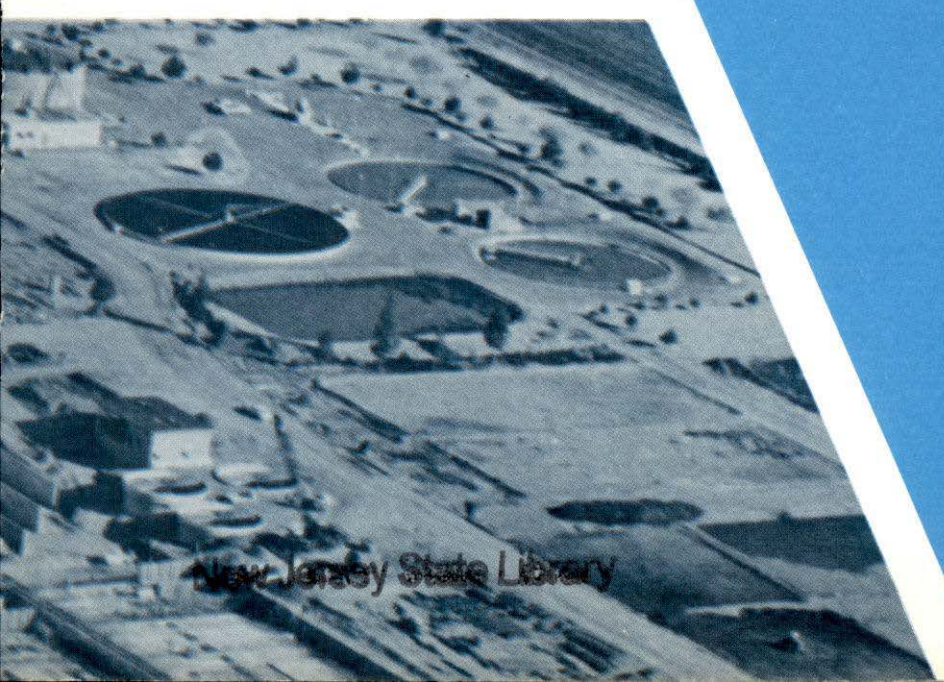

WATER QUALITY MANAGEMENT

NEW JERSEY'S VANISHING OPTIONS

STATE OF NEW JERSEY
COUNTY AND MUNICIPAL GOVERNMENT
STUDY COMMISSION

Reports of the County and Municipal Government Study Commission

Creative Localism—A Prospectus, 1968

County Government—Challenge and Change, 1969
—Supplementary Readings and Research Materials, 1969

Joint Services—A Local Response to Area-Wide Problems, 1970
—A Practical Guide to Reaching Joint Services Agreements, 1971
(In cooperation with the N.J. Department of Community Affairs.)

The Determinants of Municipal Policy in Education, Municipal Services, and Land Use, 1971 (Monograph)

Localization of Fiscal Responsibility in New Jersey, 1971 (Monograph)

Beyond Local Resources: Federal/State Aid & the Local Fiscal Crisis, 1971
—Supplementary Essays and Research Materials, 1971

Consolidation: Prospects and Problems, 1972

A Public Personnel Information System for New Jersey, 1972
(In cooperation with the Bureau of Government Research, Rutgers University.)

Solid Waste: A Coordinated Approach, 1972

Water Quality Management: New Jersey's Vanishing Options, 1973

Studies Completed, Reports in Preparation

The Role of Authorities and Districts in Water Quality Management
Local Law Enforcement
Fire Protection and Emergency Services
Community Health Services
Community Service Costs and Housing Configurations—
A Demonstration Study

Studies in Progress

The Local Role in Air Pollution Control
The Institutional Framework for Water Supply Management
Local Government Forms
Development and Environment: The Local Planning Process
The Impact of Selected Large Scale Development on Community Services

State of New Jersey

County and Municipal Government Study Commission

Eighth Report

Water Quality Management: New Jersey's Vanishing Options

June 1973

County and Municipal Government Study Commission

William V. Musto, *Chairman*
Alfred D. Schiaffo
Richard R. Stout
Joseph W. Chinnici
Edwin A. Kolodziej
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David Norcross
Samuel A. Alito, *Secretary*

COMMISSION STAFF

Eugene J. Schneider,
Executive Director

James D. Westwater
John K. Dunka
Project Team

Research Associates
Stephen Decter
Thomas Angotti
John Bonn

Secretarial Staff
Athena Kirby
June Dombroski

Illustrator
Beatrice Smith

State of New Jersey

COUNTY AND MUNICIPAL GOVERNMENT STUDY COMMISSION

115 West State Street

Trenton, New Jersey 08625

Area Code 609 292-6299: 292-6273
609 292-6226: 292-6227

WILLIAM V. MUSTO
CHAIRMAN

EUGENE J. SCHNEIDER
EXECUTIVE DIRECTOR

ALFRED D. SCHIAFFO
RICHARD R. STOUT
JOSEPH W. CHINNICI
EDWIN A. KOLODZIEJ
ARTHUR A. MANNER
ROBERT CAWLEY
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ALAN AUGENBLICK
RICHARD J. COFFEE
DORIS DEALAMAN
MYLES G. GILSENAN
DAVID NORCROSS
SAMUEL A. ALITO
SECRETARY

To His Excellency, Governor William T. Cahill, and Honorable Members of Senate and General Assembly:

The County and Municipal Government Study Commission is pleased to submit its eighth report, "Water Quality Management: New Jersey's Vanishing Options."

This study continues the examination of local government's structure and functions in our State. We would like to note that in the water management function the State plays a preeminent role and that its responsibilities are likely to increase in the future. Thus, the recommendations in this report are addressed to remedial actions at all levels of government and begin with the overhaul of the current statutory base.

This report concludes that New Jersey needs strong, comprehensive legislation upon which to base a formal system for managing water quality issues. Out of the proposed legislation must emerge a well defined and firmly established intergovernmental institutional arrangement. The absence of this framework represents the single greatest impediment to existing pollution control agencies, from local sewerage authorities to the State Department of Environmental Protection. The Commission is now undertaking the task of developing and drafting this legislation with

the cooperation and support of the State Department of Environmental Protection.

In drafting comprehensive water quality legislation, three goals will be addressed. First, there is a need to empower the State Department of Environmental Protection and local units of government to carry out a number of tasks mandated by the Federal legislation passed in 1972. Then there is a need to firmly establish the position of the Department of Environmental Protection in water quality management in the State. Because of its limited regulatory powers, the Department of Environmental Protection often cannot initiate positive programs to remedy problems. Building bans and an adversary relationship with local governments occur largely because of fragmentation fostered by New Jersey's statutes. Finally, an institutional framework that spells out the basic roles of all levels of government and what might be expected of them in the future must grow out of the legislation if it is to provide a truly sound basis for managing water quality.

The Commission wishes to note here, as we did throughout the report, the close working relationship with the Department of Environmental Protection and many regional and local agencies involved in water quality management. We reiterate that it is not the intent of this Commission to fault individuals or specific organizations but rather to call attention to a fragmented, uncoordinated and outdated management structure which thwarts the well-meaning efforts of dedicated individuals. We hope that this report will contribute to overcoming these deficiencies.

Respectfully submitted, on behalf of the County and Municipal Government Study Commission,

/s/ WILLIAM V. MUSTO, *Chairman*	/s/ ROBERT H. FUST
/s/ ALFRED D. SCHIAFFO	/s/ FRED G. STICKEL, III
/s/ RICHARD R. STOUT	/s/ ALAN AUGENBLICK
/s/ JOSEPH W. CHINNICI	/s/ RICHARD J. COFFEE
/s/ EDWIN A. KOLODZIEJ	/s/ DORIS DEALAMAN
/s/ ARTHUR A. MANNER	/s/ MYLES G. GILSENAN
/s/ ROBERT CAWLEY	/s/ DAVID NORCROSS

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For their interest, cooperation, and advice the Commission extends its gratitude to Ian Walker of the Stonybrook-Millstone Watersheds Association; Wendell Inhoffer, Chief Engineer at the Passaic Valley Water Commission; Bart Carhart, former colleague at the Commission; Dean Noll of the North Jersey District Water Supply Commission; David Mattek of the Legislative Research staff; Seymour Lubetkin, Chief Engineer at the Passaic Valley Sewerage Commissioners; and Jamie Pitney, formerly with the Department of Environmental Protection.

The Commission is also grateful to the following State and Federal agencies and individuals for their assistance and support in developing this report.

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Richard J. Sullivan, Commissioner; Charles M. Pike, Director, Division of Water Resources; Ernest R. Segesser, Assistant Director for Water Quality; Robert Vincent, Chief, Bureau of Water Pollution Control; Kemble Widmer, Chief, Bureau of Geology; A. Bruce Pile, Assistant Chief, Bureau of Fisheries Management; and Thomas O'Neill, Director, Division of Marine Services. Present and former staff who provided valuable insights include Richard Bellis, Douglas Clark, Richard Delgado, Samuel Gialella, Thomas Hardman, Christopher Hofman, Chandra Kanschik, John McNally, Margaret Miller, Anthony Ricigliano, Clifford Ross, Paul Schorr, and Fred Yaple. The Commission would like to single out for special recognition and appreciation, John Gaston, Bureau of Planning and Management, for his substantive contribution to many areas of this complex study.

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Rocco Ricci, Director, Air and Water Programs Division; and Al Morris, Director, Management Division.

The United States Army Corps of Engineers:

Jacob Gelberman, Deputy Supervisor, New York Harbor.

The Delaware River Basin Commission:

James F. Wright, Executive Director.

The Interstate Sanitation Commission:

Thomas R. Glenn, Jr., Director.

At Rutgers, The State University to:

Phillip Burch, Bureau of Government Research, and Robert Hordan, Department of Geography.

Finally, the Commission expresses its appreciation to the following individuals:

Michael A. Pane, IV, for his assistance in developing the report and his editorial comments; Charles Vernon, and William Aaronson, for their contributions to specific sections of the report; David Gladfelter, for his editorial work; and perhaps the warmest thanks to Miss June Dombroski, who never faltered through the successive drafts of this report.

While the responsibility for this report, its conclusions and recommendations, and its implications rests solely with the Commission, it is accurate to say that without the assistance of these many individuals this report could not have been written.

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WATER QUALITY MANAGEMENT: NEW JERSEY'S VANISHING OPTIONS A SUMMARY STATEMENT

New Jersey must overhaul its approaches to water quality issues or face increasing threats to our overall quality of life. This will affect the prerogatives and responsibilities of all levels of government, State, county, and municipal. In addition, it must encompass all activities related to water quality management, whether operational, managerial, or policy-level in nature.

The Commission concludes that New Jersey needs strong, comprehensive legislation upon which to base a formal system for managing water quality issues. Out of the proposed legislation must emerge a well defined and firmly established intergovernmental institutional arrangement. The absence of this framework represents the single greatest impediment to existing pollution control agencies, from local sewerage authorities to the State Department of Environmental Protection.

Water Pollution in New Jersey

To state that New Jersey has a serious water pollution problem is to state the obvious. Throughout the State pollution abounds from public and private sewage treatment plants, industrial structures, septic tanks, and background sources such as agricultural runoff. Governmental responses to pollution problems have been severely hampered by an inadequate statutory base, an antiquated administrative structure, and the absence of a comprehensive planning process. These have in turn resulted in an institutional framework characterized by fragmentation, jurisdictional conflicts, and an inability to consolidate environmental policies among various levels of government.

These institutional shortcomings directly affect communities and citizens throughout New Jersey. Due to water pollution problems, nearly 100 municipalities across the State face bans on further development. These actions are occurring at a time when the quality of life in New Jersey has already been adversely affected. Major steps will have to be taken by Federal, State and local governments before water quality is improved sufficiently to remove building bans and to actually achieve higher water quality goals across the State.

The Commission's Findings

Beyond an inadequate statutory base and an antiquated administrative structure, the Commission found that a comprehensive planning

process in which policy, financial, and physical issues are analyzed, weighed, and harmonized is absent. A funding system based on expediency has fostered rampant development, has not adequately protected headwaters areas, and has not recognized the limited resources of the cities.

Deficiencies are not limited to policy issues. Enforcement activities have not consistently led to corrective steps on the part of polluters and progress in abating pollution has been painfully slow. Major polluters often go undetected because the function of monitoring stream quality is so limited in scope and uncoordinated in practice. Duplication and overlap occur in some areas of the State while other areas go virtually unchecked.

Enormous sums of public monies have been expended on sewerage over the past decade, and far greater amounts, at least $3 billion, will be spent over the next 10-15 years. However, adequate steps have not been taken to guarantee that these expenditures will lead to improved water quality. Construction of facilities has not been closely supervised. Once constructed, facilities become the responsibility of local units of government that lack the expertise and often the resources to operate and maintain sewage treatment plants. Finally, problems are compounded by the absence of clear and comprehensive guidelines from State and Federal agencies.

The Commission also found a positive posture on the part of regulatory agencies, especially the State Department of Environmental Protection and the Federal Environmental Protection Agency. A growing awareness of the magnitude of managing water quality is evidenced by comprehensive Federal legislation, some increased staffing of the DEP, and a willingness to cooperate with other agencies in an attempt to resolve problems and coordinate activities. Even before the publication of this report, the State DEP has adopted various of the Commission's findings and recommendations including the reorganization of the Bureau of Water Pollution Control. Moreover, the DEP has already endorsed the Commission's intent to draft comprehensive water quality management legislation for New Jersey, and will participate in this follow-up effort.

Changing Directions in Water Quality Management

The Commission's report contains nearly 60 major recommendations, whose primary thrust is summarized below:

- An overhaul of the statutory base for managing water quality must begin immediately. This requires the codification of existing statutes, the enactment of amendatory legislation to meet Federal requirements, and the drafting of comprehensive water quality management legislation.

- Policy, management, and operational aspects of local, county, regional, and State agencies needs to be integrated into a formal and well coordinated institutional framework.
- Funding must be based upon a comprehensive planning process that recognizes the importance of capital investment decisions and is utilized to achieve water quality goals as well as developmental objectives.
- Comprehensive basin planning must be recognized as the basic process out of which local facilities planning will emerge and community planning goals can be best achieved.
- Governmental structures at all levels must be realigned to reflect responsibility commensurate with capability. The process has begun with the reorganization of the Bureau of Water Pollution Control and must be extended to county, regional, and local governmental agencies to create a formal institutional framework.
- Uniform reporting procedures should be required as part of a monitoring and surveillance network proposed by the Commission. The DEP should be the central repository for all information necessary for the successful operation of water quality programs within the State.
- The Commission urges that enforcement activities continue to place greater emphasis upon remedial approaches and that there is uniformity in terms of actions taken against polluters.

In essence, policy objectives must more consistently be turned into operational programs. To achieve the Commission's recommendations will require the commitment of substantial resources and manpower on the part of Federal, State, county, and local government. The critical nature of the water quality issue warrants the highest possible priority for all involved. The Commission strongly urges its recognition in the executive budget and Legislative responses.

Chapter I

NEW JERSEY'S WATER QUALITY PROBLEMS

The Degradation of the State's Streams

Much of New Jersey's water is polluted. Each day more than one billion gallons of inadequately treated domestic and industrial wastes are spewed into the State's waterways. All the major rivers in northeastern New Jersey, from the Ramapo to the Raritan, and all the major streams in the Delaware River Basin from Trenton to Cumberland County fail to meet State water quality standards. The Passaic River and the Arthur Kill are among the 10 worst polluted streams in the nation. Even the Atlantic Ocean is polluted—all ocean shellfishing grounds from Sandy Hook to Beach Haven within one mile of the shoreline have been closed to harvesting due to potential health hazards.

For years, New Jersey has been heading for a water quality crisis. Urban growth, suburban sprawl, and industrial development have hastened the deterioration of water quality. As a consequence of the expanding and competing demands, fresh water must be used and reused many times throughout the State. Along the Passaic River, for example, the Passaic Valley Water Commission (PVWC) takes 75 million gallons daily from the river at Little Falls to supply over 400,000 people in sixteen municipalities. Sewage treatment facilities located above Little Falls discharge 50 million gallons of treated domestic and industrial wastes daily. This means that during the summer months when the river's flow is 100 million gallons daily, the PVWC actually supplies at least 25 mgd of reused water.*

Industrial and domestic wastewater are responsible for the largest identifiable portion of New Jersey's pollution. Yet other sources also contribute to it: agricultural and storm water runoff, pesticides and insecticides, and drainage from solid waste landfills and sludge disposal sites. More than five million tons of sewage sludge and toxic wastes are dumped directly into the ocean off New Jersey's coast every year. The pollutants coming from wastewater treatment plants and numerous other sources use up the life-giving oxygen in water, are sometimes toxic or caustic, often cause odors, kill fish, and generally lead to the premature death of streams.

Water is a basic resource; it is necessary for sustaining life. The use of rivers, streams, and bays as sewers for dilution and transport of wastes

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* Data for this and most other figures cited were developed from the files of numerous local, county, regional, State, and Federal Agencies. The analysis and interpretation of these data was carried out by the Commission Staff. All factual information throughout the report, except where cited by a footnote, falls into this category.

negates their use as a source of water supply, as a base of recreational activity, as a habitat for fish and wildlife. In the extreme it may mean the survival of the State's economic base. In the headwaters of the Passaic River alone, continued degradation of water quality could contaminate the potable water supply for millions of people. New Jersey's fishing and shellfishing industries stand threatened, as does its four billion dollar recreation industry along the coast

Projections to 1995 (Table I-1) indicate that New Jersey's per capita water use will continue to grow:

TABLE I-1

WATER USE PROJECTIONS

Year	*Population*	*Per Capita Use* (GPD)*	*Demand (MGD)*	*Industrial Demand (MGD)*	*Agricultural Demand (MGD)*	*Demand (MGD)*
1970	7,168,164	136	976	798	240	2014
1975	7,650,000	146	1114	....	....	....
1980	8,100,000	157	1271	951	292	2514
1985	8,600,000	170	1461	....	....	....
1990	9,100,000	185	1679	1113	355	3147
1995	9,600,000	201	1928	....	....	....

* Per Capita Use figures in gallons per day (GPD), overall demand in millions of gallons per day (MGD).
Population projections from New Jersey Department of Labor and Industry.
Water projections from New Jersey Department of Environmental Protection.

In summary, New Jersey's extensive water pollution is probably the most serious problem currently imperiling the quality of our physical environment.

The Fragmented and Ineffective Response

Government has responded to the management of water quality in a fragmented and ineffective fashion. The recent upsurge of public concern over environmental questions reflects a belated recognition that past and present institutional efforts have failed to consider adequately the desirable relationship between man and the natural environment, that governments, faced with a wide range of pressing environmental challenges and dangers, can no longer remain complacent about environmental threats.

Originally a function of local government, State and Federal fiscal intervention has evolved to the point where they are now the dominant forces. Their involvent, however, has not brought about the systematic

identification and resolution of the State's water pollution problems. Although more than one billion dollars has been spent on sewerage facilities in New Jersey over the past ten years, the State's rapid growth has outpaced government's capabilities and pollution problems are more serious than before. The cost of eliminating the present backlog of sewerage facilities while keeping pace with present-day needs could approach five billion dollars in New Jersey. Local and State government cannot bear such costs and the Federal government does not appear willing to do so. *Only one project in the entire State was funded in 1972, and in the next two years only a few major projects will be funded.*

At the same time that the construction of new facilities is near a standstill, the management of existing facilities is frequently breaking down. Small, locally based sewerage authorities are incapable of generating revenues to hire licensed operators and engineers. Also, *the State management effort is severely hampered by understaffing and underfinancing.* As a mediator between local and Federal government, the State has found itself in the middle of numerous jurisdictional conflicts. Considering the multiplicity of institutions as revealed in Table I-2, it is of little surprise. Moreover, the Federal approach has been erratic at best; comprehensive legislation has been followed by unpredictable enforcement activities and sporadic and indecisive financial commitments.

The implications for New Jersey are serious. Construction costs have been rising approximately one per cent per month, thus delays in approved projects will add considerably to the already sizeable construction bill foreseen. *The efforts to date in enforcement, operation and maintenance of existing facilities, the monitoring and surveillance of the waterways, and the supervision of construction reflect the absence of a rational intergovernmental framework for water quality management.* Effective services are not being provided systematically or comprehensively, and cannot be without a well coordinated, adequately funded program to identify specific pollution problems, assign them priorities and address them in a systematic fashion.

The gravity of our situation is best understood when we consider the position in which poor water quality management has placed New Jersey. The continuation of present policies would result in the reduction of the total amount of usable water resources. This in turn might require us to seek new sources of potable water for northeastern New Jersey from the upper Delaware and Hudson Rivers, or the Connecticut River, or even the Great Lakes, all costly as well as legally and politically difficult. While such alternatives, even if feasible, might satisfy water supply needs for a time, it would not eliminate the wastes and debris from our rivers and streams, nor preserve water recreation in the State, nor bring back the fishing and shellfish industries, nor remove the peril to the environmentally productive wetlands and seashore.

There are effects which go beyond environmental questions. *Due to the overloading and poor efficiency of treatment facilities, as many as 100*

TABLE I-2

INSTITUTIONS INVOLVED IN WATER QUALITY MANAGEMENT

FEDERAL:

Housing and Urban Development	*Farmers Home Administration*	*Environmental Protection Agency*	*Army Corps of Engineers*	*Coast Guard*
— Collection Systems — Funding — Urban	— Collection Systems — Funding — Rural	— Policy — Treatment Facilities & Interceptors lines — Funding — Information System — Water Modeling	— Regulates ocean disposal — Flood control	— Enforces maritime law including hazardous cargo

INTERSTATE:

Delaware River Basin Commission	*Interstate Sanitation Commission*	*Delaware Valley Regional Planning Commission*	*Tri-State Transportation Commission*
— Policy — Planning — Water Modeling — Monitoring and Surveillance — Enforcement	— Monitoring and Surveillance — Enforcement — Technical Assistance	— Reviews capital construction projects to insure congruence with comprehensive plans	— Reviews capital construction projects to insure congruence with comprehensive plans

STATE:

Department of Environmental Protection	*Department of Community Affairs*
— Policy — Drafts legislation — Administers grants & loans — Monitoring and Surveillance — Classifies streams and sets standards — Enforcement & Regulations — Planning — Funding	— Land use planning — Coordinates functional plans with comprehensive plans — Review of federal construction projects (204) — Project grant information clearinghouse (A 95)

REGIONAL:

Water Purveyors	*Passaic Valley Sewerage Commissioners*	*County*
— Information System — Monitoring and Surveillance — Enforcement — Coordination	— Plan — Finance — Monitor — Enforce — Operate and maintain — Construct	— Form authorities — Finance — Enforce — Health officers — Construct — Plan

TABLE I-2 (Continued)

INSTITUTIONS INVOLVED IN WATER QUALITY MANAGEMENT

AUTHORITIES:

Local	*Multiple/Regional*
— Hire attorney/engineer — Finance — Construct — Regulate — Operate and maintain	— Hire attorney/engineer — Plan — Finance — Construct — Operate and maintain — Enforce — Monitor — Provide service

MUNICIPAL:

Municipality	*Conservation Commission*	*Planning Board*	*Health Officer*	*Interest Groups*
— Construct — Operate and maintain — Monitor — Enforce OR — Form authority — Name members	— Plan — Recommend — Provide information	— Plan — Zone — Land use	— Monitor — Regulate — Enforce	— Pressure — Oversight — Educate

*municipalities in New Jersey face State-imposed building bans in 1973.** Municipal planning boards rarely consider water quality when giving approval for more and more construction. Their lack of comprehensive consideration is now evidenced by the bans on further development. In New Jersey, a State with critical housing shortages, the building bans will be felt in those communities which have recently developed or are now rapidly developing. Even beyond the question of housing, there is the issue of the basic economic vitality of the State. Rapid growth has occurred at the expense of the overall quality of life and the impact is significant:

- Formerly unregulated discharges by industry must now be replaced by modern treatment facilities.
- Municipalities that fostered rapid growth without providing adequate sewerage facilities will face a dramatic halt to development and a high bill for new wastewater treatment facilities.
- The seashore recreation and fishing industries will remain threatened as long as water pollution and the ocean disposal of sludge and other harmful wastes continues.

* Department of Environmental Protection files, and commission's interviews and other sources.

- Land use and community development planning will continue to be incoherent as long as water quality is not viewed as an equal, basic factor in decision-making.

The failure of water quality management to date affects these and other broad governmental performance considerations. Most of all it points up the need to reassess basic land use planning principles if there is to be more orderly and beneficial development in the future. Finally, it reflects a need to define and establish institutional arrangements for coordinating the water quality goals and implementing the activities of the various governmental units.

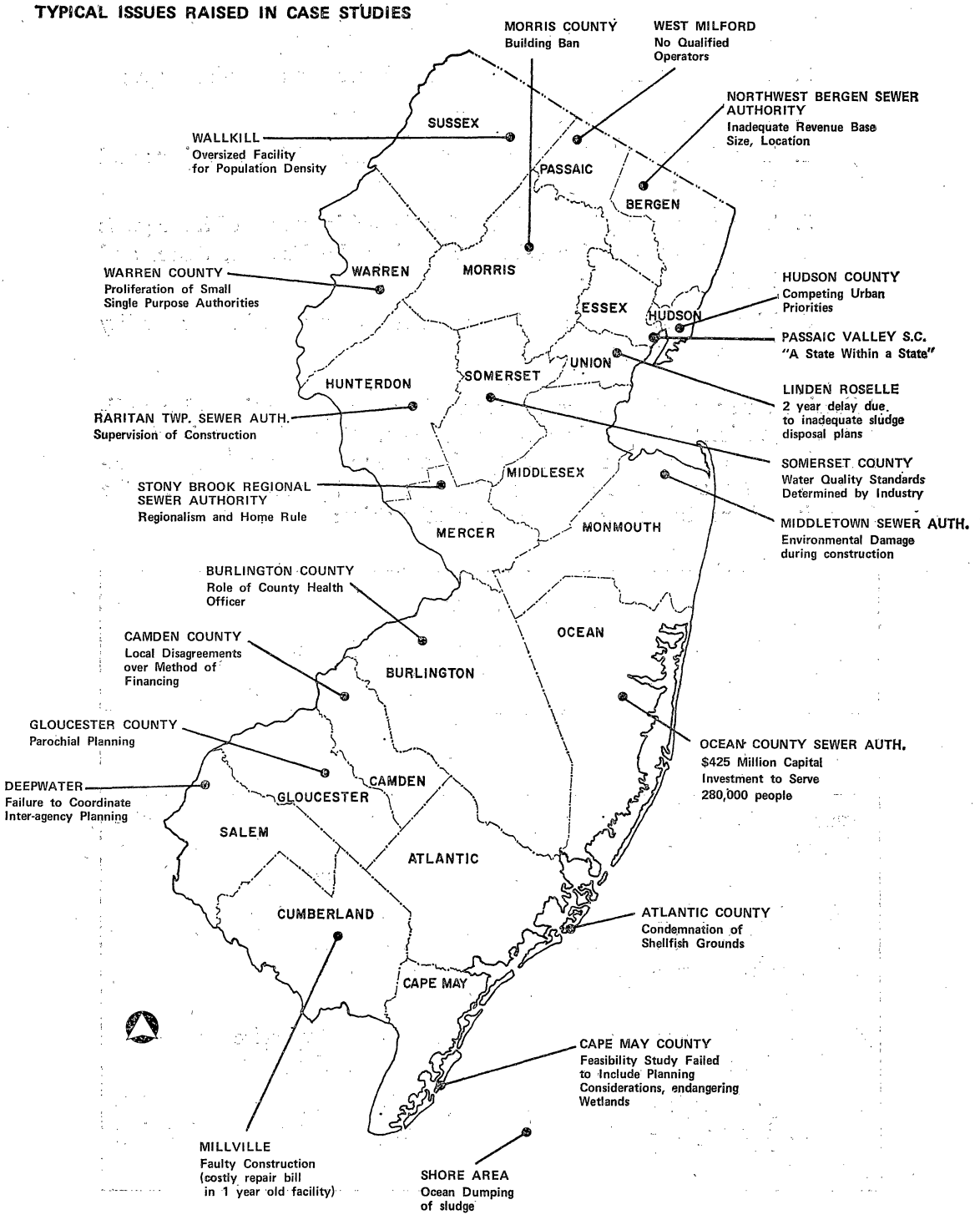
The Management of Water Quality in New Jersey

Heretofore there was no disciplined approach to water quality management in New Jersey. Over time, the approaches to water pollution evolved from the use of sewers for moving wastes away from populated areas (primarily for health protection), to the capture and treatment of wastes (or water pollution control), to sophisticated water quality management systems which are now beginning to emerge. While New Jersey is still primarily in the water pollution control phase, *it is the goal of the Commission's report to provide an institutional framework for the systematic and comprehensive management of water quality in New Jersey.*

In developing its recommendations, the Commission had the full cooperation of the State Department of Environmental Protection (DEP). In most cases, the performance standards used by the Commission to measure the program effectiveness of all the levels of government were those established by the DEP. In addition to working with the DEP staff and using departmental files, the Commission also worked with the Environmental Protection Agency and other Federal agencies including the Department of Housing and Urban Development. The Delaware River Basin Commission, local and regional sewerage authorities, consulting engineers, legislators, judges, and local government officials all helped provide a comprehensive basis for the Commission's research.

Interviews and research were supplemented by 75 case studies of specific water problems existing within the State. These case studies were carried out in every county and examined all major aspects of the overall problem. The case studies support the Commission's view that the local problems, although occurring independently of one another, often have similar and related causes. From the case studies and related research there emerged six elements (or functions) that comprise the governmental role in water quality management. Where these functions were all performed adequately, the Commission found few water problems; where one or more of the functions were inadequately performed or not performed, there were found to be numerous problems.

TYPICAL ISSUES RAISED IN CASE STUDIES



These six functions are:

1. The supervision of the construction, operation, and maintenance of wastewater treatment facilities;
2. The monitoring and surveillance of streams and discharges;
3. The enforcement of regulatory measures;
4. The finance and funding aspects of State and local projects and programs;
5. The comprehensive planning for the achievement of State goals through cooperative efforts involving the Federal, State, and local governments;
6. The legislative and administrative management of water quality issues.

Effective water quality management requires the systematic and coordinated execution of these six allied functions. Each element is closely related to all of the others and only when they are all carefully orchestrated do they constitute a system of water quality management. The following chart illustrates these interrelationships:

TABLE I-3

THE INTERRELATIONSHIPS OF POLICY, MANAGERIAL, AND OPERATIONAL ACTIVITIES

Policy ⟶	*Managerial* ⟶	*Operational (Selected examples)*
Enact enabling legislation	Develop administrative guidelines, rules and regulations	Regulate daily activities of local sewerage facilities.
Determine appropriate administrative structure and regulatory process	Implement administrative regulations	Conduct enforcement activities
Set priorities and funding levels	Direct financial programs	Supervise construction
Formulate comprehensive basin planning policies	Develop regional criteria and project reports	Coordinate participants in planning process

Some of the tasks assigned to the various functions are summarized below:

The Supervision of Construction, Operation, and Maintenance

- Adequate supervision of construction: essential to assure that design specifications are met and to minimize environmental damage while construction is in progress.
- Licensing and regulating operators: important to the functioning of a sewage treatment plant, a complex and full-time occupation.
- The maintenance of sewerage facilities: critical to efficient operation and the prevention of breakdown in the entire sewerage system.

Monitoring and Surveillance

- Reporting procedures: uniform, coordinated and consistent routines.
- Avoidance of duplication between overlapping jurisdictions.
- Achievement of even distribution of monitoring stations throughout the State.

Enforcement

- Even handed application of enforcement procedures.
- Speedy decisions and enforcement activities that abate pollution.
- Emphasis on remedial assistance as well as on apprehending of polluters.

Finance and Funding

- Enabling construction of facilities: bridging gap between rising capital construction costs and limited local resource base.
- Broadening the role of local sewerage authorities.
- The art of selling sewer bonds: techniques of minimizing interest charges and legal fees.

Planning

- New comprehensive basin planning approaches are required.
- Project planning and its relation to the comprehensive basin plans.
- Inflexibility of new Federal planning regulations.

Legislative and Administrative Management

- Modernizing antiquated water pollution laws and keeping them current; drafting of comprehensive water pollution legislation.
- Adequate staff and budgetary support for the Department of Environmental Protection.
- Regulation of local sewerage authorities so that they work toward State goals, and limiting their proliferation.

In the aggregate, the six functions described provide a framework for better understanding water quality management in New Jersey. Each is the subject of a separate chapter herein.

Water Quality Management Objectives

The question of what constitutes an appropriate governmental framework for an effective water quality management program in the State is at the core of this Commission study. The objectives perceived by the Commission toward this end are as follows:

- *Integration of the six functional areas into a coordinated and comprehensive program directed by the State, supported by the Federal government, and carried out by cooperating local governments.*
- *Establishment of an administrative process for resolving water quality issues on both a long-term and daily operational basis.*
- *Realignment of existing governmental water management agencies and their functions to the extent necessary to reflect duties and authority commensurate with responsibility.*
- *Establishment of better linkages between water quality decision-making and decision-making for other social, economic, and environmental activities.*
- *Rationalization of State and Federal regulatory practices to provide greater fairness and predictability in their substantial but necessary impact upon municipalities, authorities, and the private sector.*

Many traditional assumptions are now being questioned about population growth, economic expansion, and the use of water and land resources. As the public gains a better appreciation of the limited availability of natural resources, State and local governments will be called upon to translate these new attitudes and values into effective long-range policies and plans to attempt to achieve the goal of a quality environment. Although the problems of water quality in New Jersey today are serious, the Commission believes that they can be managed, given proper planning at all levels of government, balanced legislation, adequate financing, technical skill, fair procedures for conflict resolution, and a reasonable amount of cooperation on all sides.

TABLE I-4
CHANGES IN GOALS AND OBJECTIVES OVER TIME

Time →	Public Health	Pollution Control	Water Quality Management
	Public Health	*Pollution Control*	*Water Quality Management*
Planning:	Local	Project Area	Comprehensive
Regulation:	Observation	Identification	Monitoring
Treatment:	Primary	Secondary	State of the Art

As Table I-4 indicates, public goals and objectives within the water quality area have changed considerably over time. Our primary treatment facilities were originally built to carry wastes away from population centers, but these centers have now coalesced and what is carried away from one town adds to the pollution in the next. Moreover, the increased volume of sewage and waste has intensified the pollution and pointed up the inadequacy of fragmented management. Thus regional systems appeared, and State and Federal activities were introduced. The coordinated, intergovernmental system which is presently evolving is the result of these changed conditions and goals.

Throughout this evolutionary process, the interrelationship of local, regional, State and Federal governmentals became inextricably tied, one to the others. While these relationships are the foundation of the governmental response to water pollution abatement, they are often the chief impediment to the efficient, effective management of water quality, as well.

Although, in general, the institutional framework and response has not been adequate, a few governmental bodies have responded expeditiously to some of the changing water quality needs and demands. During this time, the main responsibility for water pollution control has been vested in the State, in particular, the Department of Health. The recently formed State Department of Environmental Protection now has the primary authority and responsibility of formulating policies and proposing regulatory schemes for pollution abatement.

During the past two years, while the Commission was conducting this study, and working closely with most of the governmental institutions, the ability of and necessity for the Department of Environmental Protection to develop a capacity to conceptualize and analyze the State's water quality problem has clearly emerged. That Department's policy statements have increasingly been implemented into daily operating practices. The Commission has actively participated in a series of joint ventures with the DEP and has supported other actions initiated by the Department, including:

- The reorganization of the Department's Bureau of Water Pollution Control along functional lines.
- Increased staffing of the Bureau of Water Pollution Control to cope with its vastly increased responsibilities.
- The development of comprehensive basin planning capabilities.
- Comprehensive guidelines for construction practices and for water quality planning.
- Enforcement efforts utilizing building bans to resolve major pollution problems in public facilities throughout the State.
- An increasing involvement with institutional and management issues involving municipalities, counties, and public authorities.

— Assisting in the obtaining of a $500,000 Federal grant that will be matched with State funds to conduct a comprehensive plan for the Passaic River basin.

— Initiating the overhaul of existing statutes and the drafting of comprehensive water quality management legislation.

The DEP has cooperated fully with the Commission in its recommendations. With the support and financial aid of the DEP, the Commission will undertake the next major step by drafting legislation that will not only meet Federal requirements, but will assure New Jersey of its own strong legal footing.

The next decade will be a most crucial time period for water management, a period when billions of dollars will be spent to improve water quality throughout the State. Actions must be taken now to overcome budgetary limitations, to stabilize the relationship between the Federal Environmental Protection Agency and the State Department of Environmental Protection, and to create a more favorable working relationship between the State and local governments. A formal intergovernmental framework is essential, for without such a structure sewerage services will continue to be plagued by the problems outlined in the body of this report.

In summary, pollution of rivers, lakes and streams in New Jersey has reached a perilous level. Technology is available to prevent pollution from occurring, but it has not been effectively used. The inability of government to organize effectively to conduct a water quality management program on a well defined regional basis, and to channel funds into this effort, appears to the Commission as the direct reason for the State's inability thus far to achieve its water quality goals and objectives.

Chapter II

THE CONSTRUCTION, OPERATION, AND SUPERVISION OF WASTEWATER TREATMENT FACILITIES

Overview

In analyzing the water quality issues, problems, and needs in New Jersey, it is important to start with what we have—some 800 wastewater treatment plants and thousands of miles of streams and waterways—and evaluate the performance of these plants, their effects on the quality of water, as well as the ability of the governmental institutions to construct, operate, and supervise these wastewater treatment facilities.

This review and analysis of government's role in the construction, operation, and supervision of some 800 wastewater treatment facilities was based primarily on the criteria, guidelines, and records of the major governmental units which are involved in and have studied this function: the U.S. Environmental Protection Agency (EPA), the State Department of Environmental Protection (DEP), the U.S. General Accounting Office (GAO), and numerous interstate, county, and local agencies and authorities.

Government's role with regard to wastewater treatment facilities begins with planning and continues with review and approval of plans. Beyond that, the governmental role extends to the supervision of construction of the wastewater treatment plant, the operation and maintenance of the facilities after they are constructed, and the licensing and regulation of the operators of the facilities. These three elements should be primary concerns, yet they are relatively neglected and lead to many of the serious deficiencies of water quality management.

Over and over again, the Commission finds the recurrence of these four obstacles: (1) unsuitable treatment plant design and construction; (2) insufficient staffing, review procedures, and auditing procedures; (3) inadequate training and supervision, and a casual approach by agencies, treatment plant owners and operators; and (4) facilities that do not perform in accordance with the design standards, because they were approved as "individual" projects and they treat wastes that they never had been designed to treat. The picture is not a pleasant one. Great sums of private and public moneys have been spent on sewerage facilities in New Jersey during the past ten years. However, despite these expenditures the records indicate that wastewater treatment plants are not meeting the operating standards intended in their design.

The Construction of the Wastewater Treatment Facilities

A critical period in the construction stage is between the time the permit to build a wastewater treatment plant is issued and the day that treatment begins. The engineering consultants and contractors are in charge, digging trenches, laying pipe that can affect groundwater, encroaching upon streams, building outfalls, and constructing the facilities. During this stage the chance of error is great and the potential effect enormous. A facility that is quite acceptable on paper in terms of design, capacity, and degree of treatment may become quite another entity once built. It is not uncommon for infiltration or related difficulties to occur because of faulty design or construction problems. An example of lax supervision over construction is evident at a recently completed facility in Southern New Jersey. This 5 MGD regional plant costing $3.3 million was opened in September 1970. The first State inspection report in October 1970, indicated an unsatisfactory effluent analysis and noted that the plant had cracks in the aeration and secondary settling tanks. Because of this faulty construction, the plant has failed to meet State standards and the effluent was polluting the receiving water.

Infiltration problems, which represent a major cause of water pollution, frequently occur during periods of wet weather, when facilities are subject to high flows that flood the plant or force it to bypass raw sewage into the receiving stream. Infiltration results from a variety of reasons related to poor construction practices, most of which can be avoided and are not difficult tasks to perform properly, but can and do lead to very serious problems when carried out improperly.

A review of Federal EPA and State DEP files and records indicates substantial inadequacies of supervision during the construction stage in three out of every four inspection reports. One such example was noted after a visit by DEP and EPA officials in November 1970 to recently constructed facilities in the eastern portion of the State—facilities costing approximately 23 million dollars. The officials noted in their report that the resident inspector was not present and that the material around the pipes was not being adequately installed. As the problems of infiltration represent one of the major impediments in the management of water pollution, this deficiency was of great consequence. In another instance in northern New Jersey problems of infiltration have been continuing for four years without abatement despite repeated State attempts at correction.

The construction problem is further complicated by the fact that two permits are issued simultaneously before construction commences—one allowing the contractor to begin work and the other allowing the owners to operate the plant. This procedure is surprising in that the Federal and State funding agencies, and the owner of the wastewater treatment plant do not insure their investments by issuing the second permit contingent upon satisfactory completion of the project in com-

pliance with approved design specifications. This procedure recently caused a suburban community in the Raritan River Basin to delay payments to the contractor until work was completed according to specifications. The wastewater treatment plant was given a qualified acceptance, with the contractor responsible for upgrading the plant in order to meet the design specifications. In this case the original work did not proceed at an acceptable rate nor was it done in an acceptable manner. The local authority insisted that clean up work had to be completed before further lines were laid and that all lines would have to be tested successfully before payment would be made.*

During the construction stage, a very important role is played by the consulting engineer who is generally the most knowledgeable about the facility from the planning stage through completion. It is he who deals with the State DEP, the authority or municipal official and the contractor. However, according to the State DEP staff, much design analysis is of a "cook book" nature and the equipment representatives do most of the design work for all but the very best consultants. Since the consultants are being paid for this work, their job should be considered complete only when the treatment plant and sewage pipes have been thoroughly evaluated to determine the correctness of design, by means of hydraulic studies and unit-by-unit evaluation of each operation's characteristics; and when the contractural specifications have been fulfilled. Although it would seem only proper for this to be the duty and responsibility of a professional engineer, there are no formal requirements to this effect. The authority member and municipal official depends upon the consultant's integrity and ability in technical matters, and it is apparent from the records that more formal and stringent means are necessary to insure that the authority and municipal officials may safely rely on the engineering services the public pays for, so that the finest possible product is obtained for each public dollar expended.

Operation and Maintenance of the Facilities

Obviously, wastewater treatment plants must perform according to design specifications if acceptable levels of water quality are to be achieved within the State. A wastewater treatment plant can be the finest and most expensive to be found, but if it does not operate anywhere near design capability its purpose is significantly negated. Interviews conducted throughout the State, as well as with DEP field personnel and engineers, indicate that approximately one-third of the State's 800 wastewater treatment plants could significantly improve their performance—often by as much as 25%—without requiring any major capital expenditures through use of better operations and maintenance techniques which are required on paper but not attained in practice. The solution to this problem does not involve additional expenses, but merely a commitment to a more systematic governmental regulatory approach and a new or-

* The new Federal requirements appear to mandate closer supervision than in the past.

ganizational arrangement which would insure that once a wastewater treatment facility has been put into service, it will operate in a manner that safeguards State standards for water quality.

It is ironic that there is a touch of glamour associated with those working to preserve the environment, for few people realize that water pollution abatement depends heavily upon the skill of the operator of the local wastewater treatment plant. Without good operation, such plants amount to little more than monuments to the expenditure of public moneys.

The operation of a wastewater treatment plant can be extremely complex and hazardous. Its machinery is intricate and technical and demands a great deal of skilled knowledge to maintain. The kinds of wastes coming into the plant must be carefully analyzed as must the receiving streams. Emergency procedures should be worked out in advance, and preventive maintenance techniques must be closely followed to forestall major breakdowns. All this is a difficult job for which the responsible individual should be thoroughly trained, but too often is not.

There are many competent operators in the State who thoroughly understand their facilities and how they are to be run. Yet for all this knowledge, millions of gallons of wastewater are poorly treated or bypassed daily in hundreds of local plants. Elementary problems may not be addressed if the operator is unaware of their existence. At present, available controls are not being enforced against substandard plant operations. State DEP files reveal many instances in which plant operators consistently receive unsatisfactory and poor ratings, yet their operators' licenses are automatically renewed each year. Since these operators receive "tenure" after five years, any possibilities of their removal or dismissal, except for matters serious enough to warrant personnel actions involving charges and a hearing, have been relinquished. Equally serious are the cases where part-time personnel are granted licenses to operate treatment plants which require full-time coverage, and the cases where major plants are without supervision by licensed personnel for months at a time.

One of many examples where repeated State approval has been granted for part-time personnel to supervise a facility that requires full-time coverage is in a certain bayshore community. DEP memoranda on this community indicate that its treatment facility, with seven pumping stations, should have the attention of a full-time licensed operaor. The plant has a design capacity of 0.55 mgd, but inspection reports indicate average flows of three times that amount, 1.5 million gallons daily.

At an old municipal plant in northeastern New Jersey, which has an average daily flow of 7-million gallons, no licensed operator was on duty for five months during 1969. During 1971 the same plant was without a licensed operator for six months. The situation has been criticized by the municipality's own consulting engineer and State DEP personnel, but nothing has come of it.

Conditions such as these are all too commonplace throughout the State. The Commission's findings (Table II-1) indicate that most of the major facilities in the State are not covered 24 hours a day by a licensed operator. According to the State records released for 1972, the largest plant in the State has only two licensed operators, one of whom is the Superintendent.

In addition, numerous facilities throughout the State are without any supervision by licensed operators. The 1971 and 1972 State records

TABLE II-1

MAJOR WASTEWATER TREATMENT PLANTS WITH LESS THAN TWO LICENSED OPERATORS: JANUARY 1972*

Plant	*Capacity—MGD (million gallons per day)*	*No. of Licensed Operators*
Municipal Plant A	5.5	1
Municipal Plant B	20.0	2
Municipal Plant C	3.0	1
Municipal Plant D	3.25	1
Authority Plant C	5.0	1
Authority Plant F	60.0 (Two Plants)	3
Authority Plant G	1.0	0
Authority Plant H	5.0	1
Authority Plant I	83.0 (Two Plants)	1
Municipal Plant J	4.0	1
Municipal Plant K	2.0	1
Municipal Plant L	2.5	1
Municipal Plant M	2.5	1
Municipal Plant N	3.0	1
Authority Plant O	200.0	2
Municipal Plant P	5.4	0
Municipal Plant Q	10.0	0
Municipal Plant R	4.0	1
Municipal Plant S	4.0	1
Authority Plant T	8.5	2
Municipal Plant U	10.0	2
Municipal Plant V	3.0	1
Municipal Plant W	4.2	1
Municipal Plant X	2.5 (Two Plants)	1
Municipal Plant Y	2.0	0

* Compiled by Commission Staff from DEP files and other sources.

indicate that there were more than a dozen State and Federally supervised facilities without operators. Also, it is not unusual for municipally owned plants to be without licensed operators for extended periods of time; two municipally owned plants in a county bordering New York State were without operators for nearly two years. The seriousness and significance of these faulty procedures and their poor application can be best exemplified through the following case studies.

Case Studies: Accountability and Responsibility in Operations and Maintenance

A suburban community's plant was built at a cost of $88,000, has a design flow of 64,000 gallons per day (gpd), and is owned and operated by the township's Municipal Utilities Authority. It is officially listed as a "tertiary" (advanced wastewater) plant which commenced operations in March 1967 and was first inspected by the State DEP in April, 1967, at which time there was no licensed operator for the facility. In early May, 1967, a State DEP basin engineer informed the State's Chief of Examinations and Licensing that the operator whose name had been submitted for consideration could not be recommended because his attendance and performance records at two other municipalities in an adjacent county was unsatisfactory. However, this candidate was granted a license and given responsibility for the plant's operation in April 1968 (prior to this time there was no licensed operator).

Within one year, the average daily flow was exceeding plant capacity by 5,000 gallons and the State DEP engineers were reviewing plans for the extension of sanitary sewers to serve two other sections of the same community. A 120-home addition was being considered at a time when the plant was already operating beyond its capacity. In addition the plant had numerous deficiencies, examples of which were the absence of a pump in the dry well, an inoperative station alarm, a non-functioning emergency generator, and a non-functioning self-starter on the final tank.

By February 1969, the State DEP inspection reports indicated that the flow recorder registered excessive infiltration of some 25 to 30,000 gallons. At that same date, the operator's license was renewed. The six inspection records for 1969 and 1970 state: "No one at plant during inspection." Thus, four years had transpired and no remedial action had been taken. This failure is not solely the result of too little manpower or money.

Regrettably this is not an isolated case, for within this same township, there are four more comparable situations, which represent $250,000 in expenditures and a minimum daily discharge of some 300,000 gpd. These examples illustrate a lack of responsibility on the part of municipal officials, a lack of follow through on the part of the State DEP, and a lack of accountability on the part of the operator, in a situation involving

plants whose effluents discharge into streams which supply water to some 750,000 people.

Unfortunately, this record of plant operations and maintenance is not an isolated situation, but is found in every county in the State. For example, one can review the record of the previously mentioned township's neighboring community, which has a much bigger, four million gallon per day plant which was partly paid for with Federal and State funds totaling over $2.5 million. The plant, officially opened in October, 1964 was polluting the receiving stream less than one year later. In May, 1965 the Federal EPA warned the State DEP about the new plant's inadequacies. In 1966, additional wastewater plant construction plans, also calling for State and Federal financial assistance, were proposed to double the existing capacity of the overloaded treatment units. The State's reviewing engineer noted in his report that unless an experienced operator was employed and unless the local officials were able to mitigate the infiltration conditions, many of the problems would remain unresolved. The additional construction was completed in June, 1968 but the DEP and EPA records for 1968, 1969, and 1970 clearly indicate that the plant was still polluting the waters. In February, 1970 DEP recommended to EPA that the final ten percent payment should be made to the community although the plant was not meeting all State standards. The plant has consistently failed to meet standards but recently the community again submitted plans for more Federal/State construction moneys.

Each plant should have an explicit set of procedures to guide operators and to delineate their responsibilities for water quality management. Preventive maintenance, effluent monitoring, and requirements for manning the plant should be spelled out. Also, there is a need for coordinated governmental procedures for oversight of daily operation and maintenance problems, technical assistance, and follow up to prevent defects from reoccurring.

The Licensing, Regulation, and Supervision of Operators

These observed operational problems give rise to questions about adequacy of the training and licensing of operators. New Jersey began licensing procedures in 1918 and was one of the first states to do so, but criteria for license classifications are long outdated. Issued on the basis of training, operating experience, and an examination administered by the State, licenses are classified with reference to the size of treatment plants and the processes employed. They may be revoked (through a State administrative procedure) on the ground of incompetence, but may be reissued after six months if the licensee achieves an acceptable score on a State examination.

State licensing requirements are supplemented by certain requirements of the EPA, such as recording the man hours for operators working on federally funded projects. However, such requirements serve little

purpose because State regulations do not require operators (or attendant personnel) to spend a prescribed number of hours at facilities, regardless of size or complexity. Facilities are often left unattended due to the limited number of licensed operators in the State (see Table II-2) and the fact that many operators are employed at more than one facility.

By administrative regulations, operators are required to compile daily reports and submit them to the State DEP monthly. However, the information presented in these reports has been criticized by the General Accounting Office as being fragmented, incomplete and of little value.

TABLE II-2

NUMBER OF LICENSED OPERATORS BY COUNTY
JANUARY 1972*

County	*Licensed** Operators****	*Number of Listed Plants*
Atlantic	19	22
Bergen	45	40
Burlington	42	58
Camden	36	44
Cape May	11	20
Cumberland	3	6
Essex	28	13
Gloucester	18	33
Hudson	14	21
Hunterdon	23	29
Mercer	48	35
Middlesex	54	39
Monmouth	58	97
Morris	73	81
Ocean	31	44
Passaic	34	40
Salem	9	9
Somerset	41	60
Sussex	17	31
Union	34	10
Warren	22***	19
Totals	714	751

* Compiled by Commission Staff from DEP files and other sources.

** Some of the operators are also covering water filtration plants.

*** Even where there are more operators than plants, it may not mean that all the plants are covered. For example, Warren County's 22 licensed operators manned only 15 plants, thus 4 plants had no assigned licensed operators, at all.

In a nationwide study which is representative of the State, the GAO said that 59% of the 60 plants studied did not fully meet the minimum State requirements for personnel, laboratory controls, or records and in 51 of the 60 plants reviewed the individual State records were inadequate to determine the degree of treatment being provided. In New Jersey, the Commission's interviews and analyses revealed that the operators' reports are of virtually no value because so few are properly submitted to the State DEP.

Although it is possible for an operator to be removed from his position, if after a hearing it is shown that he has neglected his duties or the rules and regulations of the State DEP, this sanction is rarely employed. The fine for such unsatisfactory performance is $10 per day, certainly not an amount that would place fear in an owner or operator's heart. Consequently, the operator's reports are treated with disdain by the owners and the local officials. As an example DEP's unsuccessfully attempts for nearly two years to require an operator to submit necessary water quality data.

Conclusions

The construction, operation, and supervision of wastewater treatment facilities has not been given the attention it deserves. No single agency has taken upon itself the job of standard-setting and standard-maintenance in any vigorous and consistent way. A systematic and integrated approach to the construction, operation and maintenance of sewage treatment plants is clearly necessary if we are to make any headway in the fight against water pollution. Although general direction and funds have been provided on an *ad hoc* basis, little or no technical guidance has been available. With the bulk of the construction having been supervised by consulting engineers, there has been inadequate monitoring of their work by those agents who are charged with executing major Federal and State policies in this area. There is a need for more technical assistance, operator training and stricter supervision of both construction and operations.

The State DEP has recognized many of these deficiencies and is already moving to correct them. Most notably, a report entitled "The Environmental Standards for the Preparation of Plans and Specifications for the Construction of Interceptor Sewers" was prepared by a blue ribbon task force called together by the DEP. In addition, Project Report guidelines have been prepared and should be of aid to both the State and those constructing facilities. The Federal EPA has initiated a detailed program to monitor construction which should better ensure adequate supervision of sewerage construction.

Recommendations

The Commission's recommendations for the functions of construction, operations, and maintenance of wastewater treatment facilities are:

Construction

1. *The rules and regulations for the Preparation and Submission of Plans for Sewer Systems and Wastewater Treatment Plants Should be updated by DEP.*
2. *The State should institute and enforce the environmental standards for the preparation of Plans and Specifications for the Construction of Interceptor Sewers.*
3. *The State should initiate a double permit system to better protect public investment related to sewerage facilities. The Commission recognizes that the Federal EPA has a construction control program, but believes there remains a need to protect State and local investment through the use of two permits. The permit to build a facility should be issued after detailed design plans are approved. A permit to operate the facility should only be given upon a successful demonstration that it can maintain acceptable levels of treatment.*
4. *The State should require construction contractors to post performance bonds guaranteeing that their work will meet specifications.*
5. *In accordance with Federal regulations the State should monitor the construction of treatment facilities more closely. To ensure high quality construction and performance capabilities, the DEP staff should be strengthened where necessary.*

Operations and Maintenance

6. *The State DEP should immediately formulate and publish enforcible rules and regulations to govern the operation and maintenance of all sewage treatment plants. Also, the rules and regulations relevant to each individual project should be published and circulated to all participants at the beginning of new projects.*
7. *The licensing procedures for operators should be revised, with explicit eligibility requirements distinguishing between levels of operator capability in terms of education, on-the-job training, experience, and expertise in light of today's state of the art. These distinctions should recognize the technical understanding required for the different levels of operating complexity, and also the administrative and maintenance expertise required for small, medium and large operations.*

8. *The State should identify all wastewater treatment facilities without licensed operators and demand that such facilities hire licensed and approved operators within 30 days of such notice. Failure to comply would result in a State-appointed operator at owner's expense.*

9. *The State should devise standards and criteria to determine the number of supervising hours required for the competent operation and maintenance of wastewater treatment facilities.*

10. *The Bureau of Water Pollution Control, which, pursuant to the Commission's recommendation, has been recently organized along functional lines, should be provided with a larger staff to concentrate on operations and maintenance. The staff of its Construction and Operations Control Group is still quite small (8) and should be enlarged. This would be a wise investment considering the estimated $3-5-billion which will be spent on sewerage over the next 10-15 years in New Jersey.*

11. *The DEP should designate model programs at schools where those desiring to become licensed operators could learn practical aspects of plant operation under State-certified instructors. The DEP should also have mobile laboratories to make field visits to the treatment plants periodically to keep operators abreast of new developments. Throughout the State are numerous vocational schools and community colleges, some being used as regional centers to familiarize potential operators with technical and theoretical facets of plant operation. This program should be intensified and coordinated by the DEP. Completion of the program should be equivalent to on-the-job training.*

12. *Legislation should be enacted, initiating a continuing operations and maintenance aid program in return for high quality performance. Such a program, which has been instituted in New York State, would afford the State an excellent opportunity to abate pollution and afford the DEP more leverage with authorities and municipalities.*

13. *The DEP should be empowered and required to review and approve contracts that local governmental agencies offer to consulting engineers and contractors in terms of the scope of services to be provided.*

14. *Legislation should be enacted to grant DEP power to contract for the correction of operational deficiencies and bill the owner for the services rendered, where municipalities or authorities fail to correct them.*

Chapter III

MONITORING AND SURVEILLANCE

Overview

Although monitoring and surveillance activities are often viewed apart from other water quality management functions they are directly related to the construction, operation, and maintenance of facilities, planning, or enforcement. By diligent monitoring and surveillance, the State DEP knows when a discharger is in violation of standards and may intervene before the violation impairs water quality. Monitoring is therefore closely related to effective enforcement. It is, however, generally not performed very well on a statewide or even a nationwide basis.

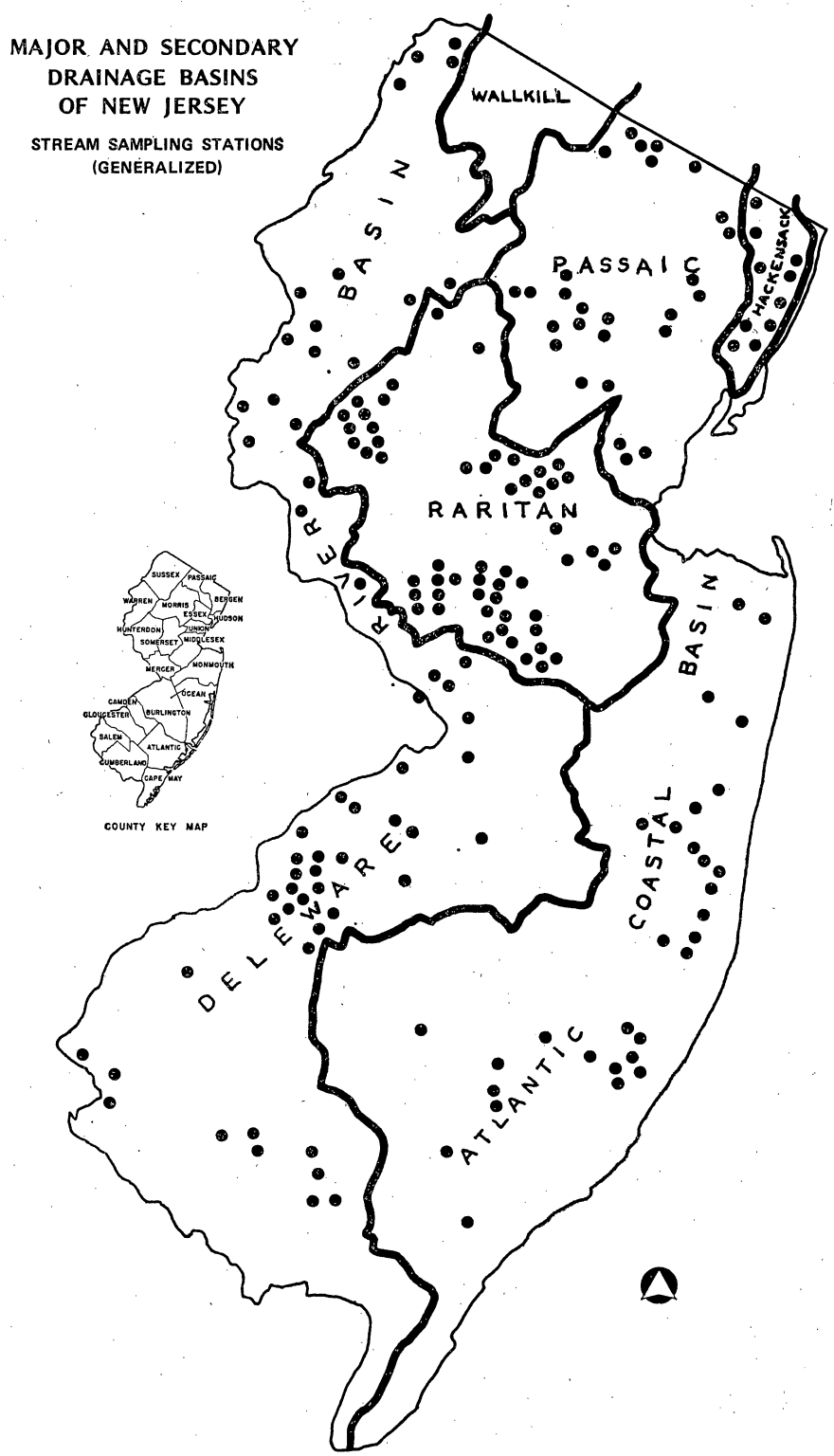
Monitoring and surveillance is also important in the collection and analysis of water quality data over time. It is important to know not only the current impact of wastewater effluents upon water quality, but the special characteristics which describe the stream. From these data a water quality model can be developed, a task imperative to the success of comprehensive water quality planning. From a water quality model it is possible to determine such information as the maximum waste load which a body of water can assimilate at minimum flow without falling below established quality criteria.

Monitoring and surveillance is also necessary to create a common data source for use by all State and Federal agencies concerned with water quality (see list in Chapter 1). As more water related functions are assigned to government by public demands for cleaner water, the need will increase for readily available data necessary to prompt, effective governmental action.

The three prime requisites for efficient monitoring are: a broad range of data collected; an adequate frequency of samples; and a proper and rational location of sampling stations. New Jersey needs significant improvement in all three.

The Workings of the Function

In order to ascertain whether a particular body of water is as clean as established standards require, it is necessary to monitor or make regular checks of indicators of its quality. It is also necessary to maintain continuous review of monitoring data supplied independently by wastewater dischargers and governmental agencies and to check these waste dischargers for compliance with water quality criteria. Systematic monitoring and surveillance keeps DEP alerted to violations and deterioration in stream quality.


MAJOR AND SECONDARY
DRAINAGE BASINS
OF NEW JERSEY
STREAM SAMPLING STATIONS
(GENERALIZED)
WALLKILL
DELAWARE BASIN
PASSAIC
HACKENSACK
RARITAN
RARITAN BASIN
COASTAL
DELAWARE
ATLANTIC
SUSSEX
PASSAIC
WARREN
MORRIS
BERGEN
ESSEX
HUDSON
HUNTERDON
UNION
SOMERSET
MIDDLESEX
MERCER
MONMOUTH
OCEAN
CAMDEN
GLOUCESTER
BURLINGTON
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
COUNTY KEY MAP

Monitoring and surveillance activities are carried out both by field personnel and by automatic monitoring stations under the jurisdiction of various participatory agencies: The Federal Environmental Protection Agency, the State Department of Environmental Protection, county and local health officers, and water suppliers. As is indicated in the next section, their involvement varies considerably.

The Institutional Setting: Local View

Monitoring and surveillance begins at the grass roots with the municipal or authority wastewater treatment plant. The staff responsible for the plant's operation is also responsible for sampling the effluent and reporting it. This information, however, tends to be haphazardly reported to State DEP and is not utilized by that agency. If the wastewater treatment plant operator should discover that the effluent is degrading stream quality, the records indicate it is unlikely that he would notify State officials, for under the present mode of operation not only would he not likely receive the technical assistance which might remedy the situation, but it is quite possible that revealing such information would invite sanctions against the plant in the form of administrative or court orders which could require the outlay of capital to upgrade the plant. While the operator may be very concerned with the quality of effluent and very much respect the dangers of polluting the water, under present circumstances, it is not surprising that he would choose not to put himself or the owners of the facility in jeopardy.

Municipal and county health officials have somewhat greater independence. Sewers and wastewater treatment were originally health functions, but over the years the purposes of government action have expanded to broader concerns in control of water pollution. Health officials became less involved although many health officers are still funded by the State Department of Health to monitor potable water sources. In some predominantly rural municipalities and counties health officials have a larger role in managing water quality, under such statutes as R.S. 58:10–1, which states that it is unlawful to pollute any water "above the point from which any municipality shall or may obtain its supply of water for domestic use."

In Hunterdon County there are 21 stream sampling stations monitored by State DEP and four stations supervised by the U.S. Geological Survey (USGS). The county has some 30 wastewater treatment plants, with most dwellings using individual septic tanks. Because danger to potable water is a prime concern of public health, the county health officer and two sanitarians regularly monitor water supply sources and stream quality. When the quality of water does not conform to standards, the State DEP is called in for technical assistance if possible and enforcement power if necessary.

This particular activity represents only the policing of water and does little to provide systematic information, yet given the relatively in-

frequent sampling by other agencies, it is a beneficial service. Such performance, however, is not uniform throughout the State. Often the counties with relatively low population densities are often those which contain infrequently sampled headwaters. These are of the greatest future value and are most likely to feel the effects of hasty development. It is important that these areas have protection of their relatively unspoiled supplies of potable water and their recreational areas. As sources of high quality water become more scarce, the water will also become more expensive and will require greater efforts to preserve its high quality. Therefore, it is desirable that local and county health officials augment the frequency and extent of State and Federal monitoring.

In Pennsylvania many of the county governments carry out monitoring and surveillance programs. In Bucks County (adjacent to Mercer County) there are 34 stations that are checked once every three weeks. This requires one full-time technician, a consulting chemist who analyzes the samples, and the use of a local college's laboratories. In total, it costs the county $30,000 and gives an adequate range of data at a good frequency. Such an approach warrants consideration in New Jersey.

Another monitoring and surveillance activity which requires an intergovernmental approach but little direct supervision or control is the disposal of plant and septic tank wastes. Interviews with State, County, and local officials, and a review of the records indicate that in the counties of Atlantic, Camden, Cape May, Cumberland, Gloucester and Salem, there is little activity in the licensing of scavengers. No one really knows where the waste material is dumped and, consequently, public health problems and seepage of contaminants into the waterways frequently result.

The uncontrolled dumping of waste by scavengers hampers efforts at pollution abatement. This may be inferred from the frequent and substantiated complaints to State and county officials which assert that scavengers are disposing of their wastes by dumping them into sewage treatment plants. The effects of such shock loads on sewage treatment plants have frequently been severely disruptive to plant operations.

More than 10% of the State's population have individual sewage treatment systems which require periodic cleaning in order to function properly. In general, septic tank cleanings and sewage sludge from small treatment plants are dumped into the waterways, at sanitary landfills, or at private land disposal areas. However, because of the lack of supervision, indiscriminate disposal and dumping into streams is a common practice. It has been estimated by State officials that approximately 1.75 million gallons of septic tank sludge is handled each week. To this, are added the sizable residues of some 300 small treatment plants which also must dispose of the sludge from their tanks and beds. Consequently, the volume of treated and untreated sludge disposal alone emphasizes the need for controls, direct supervision, and a coordinated effort by environ-

mental agencies, health officials and the Public Utilities Commission (PUC) —another State licensing agency for scavengers.

It appears that most municipalities are not adequately regulating the activities of scavengers within their jurisdiction. Those municipalities which allow scavengers, may also license them. However, that is usually the extent of the control over their activities. Inspections of dump sites are rarely made except, perhaps, when a complaint is registered, and it is therefore most difficult to ascertain where the scavengers deposit their wastes. The problem is compounded because supervised surveillance by local boards of health is frequently nonexistent, and because numerous communities will not allow septic tank cleaners to dispose of locally generated sludge within their own borders, thereby forcing them to utilize facilities in other localities.

In one of many examples that could be cited, a township authority in the Raritan basin had to dump the sludge from its sewage plant at another community's landfill rather than at its own municipally operated landfill. The fact that sewage plant and septic tank cleaners have difficulty finding places for disposal near their areas of operation has resulted in long hauls for dumping, which are costly and encourage surreptitious dumping in isolated areas.

The Institutional Setting: Regional View

New Jersey is a member of two separate and unusual regional agencies devoted solely to environmental issues. The first is the Interstate Sanitation Commission (ISC) which dates back to 1936, and serves parts of New York, Connecticut and New Jersey. The ISC is primarily a regulatory agency responsible for pollution control in tidal and estuarine waters of the Hudson River, New York Harbor, and Long Island coastlines. The second is the Delaware River Basin Commission (DRBC), a compact consisting of New York, Pennsylvania, Delaware, New Jersey, and the Federal Government. ISC addresses itself to pollution problems of air, water, and land in the New York metropolitan region, while DRBC is responsible for water resources management throughout the Delaware River Basin. These two agencies have jurisdiction over water related matters in the more heavily populated basins, containing about half of New Jersey's population. The important role they play helps to compensate for manpower shortages in the Department of Environmental Protection.

Both agencies have collected significant data over the years and have used it to develop a water quality model for planning, in the case of DRBC, and to force polluters into compliance through court action on the part of ISC. DRBC carries out analytical work which is too specialized for the States to do on a regular basis; monitors the river and its tributaries; and uses the data collected for primarily planning purposes. ISC on the other hand is a monitoring and surveillance agency whose role

does not include water quality planning. To accomplish their task ISC uses a staff of technicians, automated water monitors, and a mobile training laboratory providing two-day training sessions at waste water treatment plants. This allows plant operators to become familiar with the latest technological advancements, as well as offering general refresher courses. Such education and training program is of value both to the operators, who receive technical assistance which is not to be found elsewhere, and to ISC which can become better acquainted with physical conditions and with staffing and equipment in treatment plants and laboratories.

Other agencies perform monitoring and surveillance tasks that are somewhat different than those carried out by the DEP. However, agencies such as the DRBC or the ISC could easily become the agents of the DEP and carry out the State's work within their respective jurisdictions, thus freeing the limited DEP staff to concentrate in localities where monitoring is inadequate. Water suppliers could also play a similarly complementary role at little additional expense and with few changes in operations. They represent a vested interest because they sell water to customers at regulated prices. To them better water quality assures higher profit margins because treatment costs are likely to be lower. Many of the purveyors take their supply from surface waters, which means they already have monitoring and surveillance systems in operation. Two such agencies, the North Jersey District Water Supply Commission and the Passaic Valley Water Commission are well worth looking at as associate agencies in this functional area.

The North Jersey District Water Supply Commission (NJDWSC) supplies 100 MGD to approximately 750,000 people in some nine municipalities. It takes water from the Wanaque Reservoir which is fed by several upland streams, some of which have sewage treatment plants on their banks. Most of the treatment plants in the watershed are visited and sampled bi-monthly at the point of discharge into the stream, which in effect is a test of effluent rather than of stream standards. If problems are evident the operator is informed. Only if the operator cannot correct the problem is the Department of Health or the State Department of Environmental Protection called in for help. This reliance on individual interaction between NJDWSC and operators helps to prevent the creation of an adversary relationship. By knowing that their goals are similar and must be coordinated, and also that NJDWSC can back up its intentions with help from Trenton, their interaction is mutually beneficial.

In the estimation of a local municipal official, NJDWSC is "sensitive, militant, and powerful," due largely to their organized system of monitoring and surveillance. This is accomplished with a staff of five inspectors testing twelve stations on the Passaic River and the wastewater plants in the watershed. The samples collected by inspectors then go to a chemist and three lab technicians for daily analysis. Thus with a relatively small staff covering a jurisdiction well known to them and a laboratory which

can give quick results, NJDWSC verifies the quality of its water and compiles ongoing data for future planning purposes.

While the NJDWSC deals primarily with headwaters of relatively high quality the situation is vastly different only 15 miles away in the service area of the Passaic Valley Water Commission (PVWC). Here the question is not one of storing high quality water in a reservoir, but taking 75 MGD from the Passaic River at Little Falls and treating it thoroughly so it may safely supply 400,000 people in 16 municipalities. To supply 75 MGD, water must often be reused, for of the 100 MGD in the river at times of low flow, as much as 50 MGD is treated sewage. Obviously, it is in the interest of PVWC to begin with as high quality water as possible at its intake value in Little Falls, above which there are some 117 wastewater treatment plants, few of which meet the minimum treatment standards for the Passaic watershed.

To deal with this situation, PVWC employs three inspectors who visit the wastewater treatment plants monthly, conduct frequent six hour composite testing at 29 points along the river and make visual inspections at some 600 industrial plants. The Commission employs its own legal staff which allows PVWC to go after polluters quickly, take them to court, and receive one-half of the fine if one is issued. In addition, PVWC tests potential polluters such as warehouses in which chemicals are transferred from tanks to smaller containers and the possibility for toxics to enter the sewerage system is great. They also check industrial parks or commercial enterprises which operate their own wastewater treatment plants or use septic tanks. This coverage discourages pollution, lowers the cost of treating water for human consumption, and increases beneficial use potential. At the same time, it is done for a relatively low cost and the legal staff more than pays its own way from collecting fines and penalty awards. Thus, these quasi-governmental agencies offer excellent oversight of their water resources.

The Institutional Setting: State-Federal View

The heaviest burden for monitoring and surveillance falls upon the Department of Environmental Protection, which is presently understaffed to handle this responsibility. DEP's staff consists of 18 inspectors (compared with 10 for PVSC above) to monitor 800 wastewater treatment plants and the 200 stream sampling stations throughout the State. They visit each treatment plant and sampling station three or four times annually, hardly an adequate frequency. From Monday to Thursday they spend their time in the field and then come to Trenton Fridays to do their paperwork, which means that there is no regular monitoring three days of the week (Friday, Saturday, and Sunday). Further, monitoring and surveillance has traditionally been assigned a low priority and inspections very often are not followed up to insure that corrections are made at the source of pollution. There is also serious question as to the

value of the data obtained at the numerous stations in terms of its utility as a basis for enforcement and for ongoing planning because it is not collected often enough to give an accurate picture of water conditions.

Of the numerous federal agencies which are involved in the management of water resources, the two which have a significant interest in monitoring and surveillance (see Table III-1) are the Environmental Protection Agency (EPA) and the United States Geological Survey (USGS). EPA currently has regular field sampling done at six different locations throughout the State, on the Hackensack, Ramapo, Passaic, Metedeconk, Delaware, and Toms River. There are 24 parameters checked annually and 13 monthly at an annual cost of $11-12,000. There are also five automatic monitors in New York Harbor, two of which are located in New Jersey's waters. These monitors send hourly readings of five parameters directly to EPA's data bank, STORET, which could be the source of valuable information if properly utilized in a cooperative federal-state effort.

USGS is under contract with DEP to carry out specific monitoring and surveillance activities. They operate 10 continuous monitors, process the information, and publish the data annually, the only such agency to do so. The surface water quality network operated by USGS consists of a water quality survey of 40 sites in selected river basins. Special studies are also undertaken, such as stream sedimentation, oxygen resources and stream assimilative capacity, ground water and saline intrusion, and time-of-travel studies which provide information on the rate at which dissolved particles will travel through parts of a stream. The activities of USGS should be better integrated with those of DEP, considering that they are dealing with very similar needs and problems, and also that the state is paying for a large portion of the USGS activities.

The Adequacy of Monitoring and Surveillance

In the Passaic Basin (see Table III-2) the State DEP maintains 26 sampling stations, the USGS 13, including two automatic monitors. In addition, there are inspections by the water departments of Newark and Jersey City, the monitoring and surveillance activities of more than 50 water purveyors, and numerous health officers covering these 107 municipalities with more than 100 outfalls on the main stem of the Passaic River. It is estimated that the expenditures for these agencies in the Passaic Basin alone exceeds $600,000 annually.

Throughout the State some 200 stations are sampled four times a year by DEP; another 50 stations are manned by USGS; EPA maintains six automatic monitors and other selected projects; DRBC conducts an extensive monthly sampling program; and ISC operates automatic monitors and samples some 30 wastewater plant outfalls. Given the additional monitoring and surveillance done by the State Bureaus of Potable Water, Shell Fisheries and Fish and Game by county and local health officers,

TABLE III-1

MONITORING AND SURVEILLANCE ACTIVITIES IN NEW JERSEY: STATE AND FEDERAL AGENCIES*

Agency	*Number of Plants or Stations*	*Number of Parameters Sampled*	*Frequency*	*Location*	*Comments*
Department of Environmental Protection, Bureau of Water Pollution Control	200	9	Quarterly	State-wide	One full-time staff person collects all samples.
Department of Environmental Protection, Bureau of Water Pollution Control	800 sewage treatment plants	Varies with the sample	At least quarterly	Within basins	18 staff under the supervision of DEP's basin engineers sample treatment plant outfalls regularly.
Department of Environmental Protection, Bureau of Potable Water Supply	500 water treatment plants	21	Quarterly	State-wide	Inspections are also made of plants no more than once a year. 3-4 full-time equivalent staff cover the state.
Department of Environmental Protection, Bureau of Shellfish	3,147 stations in 35 growing areas	Coliform bacteria and others as necessary.	Approved waters—at least every 2 years	Atlantic Coastal Basin	2-3 full-time equivalent staff operate the program.
United States Geological Survey	50	25	4 times per year	State-wide	40 of these stations are paid for under contract with the State and Federal governments. USGS also maintains 6 automatic monitors in New Jersey waters.

TABLE III-1 (Continued)

MONITORING AND SURVEILLANCE ACTIVITIES IN NEW JERSEY: STATE AND FEDERAL AGENCIES*

Agency	*Number of Plants or Stations*	*Number of Parameters Sampled*	*Frequency*	*Location*	*Comments*
Environmental Protection Agency	Approximately 52	8+	Quarterly	Raritan Bay, Lower Passaic, Newark Bay, Coastal Waters	These are special short-term surveliance programs that arose from regional conferences.
	6	24	Annually	State-wide	These are maintained under contract with USGS. 5 automatic robot monitors are also set up in the New York harbor area.
		13	Monthly or quarterly		
Interstate Sanitation Commission	26 sewage treatment plants	6+	Quarterly	Newark Bay, Raritan Bay, and other areas in and near inter-State waters	There are three full-time field staff.
Delaware River Basin Commission	58	15+	Monthly	Delaware River and tributaries	18 of these stations are on tributaries of the Delaware.

* Commission's tabulations, miscellaneous sources.

TABLE III-2

MONITORING AND SURVEILLANCE ACTIVITIES IN THE PASSAIC BASIN*

Agency	*Number of Plants or Stations*	*Number of Parameters Sampled*	*Frequency*	*Location*	*Comments*
Department of Environmental Protection, Bureau of Water Pollution Control	26 stations	9	Quarterly	All sub-basins except the Pequannock and Pompton	
	100 + sewage treatment plants	Varies	Varies	Throughout Basin	This surveillance is carried out by the Basin Engineer and Staff.
Department of Environmental Protection, Bureau of Potable Water Supply	50 + water treatment plants	21	Quarterly	Throughout Basin	
Envorinmental Protection Agency	14	8		Lower Passaic	These are short-term temporary stations.
	2	25		Lower Passaic and Ramapo sub-basins	These are long-term stations operated under contract by USGS.
United States Geological Survey	13	25	4 times per year	Throughout basin	Included are two automatic robot monitors.
Major Water Purveyors: Passaic Valley Water Company	20	16	Daily Bi-Weekly Monthly	Upper Passaic sub-basin	Also monitors 24 or more parameters at intake, and samples plant outflow. PVWC regularly checks industrial and wastewater treatment plants.
North Jersey District Water	+46	15-22	Daily Weekly Monthly	Wanaque and Ramapo sub-basin	Hourly samples are taken of plant outflow.

TABLE III-2 (Continued)

MONITORING AND SURVEILLANCE ACTIVITIES IN THE PASSAIC BASIN*

Agency	*Number of Plants or Stations*	*Number of Parameters Sampled*	*Frequency*	*Location*	*Comments*
Newark Water Department	5	5	Weekly	Pequannock sub-basin	Sampling is limited to 5 reservoirs that serve as sources of water supply.
		21	Monthly		
Jersey City Water Department	12	Varies	Weekly	Rockaway sub-basin	
Other Water Purveyors	50 plants or supply systems	Varies	Varies	Throughout Basin	Some purveyors have their own staff and laboratories and others do not. Since most of these are small, their operations are limited.
Sewage Treatment Plants: Passaic Valley Sewage Commission	700 outfalls	Varies	Varies	Main stem of Passaic River	PVSC has eleven inspectors engaged in surveillance of the river.
All treatment plants	100+	Varies	Varies	Throughout Basin	These plants generally monitor their own effluents and do not engage in stream quality sampling to any significant degree.
County and municipal health officials	Water treatment plants (50)	Varies	Varies	Throughout Basin	There are 105 municipalities in 7 counties throughout the basin, not all of which have health officers, however.

* Commission's compilation, miscellaneous sources.

local conservation officials, water purveyors, watershed associations, and by numerous voluntary citizen associations, it is surprising that despite all this work by all these people, the function is one of the least adequately performed. With all these participants and with total expenditures approximating $2-million a year, the monitoring and surveillance function does not satisfy any one of the three requisites for efficiency and effectiveness mentioned earlier in this chapter—a broad range of data collected, an adequate frequency of samples, and a proper and rational location of sampling stations. While some bodies of water are rarely sampled, in other streams and waterways there is an unnecessary duplication of sampling. The Commission therefore concludes that greater coordination in this area is necessary and beneficial to all concerned.

In terms of the three requisites, the present system's inadequacies are clearly evident throughout the State. To begin, the selection and location of sampling stations appears to have resulted more from convenience or the need to appease certain interests than from systematic planning. Fewer than 10% of DEP's sampling stations are on the Atlantic coastal waters, the location of the State's main recreational area. There are more monitoring stations in the Millstone River, than in the Hackensack, Elizabeth, and Rahway Rivers. There is also significant duplication of sampling by DEP and USGS, which is funded by DEP, and DRBC, which funds DEP. For instance, in Morris County, of the 15 stations sampled by DEP, eight are also sampled by USGS and by PVWC.

In addition to the fact that most of the waters are not sampled at night or on weekends, the samples that are conducted are not taken at evenly spaced periods or in a manner designed to reflect a variety of water conditions. Consequently, for purposes of planning, research and scientific analysis the data are of limited value and accessibility. The State has been collecting information by sampling for years, but has rarely attempted to analyze it, never published or collated any of it, and disposes of it after two years.

Expenditures have been made for automatic monitoring stations which have gone months without being used and even longer periods registering "blank data." Moreover, although these stations are expensive to operate and maintain, they are not properly supervised. It costs more to operate and maintain the ten automatic stations—between $50,000 and $70,000 per year—than it costs for manual sampling at the 200 DEP stations. No attempt has been made to utilize the data obtained from the automatic stations in relation to functional needs of monitoring, surveillance, enforcement, and planning.

The performance of the monitoring and surveillance function has been weakened by the absence of coordination among all the agencies involved. A comprehensive monitoring and surveillance program requires the investment of considerable resources. Frequently these resources and agencies are available, but because of the lack of initiative

and coordination at the State-regional-local level, they are used inefficiently and ineffectively.

Conclusions

The Commission perceives the greatest need for water quality monitoring and surveillance not to be more money and manpower, but the better utilization of existing resources. There should be a systematic institutional structure for this functional area, which would improve results and performance on all sides. The final measure of success is the effect it bears upon water quality, which to date has been rather minimal. What has developed is an after-the-fact process of sampling water here and there about the State. The results are neither scientifically nor statistically acceptable. When polluters are discovered, it is by chance, and a good deal of pollution can occur before its discovery by water pollution control agencies.

Recommendations

To insure that the functions of monitoring and surveillance is carried out efficiently, effectively, and comprehensively, the Commission recommends that:

1. *As mandated by Federal legislation the State Department of Environmental Protection should immediately work out and begin using a multi-agency network system adequate for monitoring and surveillance of all the State's streams and dischargers. The DEP, with the advice of the involved parties, would delegate responsibility for coverage of designated monitoring and surveillance points throughout the State considering population, developmental patterns, and geographic (or hydrologic) location, in order to achieve the ends and goals of all involved parties more comprehensively and consistently.*
2. *The Commission recommends that the DEP initiate and fund a demonstration project in which a county or regional agency carries out a comprehensive monitoring and surveillance program. If successful, it could then be extended throughout the State.*
3. *The Department of Environmental Protection should reevaluate the present approach to monitoring and surveillance in terms of the three elements of a sound program:*
   (a) for overseeing the quality of streams and the effluent of discharges;
   (b) for enforcement purposes, and;
   (c) for developing the permit system mandated by the Federal government which would aid enforcement, as well as short- and long-range planning.

4. *A licensing procedure which incorporates the concerns of both DEP and PUC should be immediately established for regulating the operation of scavenger services. Joint procedures should be instituted which would require a scavenger to report where he dumps, the frequency of the loads being dumped, the number of vehicles he employs, and any other pertinent information needed to assist in evaluating his operations. It is also recommended that a similar licensing procedure be developed for personnel who remove sludge from treatment plants in order to ascertain the quality and quantity of the sludge that is being removed.*

5. *To meet Federal requirements, an ongoing water quality data bank should be developed with its central coordination being the responsibility of the DEP. The information coming from the many agencies such as the ISC, DRBC, USGS, authorities, water purveyors, etc., should utilize standard formats, consistent terminology, units and techniques.*

6. *The USGS, which is under contract with DEP, should expand its surface water quality network to include the collection of data on toxic metals in water and increase surveillance in tidal estuaries and bays in order to help determine the nature, quantity and sources of pollutants from up-basin.*

7. *The DEP should utilize the resources of the Federal EPA to coordinate the clean ups following oil spills in interstate waters, a problem beyond the scope of individual states.*

8. *Legislation should be enacted requiring local governments or authorities to be responsible for monitoring the waters within their service areas. Also the local bodies must keep an active catalogue on all wet industries within their jurisdictions.*

9. *A monitoring and surveillance program should be initiated to formally tie the State DEP to the activities of county and local health officers and especially those in predominantly rural counties.*

Chapter IV

ENFORCEMENT

Overview

Enforcement is the most visible element of water quality management; it has the most immediate impact on citizens, industries and local governments. This impact is sometimes sudden and harsh; sometimes quiet and effective; sometimes absent when it should be present.

The statutes indicate that the local government can gain injunctive relief from a polluter, the sewerage authority can force him to tie into a system, and the State can take him to court and have him placed under orders to upgrade his facilities. The Federal Government, having broad, general powers, is now defining them more specifically to assume a more active role within this functional area. These operating agencies are sometimes prodded by individuals, the press, conservation groups, health officers, water purveyors, and other interest groups who want pollution cleaned up and who concurrently demand more stringent laws and police powers.

The State has primary responsibility for enforcing the water quality requirements, with the Federal Government acting in essentially a supplemental role, supporting the State and initiating enforcement proceedings when the State is unable to act against a polluter. Stemming from the Federal Water Pollution Control Act of 1956, the major Federal enforcement technique to date has been the conference approach. This has not been a very strong enforcement tool in that it has not resolved very many conflicts nor has it accomplished much in the way of cleanup.

The three primary enforcement tools of the State—administrative orders, building bans, and civil prosecutions—have not been used in an even-handed, effective and complementary manner that would regulate all impartially and consistently, assist those in need, and act promptly against those who disregard pollution abatement procedures which are necessary for the maintenance of water quality. Enforcement tends to be an after-the-fact tool rather than a preventive one, and the administrative order, being an approach to put the polluter on an abatement schedule, has been abused both by polluters and by the State. Delays are all too common and exceptionally long; in numerous instances flagrant polluters are caught, placed under orders, but then in effect given sanction to continue polluting because the enforcement measures are not result-oriented.

The building ban is a special kind of administrative order which attempts to overcome the results of inadequate planning with a dramatic

fiat. In areas where the building ban has been applied the water pollution has not been abated. At best, it may be prevented from getting any worse. Until recently, the rationale for its application has been vague.

Many of the present statutes are unclear as to required action. Enabling legislation allowing agencies to formulate their own enforcement procedures, has not led to any real improvement of water quality or pollution abatement, the true goals of enforcement. Conversely, the courts, if effectively utilized, can offer a means of relief. The Courts when presented with the cases, have the option of fines for noncompliance, contempt citations when schedules are not met, injunctions to halt gross pollution, and the ability to act as a mediator in search of a remedy.

The Institutional Setting: The Federal Role

The Conference Approach—A Case Study

The Federal role in the enforcement of the water pollution abatement statutes primarily has been to assist the State upon request, or, in exceptional cases, to initiate enforcement action when the State is unable to do so. It has been the intent of Congress that the States have primary responsibility for the abatement, control and prevention of water pollution.

Federal enforcement procedures can be instituted under the Federal Water Pollution Control Act of 1956, the basic legislation for the Federal water quality program, or the Rivers and Harbors Act of 1899, commonly referred to as the Refuse Act, which during the past two years has been put to greater use to contest some industrial discharges.

Prior to new Federal legislation there was a three-step enforcement process which included: (a) a conference between Federal and State officials to identify polluters and recommend corrective action; (b) a public hearing called by the EPA administrator involving a polluter not following the recommended plan; and (c) resort to Federal court action, if necessary, to compel a polluter to comply with reasonable demands to stop polluting. As of 1972, the Federal Government had not gone much beyond the conference method, having conducted some 50 conferences throughout the country involving over 2,500 municipalities and industrial plants. Only a handful of hearings and court actions had been instituted.

The enforcement conferences were convened to identify significant sources and problems of pollution, to understand technical difficulties, and to emphasize voluntary compliance by establishing timetables and interim dates for the planning, construction, and operation phases for abatement. In general, the Federal enforcement role has been ineffective, cumbersome, and extremely time-consuming. An example of the conference method was the Hudson River Conference for New Jersey and New York, initiated in 1965 and reconvened four times. At the initial

1965 meeting, the Federal representatives presented a timetable for replacing the antiquated combined sanitary and storm sewer systems of the major municipalities and authorities in this region. It was the only timetable presented and although not specifically agreed upon by all conferees, it is important to note the type of recommendations resulting from this session. The timetable called for the completion of remedial facilities by 1970. This date has now passed and yet virtually no progress has been made in this critical area. The conference was reconvened in 1967. The Federal representative reviewed compliance of specific Federal facilities on the Bay, and New Jersey personnel spoke in general terms about the slow progress in converting facilities to secondary treatment.

In 1969, a third session was begun with a Federal report evaluating the significance of combined sewer overflows in the New York-New Jersey area. An outgrowth of the two previous sessions, it only documented what everyone had long known. The Federal representatives also criticized the Passaic Valley Sewerage Commission's (PVSC) facilities, their operating procedures, especially a poor grit removal operation and the failure to maintain sedimentation basins. There were no major conclusions reached at this session, except that supposedly everyone was moving ahead in a responsible manner and doing a good job. The next session was to be held in 1970. However, the session was reconvened in 1969 to deal specifically with PVSC. Although the Federal representatives opened with a scathing report on PVSC's performance there were no final recommendations proposed.

Eight years have passed since the initial conference, and if anything, as yet another recently held conference indicates that the water quality problems are more serious today than in 1965. There is little question that the goals of the conferences are admirable and valid, but they are too brief for a thorough analysis of problems or for serious consideration of alternative solutions, and are unsystematic means of analyzing water quality plans. Most of the findings are not new and their catalog of progress is self-deluding; some have become mere ceremonial affairs. A review of the enforcement proceedings indicates that in most instances where the conference recommendations were not followed all that happened was that the conferences were reconvened and the dates for compliance were extended. Since more forceful Federal and State action has been lacking, target dates which were set in 1965 are not likely to be attained in the foreseeable future. Unless meaningful enforcement emerges, improved water quality and the potential for increased beneficial water uses will not materialize, and those who incur increased expenditures for pollution will not receive the benefits expected.

The other two main Federal actors in the area of enforcement are the U.S. Army Corps of Engineers and the U.S. Coast Guard. The Corps has the authority to issue permits designed to regulate discharges into navigable waters and also the disposal of refuse, sludge, and wastewater at sea (although the latter is primarily an administrative function. The

U.S. Coast Guard's responsibility is limited to the enforcement of maritime law, under the Hazardous Cargo Act, which prevents the loading of materials termed "hazardous" upon ships flying the United States flag.

As of now, the Corps, the Federal EPA, and the State have not been able to identify all the industrial dischargers in the State. This will be a necessity under current Federal legislation, which includes a far-reaching discharge permit system. This permit program will provide a basis for future enforcement actions on the part of both the Federal EPA and the State DEP.

The State Role

The primary responsibility for water quality enforcement has thus far rested upon the State. Statutes dating to 1876 and 1899 give New Jersey an impressive set of enforcement powers for developing standards and compelling their observance. In 1970, these enforcement responsibilities were conferred upon the Department of Environmental Protection, with responsibility for their administration residing primarily with the Bureau of Water Pollution Control.

The statutes which form the basis of the DEP's regulation of water quality are R. S. 58:10–1, 10–5, 10–10, 10–17, 12–2, and 12–3. The 58:10–1 and 10–5 activities are often referred to as the "thou shalt not pollute" statutes since any and all pollution of potable waters and fresh waters is prohibited. Under R. S. 58:10–10, the State is empowered to regulate the discharge of any effluent from any sewage disposal system.

R. S. 58:10–17, which was enacted in 1921, makes written consent by the State a prerequisite for construction of any industrial plant located on any watershed within or bordering the State. However, a debilitating clause in the statute states that this requirement may be varied by the State if the industry is to be serviced by a public sewerage facility. The administrative discretion in this clause has resulted in issuance of permits to fewer than 900 of New Jersey's 10,000 industrial plants producing waste. Since ratable-hungry municipalities have little incentive to control industrial wastes and much greater incentive to provide economical sewerage services to tax-paying companies, municipal treatment facilities serve as conduits to streams for hundreds of millions of gallons of inadequately treated industrial wastes.

Under R. S. 58:12–2 and 3, DEP has broad supervisory and enforcement powers. A host of other statutes further define the State, county, authority, and local roles in enforcing the regulatory standards developed by the State. In general, the primary enforcement tools available to the DEP are administrative orders, building bans, and relief from the courts.

Enforcement Tools: The Administrative Order—Case Histories

Prior to 1967 the enforcement work of the State generally involved negotiations with those polluters that were identified, in which the State relied heavily on the polluters' voluntary compliance with State requirements. Few cases were ever referred to the Attorney General's Office for court action. Many polluters did not comply, and the State's enforcement program generally was not implemented effectively except when the pollution was of sufficient level to be considered either a public nuisance or a public health hazard. As a result the State has generally had limited success in abating and controlling harmful discharges into the State's waters.

Since 1967, and especially in the past two years, the enforcement programs of the State have expanded considerably in number, if not always in quality. In 1965-66, some 68 administrative orders were issued; in the 1967-68-69 period, more than 300 were issued. This increase reflects a new mode of operation, but should not be interpreted as the achievement of complete effectiveness. The administrative orders were not issued selectively, but "en masse" and were not dealt with individually, or at least grouped on the basis of different needs, common regional problems, or the demands on a .25 mgd facility in comparison to a 10 or for that matter a 50 mgd facility.

Generally, an administrative order specified the date by which corrective action must be taken. Recipients of administrative orders could request hearings within 30 days after the order was issued, and for the most part hearings were held only at the request of polluters. When polluters failed to comply with the dates stipulated in the administrative orders and when acceptable reasons for the failures did not seem to exist, the DEP could refer the cases to the State Attorney General.

Administrative orders ideally represent a staging device used when a particular discharger is found not to be in compliance with existing criteria. In general the orders first require an engineering report concerning the work proposed to remedy the situation to be submitted on or before a certain date. After an appropriate period of time the consulting engineer must prepare and produce the preliminary engineering plans, which are then reviewed and approved if acceptable. As a rule, a six-month period is provided for the completion of detailed plans and specifications. After these are reviewed and approved, construction contracts may then be awarded. The final requirement is that all proposed construction be completed on or before a given date. While this seems to be a workable approach, the DEP's follow through has generally been uneven and control almost nonexistent.

Until this past year, Bureau of Water Pollution Control Staff were responsible for issuing orders which in turn were subject to approval by the bureau chief. These orders were issued haphazardly with no one in DEP aware of how many orders have been issued or their present status.

When the General Accounting Office of Congress recently visited New Jersey to evaluate its water pollution control program as part of its nationwide study, the GAO found it necessary to go through every file in the bureau to find all of the desired information on administrative orders.

A case study illustrating the abuse of an administrative order involves a firm first cited for extreme pollution of public lands in 1959 by a unit of the former Department of Conservation and Economic Development. It was not until 1963 that the Department of Health wrote up the case and gave the owner an application for a treatment system. However, inspection during the next three years indicated that destruction of trees and other plant life and extensive fishkill in the area was directly attributable to pollution by the cited firm. Official complaints led to recommendations for court action, but paradoxically, official statements also were made during 1967 complimenting the firm for its conscientious efforts to resolve its problems and suggesting that the only solution was to hook into the municipal sewerage authority's facilities which would be ready one year later. (The basin engineer indicated, however, that the sewerage lines would terminate a considerable distance from the firm's site.)

Two alternatives were proposed during 1968—rebuilding the separation ponds and barging the pretreated wastes to sea. These were accompanied by recommendations for an administrative order to stop pollution which was finally issued in early 1970, *ten and a half years after pollution was first reported.* Ironically, the firm was commended shortly thereafter by a local official. In a letter to the firm he stated:

> I wish to state that your office as well as ours has not been asleep at the switch and that this is a good example of local government working in conjunction with private industry to alleviate a possible source of water pollution. In conclusion, I must state that you have displayed, in my opinion, good faith in attempting to comply with the order of the State.

But the case was to continue. Assurances were provided by the firm that the holding areas would be expanded and, if this were not successful, the possibilities of a scavenger hauling the waste away would be explored. By the spring of 1970 public health officials recommended that the case be turned over to the Attorney General and a formal cease and desist order was issued that summer.

The defendant's proposal for compliance required an immediate and long-range solution. The former was to dig more pits, the latter to install pretreatment facilities and utilize the Township Sewerage Authority facilities as soon as available.

Since that time discharges have entered the stream on several occasions; the firm has not submitted plans for pretreatment facilities; has

not connected to the wastewater sewer which is available, and has not complied with the court's order. This case has been drawn out over twelve years and is only now nearing resolution. This case crosses from one era to another, but it is not an isolated abuse of an administrative order.

A concentrated review of DEP's files and administrative orders for municipalities and industries in the Passaic and Raritan River basins, indicates that on the average, the municipality or industry under orders are behind schedule by at least four years. According to interviews with State, local, and industrial officials, the delays are attributable to one or more of the following reasons:

- inability to assume the costs of treatment.
- insufficient Federal and State financial assistance.
- unwillingness by voters to approve local bond issues.
- reluctance or recalcitrance by local and industrial officials to comply with the recommended timetable.
- imprecise guidelines and plans for regional solutions.
- difficulties in creating an acceptable institutional form to provide sewerage services.

Regionalism: A License to Pollute?

Obviously, the mere establishment of staging or interim dates, does not guarantee timely enforcement. The State's administrative orders, which establish interim dates for the submission of preliminary and final plans, and for the commencement and completion of construction, also includes a statement that this planning must be studied within a regional context. Since the State has had substantial difficulty in consistently defining and explaining "regionalism" many polluters have been able to say that since they were in a region they had to wait until a regional plan had been formulated. Consequently, this has amounted to "a license to pollute" for the polluter and there are many counties in the State that have been unable to formulate a regional plan after five to seven years of extensive expenditures and planning. In addition, local units of government have often failed to cooperate in forming regional units.

An excellent example of "regionalism and the license to pollute" is in a growing residential community, where the consulting engineers stated that since a regional system would be completed far in the future, the expenditure of capital to upgrade the present system was certainly warranted. However, this advice was not followed and the town's facility continues to be one of the worst polluters in the upper river basin.

When the town received the administrative order over five years ago, it was clear that there was no acceptable regional plan for the area, that

neither the county's planning office and functional agencies nor the State were seriously addressing themselves to a regional solution, and that the quality of the potable water supply was in jeopardy. A "license to pollute" was granted in this case where an interim solution was economically feasible, desirable, and necessary, and where a regional solution was not possible in the foreseeable future. The recommendations of the consulting engineer for an interim solution were minimal and reflected a realistic awareness of costs: a) to add a minimum of new units to the plant, b) to replace worn and obsolete equipment, c) to provide a means for controlling the treatment process according to present practices; and d) to improve operating conditions generally.

Given that regional systems are taking progressively longer from the initial planning stages to the operational stages, it may be preferable that upgrading be carried out regardless of the fact that a regional system is being studied, particularly if it is to be a minimum of eight to ten years before operation. An extreme example of delay is a case in which a large corporation was first found to be polluting in 1942, was placed under orders in 1958, and put in their treatment plant in 1966. While this particular problem was complex and expensive, a twenty-four year period can hardly be termed a reasonable response.

The Building Ban: 1968-1972

Beyond administrative orders, by far the most common enforcement technique, there are various other tools at the Department's disposal. One such approach is to have DEP engineers operate plants found to be faulty but the manpower expense is so great to the understaffed agency that it may be detrimental in the long run. Recently, one of the four-man Passaic-Hackensack Basin staff devoted his full time for more than three months supervising a local plant.

Another tool is the building ban by which DEP prohibits additional building until sanitary sewerage facilities are able to handle wastewater flows without degrading stream quality. The implications of utilizing the building ban on a continuing basis touches land use and developmental patterns, the very heart of local governments' powers.*

The most extensive experience with building bans to date has drawn out for nearly five years. The ban did achieve one goal—pollution did not worsen, but progress toward its resolution has been slow. Conversely, some municipalities would welcome building bans to stabilize service costs, halt rapid growth, and even serve as a guise for elitist land use policies. In view of the new complexions, the Commission urges that if building bans are to be implemented in the future, the tasks to be performed be associated with realistic timetables. Otherwise, building bans could have no useful impact, both short and long term.

* The State has utilized the building ban in such areas as nine municipalities in Morris County, Bridgeton (Cumberland County) and Beach Haven (Ocean County).

During the summer of 1972, the State DEP took a new approach to enforcement. The new method employed the best aspects of an administrative order and the building ban. In the order that was issued, the DEP effectively took over the issuance of certificates of occupancy from the municipality in question. Furthermore, the State-issued order explicitly stated the conditions which would have to be met (including the schedule) before the municipality could regain these powers. Also listed are the interim improvements necessary, the desired long-term goals, and the institutional framework that would be acceptable as a regional unit emerged.

This strategy was used in a case that was considered almost hopeless and it worked effectively because of the comprehensive, cohesive, and concise nature of the State order. Such building bans are forthcoming in nearly 100 municipalities throughout the State and if administered competently could rationalize the entire enforcement effort for New Jersey while offering an opportunity to review basic developmental trends and the decision-making process for land use.

The Courts, Fines, and Effluent Charges

The inability to know when and where to apply the administrative order and the building ban, has demonstrated the lack of a consistent strategy and has denied to the State the maximum utilization of the courts. Also, most of the present statutes are vague and do not require specific action, thus enabling administrators to formulate procedures—done with the help of special interest groups—which have not traditionally resulted in the improvement of water quality or pollution abatement.

The State and local governments in conjunction with the courts, have the powers to carry out enforcement efforts in several ways. When appealed to, the Courts have the option of decreeing fines for non-compliance, contempt citations when abatement schedules are not met, injunctions to halt gross pollution, and the ability to act as mediators in search of a remedy. These alternatives, especially the final one which offers endless possibilities, give the court a position of prominence which can not be easily challenged by polluters.

Fines are only imposed upon the request and proper showing of the State, and the statutory penalties are such that fines have not amounted to a burden upon the responsible party significant enough to deter continuing violations. The DEP rarely requests the Attorney General's Office to seek any penalties in water pollution cases. For example, in 1967, only two of nine convicted industrial polluters were fined (total of $2,900), and in 1970, three court decisions resulted in only $19,000 in fines.

In June, 1972 a refinery was fined the maximum amount of $400 for substantial oil spillage in Arthur Kill. The Municipal Court ordered the

maximum $200 in fines on each of two counts for the spill of 36,000 gallons of heavy oil into the Arthur Kill. The corporation had been charged with violating a local anti-discharge ordinance. These fines represent a trifling amount in comparison with the costs that the company would have to bear if it wished to ensure against further spills. The Company itself claimed that it spent $150,000 over several days to clean the water and the beaches after the accident.

It would be a significant step forward if the courts were accessible to the general public as well as public agencies. A very attractive idea initiated in the State of Michigan, allows an individual to bring a potential or actual polluter to court to show cause why the pollution is necessary and cannot be avoided. Such a bill has passed the New Jersey Assembly and at the time of this writing was pending in the Senate. This would make the courts available to the citizen who can demonstrate sufficient injury to be granted standing to sue. It would expand the legal measures available to control the public menace of industrial pollution.

One innovative approach to enforcement is through effluent charges, which in perspective could be a beneficial tool in the abatement of pollution. The effluent charge is not conceptually the same thing as the user charge, which makes the discharger pay exactly what it costs to treat his wastewater. The effluent charge is a fiscal mechanism designed as an economic inducement aimed at changing the behavior—the quality and even quantity of the effluent discharged—by making it economically unworthwhile to pollute. The charge is based upon the quality of the effluent as well as the impact it has upon downstream water use. This would, in theory, promote in-plant waste reduction through process changes, pretreatment, reuse, and eventually recycling. Because market forces have thus far failed to allocate water resources efficiently, it may well be that this kind of correction of the economic balance is desirable. The economic advantage is now often on the side of pollution, because it costs less than treating wastes. By charging those who now do not adequately treat their wastes an amount more than equal to the cost of treating wastes, it would become more economically desirable for the polluter to treat the wastes adequately than to pay the extra costs. If he elected to pay the effluent charge, the municipality of State could apply the funds to pollution control.

To be of worth, however, effluent charges must be tied closely to water quality standards. As inviting as the effluent charge appears, it presents substantial obstacles, as it is a sophisticated tool requiring more technical skill than our water quality management agencies now possess. Effluent charges are not self-executing; rather, they rely upon catalogued dischargers, reliable information and its systematic processing, comprehensive monitoring and surveillance, and the ability to calculate downstream damages, the latter an extremely difficult task on many of New Jersey's heavily used streams due to interaction of multiple discharges. Because New Jersey has not yet instituted the requisites of a good water

quality managment system, effluent charges would not be a feasible first step. Like any other system of public regulation, it must have fairness or it will be rightly rejected. In interviews with EPA and DEP officials responsible for implementing such techniques, they admitted that effluent charges are virtually impossible to implement on the Passaic River. Thus is seems that effluent charges are some time away for the 800 wastewater treatment plants and industrial dischargers in the state. The Commission sees a potential role for effluent charges, but not in the near future. For now, the State must stress other regulatory measures in its attempt to halt the pollution of the State's waerways.

County and Local Role

Since county and local governmental jurisdictions do not conform to water basin boundaries (see *map*, page 25), the prevailing situation finds local governments restricted in their grip on pollution control. Municipal officials are aware that they cannot guarantee water quality because their efforts alone are insufficient to clean the water. They cannot control what dischargers do in communities upstream. Moreover, in the absence of an equitable and coordinated approach, municipal officials are reluctant to act independently and deny industries access to overloaded plants, or to vigorously enforce the law against the tax-paying industries they seek to attract and retain. Although more than 10,000 industries discharge into publicly owned municipal treatment plants, no one has concentrated on developing a method of distinguishing between municipal wastes and industrial wastes. In the absence of a systematic monitoring and surveillance program, those industries discharging into "certified" treatment facilities are immune to any verification. This should be corrected under the Federal discharge permit system presently being implemented.

The county has some enforcement powers, but generally has no administrative agency to tie them to. Therefore, at this level of government, particularly in the suburban and rural counties, there is a need to create or strengthen the role of the county. Although their performance is extremely erratic on a statewide basis, the rural counties could benefit immensely by encouraging county health officials to perform water sampling and enforcement duties. If counties are to play a major role in the future of water quality management, routinizing the health officer's role would be a beginning to providing a level of protection currently missing in most areas of the state. Contrast for example the cases of Burlington and Ocean Counties. In the former, the County Health Department's role in water pollution control grew even more rapidly than the County's population as reflected in the increase in the number of sanitarians from one to 16 since 1966 and in the rise in the number of municipalities participating under contract from 27 to all 40. Ocean County's 33 municipalities make up the fastest growing county in the State and in the nation, but at this writing they were only making arrangements to employ a single full-time health officer, compounding the

serious water quality problems in this area and resulting in building bans along the shore.

Another local jurisdiction with tremendous potential, but where very little is currently done, is the sewerage authority. This is largely due to the authorities' reluctance to report the polluters they serve. Further, there is presently nothing that mandates authorities to enforce pollution laws within their jurisdiction although permissive legislation to this effect exists. Nor in the past was such reporting and enforcement a prerequisite for receipt of State and Federal grants for which the authorities are the prime beneficiaries. Authorities also lack the power to require dischargers within their jurisdiction to connect into their systems.

Presently, the actors with the most vested interest in seeing that water quality criteria are met are the suppliers of water. Largely because of their monitoring and surveillance, the water suppliers are extremely active in enforcement. They are therefore able to detect non-compliance more readily; are willing to go to court if the problem cannot be amicably resolved; and are militant, sensitive, and willing to use their political power, as well.

Within the private sphere, there are two primary means of enforcement, the first through conservation groups and watershed associations, the second through industry itself. Active environmental groups in many areas of the State often sample waters, discover polluters, and report them for official action. In view of DEP's limited reporting capabilities, an expanded, more formal role for these groups would be preferable. Private industry which bears the primary burden in meeting requirements, could have an input as well. Unfortunately, there are disincentives to this ever happening because of the present tax structure and prevailing attitudes toward industry. These do not foster a cooperative role which would see DEP assisting industry with their technical problems and industry aiming at closed systems which would eventually end discharges.

Conclusions

Water quality management has not resulted where enforcement alone has become its major focus. Although it receives a great deal of publicity, enforcement is too often a public relations tool and not an instrument that brings about maximum desired results. More police powers may be needed, but incentives which can change behavior are imperative. Also, it is extremely important to know when and where to apply the primary enforcement strategies. As indicated, there is progress in terms of the new form of building ban that will be utilized by the State Department of Environmental Protection.

Recommendations

To ensure that the enforcement tools are used in an effective and complementary manner and that they would concentrate on the attainment of water quality goals, the Commission recommends that:

1. *Under the current Federal legislation, the State DEP should exercise its option to institute a permit system for all wet industries and commercial discharges whose effluent, by virtue of either its quality or quantity, could degrade water quality. If the State does not operate the permit system, the EPA is mandated to do so. Wet industries would have to obtain a permit to operate, with DEP and EPA setting guidelines for wastewater control and determining the information to be collected and verified, and the local service delivery units being responsible for its integrity. The permit system would be tied to funding, the respective municipalities and authorities would be held accountable, and the particular business concern would have to describe its products, methods, and wastes, qualitatively and quantitatively. With each process change, a report would be submitted immediately under penalty. Thus DEP would have a system which would give information on wastes being generated in order that DEP could require pretreatment when needed, encourage process changes which would reduce waste generation, implement water reuse and/or recycling where possible, and tie them all to water quality. A guarantee could be established both in terms of completing the permit and meeting DEP requirements for pretreatment or process changes through a system of heavy fines and an auditing procedure similar to the Internal Revenue Service.*

2. *The DEP should be empowered to name receivers to operate critical facilities which, coupled with an ability to finance new construction through a bond bank and determine participants in regional arrangements, would quickly end the foot dragging so common to enforcement problems. This is not to imply that the State should be an operating agency, one which constructs, sells, operates, and maintains facilities, but a recommendation for the Department to have the power to intercede and have at its disposal any one or all of these alternatives in critical cases. It is the most potent enforcement technique available and should be implemented immediately.*

3. *The administrative orders and building bans should be based upon precise procedures, the problems clearly stated, and the expected actions on the part of the local government and the eventual goals, concisely indicated.*

4. *To keep the administration of building bans at a minimum on the part of the State, explicit criteria for the approval of building*

permits and certificates of occupancy must be issued by the DEP. Building bans should be selectively issued, have realistic deadlines, attainable and clearly stated goals, and should be strictly enforced.

5. *The DEP should annually report to the Legislature and the Office of Fiscal Affairs the status of all building bans and administrative and court orders, as well as their progress as of the end of each year.*

6. *The DEP should immediately indicate the process for enforcement that will be utilized in accordance with Federal legislation. This will allow the Delaware River Basin Commission, the Interstate Sanitation Commission, water suppliers, and county and local health officers to determine their respective enforcement roles.*

7. *Legislation should be amended regarding the fines levied against polluters. There are identifiable costs associated with pollution, and those convicted of polluting should be made to bear those costs. In essence, the dollar amount of fines for water pollution should better reflect the costs of such pollution, as is the case in the State's air pollution program.*

8. *Legislation should be enacted obligating the authorities to protect all the waters within their jurisdictional areas, and holding them responsible and accountable to fulfill the law and prosecute violators within their jurisdictions.*

9. *State legislation should be enacted to implement the citizens' "right to sue" legislation.*

Chapter V

FINANCE AND FUNDING

Overview

The water quality management program in New Jersey has been and still remains dominated by funding requirements so that regionalism has come to mean a geographic area which meets funding rather than functional criteria. The first result, which has been related throughout this report, is that there has not been a functional basis for water quality management and when wastewater treatment facilities are constructed they often cause as many problems as they resolve. The second result is that the funding of "regions" which were not functionally sound caused institutional problems to proliferate in many of the functional problem areas, thus compounding water quality management difficulities and lessening the effectiveness of DEP's regulatory role.

The role of capital finance is of obvious importance to water quality management. Availability of capital is an inducement for municipalities to enter into joint agreements, and conversely, its absence has hindered regional arrangements and the water pollution control programs which must be addressed at least on a watershed scale. New Jersey's present backlog of sewerage projects exceeds by several times the amount of available capital and is a reason for great concern due to the uncertain status of the Federal financial commitment.*

Also important to water quality management is the role of operating revenues. Traditionally domestic users have paid higher service charges than commercial and industrial users, as well as a proportionately higher share of capital expenditures. Commercial users are often given rate reductions as volume increases. This practice fails to reflect the true incidence and impact of the user's waste water with his user charge.

Until the enactment of the 1972 Federal legislation, industry could only gain by being a participant in a municipal or regional sewerage arrangement. Even under systems employing an equitable cost recovery system, industry enjoyed the benefits from the substantial impact of State and Federal with their minimum capital cost subsidies of 55 percent. Now, however, industry will be required to repay at least the Federal contribution allocable to industrial wastes. Furthermore, industries will be required to pre-treat wastes entering public systems. This could cause many industries to withdraw from public systems (if allowed), which could in turn bankrupt the public systems. Tax laws in New Jersey are not consonant with new Federal legislation or with the state of the art

* The Federal courts are reviewing the legality of the impounding funds.

and must soon be altered to encourage those industries to recycle or reuse water and protect water quality, to do so.

Federal Grant Programs

The cost of constructing sewerage systems is high, and is continuing upward at the rate of 1% monthly. To aid municipalities, the Federal government makes moneys available through various grant programs for the purpose of building sewerage facilities.

The Farmers Home Administration (FHA) is able to make both grants and loans for the design and construction of waste disposal facilities in rural communities of less than 5,500. This program was initiated in 1965, and since then only four other states received more FHA money than New Jersey. Of the total national appropriation of $40 million, New Jersey has received an average of approximately $500,000 annually, giving the State a total of over $4-million in project aid. However, funds have recently been impounded for this program and its future is uncertain.

The Department of Housing and Urban Development (HUD) was the administrator of a grant program for sewer collection facilities which affected many more municipalities. Since the grant program was instituted in 1966, New Jersey has qualified for some 50 grants. Under the new legislation, all such grants are now being tied to the EPA water quality management program to insure both that the collection sewers are routing wastewater to adequate treatment facilities and that coordinated planning is taking place. Under current Federal legislation collection systems are technically eligible for funding, but it now appears unlikely that any money for this specific program will be released.

In the past, EPA has made available a series of grants, including treatment facility construction grants equal to 30-33 per cent of the project's cost. Under the new 1972 legislation EPA's contribution will be increased to 75%.

Since 1957 when the EPA grants originated, New Jersey municipalities have been the recipients of 167 grants—the eligible cost of these projects amounting to a quarter billion dollars. Of the 167 grants, 137 (82%) have been made to municipalities with populations of less than 25,000. A list by county follows:

State Grant Programs

To complement the Federal programs, New Jersey enacted the State Public Sanitary Sewerage Facilities Act on July 1, 1965. This legislation established three separate financial aid programs, all of which were designed to encourage and promote the development of comprehensive regional sewerage facilities. The program has been used to control, rather than manage, the problems attendant to water pollution and its abate-

TABLE V-1

EPA CONSTRUCTION GRANTS—1957-72*

County	*Grants*	*County*	*Grants*
Atlantic	4	Middlesex	10
Bergen	22	Monmouth	12
Burlington	9	Morris	17
Camden	9	Ocean	7
Cape May	10	Passaic	9
Cumberland	2	Salem	2
Essex	10	Somerset	11
Gloucester	4	Sussex	3
Hudson	3	Union	12
Hunterdon	1	Warren	1
Mercer	10		

* Source: Federal Environmental Protection Agency.

ment. The thrust of the legislation and grants is planning for feasibility studies, project planning and design, and the construction of facilities.

The first of the programs provides outright grants for the completion of feasibility studies. From 1965 to 1972, 47 feasibility study requests had been approved, with 42 of them completed, reviewed, and approved, and the other 5 at various stages toward completion. The total cost has been $2,267,000 and has covered studies ranging from two small adjoining municipalities with a population of 9,000 to one covering 26 municipalities and 5 counties. Ironically, the former was implemented, the latter was not.

Second is a program which gives interest-free loans to assist in the preparation of engineering plans, specifications, and contract documents for the design of collection systems, plants, and pumping stations. The no interest provision stays in effect for a three-year period or until contracts for construction of the project have been awarded, whichever is earlier. From 1965 to 1972 the loans approved amounted to $13,000,000, with pending loan requests of approximately $12,000,000.

Several difficulties have arisen with these programs, including the slow repayment of loans and cost overruns. Initially many smaller authorities were delinquent in failing to pay back their loan money and no attempt was made to coordinate and associate feasibility money, engineering loan money, and the stages of development through which

all projects pass. Moreover, the money spent on feasibility studies has often failed to produce plans capable of achieving water quality objectives, establishing functional regions, and insuring the participation of all municipalities in regional arrangements.

The third State program covers construction grants, which New Jersey has been using to provide 25% of the eligible project cost to municipalities in approved regional arrangements. The determination of recipients of grant money is based on a point system which is developed by the State. The maximum number of points a municipality could receive in fiscal 1971 was 670 points, the minimum 21 points. It is a flexible system with the criteria for the rating system having been recently changed. In fiscal year 1971 and 1972 the criteria and their respective values were as indicated in Table V-2. In fiscal year 1972 the

TABLE V-2

RATING SYSTEM FOR REGIONAL PROJECTS*

	Points Awarded		
	1971	*1972*	*1973*
Regional (Planned Regional System)	0 *or* 500	0 *or* 500	0 to 20
Waters being protected (Nature and Effluent)	10 to 100	80 to 100	85 to 115
Population base	5 to 20	....	0 to 20
Volume of waste	5 to 20	5 to 50	....
Elimination of septic tanks	0 to 10	....	....
Financial need	1 to 20	1 to 20	0 to 20
	21 — 670	86 to 670	85 to 175

* Source: Department of Environmental Protection.

population base and elimination of septic tanks were dropped as criteria. Volume was deleted in 1973.

The rating system has had a decidely pro-suburban bias. A proposed interceptor near the Delaware River, designed to serve 500 people in a rural community received 511 points, whereas an interceptor to serve 68,700 people in an urban community received only 564 points. An interceptor and force main serving 6,500 people, received 626 points, whereas, an interceptor serving 1,150,000 people received 551 points. Although some 90% of State's population are served by sewers, communities with septic tanks have received a bonus of 10 points. Even under the 1972 point system, a community with 1,100 people received 615 points

for an interceptor while an interceptor in Essex County serving 54,500 people received 594 points. Moreover, financial need has been based on a one year fiscal consideration and was determined by a formula which divides the eligible cost of the project by the net valuation taxable, thus giving a very static, rather than dynamic base for analysis. Now it has been dropped as a criterion altogether. The Commission thinks the rating system should be changed to eliminate these inconsistencies.

The result of this system has been termed "fiscal regionalism," meaning that regionalism is not related to functional water concerns or problem sheds (i.e.,—areas sharing a group of common problems), but to whether or not an applicant is "fundable." Rather than being an application of a federally designed management concept, it has been an in-house application of a vague concept. In one instance the State applied to the N.J. Supreme Court to stop a community from building facilities while at the same time it funded comparable communities by defining them as regional. Furthermore, the proliferation of relatively small sewerage authorities has not halted because the State has not been able or willing to deny eligibility on the basis of poor planning, thus placing the engineering, bonding, and the interests of local authorities above functional planning needs. It should be noted that these practices preceded comprehensive basin planning approaches, adopted in New Jersey and elsewhere. Hopefully its adverse results will serve to guide policies where similar issues arise in the future.

Since the inception of the State aid construction moneys in 1968, New Jersey has offered grants or disbursements totaling $64,936,269; as broken down in Table V-3. While the dollar figure is respectable, an

TABLE V-3

STATE GRANTS FOR CONSTRUCTION 1968-1972*

1968 — 9 grants	$4,320,441
1969 — 10 grants	5,294,515
1970 — 18 grants	17,382,823
1971 — 9 grants	17,938,491
1972 — 1 grant	20,000,000**
Totals — 47 grants	$64,936,269

* Source: Department of Environmental Protection.
** Encumbered but not released.

analysis of where the grants were directed reflects the failure of planning in general and feasibility studies in particular especially since State moneys have been made available. This is evidenced by the fact that

most of the moneys went to counties, which either had a large authority prior to feasibility studies, or which funded their own feasibility studies (Table V-4).

TABLE V-4

STATE CONSTRUCTION GRANTS CUMULATIVE BY COUNTY, 1972

County	*No. of Grants*	*$ Amount*	*County*	*No. of Grants*	*$ Amount*
Atlantic	0	.....	Middlesex ..	2	20,994,630*
Bergen	13	8,736,658	Monmouth ..	5	11,462,036
Burlington ..	0	.....	Morris	3	1,321,524
Camden	0	.....	Ocean	1	4,266,500
Cape May ...	1	731,500	Passaic	1	70,296
Cumberland..	1	509,250	Salem	0	.....
Essex	1	74,482	Somerset ...	6	2,372,776
Gloucester ...	1	7,500,000	Sussex	0	.....
Hudson	0	.....	Union	4	4,436,079
Hunterdon ..	2	1,116,027	Warren	1	750,000
Mercer	4	1,103,762	*20,000,000 tentative		

* Source: Department of Environmental Protection.

The results of limited planning and the approval of regional feasibility studies based on fiscal criteria as further evidenced by DEP's 1972 regional list. All the older urban centers combined have only 2 sewerage projects listed. Of the 53 "regional" projects for 1972, 32 will be servicing areas of less than 15,000 people each and of these 28 have populations of under 10,000 and 10 communities are under 5,000. Moreover, wide disparities are apparent in terms of per capita costs. For example, in three successively listed "regional" projects for the same county by the same authority and all for interceptor sewers—the per capita costs varied widely as indicated in Table V-5.

TABLE V-5

COST FOR SELECTED PROJECTS*

Points	*Project*	*Population Served*	*Eligible Cost*	*State Contribution*	*Per Capita Costs*
653	Interceptor sewers	56,300	3,736,000	934,000	66.35
638	Interceptor sewers	36,800	14,136,000	3,534,000	384.13
637	Interceptor sewers	48,700	844,000	211,000	17.33

* Source: Department of Environmental Protection.

Also, on some projects, which do not include treatment plants, it is not unusual for engineering, legal, administrative and contingency costs to be extremely high and commonly reach 20% of total project cost. Some applications for funds, *which were rejected,* ran from 40-65%. This appears to represent an exceptionally large percentage of the total cost and is one reason why engineering and bonding interests have favored the continuation of relatively small regions which in turn foster the proliferation of relatively small authorities.

The County Sewerage Authority: A Case Study of "Political Regionalism"

Counties represent potential beneficiaries if they are interested in moving into the comprehensive roles which few, with the notable exceptions of Bergen and Monmouth Counties, have been willing to assume. Under the County Sewerage Financing Law the county is permitted to advance funds either on a local basis or under some other acceptable method, to authorities or agencies constructing sewerage facilities, thereby providing for the present and future needs of the county.

While the grant and loan program has not been utilized effectively by most counties, in several others (Bergen, Camden, Gloucester, and Monmouth—as examples) it has been a major factor in providing sewerage facilities. Moreover, as the following case study indicates, this program can provide an extremely important role for the counties to play in guaranteeing that State regulations and local needs are harmonized. It is not a typical case, but one where nearly all issues faced in water quality management, including partisan politics, coalesced at one time in one county.

In December 1967, a lame duck Board of Chosen Freeholders created a County Sewerage Authority, appointed the authority officials, and accepted a State-approved county feasibility study from its consultant, which called for expanding the largest municipal plant to accommodate the waste loads of virtually the entire county. The fears of some observers, who noted "political motivations" for the hasty completion of the feasibility study and questioned the future resolution of the county's water related problems were borne out in less than one year, when officials of the major city announced that they did not want to sell the City's water and sewer assets, valued at $30 million, but would prefer to create a city municipal utilities authority which could serve other towns as well.

At the same time the county sewerage authority had announced its intention of picking up the bonded indebtedness of municipalities still amortizing their present facilities. Many older towns that had already paid off their sewerage systems were therefore reluctant to join the county authority, their neighbors. This encouraged the older, developed municipalities to accept the City's position and led to their release from the county arrangement three days after the DEP agreed to allow a two-facility plan.

Resolution was not any closer at hand when there was a proposal to form a third authority and it was not until ten months later that this plan was vetoed by the State. During this time, the State instituted a suit which required municipalities to cease the issuance of building permits if they did not upgrade their sewage treatment plants, but at the same time promised to drop prosecution if they agreed to join a regional system. While almost all municipalities agreed to join, it was not clear which one they would join, how much it would cost, whether or not local bonded indebtedness would be assumed, or whether or not the original feasibility study was sound. The case is still not appreciably nearer to resolution even though the county and city authorities are in agreement on some operational aspects.

Several conclusions emerge from this case:

- The feasibility study was completed and approved in haste; some interceptor lines followed political, rather than functional boundaries. State guidance has been lacking for the system's design; there has been vacillation from one treatment plant to two and back again to one. (Some of the approved plans showed interceptors actually intersecting, a situation created by the county authority's willingness to pick up one municipality's indebtedness.)

- Regionalism has had two basic meanings over the years: one treatment facility to serve a designated, or one administrative agency to plan and construct, all wastewater treatment facilities in a designated area.

- Because the statutes are not clear and R. S. 40:36A–23 states that "An authority shall have full power to do or cause to be done, all acts and things necessary or proper in the designing, financing, . . . of its sewer system . . .," the question of the county's willingness to assume local bonded indebtedness became a major obstacle. The State on the other hand failed to appreciate the problems inherent in the assumption of local debts and lacked the power to force the county to withdraw the pledge.

- State guidance has not been apparent on the question of an equitable cost distribution system, even though State loans of nearly a million dollars have been allocated. Unfortunately, the treatment plant itself became the major focus, rather than the breakdown of collection, transmission, and treatment costs. Without such cost estimates for comparative purposes, it was unreasonable to expect local officials to make decisions which will cost their municipalities millions of dollars.

- The municipalities involved were definitely caught in a squeeze since important decisions had to be made but the necessary information was not at hand. Thus, because of the bonding question, the lack of hard cost estimates, the complicated engineering

design and the lack of State guidance, it was inevitable for this to become a local political issue.

This case does not represent the only example of such problems. In a rapidly developing shore county, management problems abound and municipalities have been made aware through orders, building bans, and warnings for over five years that they must face up to the realities of development and pollution. Some $3,500,000 has been committed in planning money since 1967, but as yet there have been no results chiefly because several older, developed municipalities have recently built their own localized treatment facilities (two are across a street from one another) and are not interested in investing in new regional facilities that will primarily benefit rapidly developing mainland communities. Again the question of the authority picking up the local indebtedness has entered the picture and at this point, indecision caused by delays, changes in design, and the unwillingness to share local debts have pushed the price of a county system exclusive of the cost of local collection systems from $92.5 million to an estimated $260 million, nearly a staggering 180%.

Such increases certainly raise questions ranging from the validity of original estimates to the permissive posture of the statutes and State financing guidelines. The paramount issue however is how the State funds are to be managed, what relative benefits are derived from their issuance, and the type of regulations and guidelines which need to be instituted in cases which are not moving toward resolution. Regionalism cannot institute itself.

Aid for Industry: A Survey of "Fiscal Regionalism"

Three Federal programs benefit industry financially in meeting their wastewater treatment needs. The Small Business Administration is authorized to give a priority in loans to firms faced with financial difficulty in making heavy capital investments for pollution control facilities; the Economic Development Administration has limited authority in assisting industry through loans and grants which could be used for investment in pollution control measures; and, the Tax Reform Act of 1969 has provisions for the accelerated amortization of private water pollution control facilities for Federal income tax purposes. The depreciation write off means that 30-45% of the capital investment is borne by the government in the form of reduced tax revenues from business firms. The costs of operations and maintenance are also deductible as necessary business expenses, and a 7% investment tax credit for the construction of water pollution control facilities may be claimed.

As regards State programs, Chapter 127 of the Public Laws of 1967, which established tax exemptions for air pollution control equipment was amended to include water pollution control facilities, by *allowing the equipment and facilities used primarily for the control of water pollution to be exempt from property taxation.* Although product re-

covery from wastewaters is an acceptable economic and management practice, unfortunately, the thrust of the State's tax legislation has been counter-productive with regard to by-product recovery, in that the *pollution control tax specifically excludes credits for facilities which recover any product for reuse.* The 3 R's of water quality management are reprocessing, reclamation, and recycling, all of which are taken into account in current Federal legislation. A 4th R—renovation in a treatment facility and returning the effluent to a receiving stream—is the last line of defense and certainly the least desirable, yet it is the only tactic allowable if one wishes to qualify for a State tax exemption.

In other states, such as Massachusetts and Michigan, tax laws are more flexible and encourage technological advances rather than discriminate against them. It seems imperative that the statutes of New Jersey be amended to incorporate water quality policy goals and provide the means for their attainment, although such is not now the case.

Over the years, industries in general have utilized a deliberate strategy of delay to postpone indefinitely the time when firm resources would be committed to water pollution abatement facilities. By intentionally stalling investment in waste treatment, industries have benefited from cost savings on capital expenditures, as well as in operations and maintenance. Because of minimal enforcement pressures, time lags are built into the enforcement procedures which are good for five-year delays, and are further augmented by court ordered stays. Many firms are thus able to ignore the State's water pollution control program until all delay tactics have been used.

Another course of action has been for industries to tie into municipal facilities which provide joint treatment. Initial capital expense and continuing operating costs associated with a separate facility are thus avoided. However, by benefiting industries able to obtain waste treatment services from public facilities, the public as a whole, in that their tax dollars provide the grants-in-aid, are in effect subsidizing a portion of industrial waste treatment costs. New Federal legislation now mandates that industry pay its share of capital costs back to the Federal government over time. This allows for more equal competition among industries, and in the long run, will end the subsidies to industry which have sometimes been abused. The following case study outlines one such example that would not qualify for funds under new Federal regulations, but serves to illustrate why there is a need to define more clearly the criteria used for the allocation of public moneys.

A sewerage authority, comprising three communities, was faced with a series of problems in 1966-7 when it was issued administrative orders. The "resolution" is well worth exploring, especially by focusing on one of its outgrowths—another authority which was established in 1967.

The new authority operated a collection and transmission system for one of the communities and the industrial connections account for

99% of the total flow. This new industrial authority employs two clerical persons and two part-time maintenance men who care for the two pumping stations, while the authority's technical concerns are looked after by the consulting engineer. It is what can be termed a "paper authority" and is primarily established for the benefit of the local industries which might qualify for State and/or Federal moneys.

The authority perceives its role in an economic and developmental sense which allows the maximum use of its waters by industry. It does not coordinate its planning with its neighbors and does not monitor its waters. The authority has qualified as a "fiscal region" on the State's regional grant list. Although it has never been funded by the State, the authority was allotted over $200,000 by EPA in 1971 through special "reimbursable" funds, thus giving a public subsidy to a 99% industrial project. The final irony is that while still another special authority has been formed to serve largely industrial users, there has been difficulty arranging a system to serve adequately the residents of the three municipalities.

Local Financing: A Case Study of Overwhelming Urban Costs

Local government must still continue to bear a large proportion of the financial burden for sewer facilities, and as costs continue to rise, the absolute dollar amount skyrockets even with State and Federal grants-in-aid. As this is a time of high interest rates on municipal bonds, the long-term debt burden on the shoulders of the citizenry is substantial, and one which competes for scarce money with such other important local functions as education and transportation. Regardless of these factors, all municipalities are offered the same percentage grants; are faced with the task of separating combined sewers at costs running into the hundreds of millions of dollars; and are also asked to assume new costs such as those related to sludge disposal. It must be viewed as a basic premise that today's sewerage costs place a great and increasing strain upon local finances, notwithstanding Federal and State grant programs.

Because of debt limitations clauses and the fact that municipal bonds have to be authorized by referendum, most municipalities have opted to become part of an authority. The authorities are given the power to issue bonds without gaining citizen approval and are not faced with the debt limitations of municipalities, thus they appear to be more attractive than municipalities for capital finance. However, it is ever more apparent that the authorities are less accessible than general governments and that the reason for their proliferation is because they provide a vehicle for capital financing and not because they can necessarily provide a service more efficiently or effectively.

Bonding procedures are an issue which also merits further investigation. Under present statutes, financial advisers for authorities are permitted to underwrite and negotiate the bonds as well, giving them a

distinct advantage over competitors (unlike advisers to municipalities, which are prohibited from taking part in the underwriting or selling of bond issues). It is also commendable that the State Bar Association is reviewing the bonding fees of attorneys in an effort to standardize fees rather than allow them to be based on the dollar amount of the bond issue, which has little to do with the work involved.

Another critical question is the overwhelming cost of sewerage systems in relation to urban centers. The collection systems of many competitive priorities in older cities are antiquated and deteriorating. Hoboken in Hudson County is a prime example, having combined sanitary and storm systems, severe infiltration problems, and little money to pay for the needed rehabilitation of its system.

Hoboken has in use approximately 10,000 linear feet of wooden sewers built prior to the Civil War. Brick sewers constructed before the turn of the century commonly used lime mortar which has deteriorated almost totally due to chemical reactions with elements of the wastewater. Because of the dilapidated condition of the pipes, at least 25-30% of the flow entering Hoboken's treatment plant is from infiltration, which not only overloads the facility, but results in the injection of debris and grit into the system as well. In 1968, a trunk line beneath Hoboken's main street collapsed, leaving a gaping hole which required an extraordinary appropriation of $26,000 from the municipal budget for repair.

The estimate for the rehabilitation of Hoboken's collection system in 1970 was $19,412,000. Hoboken is only 1.3 square miles in area, has a population of 45,000, a per capita valuation of $2,601, a true value tax rate of $8.91 which far exceeds the state median, and a budget of $14.8 million. It is neither possible nor reasonable for a city in this fiscal condition to have to rebuild its sewer system with its own resources. Furthermore, under policies which have been reenforced by an agreement between HUD and EPA, it is not possible to improve the collection system if the treatment facility does not meet standards, thus Hoboken would have to upgrade its primary plant to secondary treatment if it were to qualify for Federal aid. While this may be a wise stipulation for other fiscally sounder communities, it is not presently realistic for Hoboken or the older cities of this State. As the following chart displays, the capital needs of the urban areas are extraordinarily higher than those of counties in earlier stages of development.

To further exemplify this situation, it is necessary to view different types of municipalities within Hudson County. What has come about, in effect, is a situation where the municipalities which are already paying most heavily are being asked to pay even more, even though the economic base is clearly not available.

To further complicate matters, there is a considerable jurisdictional dispute over Hudson County's planning and management role vis-a-vis those of the Hackensack Meadowlands Development Commission, PVSC,

TABLE V-6

ESTIMATED FIVE-YEAR CUMULATIVE CAPITAL EXPENDITURES FOR WASTEWATER TREATMENT AND ABATEMENT*
($, in millions)

Counties		*1972 - 1976* Total	*1972 - 1976* Local Share	*1976 - 1981* Total	*1976 - 1981* Local Share
Rural	I	$178.9	$71.6	$93.7	$37.5
Suburban	II	253.4	101.4	132.0	52.8
Suburban	III	321.6	128.6	175.3	70.1
Urban	IV	257.3	102.9	132.0	52.8
Urban	V	998.8	399.5	498.0	199.2
	Total	$2,010.0	$804.0	$1,031.0	$412.4

Type I — Cape May, Cumberland, Gloucester, Hunterdon, Salem, Sussex, Warren.
Type II — Atlantic, Burlington, Ocean, Somerset.
Type III — Mercer, Monmouth, Morris.
Type IV — Camden, Passaic.
Type V — Hudson, Bergen, Essex, Middlesex, Union.

* Source: Developed by the N. J. Department of Community Affairs.

and the Bergen County Sewerage Authority which must be resolved before any real attempts to manage water quality on a comprehensive basis can be made. Moreover, for a rapidly developing municipality to pay for a trunk line, collection system, and treatment facility, all of which will reap dividends in ratables, is one thing; to expect Hoboken, Jersey City, or Newark to expend sums of money they do not have in order to meet State regulations is another, and not very realistic. The State's water quality

TABLE V-7

PROFILE OF SELECTED HUDSON COUNTY MUNICIPALITIES*

	1970 State Equalized Tax Rate	*Per capita Municipal Expenditures*	*Per capita Sewer Charges*	*Eq. Valuation Per Capita 1969*	*Population*
Jersey City	$7.50	$227.98	$18.00	$3,397	260,545
Hoboken	8.91	208.72	15.00	2,601	45,380
Bayonne	4,58	159.75	28.79	5,052	72,743
North Bergen	4.16	178.85	2.70	6,935	47,751
Kearny	3.06	192.58	1.72	9,863	37,585
Secaucus	3.23	157.35	6.67	14,433	13,228

* Source: Commission Research by N. J. DCA, Division of Local Finance.

management program should be flexible enough to recognize the significant problems of her major cities.

Sludge Management: The Stepchild of Wastewater Management

For years, sludge has been viewed as the stepchild of wastewater treatment. It is now imperative, to realize that sludge is a resource management issue, not simply a disposal problem. It is also obvious that a great deal of research must be done to determine scientifically the potential uses for sludge, the means of treating it, and how to render it harmless at the lowest possible cost. However, there is a practical problem which cannot wait for years of research and the eventual development of sludge management facilities: sludge must be disposed of in large quantities presently, and as more major wastewater treatment facilities initiate secondary treatment, the volume of sludge will rise dramatically.

Capital costs for sludge treatment can run between 10% and 40% of the total construction cost for new facilities, depending upon the level of treatment and the method of disposal. In densely populated areas it is not feasible to use land disposal methods and incineration often causes as many air pollution problems as it solves water related problems. Furthermore, industrial discharges cannot be placed onto the ground because of heavy metals and chemical contaminants. Minimum estimated sludge capital construction costs for some of the larger planned facilities are shown in Table V-8. These obviously represent significant capital outlays but cannot be considered long-term solutions because of our yet undeveloped sludge management technology.

TABLE V-8

ANTICIPATED CAPITAL CONSTRUCTION COSTS FOR SLUDGE TREATMENT*

Middlesex County Sewerage Authority	$10,176,000
Bergen County Sewerage Authority	2,214,300
Passaic Valley Sewerage Commission	25,000,000
Passaic Valley Water Commission	2,400,000
Somerset Raritan Valley Sewerage Authority	682,000
Rahway Valley Sewerage Authority	3,500,000

* Source: Commission Questionnaires, 1971-1972.

Sludge management is significantly an industrial problem which must be regulated by government. Complicating the situation are combined sewerage systems in urbanized areas, small pipes, infiltration, wet industries, no enforcement of pretreatment ordinances, and poor treat-

ment in public facilities. Until this problem is approached and the 3 R's of wastewater treatment—reprocessing, reclamation, and recycling—are encouraged and practiced, sludge will be a problem wherever it is disposed.

Fiscal Analysis of Local Sewerage Service Costs

How to pay for sewerage service has been handled in various ways in New Jersey. In some communities it is considered comparable to electricity, therefore a price mechanism is employed, so that the benefits are enjoyed almost exclusively by those who discharge into a system, since they would be compelled to find alternate solutions were the system not at hand. In others sewerage is considered a tax cost of general government therefore it is a financial responsibility of the public as a whole. Different ideas have been presented regarding the appropriate division and allocation of costs, each of which reflects differences in terms of roles and responsibilities. The main theories are:

1 — *Public Utility Theory:* charges are allocated to the users.

2 — *Diffused Benefits Theory:* assumes a "right to pollute" by placing no direct responsibility on those causing pollution.

3 — *Historical Theory:* charges allocated in the same manner as in the past.

4 — *Added Expenditure Theory:* storm sewer costs should fall to property owners. Additional costs should be financed by user charges.

5 — *Alternative Revenue Theory:* because local governments are overburdened user charges should be high enough to completely finance sewerage systems.

6 — *Capital and Operating Cost Theory:* capital costs should be borne by property owners and operating and maintenance costs by users.

7 — *Differential Benefits Theory:* costs are apportioned in relation to the benefits obtained.

8 — *Joint Committee Theory:* costs are divided into fixed and operating charges, and further divided on the basis of volume and characteristics of the sewage.

The first six of these theories can be found in use within New Jersey presently, but the determination of the *most equitable* theory is complicated enormously by the fact that storm, sanitary, and industrial wastes are frequently collected and treated in the same system.

There is presently a strong push for equity, with the direction being provided by the Federal EPA. By blending the common themes of several of the aforementioned theories it is possible to establish an equitable cost

TABLE V-9

SEWERAGE CHARGES TO USERS: 30 SELECTED LOCALITIES*

Plant	*Treatment*	*Capacity Design*	*Single Family Unit Annual Charges—*
Municipal Plant 1	Secondary	8.5 MGD	$176.00
Municipal Plant 2	Primary	13.0 MGD	23.18
Authority Plant 3	Secondary	1.0 MGD	58.50
Authority Plant 4	Primary	.6 MGD	60.00
Authority Plant 5	Secondary	.3 MGD	70.00
Authority Plant 6	Secondary	1.0 MGD	55.00
Authority Plant 7	Secondary	2.0 MGD	70.00
Authority Plant 8	Secondary	1.5 MGD	60.00
Municipal Plant 9	Primary	50.0 MGD	3.88
Authority Plant 10	Secondary	1.0 MGD	88.00
Authority Plant 11	Secondary	4.9 MGD	28.00
Municipal Plant 12	Secondary	.14MGD	60.00
Authority Plant 13	Secondary	1.5 MGD	75.00
Municipal Plant 14	Secondary	.15MGD	81.00
Authority Plant 15	Secondary	.65MGD	75.00
Authority Plant 16	Primary	2.5 MGD	35.00
Municipal Plant 17	Secondary	1.6 MGD	19.92
Authority Plant 18	Primary	1.4 MGD	60.00
Authority Plant 19	Secondary	.3 MGD	50.00
Authority Plant 20	Secondary	2.0 MGD	145.00
Authority Plant 21	Secondary	2.0 MGD	28.00
Municipal Plant 22	Primary	.45MGD	60.00
Authority Plant 23	Secondary	3.0 MGD	64.00
Authority Plant 24	Secondary	4.0 MGD	22.00
Municipal Plant 25	Secondary	1.2 MGD	85.00
Municipal Plant 26	Secondary	8.5 MGD	200.00
Authority Plant 27	Primary	1.2 MGD	55.00
Municipal Plant 28	Secondary	.3 MGD	64.00
Municipal Plant 29	Primary	.6 MGD	40.00
Authority Plant 30	Secondary	.3 MGD	25.00

* Source: Commission Questionnaires, 1971-1972.

TABLE V-10

COSTS PER MILLION GALLONS FOR SELECTED LARGE REGIONAL AUTHORITIES*

Plant	*Treatment*	*Cost per MG*
Regional Authority A	Secondary	$215.61 per MG
Regional Authority B	Primary	83.36 per MG
Regional Authority C	Primary	54.39 per MG
Regional Authority D	Secondary	463.00 per MG
Regional Authority E	Secondary	440.00 per MG

* Source: Commission Questionnaires, 1971-1972.

recovery system "which distributes the cost of waste treatment equitably among contributors of wastes to be treated and therefore makes as direct as possible the incidence and impact of these costs."[1] In this manner, it will be possible to overcome the inequity of domestic users subsidizing a portion of the costs which should be allocated to industry, but traditionally have not. Thus, systems where revenues are derived through property taxation, but which fail to recognize that industry's effluents differ quantitatively and qualitatively from domestic wastewater will no longer be acceptable. Neither will this approach permit service costs to decrease as volume increases, a method rightly criticized because it gives a distinct economic advantage to industry, for only industry or a few commercial interests could possibly use the amount of water needed to qualify for such rates. This method also provides a financial incentive to produce more sewage rather than less.

Charts V-9 and V-10 give an idea of the disparities in the cost of sewerage services to users (sample of 30 municipalities).

Conclusions

The cost of constructing sewerage systems is already extremely high and still climbing. To aid municipalities, Federal and State agencies make available various grant programs for the purpose of building sewerage facilities.

An analysis of these programs raises questions about the delinquency on loans, faulty feasibility studies, the waste and cost overruns, the worth of the investment, the validity of original estimates, and the permissive posture of the statutes and departmental guidelines in terms of financing.

Financial considerations appear to be a key to resolution of many of the present programs' shortcomings. From the needy cities to the management of sludge, from bonding practices to the elimination of antiquated combined sewer systems, money is at the forefront. Yet if the

State and Federal governments are to receive acceptable levels of return on their investments, the management of funds beyond their approval date is essential. With the fiscal squeeze presently being experienced by all levels of government, the benefits derived from funding must be optimized more than ever before.

Other overriding issues are that local jurisdictions have what can be termed "a limited veto" over the development of institutional arrangements for sewerage services. This is especially true where the partisan political conflicts are strong—swing counties and municipalities are more difficult to work with than those one-party areas. Throughout the report jurisdictional conflicts have been at the heart of many problems but surface most dramatically in the area of finance and funding.

Recommendations

The Commission's recommendations in the area of finance and funding are:

1. *The DEP should restructure its priority rating system to give more weight to areawide planning principles, financial need, and water quality problems. It is also suggested that the DEP cease to give grant moneys on the basis of fiscal regionalism and that the DEP develop the capability of monitoring the status of all grant and loan money.*
2. a. *The DEP should utilize three distinct priority rating lists: one each for headwaters or rural areas; one for suburban; and one for urban. This would allow many smaller, but environmentally critical projects to move ahead more quickly where they are now often blocked because of the considerable costs of urban facilities, one of which could encumber an entire year's grant money.*

   b. *In the alternative, financial advisors should be required of all municipalities and authorities. Also, advisors to authorities should not be permitted to underwrite or negotiate bond issues (this is already the case with municipalities), to insure that services performed are in the public interest and not in competition with any personal gain on profit motive.*
3. *A New Jersey Municipal Credit Corporation should be created to aid in the financing of costly sewerage projects. The powers of such a Municipal Credit Corporation would include: a municipal bond bank, authorized to purchase bonds issued by local governments and thus guarantee that the desired funds would be raised; and a State guarantee fund, to lend financial backing to local bond issues, and offer advice on bonds and the bond market. Because of its significance to water quality management, the Commission also urges that the appropriate State agencies consider and evaluate the impact of a Municipal Credit Corporation on the State's and local governments' position in the bond market.*

4. *To facilitate greater and more rapid involvement of local government in water quality management:*

   a. *Sewerage facilities should be removed from local debt limitation clauses. Educational and highway needs are more continual in nature, while sewerage capital expenditures are relatively infrequent. This could induce many larger municipalities to view sewerage as a municipal responsibility, rather than one requiring an authority to facilitate capital financing. The proliferation of small, single purpose authorities is a significant obstacle to responsive and accountable government.*

   b. *It is imperative that attorneys' bonding fees be standardized and be related to work performed rather than as a percentage of the bond issued. In concurrence with the State Bar Association and with the Center for Analysis of Public Issues, the Commission finds no reasonable relationship between the dollar amount of a bond issue and the amount of legal work involved in its preparation.*

5. *The statutes should be revised to state that regional sewerage authorities may not assume the prior bonded indebtedness of participating municipalities unless it can be demonstrated that such assumption is based on sound cost recovery systems, that the benefits derived are in the best interests of the region and its constituent members, and that the State concurs with the recommendation.*

6. *The State's share for the costs of sewerage facilities should be reduced from the present 25% to 10% in the future, given the increase in the Federal share from 33% to 75% of costs and the fact that collection systems are now eligible for direct Federal grants. This will enable the State to extend its contributions to more areas and, at the same time, assure continuing responsibility by local governments for their fiscal commitments.*

7. *The DEP should initiate a cost recovery system embracing equitable user charges to prevent further public subsidies of industry beyond State and Federal grants-in-aid. Inherent to such a system of cost recovery is equitable charges for benefits derived, economic efficiency, administrative ease, and revenue increases adequate to cover increases in costs.*

8. *New Jersey's tax statutes should be revised to reflect sound environmental principles and to encourage rather than deter industrial recycling, reprocessing, and reclamation of water. At present these laws discriminate against water reuse by prohibiting tax writeoffs of water pollution abatement facilities which can recover water for recycling.*

9. *The State should allocate special resources and funds to resolve the sludge management problem. Sludge management also offers a vehicle by which industry could be called upon to lend its technical expertise and financial support to what is largely a problem of industrial origin.*

10. *Engineering loan moneys should be made available for DEP to do planning in areas where a clearly defined institutional framework for such planning does not exist or where third-party objectivity is necessary. Payback would be required only if construction results from such planning studies.*

Chapter VI

PLANNING

Overview

When wastewater treatment plants were primarily a function of public health, the task at hand was to connect all dischargers into a sewerage system to deliver wastes to a facility where they could be treated. Septic tanks were eliminated and water supplies were generally protected, especially where wastes were largely domestic. Until only a few years ago, the objective of sewage treatment policies was to preserve present uses of water. Today the need is apparent for the enhancement of water quality, as well as the necessity to manage water resources in order to exploit the potential for water-related products and services, such as municipal, industrial, and agricultural water supply, navigation, electric energy, flood control, economic development, recreation, and environmental amenities. Obviously, wastewater treatment facilities are no longer the only goal of planning as they were forty years ago; rather, they are one of the means, a way in which the goal of high water quality can be achieved in order to provide the basis for the multiple beneficial use capacity of a stream.

Political acceptability follows from public understanding if the need is a genuine one, and it is the planner's task to lay alternatives before the public in a manner which facilitates understanding. Both environmental goals and the strategy for their eventual implementation must be spelled out to determine the technical, economic, and social validity of proposed wastewater systems. It is evident that many systems throughout the State were built without such an understanding; many facilities are not meeting water quality standards, are literally crumbling, are costly, and are fostering poor land development policies. There is little an operator of a wastewater treatment facility can do when he does not even know what wastes are being treated because the dischargers were not catalogued when the system was designed. There is little doubt that when land intended for low-density development is crossed by a trunk line, it will eventually succumb to developmental pressures and be subdivided.

Planning is a preliminary stage of governmental involvement, but has rarely been utilized in water management in New Jersey. Instead, municipalities with sewage problems have traditionally called in their consulting engineers, who immediately looked at the engineering and design aspects, without advance planning. The result was that high investments were made in engineering designs before comprehensive plans were developed, and the vested interest in the design on the part of those

submitting it tended to outweigh any doubts raised about its technical, social, and economic validity. In the future, the Commission believes, the public interest would be better served if planning and public discussion preceded any engineering work. The attainment of environmental, policy, and functional goals rests largely upon the competence of water quality planning. They are only secondarily engineering goals.

Comprehensive Planning and Feasibility Studies—21 Counties, 21 Approaches

Water quality planning can best be understood in the context of a comprehensive planning process which encompasses virtually every area of endeavor. It is fair to state, however, that in New Jersey this process is still in the making, and its various interrelated components, which ideally should be directed at the attainment of common objectives, are still following separate paths. Thus, our planning for economic growth and development often has neglected housing and open space, and planning for the use of land has been at cross purposes with social imperatives and fiscal realities. So also, sewerage facilities have not been adequately planned, as to their management or their impact on the environment.

The results of past and present failures to coordinate and rationalize these various segments into a cohesive entity are apparent and have been described in this report and elsewhere. There is also a growing awareness that government has been no innocent bystander, but whether this awareness will lead to more effective interagency planning remains to be seen.

Comprehensive planning begins with a series of stated objectives. Its tasks include devising a workable system for allocation of resources; identifying capacities and constraints relevant to the objectives under consideration (physical, socioeconomic and fiscal); proposing ways and means to carry out chosen objectives, and identifying jobs to be done, how soon, how well and by whom.

The planning that was done in the past for water supply and sewerage, when it was done at all, was not always of this comprehensive nature. In response to growing problems attributable to the lack and deficiency of planning, especially on an areawide basis, the State began to fund feasibility studies (initially for any two or more municipalities and eventually on a countywide basis). These were considered as functional "plans" and in many cases were designed to meet Federal grant requirements, as well.

The feasibility study was thus the precursor of water quality planning. Basically a compilation of previously developed data, it contained an inventory of existing sewerage systems, projected wastewater flows, the present stream classifications, population, land use, methods of financing, procedural documents and the derived recommendations. Important as this information obviously was, it could only be useful in the

context of a comprehensive plan in which other factors and objectives were considered.

The feasibility studies funded by the State at a cost exceeding $2-million were developed without specific guidelines; most failed to convey rationale for alternatives, or any basis other than financial for the selection of a given alternative. The best method of exploring the pitfalls of the feasibility study is to compare those prepared for two neighboring counties with similar topography, resources, and problems. This analysis does not attempt to judge 1967 planning efforts by 1973 standards. Rather it is intended to criticize the lack of uniform scope of services to be performed in feasibility studies at any one time.

The County A feasibility study, initially prepared in June, 1967 is singular in that it was highly criticized by that county's own planning board. The basic regional boundaries established by the consultant largely dictate the method of collection, treatment, and disposal, and the resulting location of treatment plants and pipes did not coincide with the county land use plan. In one area of the county, which was designated in the county plan and zoned locally for low-density development, the feasibility study proposed sewers which would have encouraged intensive development. A plant in another area was to discharge into waters that had been recommended as part of a park. A study for creating a park had been completed, and the county planning board had received a HUD planning grant to prepare a recreational plan for the area. Thus, the proposed plant would be in conflict with a proposed public recreation area.

In the neighboring county the planning process was substantially different. The study was relatively comprehensive in that it viewed the County in its regional setting, characteristics of sewage and pollution problems, current and future methods of sewage treatment, aid programs, water resources and their assimilative capacity, administration of a regional sewerage authority and alternative solutions. The study was thorough and was presented in an understandable fashion which facilitated its eventual acceptance. The technical, economic and social bases for decisions were also explained, as for example, in the consideration of advanced wastewater treatment, which was described as encouraging for future consideration, but economically unfeasible at that time.

The problems faced in both counties were very similar yet the decisions reached were different. A comparison of the two studies indicates that feasibility is something very different to each consultant:

	County A	*County B*
Cost on sq. Miles Basis	$164,000	$58,000
Cost per capita	$780	$180
Discharge Waters	Bay	Ocean
Approach Stressed	Highly Political	Policy Goals

It is difficult to believe that such disparities occur in such similar counties and even more difficult to comprehend how planning procedures are allowed to go unregulated to the point where such inconsistencies abound. There are cases in which two feasibility studies performed by the same consultant reflected alternately regional and parochial approaches. In another case concerning neighboring counties, one consultant shows each county running an interceptor along its respective side of the very same stream that actually separates the two counties. Regionalism implies coordination, regulation, supervision, and economies, but in its application this has not necessarily resulted, largely because the tools needed to define and implement the concepts have been lacking.

The Limitations of the Review Process

Traditionally, the State has been understaffed to direct the course of a feasibility study, especially in setting its goals and establishing its parameters—for the most part the State reviewed and dressed up the feasibility studies in order to qualify for Federal grants-in-aid and thus aggravated the symptoms of "fiscal regionalism." Little time or staff work were devoted to in-house planning. The following case studies indicate what can happen when the Department of Environmental Protection plays only a review role, rather than have its own active planning capabilities.

In March, 1965, correspondence in the Department of Health (DOH) states that a proposed county regional authority in northern Jersey was to utilize the best, most efficient form of secondary treatment available, and that the DOH would be prepared to expedite their review of the proposal to insure that it would conform with State standards. In April 1966, the authority directed a letter to the DOH, suggesting a stream sampling project to determine the effect the proposed facility would have upon the stream, but the State replied that because of manpower limitations they could not provide the comprehensive stream sampling and laboratory services as suggested.

Approval of construction was given in October, 1967. Some eight months before the plant began operations a concerned municipality indicated that its water supply source, which included the stream on which the wastewater treatment plant was being located, might be endangered. The State replied that the matter would be studied. In Oc tober, 1970, only eleven months after operations had begun, the regional authority wrote, asking if the State could give any guidance in terms of developing standards for the pretreatment of wastes to be discharged into a public system, especially industrial wastes such as metals, cyanides, and chemicals. The reply was that there were no Departmental standards and that the consulting engineers should be relied on.

In this case, the State failed in its responsibility to review the plans thoroughly and allowed the oversized plant to be located on a stream

which could not possibly handle the effluent the plant is designed to treat. The authority asked for water quality sampling which might have averted the decision to locate there, but it was denied. Although the construction costs of this Federal-State funded project exceeded $13-million, the State failed to advise the authority on the question of pre-treatment, which advice might have reduced pollution.

A similar event occurred in 1969 when an application for a sewage plant to treat the wastes of a 150-home subdivision was received. Two DEP staff members went to visit the location on the stream and recommended that approval be granted after the plans were submitted to the review team for consideration. The plant was to have a flow of 60,000 gpd, and a permit for construction was issued for the construction and operation of the plant in September, 1969.

On June 30, 1970 a letter was received from a local resident commenting on the many pollution problems in the immediate area. The letter also stated that the stream was rather small, "perhaps a yard wide with a water depth of about one inch." More letters followed, enough to send two senior DEP officials to the proposed site. Their findings were that the stream was native trout propagation water, had a flow of 25,000 gpd, ran through a State Park, and that the Division of Fish, Game, and Shell Fisheries considered it a valuable fishery. Finally, it was determined that at best, dilution was only one part fresh water to two parts treated sewage. It was their belief that the permit should never have been issued and that septic tanks should have been employed, but once again it was too late.

Planning at the County and Regional Levels

In the past counties were the recipients of sewerage grants and contracted with the consulting engineers, and did some planning for sewerage within county borders. These plans seldom involved very much critical evaluation by other county agencies; county planning boards and health officers did not become involved with the sewerage departments; divisive issues often emerged, as the case studies presented have indicated.

Better planning is being done by regional agencies such as the Delaware River Basin Commission (DRBC), an agency devoted solely to water related issues. The DRBC has conducted some sophisticated planning and research, such as its Delaware Estuary Study and Deepwater Project. However, research alone cannot attain water quality; implementation and operation of wastewater management systems must accompany the plans. DRBC has only one full-time planner, it is frequently bypassed by the State-funded consultants, and has often been forced to live with plans which do not coincide with its philosophy or program. DRBC ends up being in a review position, which weakens the concept of regional planning it is supposed to be fulfilling, and undermines the very reasons for DRBC's existence.

Inadequate coordination between counties and regions can also be demonstrated. In one such instance in the Delaware River basin, a planning study of one county revealed that an interceptor system for a small basin stopped near the county line, although it was supposed to have been continued by its neighboring county, according to the first county's plan. The neighboring county's plan does not say anything about the dead-end sewer next door to it, and does not address sewerage issues in the basin. This situation is reversed as applied to an interceptor line in another basin.

These case studies illustrate recurring problems caused by lack of local inputs to the planning process, unwarranted reliance by governments on private consultants in the planning stages, and the lack of guidance and control by the State. Local, regional, and county agencies must be included for they are often aware of considerations which outsiders may not notice or uncover. The Bureau of Water Pollution Control should prepare a strategy for each basin and insure that individual projects coincide with the basin strategy. This cannot be achieved through review procedures; it requires active long-range planning by the Bureau and the capability to implement the plans once formulated.

Improving Planning Practices

Regional planning for sewerage and water quality should not be limited to political jurisdictions, but should encompass entire drainage basins. Functional analysis similar to that in this report should be used to provide a foundation for political decisions. The comprehensive basin plan, which used to be required for Federal grants, but is now deemphasized, should be revived to set forth guidelines needed to implement the plans as conceived. By planning entire hydrologic basins, an overview is achieved which comprises basic information on stream flow and water quality, pollution sources and their impact, dischargers, alternative pollution control measures, environmental assessments, requirements for jurisdictional cooperation at various levels, institutional information, and so on. The comprehensive basin plan can counteract the fragmentation which weakens orderly and efficient management of water resources.

A water quality management plan must be prepared as part of the comprehensive plan which includes a statement of goals, the problems in physical, social, and economic terms, planning premises for wastewater treatment, resource availability, administrative resources, and alternatives from which a final proposal will be chosen and its unit costs set forth. The advantages of this approach are that in addition to the feasibility study, it presents a strategy with the institutional means for carrying out a water quality management program on a problem shed basis. The need for this approach is evident throughout the State, as may be demonstrated by a review of planning in the Stony Brook-Millstone River Basin.

Stony Brook-Millstone: A Case Study

In 1965 the Stony Brook-Millstone Regional Sewerage Study Committee was initiated and participated in the State's first regional sewerage feasibility study. Twenty-six municipalities were included in the study area which had a 1960 population of 83,140. The plan, published in April 1966, recommended that a single sewage treatment plant be located one mile north of Rocky Hill on the Millstone River, with the cost (adjusted to 1970 prices) for the plant and sewers estimated at $34,877,000. The plan encountered difficulty and was abandoned in April 1968. In its place was proposed a seven municipality system which would serve a 1970 population of 62,600 at the greater cost of $60-million, with a treatment facility to be located near the site of the present Princeton plant.

The original study was supposedly dropped because it tried to include too many municipalities to be able to agree on anything. But it set the precedent of watershed basis planning. However, many municipalities were not yet ready for that and preferred going it alone. The result was that most of the municipalities did not become part of a regional system; only the seven along the Stony Brook were included in the Stony Brook Regional Sewerage Authority.

The Stony Brook Regional Plan, a controversial proposal to begin with, is presently being debated and its final outcome may affect the future of regionalism and its meaning in New Jersey. This case illustrates the differences between the traditional view of regionalism—one facility serving numerous municipalities—and the emerging concept of regionalism—an institutional means for dealing with water quality management on a problem shed basis. Because such a long period of time has transpired since the original region's inception, planning practices have changed drastically and the feasibility study is now being displaced by the comprehensive basin plan, which encompasses far more than the feasibility study. Many of the criteria and requirements of the CBP were not given consideration in the regional feasibility study, and undoubtedly, were the criteria available and utilized as guidelines, the present confrontation would have been avoided.

The Stony Brook arrangement has these inconsistencies and problems:

- Montgomery Township with one acre zoning now has 13 package sewage treatment plants and one municipal plant, which also treats the wastes of Rocky Hill.
- East Windsor Township originally was to be included but now serves only itself, and has shown reluctance to serve neighboring municipalities without sewerage systems, Washington and Cranbury. East Windsor has not displayed any intention to incorporate Hightstown even though East Windsor surrounds Hightstown, whose treatment plant is degrading the Millstone River, thus eliminating whatever purifying effect the East Windsor facility has.

- Princeton Borough and Township are to be included in the Stony Brook region, but will still have other communities' pollution flowing into Carnegie Lake.
- Pennington, which was ordered into the regional system by a Supreme Court decision, will now have to pay more for their collection sewers alone than they would have had to pay for both sewers and a treatment facility if they had built their own.
- The cost of the Stony Brook Regional system, serving 16 fewer municipalities than originally proposed, may cost nearly twice as much as was originally proposed.
- The two Princeton's have infiltration problems which will largely nullify the impact of the new facility if not corrected.
- Attempts to cleanup Carnegie Lake will be useless unless pollution on the Upper Millstone is also cleaned up.

Some progress has been made in the past year in both Stony Brook and the Millstone River. Cooperative efforts by DEP officials, local governments, and interested groups have resulted in initiation of an environmental assessment of the Stony Brook project, with greater direction on the part of the State in identification of issues which must be explored and satisfactorily answered before the project proceeds. DEP officials also took a strong stand on limiting the issuance of building permits, interim remedial measures, and planning the long-range solution of water quality problems within the basin. Interim improvements will likely prove to be the only way many municipalities will be able to address sewerage needs, given the backlog of projects and limited State and Federal moneys available.

Progress or More of the Same?

For the past two years, the Federal government has required that comprehensive basin plans be prepared before individual projects within a basin could be funded. In response to this requirement DEP created an Environmental Task Force comprising experts in the field, which in turn developed an extensive methodology for basin planning in the State.

However, the recently enacted Federal Water Pollution Control Act Amendments have been the source of much confusion in the State and the nation. Under Section 208 of the new Federal Act, in designating the boundaries of areas having substandard water quality problems, the Governor is required to consult with appropriate elected and other officials of local governments having jurisdiction in such areas. Furthermore, the Governor is required to designate a single representative organization, including elected officials from local governments or their designees, capable of developing an effective areawide waste treatment management plan for the area.

Local governments should have a say in planning. But the Commission believes the only agency capable of areawide water quality planning is the Department of Environmental Protection. The Governor should accordingly designate the DEP as the water quality planning agency for the entire State. Areawide councils should also exist with representatives of the State, locally elected representatives, and other officials. These councils could review project plans which would conform to the State approved comprehensive basin plans.

Conclusions

The Commission has found a record of disregard of sound land use and water quality management policies, as New Jersey municipalities, counties and regional planning agencies have struggled with sewerage proposals. Political boundaries have been the framework of planning, rather than watersheds. Planning has not succeeded in providing the means for achieving either policy or functional goals. State leadership and technical skill are needed. The role of intergovernmental cooperation in planning is important and should be encouraged.

Recommendations

1. *The Bureau of Planning and Management should receive an increased budget adequate to provide for 10-15 new planning positions. Compared with the $3-5-billion which will be spent on sewerage in New Jersey over the next decade, the modest increase in staff proposed is a prudent investment. It should be noted that budget requests for staff have been denied for two consecutive years.*

2. *The development of an in-house educational program which could benefit the entire Division of Water Resources. It could be modeled on a similar program offered in other states which exposes individuals to a broad range of issues important to all employees, but essential to those in planning. Federal funds are available for such programs.*

3. *As a management and administrative tool, the DEP should define the concept regionalism as the institutional means for the implementation of a water quality management plan developed out of the comprehensive basin planning process and applied on a problem shed basis. Also, funding on the basis of "fiscal regions" should cease immediately.*

4. *The DEP should be designated as the water quality planning agency for the State. Also, the Governor should designate areawide councils comprised of State and local officials and interested parties to develop project plans which coincide with State approved comprehensive basin plans.*

5. *The DEP should implement the criteria developed by the Environmental Task Force on the Impact of Regional Sewers; should redefine the relationships of interim solutions to comprehensive basin planning; and should carry out comprehensive plans for all basins throughout the State.*

6. *The DEP should develop immediately the criteria for interim solutions and regional solutions to determine when expenditures for the upgrading of facilities being considered in a regional context are warranted and when they are not.*

7. *The DEP should be given the responsibility to define and determine regional areas and should report activities pertaining to the formation of regions to the Legislature annually.*

8. *The Departments of Environmental Protection and Community Affairs should develop data storage and retrieval capabilities to facilitate the sharing of information and the development of an ongoing information system for physical and social planning.*

9. *The Division of Water Resources should devote time and staff to planning for the ongoing management of sewerage facilities as well as their construction.*

10. *The DEP should arrange for regular meetings with Federal, State, interstate, county, regional, and local officials and interested parties to explain Departmental activities and proposals and assure all parties that a cooperative approach is statutorily required and will be followed.*

Chapter VII

STATUTORY BASES AND ADMINISTRATIVE STRUCTURES

Overview

Governmental involvement in the function of water quality management begins with legislation, which ideally defines policy goals, the action programs which will strive for those goals, the scope of regulation, and the primary actors in an intergovernmental response to stated needs. It is the role of the statutes to delineate policies and programs for the regulation, development, preservation, and management of water resources within a far greater resource system which incorporates economic, social, and institutional considerations as well as those which are primarily physical in nature. Beyond the determinants of quantity and quality of water, both of which are essential to water quality management, are the people of the State with their commerce, industry, transportation, recreation, living patterns, and institutional arrangements, all of which place demands upon the water. *The quantity and quality of water must be recognized as the physical basis of water quality management in legislation, and they must be related to the institutions which will regulate them in a more comprehensive resource system.*

Water related needs can be determined largely through systematic research and can be reflected in the laws by defining overriding State and local water quality interests on one hand, and the functional activities (monitoring and surveillance, enforcement, planning, etc.) on the other. *Institutional needs,* those related to a governmental response, are determined less scientifically, but can provide the basis for an administrative structure in which the authority vested by the statutes for each participating governmental unit is compatible with the responsibilities and resources of that same unit. It is with the statutes then, that the potential for a gap between service needs and delivery capacity first exists, due to either a failure in identifying needs (functional or institutional) or a failure in developing legislation comprehensve enough to meet needs once they are identified.

Given statutes that are equal to the functional and institutional needs of water quality management, an administrative structure emerges which gives presence to a system of personnel and a formalized system of communication. The role of administration is to execute the legislative programs to attain policy goals, and is most likely the pivotal point of water quality management in that it coordinates legislative policies and programs with the realities of a delivery system faced with issues of pollution, water supply, resources, etc. Conversely, whenever statutory

inadequacies arise they are usually followed by even greater administrative breakdown and problems.

Historically the significant problem area in New Jersey was the absence of central instrumentalities and the resulting proliferation of public authorities to the extent that we now have more governmental units per county than in any other State. Sewerage authorities are a special consideration due to their widespread use; the great sums of money presently connected with their function; the increasingly common trend to have treatment facilities owned and managed by one regional authority which in turn serves one, five, or even ten intra-municipal collection authorities; and the fact that adequate controls are not available to influence their behavior.

The intent of this chapter is to survey the statutory bases for sewerage administration and to show how present statutes affect the behavior of the agencies charged with water quality management duties. In addition, the administrative structure and process of water quality management is examined to identify and remedy the gaps which have emerged between promise and performance.

Statutory Basis of Administration

The water quality issue has presented government with problems of organization and management that are of unprecedented complexity. In the aggregate, unlike most regulatory programs, the water quality issue is concerned with the impact of everyone upon the water. It must deal with all those activities and aspects that relate to the quality of the water. Also, in order to act effectively, government must act before the issue becomes acute—frequently, before the general public is aware or receptive to taking public action.

Although the relevant statutes of the State are frequently considered to be stringent, it is apparent in analyzing the laws pertaining to each of the three primary jurisdictions—local, county/regional, and State/interstate—that they do not address themselves to fulfillment of functional activities. More specifically, the inadequacies of the water quality statutes are:

Policy: The laws do not enunciate policies and priorities—they are not declaratory, they do not specify legislative goals and priorities, and they do not formulate the basis for their implementation.

A declaration of legislative purpose and the identification of goals represent the minimum statutory policy elements. The absence in the statutes of policy goals and the recommended course of action which will attain those goals, has caused serious confusion in the State. In addition, the State statutes do not delegate authority, are permissive, and fail to reflect the urgency of the water quality problems. While defining policies with respect to man's future environment is a very complex, and

continuous responsibility, it should be the role of legislation to make a whole out of component parts. The New Jersey experience has been otherwise, with the whole becoming less the focus as fragmentation occurred. More than any other single theme, the failure to insure congruence of authority with responsibility is common to the body of statutes. This has led to a breakdown in any number of cases.

It is largely the lack of precision and updating in the statutes that has caused endless conflict and tumult, and has seen an agency created by the State—the Passaic Valley Sewerage Commission—become the State's greatest competition and sometime adversary. The PVSC statutes are not clear on many issues of the highest order: is the State empowered to seek relief from industries discharging pollutants into the sewer systems? is PVSC empowered to do so, or must it act through the municipalities who are the actual customers? is the State empowered to act against any polluters within PVSC's jurisdiction if PVSC is not performing its duties adequately? is PVSC empowered to compel the municipalities it services to repair their sewer systems or build separate sanitary and storm sewers? is PVSC empowered to enforce pretreatment ordinances against industries? These are not insignificant questions, since they focus on the daily operations of the largest sewerage system in the State. Yet, the original statutes are not clear, the laws have not been continually updated to meet contemporary needs, and the issues remained unresolved in the absence of clearly stated policies and goals.

Powers: The laws do not delegate powers—actions whereby a legislative confers upon administrative agencies and other bodies certain authority.

In the nineteenth century, the State's water pollution laws primarily enabled the local or municipal level of government to concentrate on health related issues. With time these enabling statutes were enlarged to permit local governments to construct sewers and move the potential health hazards away from the more populated areas. Also, in the early 1900s as towns began to spread out, it became apparent that different organizational arrangements—units with a broader geographical base—were required for coping with the sewerage issues. Although these needs gave rise to local and regional authorities and the granting of certain enforcement powers to the State Department of Health, the local units of government still maintained the key regulatory powers. Until the 1950-1960 period, pollution control was viewed primarily as a local responsibility.

Over the years as the issues have moved from health to pollution control and presently to water quality management, the body of laws in New Jersey did not evolve commensurately to reallocate functional responsibility. Seventy years of incremental legislation finds the State unable to formulate the necessary regional approaches to water pollution abatement. Moreover, the sewerage authorities created to deliver services were often stymied in efforts to regulate polluters since they were com-

pelled to act through the local units of government in most enforcement matters.

It is apparent that instead of incorporating both jurisdictional and functional considerations, the State's body of laws is aimed only at the agencies involved in water quality management, and with the exception of enforcement procedures, there is little emphasis on the functional areas. This lack of delegated power has resulted in over 600 private and public agencies, authorities and commissions in the State with varying degrees of involvement in the water and sewer area. But with all of these units of government, no planning responsibilities are designated and the concept regionalism is not defined.

New Jersey's statutes for municipal and county authorities are noteworthy in emphasizing the preeminence of the bondholder. While it is certainly justifiable to guarantee the bondholder's investment, it is doubtful that his status should be made the central focus of the statutes. The statutes pertaining to the DEP are largely regulatory and passive in nature. The absence of affirmative powers has hampered DEP's ability to address planning issues, the organizational arrangements for sewerage service provision throughout the State, and technical assistance to local units of government.

Structure: The laws do not represent a clear and precise basis for organization and responsibility—they should not foster duplication, lack of coordination, complacency, and the basis for noncompliance.

The unsuitability of the present governmental structure for the formulation and administration of water quality policy is a consequence of its *ad hoc* historical evolution and development in the statutes. At all governmental levels, functions have been added one at a time, in response to specific needs and opportunities. The laws have imposed new structures on the old often without altering the necessary power and commensurate responsibility.

The evidence of overlapping structures and authority is overwhelming, and often exacerbated, rather than clarified, by separate statutes which pertain to one jurisdiction. This has happened, when a municipally operated sewer district was abolished in favor of a municipal utilities authority, which in turn became first, part of a small regional authority and second, part of a county sewerage authority, and that county authority then had to deal with both an interstate or basin-wide agency and the State. In such circumstances, it is not difficult to imagine the conflicts that can emerge. When new statutes were proposed, they did not take cognizance of existing legislation. If they did, it would then have been possible and wise to have coordinated the new statutes and structures with the old to prevent conflicts, or the old laws could have been revised if they did conflict with the intent of the new.

The overlapping and fragmented structure has fostered a political response to the water quality problems, and has shifted the real decisions

from the Federal to the State to the local level and from the executive and legislature to the bureacracy. Also, the response has shifted to making decisions in arenas where there is less accountability and accessibility, and has avoided the necessary resolution of the conflicts in favor of piecemeal, fragmented decisions. Such tendencies have worked against the public interest in water quality control and in favor of the polluters.

Process: The laws do not indicate the rules of political action—specifying the ways in which decisions are to be made, and the steps that must be observed if governments' actions are to be legitimately binding.

In the necessity for interrelating policy and procedure, structure and strategy, criteria and standards, there are few areas of public policy in which this necessity is more compelling and exacting. The water statutes for all their complexity, tend to be simplistic in relation to the problems. The laws are especially deficient in specifying the ways in which decision are to be made, and the steps that must be observed if government's actions are to be legitimately binding. Even if DEP's mission is conceived and defined by broad environmental considerations, its application is likely to intrude into areas that have been assigned by law to other agencies or units of government.

There are many examples of local, county and State statutes, which indicate that the laws do not specify the rules of political action. Although statutes 58:10–17 through 58:10–21 mandate State factory permits, only some 900 industrial permits have been issued in the past twenty years in a State with over 10,000 industries producing wastes. Also, present statutes do not spell out the ways in which decisions are to be made and the responsibility of municipalities over the waters in their jurisdictions is not specified. Moreover, the present penalties, being too low do not serve as a deterrent or provide incentives to municipalities and industries to improve their water quality.

At the county level, case studies in Chapter V—"Finance and Funding"—are excellent examples of the weaknesses of statutes in specifying the ways in which decisions are to be made. Because the statutes were so broad that the county was empowered "to do any and all things necessary and proper to finance sewerage construction," there has been little to guide the county in the resolution of specific issues. Thus, in this case, such loose and permissive phraseology was largely responsible for a five-year delay on the size of a bond issue.

Functions: The laws do not establish administrative criteria and functionally related standards—they must serve as instruments of control, regulating political conflict, and directing inter-agency and inter-governmental relations.

Present State legislation—and Federal—is primarily based on a regulatory strategy, with a considerable State-Federal subsidy. This carrot-stick strategy, however, has not developed effective institutional

mechanisms, based upon statutes that indicate functions and operating procedures.

In addition to the need for developing legislation which incorporates criteria and standards, the State statutes can only be effective if they are conceived with an understanding of the technology and the system responsible for their eventual and desired attainment. Otherwise, as the present process indicates, the real issues are camouflaged in technical jargon, and the regulators are largely isolated from political accountability for their actions.

In the absence of established criteria and standards, State and local pollution control efforts have been severely limited in scope and coverage in two critical areas. First, State and local efforts have been aimed at primarily organic pollutants and not at the non-organic pollutants (plant nutrients, heavy metals, toxics, heat, etc.). Second, pollution control activities have been limited to point source discharges—factories and sewer pipes—and not the non-point discharges (soil erosion, siltation, pesticide run offs, etc.). This has occurred because policy and technology are not well developed and incorporated in the statutes, and because organic pollution is the most noticeable in its effects and is relatively easier to deal with.

The State's water and sewer laws governing the activities of municipalities and their utilities authorities are replete with procedural sections, and, conversely sections dealing with the substance of the function are absent. Although the statutes give the municipality or its instrumentality virtually unlimited authority and broad powers, these must often be ignored, because many local units are too small and ill-equipped to deal with water quality management.

The State's county sewerage laws are primarily concerned with the creation of agencies rather than with the type of service they were to provide. For example, enforcement is mentioned in the county statutes one time; planning is permitted but content is not considered; finance is discussed in general and permissive terms; operations and tenance is mentioned to see that O & M records are kept, and monitoring and surveillance are not mentioned. The statutes reflect neither the depth nor the breadth, neither the institutional response nor the functional requirements needed to manage water resources. These are the essential support functions upon which the success of regionalism and water quality management is wholly dependent, and they are not treated adequately in the statutes. Furthermore, these functional areas are the tasks which can be best performed by the county or area-wide agencies and the failure to tie the geo-political unit around which regionalism is normally formed to the work they might be best suited to perform is another reason why regionalism has not been a financial, administrative, or functional success in many instances.

New Federal Direction

These shortcomings of the statutes were not always noticeable in the past. Now that there is comprehensive Federal water pollution legislation that requires the State to operate a discharge permit program, design local institutional arrangements, and be substantially more active in planning, it is evident that New Jersey is simply not empowered to carry out these activities. *At all levels of government in New Jersey, the agencies responsible for performing water quality management activities lack the authority to do so.*

The State faces a takeover of many of its responsibilities by the Federal government and the loss of hundreds of millions of dollars in Federal aid if New Jersey does not move swiftly to comply with "The Federal Water Quality Act Amendments of 1972," by developing its own legislation.

In particular, the statutes must overcome:

- The basis for administrative breakdown.
- The jurisdictional conflicts.
- The inability to control unregulated discharges.
- The non-direction in planning.
- The proliferation of small single purpose authorities.
- The failure to mandate responsibilities.

For these reasons it is essential that a comprehensive water quality act be drawn up to adequately address problems affecting all activities and agencies in water quality management.

Administrative Structure

There has been a wide gap between intent and performance in water quality management. This is attributable in part to the absence of clear statutory direction and extends to courses of action, systems of personnel, and allocation of responsibility beyond the scope of legislation. The translation from legislative intent to performance in many respects falls to those who administer policy developed both in and from the law. The lines of authority within the function are established through the administration of statutes enacted and the policies which emanate from them and represents the total governmental response to perceived needs. In New Jersey the response has often been less than desirable due to the conflicts inherent to the structure created by legislation.

Upon enactment of legislation, one of four events generally occurs:

- New powers and responsibilities are assigned to existing units.
- New agencies, boards, commissions, etc., are created outside existing units.

- New units of local government are created through enabling legislation.
- Existing units are allowed to create new divisions within themselves.

The result has been fragmentation of units and the limitation of coordinated and efficient authority. Administrative needs cannot be fulfilled because of inadequate control or coordination, the absence of technical assistance system and of comprehensive and in-depth planning, and the existence of a financial assistance system which merely awards grants, instead of offering advice and expertise on fiscal and economic matters. At the same time and without sound rationale, units of government become more compartmentalized and an increasingly complex set of intergovernmental relationships evolve.

It becomes ever more apparent that the crisis is not resolved by creating new agencies to deal with problems which existing agencies have failed to handle, but by managing the existing agencies within a well-defined and well-planned system which addresses itself to functional determinants and jurisdictional needs. Axiomatic to such a system are three prerequisites:

- A balanced distribution of authority to meet objectives.
- Financial resources commensurate with responsibilities.
- Allocation of economic burdens based on a ratio of users to benefits-derived, wherever possible placing more correct monetary values on water resources.

Currently, these principles are not central to the operations of many existing agencies, and severely limits their ability to implement sound statutes, public policy, and programs designed to achieve stated goals.

The Pivotal Agencies—EPA and DEP

There has been insufficient vertical and horizontal communication on a systematic basis within the functional area of water quality management. Also lacking has been the incorporation of interdisciplinary planning into the larger concerns of economic development, land and water use, solid waste disposal, and air pollution. Policies have been poor and knowledge inadequately transferred in the courses of implementing action programs.

It is the role of the Federal EPA to set general trends within the nation, administer Federal laws and programs, and design the programs beyond their statutory basis. The administrative process in EPA is closely tied to facilities construction grants. By funding projects EPA has the potential to make an input to the local decision-making process. EPA's review of local plans (which follows State reviews) offers an excellent opportunity for the direction of local projects, as well.

However, there has been difficulty in implementing many of the Federal policies, due largely to ill-defined parameters from which DEP and local governments can work. On a policy level it is possible to cite regionalism, which was imposed upon lower levels of government, yet did not have a definition which could serve as a goal to those charged with its implementation. Similarly there is an intra- as well as inter-agency breakdown of communication on questions as important as equitable cost recovery systems, and at least on one occasion the regional office of EPA was not certain of Washington's policy. Another inconsistency is EPA's continuing involvement in local issues and their insistence on dealing with DEP rather than becoming directly involved with the applicant and DEP in a conference setting. At an operational level, EPA has changed its focus too often to provide consistent and continuing program direction. Thus the monitoring and surveillance and planning operations on the Raritan River were dropped prior to their completion with EPA's new emphasis on enforcement. It has fallen to the State DEP to salvage the Raritan River program and incorporate it into an eventual basin plan.

However, an emerging approach, sponsored and funded by EPA—the comprehensive basin planning—represents a sound basis for planning and also a solid administrative document in that it defines goals, outlines the steps necessary to achieve goals, gives firm guidelines for meeting legal and administrative requirements. The basin plan is aimed at making regionalism practicable by forcing water quality planners to examine all aspects of the function, from the numbers of dischargers to the assimilative capacity and environmental impact. But the tangible results of comprehensive basin planning are still in the future and until then, the record of Federal environmental agencies (EPA and its predecessors) must be judged erratic, at best.

For the State DEP the situation is somewhat different, for it must assume the most difficult role of taking explicit State legislation and the implicit policies it contains, and fitting it into a program which recognizes the Federal program on one hand and local needs and desires on the other, to guarantee a daily operating procedure for water quality management. Thus, the DEP is often the middle man, being criticized from both sides, instead of being a coordinator harmonizing Federal programs with local planning. Notwithstanding the State's difficult position, it has been remiss over the years in developing overall strategies. Rather, each water-related crisis generated new reactions and these only served to postpone the formulation of ongoing policies.

Formation of the Department of Environmental Protection in 1970 brought together the respective water resources units of the Departments of Health and Conservation and Economic Development. This move improved policy formulation and operational procedures. But a formal system of authority within the State is still lacking. Some of the more apparent manifestations of this deficiency are:

1. DEP continues to experience difficulties in communicating with other actors: the many authorities, units of local government, and other parties (industry) involved in water quality management and this promotes uncertainties as to authority and jurisdiction.
2. There is relatively little flow of information from DEP to service-delivery units, and there is equally little which flows in the other direction.
3. Budgetary data goes to the Division of Local Government Services in the Department of Community Affairs and is not transferred to DEP. DEP does not require authorities to report fiscal matters, and that which is exacted by Local Finance does not meet DEP's needs. This situation exists across all of the functional areas.
4. When the Department of Health was responsible for the regulation of sewerage, it was largely a public health concern which was adequately performed. The evolution to environmental protection, which implies control and management of waste water and water quality, has been slow and tedious. Although general goals are stated, they are yet to be defined, and refined into operating programs. Without basic guidelines and a standard operating procedure to serve as a benchmark, it is difficult to know what changes are needed and when.
5. There is a lack of precedent-setting documents and actions to provide a departmental overview, and policy is thus often made off-the-cuff and is not recorded to serve as a reference for future cases.
6. EPA grants are used to foster innovation and to encourage DEP to initiate new concepts and techniques, but all too often there is an overriding feeling in DEP that nothing can be done until there is "more manpower and money." While it is not disputed that these are essential elements to a successful program, they alone will have little effect if they are not utilized more resourcefully in a well-planned, adequately defined and flexible system.
7. Administration has not been recognized as yet as a structure employing the latest management techniques and strategies to achieve stated policies.
8. An inflexible set of Civil Service Regulations which inhibit the development of positions in new and unfamiliar programs.

There is nothing that exemplifies the lack of administrative strategy as regionalism. DEP has utilized regionalism as a basic policy, but has failed to define it or show how it can be implemented. It is a rule that is general and vague, and applied in a random fashion. Specific areas

become "regions" by fitting them to a description of regionalism, although in reality they may only faintly resemble regions. It is at this point that DEP has not played its role of allocating responsibility where there is authority, to see that these two ingredients are compatible in order that the issues of jurisdiction, resources and responsibilities, and equitable economic burden can be resolved.

The role of DEP is the most important of any agency involved in water quality management in New Jersey. However, its system of personnel does not represent an effective and efficient administrative process. The employees of DEP are dedicated and hard working with the best intentions, but have been organized only recently in a manner which best utilizes their talents. In addition, there are still certain talents which are lacking because of their specialized nature, such as planners, economists, financial advisers, and governmental specialists. DEP's administrative system should be a flexible, comprehensive and effective water management instrument. Unfortunately, it does not yet possess these attributes, due largely to past organizational failures. The Commission staff has worked with DEP personnel to bring about more effective internal organization. The need to allocate responsibilities along functional rather than geographic lines was acknowledged and implemented but certain administrative policies, mostly beyond the control of DEP, must be instituted, changed or relaxed before such reorganization can be effective. These include the restrictions placed on the Bureau of Water Pollution Control to the effect that engineers can only be hired at entry level positions. More positions are desperately needed and salaries should be more competitive with those in the private sector. Furthermore, salary levels at DEP are not even competitive with those of the EPA, the DRBC, or New York State. The following charts reflect the Bureau's limited budget and the fact that states with one-half of New Jersey's population spend greater amounts on water pollution control. Such a limited perspective results often in ad hoc decision making, over-reliance on consultants, lack of expertise, and "tunnel vision" that does not relate water pollution control to water resources management, and in turn environmental management within a greater natural, human and institutional resource system.

In summary, the function of water quality management in New Jersey is wholly dependent upon DEP and its ability to execute efficiently and effectively the delivery of essential services. It is the role of DEP to deal with issues outside the operational scope and capabilities of local service delivery units and beyond the jurisdiction of EPA. Therefore, the need for DEP to coordinate agencies, provide leadership, and nurture the inter-level relationships necessary to the delivery of the function is obvious, the dependence upon its system of personnel pivotal.

An issue related to manpower is the role of local health officers in extending the capabilities of DEP. Formerly the State agency—the Division of Clean Water and Air and its predecessor the Division of Environ-

TABLE VII-1

COMPARISON OF NEW JERSEY WATER QUALITY EXPENDITURES WITH OTHER STATES*
FISCAL YEAR 1970

States	*Federal Construction*	*State Authorization*	*Total*	*$ / per Capita*	*1970 Pop.*
New Jersey	$311,900	$726,204	$1,038,104	.145	7,168,164
Michigan	359,800	992,200	1,350,000	.152	8,875,083
California	661,000	2,801,270	3,462,370	.174	19,953,134
Texas	427,000	1,771,339	2,198,339	.197	11,196,730
Pennsylvania	488,300	2,085,978	2,574,278	.218	11,793,909
Illinois	428,000	2,327,340	2,755,340	.248	11,113,976
Virginia	210,500	1,065,740	1,276,240	.274	4,648,494
New York	650,400	4,564,632	5,213,032	.287	18,190,740
Washington	131,037	1,025,803	1,156,840	.339	3,409,169
Wisconsin	193,000	1,402,000	1,595,000	.361	4,417,933
Maryland	181,300	1,369,830	1,551,130	.395	3,922,399
National Total	$9,392,406	$32,051,045	$41,443,451	.200	206,024,830

* Source: Federal EPA—Records.

mental Quality was located in the Department of Health and local health officers looked to the DOH for guidance, statutory authority, and financial support in performing water pollution abatement tasks.

The focus of these individuals is still largely in environmental matters, but channels of communications, some legal authority, and State aid are still vested in the Department of Health. A clearer definition of the role of the local health officer and of the administrative, statutory and fiscal basis for his activities is essential. Similarly the utility of data generated by local health officials as well as some of the bureaucratic requirements need to be reevaluated, as some of these documents are undoubtedly of little current value. The Commission has undertaken to do this part of its study of local health services.

The Administrative Process at the Local Level

The administrative process is still weaker at the local level, where authorities and governmental units have proliferated to a degree where they are neither responsive nor accountable and have few incentives to

improve. Multiplicity and fragmentation characterize New Jersey's government in general and the two hundred plus sewerage authorities, better than four-fifth's of these intra-municipal, are among the major contributors to this syndrome. There are several causes for this practice: New Jersey's rapid urbanization which require various financing devices, the unhealthy reliance on local government to finance a great proportion of total governmental expenditures, and prerequisites of State and Federal aid programs which require multi-municipal approaches, making the use of general government (joint meetings) unwieldy, among others. Authorities are thus virtually inevitable, for Federal and State aid cannot be viewed lightly, and the local governments cannot be expected to finance everything from the local property tax, and especially not those functions, such as sewerage, which are so much in the State's interest. There appears to be no viable alternatives to inter-municipal sewerage authorities in New Jersey because they represent an acceptable and politically feasible institutional form.

The use of the authority structure to provide sewerage services has become so common in New Jersey that it is currently viewed as the one viable way to finance these costly, complex, capital construction projects. There are a number of reasons for this view including the supposition that authorities are above politics, operate more efficiently, that municipalities are incapable of financing expensive facilities within their debt limitations, and that greater equity is achieved through user charges. State and local officials look favorably upon authorities and appear to use them without carefully weighing their effect upon a systematic, coordinated governmental process. In addition, current environmental concerns have provided a boost to the authority structure which will further insure their continued proliferation.

Municipal officials consider the authority a convenient vehicle for capital finance, whether intra-municipal or inter-municipal in nature. General literature and statements made in the course of Commission interviews suggest that many municipalities initiated authorities to get around municipal debt limitations, but findings of the New Jersey Tax Policy Committee suggest otherwise, as can be seen in Table VII-2.

It appears that authorities are not created because of financial pressure, but because of financial expedience. If this trend is to continue, controls must be sought to insure that authorities are large enough to provide necessary services at reasonable unit costs, and that means authorities will be regional (multi-municipal) in scope, terminating the extensive reliance on intra-municipal sewerage authorities.

Moreover, authorities are not created because of any special capabilities in terms of the function they perform, and nowhere is this more apparent than with sewerage authorities. The Commission's research indicates that little of the planning activities carried out by the authorities is tied to the actions of other related agencies. Because aid programs are limited, competition arises and cases exist where sections of municipalities

TABLE VII-2

DEBT POSITION OF COUNTIES AND MUNICIPALITIES, 1970*

Net debt percentage of debt limit	*Number of governments (municipal and county)*
0	92
0 – 49.9	355
50 – 99.9	79
100 – 199.9	44
200 – 200.0	10
300 – 349.9	6
Not reported	2

* Source: N. J. Tax Policy Committee, Vol. IV, 1972.

broke out of their agreements to form small authorities to serve only small sectors of municipalities. In other areas the planning money offered by the State induces municipalities to form an authority and in so doing locks the sewerage services to the authority for about 40 years, without establishing whether or not the authorities had the capabilities to provide adequate services and how emerging needs related to the service they provide are to be accommodated.

Even during the planning phase which usually precedes their formation, the number of authorities tends to proliferate, as demonstrated in one rural county where 5 sewerage authorities and 6 water authorities were proposed in county-approved studies. No one of the authorities will be able to hire an adequate staff, provide monitoring and surveillance, or enforcement. If all sewerage authorities had been grouped into one centralized authority, however, capable personnel could be supported by the combined economic base (the same is true for the water). In another county two relatively undeveloped municipalities with a combined population of 25,940 and land area of 86.70 square miles are served by a collection authority, a transmission authority, and a treatment authority. Two other counties have 15 "regional" authorities each, while two others are planning only one regional authority for the entire county in an effort to end small, inefficient, and ineffective units of government. The large regional or inter-municipal sewerage authority will not, on its own, put an end to the increasing number of intra-municipal authorities.

All of this reflects the fact that the needed controls are not at hand, especially after the construction phase is completed. It is true that bondholders are well protected and that the Division of Local Government Services has the power to require audits (although this is not done com-

prehensively), but there are no statutes or regulations that go along with Federal and State aid which require sewerage authorities to perform support functions such as monitoring and surveillance, enforcement, planning, operations and maintenance, and data collection. Moreover, regulation is so lax that there is not even a complete list of authorities available, some authorities do not report either to DEP or to the Division of Local Finance, and the names of authority members are not available even in the incomplete listings. Further example is the recent consideration by the Legislature of a bill to require the Passaic Valley Sewerage Commissioners (all of whom are appointed by the Governor) to submit their minutes to the Governor.

Without controls it is impossible to force authorities to plan with municipal, county, and State planning agencies. The absence of integration and coordination which was observed in all twenty-one counties, has thus resulted in a hindrance to orderely development and wanton sewering of headwater areas, flood plains, and wetlands which in turn precipitated development where it should not occur. Sewers are meant to protect the environment from the adverse impact of polluted waters. It seems a contradiction that millions of dollars are being expended without stringent controls and that the net result is often environmental degradation and uncontrolled growth patterns.

By definition, horizontal and vertical decision-making is fragmented, and it is further exacerbated when expertise is lacking, when authority decisions are made independent of the general government, or when there is no administrative accountability. Public interest and participation are further lessened by the failure of authorities to balance representation of the various constituencies and the fact that the proliferation of authorities undermines the citizen's ability to focus on the activities of government in general. In many respects, authorities reflect the weaknesses of county and municipal governments by showing that those governmental units cannot provide the services and cannot control the units they themselves created to provide the services.

The most disturbing point is that most of these deficiencies are significant, and cumulatively viewed, they represent a near breakdown of the systematic provision of sorely needed services and a short circuit in New Jersey's governmental structure. The problems are serious, but they can be resolved by combined Legislative and Executive actions resulting in the imposition of controls.

Conclusions

The State's water and sewer statutes, in summary, contain much vague enabling legislation (especially in areas relating to jurisdictional configurations) which in turn fosters overlap and conflict. There is too little legislation which pertains directly to the fulfillment of functional activities; authority appears everywhere in the laws, responsibility almost nowhere.

The water and sewer statutes must be totally revised to reflect a systems approach to the management of water quality, with scientific research being the basis for determining functional and jurisdictional needs and how they fit into a total resources system. Legislation should develop policy goals, the means of their attainment, and dates for their achievement. DEP's performance against these targets should be monitored, at least annually, through an audit made public and detailed reports to the Legislature.

DEP must assume the role of allocating responsibility for the carrying out of the functional tasks. The local authorities, consultants, health officials, planning boards, county agencies, water purveyors, interstate agencies, and other State agencies all have important roles to play in the efficient and effective management of water quality.

The private sector of society must be incorporated into the decision-making process to insure that industry, which must bear dollar costs, and public interest groups, who must bear aesthetic and environmental costs, are well represented. An open educational forum could make obvious that public and private attitudes are not at odds and a common attack on a common problem can be achieved.

Recommendations

The Commission recommends the early development of comprehensive legislation which will feature an integrated water quality management approach. A primary purpose of this Act would be the realignment of the respective roles of local and regional governments and authorities and State water-related agencies.

1. More specifically such legislation should:
   a. pull together and update, where necessary the relevant existing statutes;
   b. spell out current legislative priorities and formulate fiscal policies and eligibility criteria for their implementation;
   c. establish administrative criteria to guide interagency relations;
   d. provide a flexible basis for meeting Federal requirements;
   e. implement the environmental data bank cited previously;
   f. establish a reporting system whereby authorities would send all financial data to the Department of Community Affairs and financial data and functional plans to the Department of Environmental Protection on a regular basis under uniform format. In addition, functional plans would be transmitted to local and county planning boards as well;
   g. permit the establishment of authorities which are multi-functional;

h. empower the Department of Environmental Protection to determine the appropriate service areas for all newly-formed authorities. Moreover, insure that such service areas and their economic base are directly related to the scope of area-wide functional problems. County authorities should be encouraged where appropriate. The statutes R. S. 58:12–3 and R. S. 58:12–4 should be amended to give the DEP the power to delineate both service and management areas for the provision of sewerage services.

   — The DEP would be required to develop the criteria for such delineation and those criteria should include, but not be limited to, environmental, economic, engineering, and institutional considerations.

   — In cases where local units of government failed to demonstrate a willingness to address their sewerage responsibilities or include neighboring municipalities who were logical participants based on the aforementioned criteria, the DEP would be empowered to name the participants of a regional proposal.

2. Within the context of this legislation municipal governments should be empowered to establish area-wide sewerage collection districts (rather than intramunicipal authorities) having the capacity to issue either general obligation bonds or revenue bonds or both.

3. DEP should develop a public educator and information program, featuring regular forums for exchange of views on environmental issues.

TOWARD THE BETTER MANAGEMENT OF WATER QUALITY

Pollution is one of the critical problems facing New Jersey in the 1970's. By far the most serious pollution problem in the State and the entire country is water pollution, and it is also the most difficult to correct. *Well over $1 billion has been spent over the past decade in New Jersey to control water pollution yet it has continually worsened* to the point where contact with water sometimes represents a health hazard, beaches are closed to bathers, and shellfishing is forbidden. The basic quality of life is threatened when pollution is so serious and widespread. Considering the vast sums of money spent to combat water pollution throughout the country and especially within New Jersey, it is the Commission's view that the efforts have not been sufficiently effective to date.

At least $3 billion more will be spent for water pollution control in the State over the next decade and it is essential that this expenditure produces the desired water quality goals. Institutional inadequacies at the Federal, State, and local levels of government have led to a general breakdown in the provision of sewerage services throughout New Jersey, as well as the possibility of bans on further development across the State. As detailed in every chapter, *the Commission has recognized inadequacies in resources, the institutional framework, and the rationale behind water quality management in New Jersey. Clearly, the development of an institutional framework for the systematic and comprehensive management of water quality in New Jersey. The Commission recognizes the potential for success and the deep commitment of those who carry out pollution control programs, especially in the Department of Environmental Protection.* The Commission does not believe that existing institutions must be abolished or new ones necessarily created. The evolution of management responsibility makes it impossible and undesirable to do away with the agencies now carrying out water quality programs. Rather, the Commission sees the Department of Environmental Protection playing the crucial role of coordinating the many agencies into a cohesive water quality management network.

Achievement of the Goals

To achieve water quality goals throughout the State will necessitate costly and drastic alterations in present resource allocations and organizational arrangements. Throughout the previous seven chapters there have been numerous specific recommendations made concerning the distinct elements of water quality management. However, even if each element was performed adequately, that would not be enough to assure effectiveness for the program as a whole. Therefore, each element must

mesh with the other elements to create an integrated water quality management program.

The implementation of the Commission's recommendations then are a major step toward the unification of operational activities, administrative, fiscal, and planning tasks, and the development of legislative and administrative strategies.

It is essential that the integration of the three levels of issues described in this report—operational, management, and policy making—occurs at the same time. As internal reorganizations take place in water quality management agencies an assessment of the role of water quality management in relation to housing or land use must occur as well. In turn, this will lead to a more effective and efficient process for realizing the long-term goals of State, Federal, and local agencies. This may mean a more formalized structure for intergovernmental and public-private communication than we have at present. The charts on pages 102-103 reflect schematically the basis for such a structure.

The Next Step: Legislation

The Federal Water Pollution Control Act Amendments of 1972 are the new umbrella for water quality management. As mentioned previously, the New Jersey water statutes do not comprehensively empower the DEP to carry out many of the activities for which it will be responsible. One option, and a real one, is to allow the Federal government to assume the State's responsibilities. This, however, will limit the State's control over its own destiny. Therefore, with the full support and cooperation of the Department of Environmental Protection, the Commission will immediately begin drafting a comprehensive water quality management act for New Jersey. With proper statutory powers and the parallel adoption of administrative policies, New Jersey will have the basis for a sound water quality management program in the near future.

Institutional Framework for Water Quality Management in New Jersey

	Construction, Operation and Maintenance	Monitoring & Surveillance	Enforcement
Federal (EPA)	—Approve Construction Plans —Review O & M Programs —Support Research Capabilities	—Develop Demonstration Programs —Approve Water Quality Standards —Supervise interstate oil spills —Provide software for M & S reporting system —Technical direction including uniform lab standards & methods	—Approve Permit System —Conduct Enforcement Conferences —Coordinate Activities with State Program
State (DEP) (DCA)	—Serve as Federal agent for Construction —Issue Permits, Guidelines, Rules and Regulations —Develop Technical Assistance Programs —Administer O & M Aid —Supervise Construction	—Coordinate Multi-Agency Network System —Formulate Uniform Reporting System —Repository for M & S Data —Ensure Water Quality Standards	—Institute Permit System —Maintain Criteria for Interim Solutions —Issue Annual Reports —Develop Inter-Agency Approach
Inter-State (DRBC) (ISC)	—Review Plans —Manage technical assistance programs in jurisdiction as state agent —Operate training laboratories	—Manage M & S in jurisdiction as State agent —Operate Water Quality Labs —Vertify Water Quality Standards	—Institute Enforcement Actions —Maintain Technical Assistance —Supervise jurisdiction as State agent
Regional —County (Auth)	—Supervise O & M as agent of the State —Develop Educational Programs for Training —Certify Construction	—Operate Sampling Stations —Monitor Waterways —Manage M & S operations	—Operate Permit System —Report to State DEP —Coordinate Agencies
Local (Auth)	—Issue Performance Bonds —Conduct Daily Operations —Maintain adequate staff	—Catalogue Dischargers —Conduct Daily Testing —Maintain Effluent Data —Analyze infiltration —Supervise Collection Systems	—Protect all waters within jurisdiction —Inter-face with Health Dept. —Supervise connections
Public	—Develop Oversight Capabilities —Pursue public forums	—Report all irregularities —Conduct portable testing	—Inform State DEP —Implement "right to sue"

Institutional Framework for Water Quality Management in New Jersey

	Planning	Finance and Funding	Legislative & Administrative
Federal (EPA)	—Support Comprehensive Basin Planning —Approve State Program —Review Basin, Areawide & Facilities Planning	—Maintain Major Funding —Approve cost recovery systems —Allocate resources to sludge management	—Implement Legislation —Oversee Water Quality Programs
State (DEP) (DCA)	—Formulate Water Resources Planning —Develop Institutional Management Planning —Manage land use planning —Approve areawide and facilities planning —Maintain Information System	—Review costs, bonds and debt management —Monitor grant & loan monies —Institute O & M Program —Institute Cost Recovery System	—Establish administrative criteria to guide inter-agency relations —Draft State legislation —Enunciate priorities, formulate policies, and implement criteria.
Inter-State (DRBC) (ISC)	—Review Concepts & Approaches —Process Information as State Agent —Approve regional plans	—Review priority system —Aid State in determining priority projects.	—Develop Management Capabilities —Ensure inter-state cooperation —Review service areas
Regional —County (Auth)	—Coordinate Planning Process —Manage Treatment—Transmission Collection Planning —Analyze Environmental Impact Proposals —Supervise Planning Information	—Manage cost recovery system —Provide a flexible basis for meeting Federal-State requirements	—Develop intra and inter-agency communication systems —Employ management techniques
Local (Auth)	—Ensure local representation —Supervise facilities planning —Inter-relate with all local levels —Maintain Information System	—Institute cost recovery procedures —Develop equitable charges —Maintain financial data	—Maintain administrative competence —Develop adequate Personnel System —Ensure accountability
Public	—Participate in Area Wide & Facilities Planning —Review Planning Proposals	—Support sound WQ programs —Demand accountability	—Demand efficiency and effectiveness —Foster legislative review