.



Reis, Robert. "Selected Legal Considerations on North-East River Diversions," pp. 70-91 of *New England Conference on River Diversions*, Robert H. Forste, editor. Sponsored by The New England Council of Water Center Directors. University of New Hampshire, Water Resources Research Center. 1971. 162 pp.

In this article law is defined broadly as a formalized system of principles and arenas for conflict resolution designed as behavioral controls.

Walton, W. C., et. al., "Water Laws in Minnesota." Univ. of Minn., Water Resources Research Center, Bull. 9, 1968. 640 p.

The study concludes that existing laws for the most part are weak expressions describing piece-meal cooperation. Doubt is expressed that existing "institutional" relationships are effective.

Williams, P. H. "Law of Water Resources in the State of Mississippi." A-006-MISS. Mississippi State University. Water Resources Research Institute. 1966.

Williams, McDougal, and Champion. "The Law of Water Pollution Control." A-014-MISS. Mississippi State University, Water Resources Research Institute. 1967.

#### ECONOMIC PROCESSES

Armenakis and Peden. "A Long Financial Planning Model for Small Water Service Utilities in Mississippi." A-025-MISS. Mississippi State University, Water Resources Research Institute. 1968.

Barnard, Jerald. "Economic Factors Affecting Change in the Intensity of Flood Plain Use." A-038-IA. Iowa State University, Water Resources Research Institute.

Daicoff, Darwin W. "Methods of Financing State Participation in Water Resource Development." A-006-KAN. Kansas State University, Water Resources Research Institute, 1967. pp.1-34.

Harl, Neil E. "An Analysis of the Economic Implications of the Permit System of Water Allocation." B-009-IA. Iowa State University Water Resources Research Institute.

Hite, J. C. "Socio-economic Effects of Industrial Development in the Past Victoria Area of Beaufort County, South Carolina." S-022-SC Clemson University, Water Resources Research Institute. 1971.

Lofgreen, H. A. and Barnard, J. R. "Economics of Water Quality: An Application to the Des Moines River Basin." (A-018-IA) Iowa Business Digest, 40:3, 1968.

- Macaulay, H. H. "The Use of Taxes to Effect an Approved Allocation of Water Resources: A Case Study, the Textile Industry." A-008-SC. Clemson University, Water Resources Research Institute, 1967.
- Meyer, Charles W. "An Economic Analysis of Organizations of Water Users." B-011-IA, Iowa State University, Water Resources Research Institute.
- Nicholas, James C. "Controlling Pollution: An Economic View." Research Reports in Social Science, Institute for Social Research, Florida State University, Vol. 14, No. 2, (Feb. 1972) pp. 11-16.
- Peden and Oliphant. "The Availability of Water For Industrial Uses in Small Communities in Mississippi." A-011-MISS. Mississippi State University, Water Resources Research Institute. 1967.
- Peden, Pulley, and Roberts. "An Analysis of Alternative Methods of Financing types of Water Resource Facilities in Mississippi." A-016-MISS. Mississippi State University, Water Resources Research Institute. 1968.
- Pitterman, Marvin. "Impact and Incidence of Taxation on Water Utilities in Rhode Island." A-005-RI. Water Resources Center, University of Rhode Island.
- Seagraves, James. "An Economic Study of the Effects of Municipal Sewer Surcharges on Industrial Wastes." B-032-NC. University of North Carolina, Water Resources Research Institute. 1972.  
Study encourages economic constraints on industry to make them clean up their water.
- Weiss, S. F. "The Effects of Authorization of Water Impoundments on Shoreland Transition." B-047-NC. University of North Carolina, Water Resources Research Insitute, 1972.  
The study is concerned with control of land surrounding Federal resevoirs.
- Willeke, G. E. and Kroecke, F. W. "A Program for Metropolitan Water Management." Georgia Institute of Tech., Environmental Res. Center. In this study it was discovered that actions in the private sector (developers, realtors, and fianciers) and in the independent sector (Chambers of Commerce, League of Women Voters) have much to do with decisions on water management in the Metro area.
- Williams and Daniel. "The Impact of Reservoirs on Land Values: A Case Study." A-026-MISS. Mississippi State College, Water Resources Research Insitute. 1969.

ADMINISTRATIVE PROCESSES

- Focht, Theodore. "Connecticut's Administrative Control of Water Pollution-The Fluid Administrative Process." Report 8. University of Connecticut, Institute of Water Resources. 1969. pp. 3-44.  
Included is a legal survey, a case history on pollution control, and an evaluation of the Water Pollution Control Act of 1967.
- Hines, N. W. "A Decade of Experience Under the Iowa Water Permit System." (B-001-IA) University of Iowa, Agricultural Law Center, Monograph No. 9. 1966, 99 pp.
- Hite, J. C. "Economic Evaluation of Zoning Alternatives for Managing Executive Resources." B-012-SC. Clemson University, Water Resources, Research Institute.
- Kenny, Kenneth. "Urban Water Policy as an Input in Urban Drouth Policy." B-014-TENN. (currently underway) University of Tennessee, Water Resources Research Center.
- McLeskey and Jones. "Water Politics in Mississippi: A Comparative Analysis of Two Water Resource Development Organizations." A-031-MISS. Mississippi State University. Water Resources Research Institute. 1969.

PERSUASION PROCESSES

- Berger, Bernard. "Formation of Public Policy on Issue of Out-of-Basin Diversion of Connecticut River Flood Waters to Boston Metropolitan Area." University of Mass. Water Resources Research Center. Project underway 1970.
- Fliegel, F. C. "Fidelity of Information Transmission . . . ." (B-052) University of Illinois, Water Resources Center.
- Gerlach, L. P. "Ecology Movement" Natural History Magazine, The Museum of Natural History, New York, Dec-Jan. 1971. 75-80.  
This article deals with beliefs held by ecology minded people, unrelated to any organization but whose views impinge upon agencies and structures.
- Ingram, Helen. "Patterns of Politics in Water Resource Development: A Case Study of New Mexico's Role in the Colorado River Basin Bill." University of New Mexico, Institute for Social Research and Development, 1969. pp. 1-96.  
The case study illustrates the way in which the Colorado River Basin Bill came about. As a result it describes in detail various institutional means for influencing behavior. Mentioned were institutions specializing in persuasion such as Arizon Newspapers. Others include congressional delegations and state agencies using bargaining means. Institutions referred to also include Indian tribes, conservation groups, and individuals.

McPartland, Edward. "Measuring and Developing Methods of Attitudes and Motivational Changes in Implementing the Big Blue River Basin Plan." University of Nebraska, Water Resources Research Institute.

Millar, Albert E. Gibson D. J. and Klofter, Richard D. (eds.) "Clean Water: Affluence, Influence, and Effluents," NASA Contract NGT 47-003-028, Old Dominion University Research Foundation. 1971. 228 pp.

The unit of the report of interest to us deals with the "Societal Influence On Clean Water." Here the fragmentation in any control on pollution is duly noted. Called for is the necessity of education on all fronts that polluters might be charged to clean up their wastes.

Miri, J. A. "The Politics of Water Supply in Northern New Jersey." New Jersey Water Resources Research Center, Rutgers University. 1971.

Peterson. "Community Organization and Rural Water System Development." B-005-MISS. Mississippi State University, Water Resources Research Institute. 1971.

Shad, Theodore. "National Issues of Water Diversion." pp. 3-17. The New England Conference on River Diversions. Robert H. Forste, Editor, Sponsored by the New England Council of Water Center Directors, University of New Hampshire, Water Resources Research Center. 1971. 162 pp.

Wilkinson, Kenneth. "Local Action and Acceptance of Watershed Development." A-008-MISS. Mississippi State University, Water Resources Research Institute. 1966.

Wilkinson and Singh. "Community Leadership and Watershed Development." A-035-MISS. Mississippi State University, Water Resources Research Institute. 1970.

#### ADMINISTRATIVE REORGANIZATION PROCESSES

Ditwiler, C. Dirc "Public Water Supply in Washington." 1901-W-81, Washington State University, Agricultural Experiment Station. 1970. 71 pp.

This study argues for a flexibility in the interpretation of water districts and shows that modification of existing statutory authority can lead to improvements in public water supply.

Anon. "Federal, State, Local Water Agencies in Minnesota." University of Minnesota Water Resources Research Center, Bull. 1. 1965. 122 p.

Gibson, U. P. Straub, C. P. and Bond, R. G. "Integrating Water Quality Management into Total Water Resources Management in Minnesota." University of Minnesota, Water Resources Research Center, Bull, 23, 1970. 376 p.

This study calls for integration of Water Quality concerns into a water management systems approach.

Hines, N. W., "Rational Institutional Arrangements for Water Resource Management." A-003-IA, Iowa State University, Water Resources Research Institute.

Rosenow, Beverly. "A Study of Various Procedures Utilized by Selected Water-Oriented Special Districts Which Are Common To All of Them." A-030-WASH. Washington State University Water Research Center, 1970. 139 p.

This study recommends the creation of a single type of water management district authorized to carry out all of the water resource functions now spread among the many types of special districts.

Trock, Warren L. "Institutional Factors Influencing Water Development in Texas." B-025-TEX. Texas A&M University, Water Resources Institute, 1970, pp. 1-35.

This study is particularly important because it contains some definitions of institutions and institutional processes. The report defines institutions as "organizing and directing mechanisms by which we achieve an organization of resources in productive activities which satisfy human needs."

The study calls for institutional arrangements which will

1) resolve conflicts, 2) provide for the development of water systems, and 3) insure efficient use of water.

Institutions of particular importance to efficient distribution and use of water are irrigation districts, and their policies, and operations plus water rights.

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This is a call for a centralized water management agency to gather together the fragmented organizations of Water Resource Management.

Whipple, William, "Water Pollution Control Institutes." in Engineering Issues. (Jan. 1972).

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Dzurik, Andrew. "Florida, A New Industrial State?" Research Reports in Social Science, Institute for Social Research, Florida State University, Vol. 14. No. 2, (Feb. 1972) pp. 17-21.

Kelnhofner, G. J. "Metropolitan Planning and River Basin Planning: Some Interrelationships." Report WRC-0268, Georgia Institute of Technology, Environmental Resources Center.

Olcun, Daniel. "Regional Public Water Supply Systems." A-055-NC. University of North Carolina, Water Resources Research Institute, 1972.

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Anon. "Water and Related Land Resources Planning-Minnesota." Minnesota State Planning Agency, Water Resources Coordinating Committee, Bull. 1, 1967. 122 p.

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Wuenschner, James. "Environmental Considerations in Land and Water Use Planning." A-062-NC. University of North Carolina, Water Resources Research Institute, 1972.

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- Cochran, G. F., Ohrenschall, J. C. and Wilson, W. C. "Analysis of Ground and Surface Water Utilization in Urbanized Arid Areas." H. W. Pub. No. 8. University of Nevada, Center for Water Resources Research. The study has a large section on Legal and Institutional Framework, and the Economic System.
- Cochran, G. F., and Wilson, W. C. "Arid Urban Water Management: Some Economic, Institutional, and Physical Aspects." H. W., Pub. No. 11. University of Nevada, Center for Water Resources Research. This is a case study and lists the various institutional processes and agencies in the area. Recommended is better water law for conjunctive use of ground water and imposed water. Unified water management is also favored.

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 Water and Related Land Resources." Report WRC-0667, Georgia  
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Fox, Irving, ed. "Institutional Design For Water Quality Management:  
 A Case Study of the Wisconsin River Basin, C-1228-WIS.  
 In one section of the report institutions are described as private  
 organization, state laws, tax policies, administrative agencies,  
 and federal laws. The report provides an excellent breakdown of  
 all institutional processes in reference to the Wisconsin River  
 Basin.

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 And Public Officials Related to Alternative Levels of Water Quality  
 and Correlated Alternative Systems of Management of the Penobscat  
 River." University of Maine, Water Resources Center, 1973.  
 The study seeks to determine the Public's awareness and committ-  
 ment to environmental protection.

Howards, Irving and Kaynor, Edward. "Institutional Patterns in Evolving  
 Regional Programs for Water Resource Management." B-003-MASS.  
 University of Massachusetts, Water Resources Research Center. 1967.

Knight, John E. and Hines, W. "Complex Systems Analysis of Water  
 Quality Dynamics," Report ERC-0570, Georgia Institute of Technology,  
 Environmental Resources Center.

Leonard, Robert L. "An Economic Evaluation of Connecticut Water Law;  
 Water Rights, Public Water Supply and Pollution Control." Report  
 11. University of Connecticut, Institute of Water Resources,  
 1970. pp. 1-66.

This is an attempt to isolate economic considerations behind  
 water law, water use, and water preservation. It's value for  
 institutional definitions lies in its grouping of several means  
 (economic and legal) to influence behavior

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 University of Florida, Engineering Progress, Vol. XXI, No. 6.  
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 Effluent of the Textile Industry." B-004-SC. Clemson University,  
 Water Resources Research Institute. (combined)



Waelti, J. J. "Water Quality Controversy in Minnesota." University of Minnesota. Agriculture Extension Service, Bull. 359, 1969. 27 p. Included in this brief study are issues impinging on institutional structures, and their ability or inability to influence behavior.

PERSONNEL

The names and addresses of the following people were submitted by the centers in response to the request for names of those who might have interest or competence in the institutional aspects of water management. The names are listed in alphabetical order. Also included is a brief note on the special interest of the individual, if this was stated in the reply. In several cases the names were referred to more than once. These will be indicated by an asterisk (\*) for each additional reference. Neither funds nor time were available to survey these individuals. It is apparent, however, that the list is by no means complete. In any case, surveying these and other individuals would be a fruitful next step in this survey.

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