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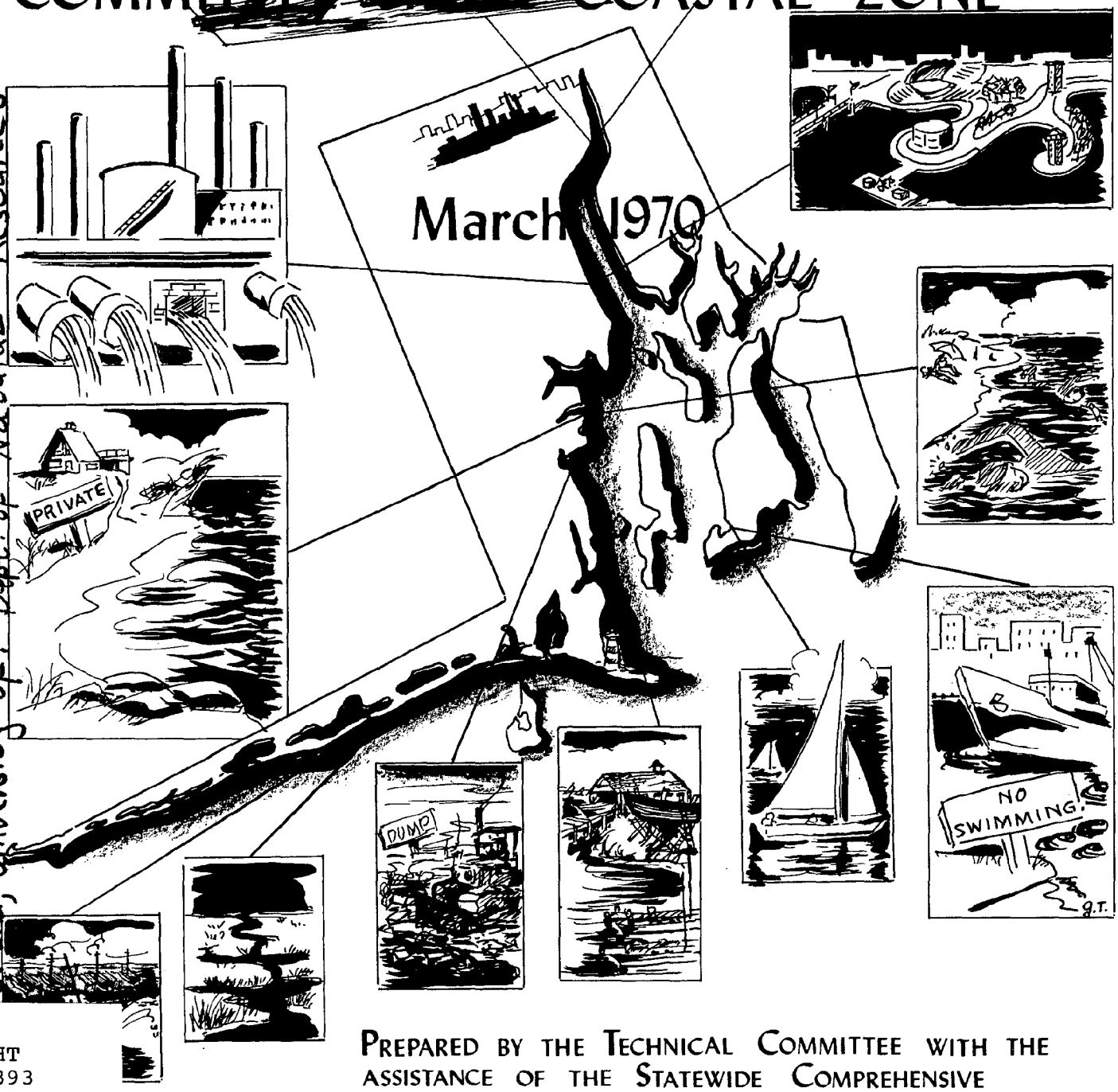
State of Rhode Island

REPORT of the GOVERNOR COMMITTEE for the COASTAL ZONE



March 1970

Island, University of, Dept. of Natural Resources.

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PREPARED BY THE TECHNICAL COMMITTEE WITH THE ASSISTANCE OF THE STATEWIDE COMPREHENSIVE TRANSPORTATION AND LAND USE PLANNING PROGRAM, THE DEPARTMENT OF NATURAL RESOURCES, AND THE UNIVERSITY OF RHODE ISLAND

NEITHER OUT FAR NOR IN DEEP

The people along the sand
All turn and look one way.
They turn their back on the land.
They look at the sea all day.

As long as it takes to pass
A ship keeps raising its hull;
The wetter ground like glass
Reflects a standing gull.

The land may vary more;
But wherever the truth may be --
The water comes ashore,
And the people look at the sea.

They cannot look out far.
They cannot look in deep.
But when was that ever a bar
To any watch they keep?

Robert Frost

Preparation of this report was assisted through a comprehensive planning grant from the U.S. Department of Housing and Urban Development and through highway planning and research funds from the U.S. Department of Transportation.

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REPORT of the GOVERNOR'S COMMITTEE on the COASTAL ZONE

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State of Rhode Island
and Providence Plantations

REPORT OF THE GOVERNOR'S COMMITTEE ON THE COASTAL ZONE

November 30, 1970

The report presented herein was prepared by a Technical Committee appointed by Governor Frank Licht on April 7, 1969. The committee completed its assignment and presented this report to the Governor one year later, on March 31, 1970.

Legislation based on the recommendations presented in Part Five of this report was subsequently drafted and introduced into the General Assembly, January Session, 1970, as House Bill 1698. The House and Senate Committees on Finance held a joint public hearing on this proposed legislation on April 23, 1970. The bill attracted substantial support from commercial, sportsmens, conservation, and other organizations and private citizens who are concerned with the ways in which Rhode Island's coastal lands and waters are used or misused. Significant opposition was voiced to provisions of the legislation which would authorize the state, acting through a coastal zone council, to require that development or use of water or land areas within the coastal zone conform to plans and implementing regulations enacted by the General Assembly and permit the coastal zone council to acquire land or water areas.

The resulting conflict between broad-scale resources management and the established prerogatives of local government to regulate the development and use of land forestalled action on the proposed legislation before the adjournment of the January, 1970 Session on May 1, 1970. The Governor then directed the Technical Committee to continue its work toward an acceptable, effective, and equitable mechanism to insure the proper and orderly development and management of the coastal zone.

In the subsequent six months, several events have occurred which have focused attention on the need to bring the broadest possible spectrum of the public interest to bear on major decisions which must be made by local governments, but which have a direct and obvious impact on the state's total coastal environment. The most important of these decisions will be made in response to proposals to construct two industrial plants, at a total cost of

$72 million, on the shores of Narragansett Bay. The first would refine about 65,000 barrels of petroleum products per day. The second would store liquified natural gas. Other proposals discussed involve filling or dredging coastal marshlands and construction of an electrical power generating plant. Each of these proposals make it apparent that efforts to improve the state's economy, and to protect and restore its environment, will come into conflict most frequently and most dramatically in the coastal zone. They also make it apparent that neither the state nor its communities have adequate institutional mechanisms to resolve these conflicts in favor of proper management and use of what is frequently referred to as our greatest natural resource.

In November, 1970, Governor Licht strengthened the Technical Committee's efforts to meet this need by expanding the committee's membership. The additional members represent the coastal cities and towns, the General Assembly, and twelve public and private agencies. Two regional and four federal agencies and the University of Rhode Island's Marine Advisory Service were asked to appoint representatives to serve in an advisory capacity. This much-enlarged committee is charged with considering this report and the legislation based on it, to consider the advice of all parties concerned, and to recommend new legislation for consideration by the General Assembly in 1971. The committee provides a means to bring a wide variety of knowledge and experience to bear on this problem, and an opportunity to develop the degree of community interest and support which any meaningful coastal zone resources management program must have if it is to be both effective and acceptable.

The Statewide Planning Program, the Department of Natural Resources, and the University of Rhode Island continue to provide the technical support which the committee must have to carry out its responsibilities successfully. This assistance is supported financially by the New England Regional Commission. This report has been reprinted as part of this technical assistance, in order to make more readily available the information which it contains on Rhode Island's coastal zone, governmental agencies which exercise jurisdiction over the area, the activities which take place in the coastal zone and the problems and conflicts which result, the need for a mechanism to resolve these problems and conflicts, and the committee's initial findings and recommendations. These data are the result of tax-supported research and as such are not copyrightable. They may be fully reprinted with the customary crediting of the source.

ABSTRACT

TITLE: Report of the Governor's Technical Committee on the Coastal Zone

SUBJECT: Resource Planning

DATE: March, 1970

AGENCY: Rhode Island Department of Natural Resources; Rhode Island Statewide Comprehensive Transportation and Land Use Planning Program; University of Rhode Island

SOURCE OF COPIES: Rhode Island Statewide Comprehensive Transportation and Land Use Planning Program, State House, Providence, Rhode Island 02903

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PROJECT: R.I. P-51

SERIES NO.: Special Report

NUMBER OF PAGES: viii + 119 + Appendix (17 pages unnumbered)

ABSTRACT: This report was prepared for the Governor's Technical Committee on Narragansett Bay and the Coastal Zone, in response to a charge to draft future management policies for the state's coastal area.

This study provides for one aspect of the state's objective to establish overall development policies and programs for the environment.

The report consists of five sections and an appendix. Part One provides an introductory description of the coastal zone and its role in the state. Part Two inventories governmental involvement in the coastal zone. The various land and water activities and related problems and conflicts are discussed in Part Three. The need for a management mechanism is reviewed in Part Four, and final recommendations are presented in Part Five. The Committee proposes the creation of a Coastal Zone Council to guide development and use of the state's coastal region. The powers, duties and jurisdiction of the Coastal Zone Council are presented and legislation is proposed. The appendix includes material prepared by the staff as a basis for the final report.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
GOVERNOR'S TECHNICAL COMMITTEE ON NARRAGANSETT BAY AND THE COASTAL ZONE
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83 PARK STREET, PROVIDENCE 02903

CALVIN B. DUNWOODY, CHAIRMAN
WALTER SHEA, VICE-CHAIRMAN
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STAFF:
SIDNEY FELD, CO-ORDINATOR
SUSAN P. MORRISON
ROGER TIPPY
DANIEL WILKES
ALBERT A. ZURLINDEN

March 31, 1970

The Honorable Frank Licht
Governor of the State of Rhode Island
State House
Providence, Rhode Island

Dear Governor Licht:

Your Technical Committee on Narragansett Bay and the Coastal Zone herein submits its Coastal Zone Report.

We believe the recommendations offer a reasonable and realistic response to your charge to the Committee "to provide the people of Rhode Island with a mechanism which will insure that their interests in Narragansett Bay and Coastal Waters are realized."

The Committee and Staff found the task most challenging, and appreciate the opportunity of having worked on a subject of such importance to Rhode Island's future.

Respectfully yours,

Calvin B. Dunwoody (Chairman)

Walter Shea (Vice-Chairman)

Daniel W. Varin (Secretary)

Daniel O. Cargill

Ernest Friday

Nelson Marshall

Henry Monroe

John C. Murray

Jack Thompson

SUMMARY OF RECOMMENDATIONS

The Technical Committee recommends:

1. That the state of Rhode Island make a declaration regarding the importance of its coastal zone and the intention of the state to provide for the proper planning and management of this resource.

2. That the management mechanism be a Coastal Zone Council created by the General Assembly.

3. That the University of Rhode Island be designated as the state's Coastal Zone Laboratory, with primary research responsibility.

4. That the Coastal Zone Council immediately begin to prepare a comprehensive plan for the coastal zone.

5. That the Council identify and if necessary initiate the actions needed to clarify the state's legal jurisdiction in the coastal zone.

6. That the Council review statutes relating to the coastal zone and recommend necessary changes.

7. That the Council review existing programs and projects relating to the coastal zone and make recommendations concerning their future direction.

8. That the Council develop and maintain an inventory of coastal zone resources.

9. That the General Assembly amend Section 42-1-1 of the General Laws of 1956, as amended, regarding the state's seaward boundary, so as to extend the state's jurisdiction to the maximum extent possible under existing statutes, treaties, and conventions.

The responsibilities of the Coastal Zone Council should include (1) formulating a comprehensive plan, (2) implementing the plan, (3) making related studies and investigations, and (4) coordinating all coastal zone activity for the state. It should accordingly have the authority to secure assistance from the University of Rhode Island and from state agencies; to hold public hearings; to subpoena witnesses and records; to make recommendations and regulations for the use of coastal zone water, land, and related air space; to review and reject proposed developments or uses when these conflict with the coastal zone plan; to set fees and regulations for use or lease

of state-owned coastal zone areas; to acquire title to and interests or rights in land and water areas; to establish pierhead and bulkhead lines; to develop and operate facilities or vessels; to advise the Governor, Legislature, and citizens of its findings; to recommend legislation; to coordinate efforts of government agencies and private groups to carry out coastal zone activities; to represent the state in coastal zone affairs; and to inventory available funds and programs and advise appropriate agencies and groups of them.

The proposed coastal zone organization should consist of an eleven-member Council comprised of appointed and ex-officio members, with provision for advisory members and groups. It should have a staff headed by an Executive Director and assigned to the Department of Natural Resources for administrative purposes.

Two geographic areas of concern to the Coastal Zone Council should be defined by law: its planning area (the immediate coastal zone drainage basin) and its area for regulation or control.

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INTRODUCTION

On March 19, 1969, Governor Licht appointed a Technical Committee as "the first step toward drafting future management policies for Narragansett Bay." This step was taken in response to growing recognition that Rhode Island does not have adequate mechanisms for formulating or implementing policies designed to protect and develop one of the state's most important natural resources, Narragansett Bay, the coastal waters, and the adjacent land areas. The members of the Technical Committee are:

Calvin B. Dunwoody, Chief, Division of Planning and Development, R.I. Department of Natural Resources, Chairman

Walter Shea, Assistant Director, R.I. Department of Health, Vice Chairman

Daniel O. Cargill, Chief Engineer (Retired), R.I. Department of Public Works

Ernest Friday, Planning and Program Coordinator, R.I. Department of Community Affairs

Nelson Marshall, Professor, Graduate School of Oceanography, University of Rhode Island

Henry Munroe, Assistant General Manager, R.I. Water Resources Board

John C. Murray, Budget Officer, R.I. Department of Administration

Jack M. Thompson, Federal Coordinator, Governor's Office

Daniel W. Varin, Chief, R.I. Statewide Planning Program, Secretary

The need for management policies for Rhode Island's coastal zone, and the hazardous consequences of the absence of these policies and the means to implement them, were forcefully pointed out in a report to the Governor by the Natural Resources Group, an organization of private, interested citizens. Their report states that:

> Narragansett Bay is Rhode Island's greatest natural resource substantially supporting industrial, commercial, military, recreational and domestic activities; yet there exists no satisfactory means of guiding or directing its use and development for the best over-all interests of the state and

its people.[1]

This need has also been recognized nationally in the work of the Commission on Marine Science, Engineering and Resources. The Commission states that:

> The key to more effective use of our coastland is the introduction of a management system permitting conscious and imformed choices among development alternatives, providing for proper planning, and encouraging recognition of the long-term importance of maintaining the quality of this productive region in order to ensure both its enjoyment and the sound utilization of its resources. The benefits and the problems of achieving rational management are apparent. The present Federal, State, and local machinery is inadequate. Something must be done.[2]

The Commission proposes that the states play the key role in meeting this need:

> . . . the States must be the focus for responsibility and action in the coastal zone. The State is the central link joining the many participants, but in most cases, the States now lack adequate machinery for that task. An agency of the State is needed with sufficient planning and regulatory authority to manage coastal areas effectively and to resolve problems of competing uses.[3]

Governor Licht's charge to the Technical Committee and the reports of the Natural Resources Group and the Commission on Marine Science, Engineering, and Resources clearly establish the Committee's primary concern as the effective management of the great natural resource which Rhode Island's coastal waters and lands represent. This report presents the Technical Committee's response to this charge, in the form of recommendations for creation of a mechanism within state government which can formulate policies for the coastal zone, prepare plans based on these policies, and coordinate public and private actions toward the achievement of the objectives set by these plans.

---

1 Natural Resources Group, Report on Administration of Narragansett Bay, January 1, 1969, p.1.

2 The Commission on Marine Science, Engineering and Resources, Our Nation and the Sea (Washington, D.C.: U.S. Government Printing Office, 1969) p. 49.

3 Ibid., p. 56.

There are two basic approaches or orientations which the Committee could follow in carrying out its charge. The first approach would emphasize the administrative aspects of the problem: formulating a mechanism or an organization which can manage this resource and coordinate research, development, and conservation activities. The second approach would focus on the technical aspects of the problem: study of the activities which affect this natural resource, identification of its problems, formulation and analysis of alternative solutions, and proposal of implementation programs.

These two approaches are not mutually exclusive. Following either one requires that at least the central issues of the other be considered. The Technical Committee has selected the first approach as the one which is best suited to its primary objective: insuring that the state has the ability to guide the development and use of coastal lands and waters, and to work effectively with the many federal, regional, state, local, and private interests which are concerned with the preservation, utilization, and regulation of the coastal zone. This approach is also the one most appropriate to the Committee's staff and financial resources, and to the limited time which it had to prepare recommendations.

The Technical Committee has undertaken six major activities in carrying out its assignment:

1) The Committee has held regular meetings to explore coastal zone problems and possible solutions. Meetings were scheduled twice a month beginning in April, 1969. In 1970, meetings have been held weekly.

2) Initial contact with those interested in the coastal zone was made through a questionnaire. Approximately 70 agencies, groups, and individuals involved in commercial, industrial, recreation, tourism, education, research, regulatory, and enforcement activities were contacted. The questionnaire was designed to obtain information on the users of the coastal zone, the kinds of activities they conduct, the conflicts which they encounter with other activities, their plans for future activities or expansion of current operations, and their viewpoints on the problems and potentials of the area.

3) Using the basic information obtained through the questionnaire, the Committee held a series of eleven meetings to develop further data on the activities now going on in the coastal zone, their size and location, trends in growth or decline, future plans, and conflicts between activities. Representatives of the following have attended these

meetings:

U.S. Navy installations

State and federal regulatory and enforcement agencies

Marine-oriented industries and industrial development and promotion agencies

City and town governing bodies, planning, conservation, and industrial development agencies, public works departments, and harbormasters.

Commercial fishing industries

Marine transportation interests

Recreation and conservation groups

4) A subcommittee was established to study legal jurisdictions in the coastal zone. The subcommittee included representatives of the Executive Counsel's office, the Law of the Sea Institute of the University of Rhode Island, and the New England River Basins Commission. This review covered a broad range of questions from the extent of the state's jurisdiction out into the Atlantic to the specific authority given to federal, state, and local regulatory agencies.

5) A series of working papers was prepared by the Statewide Planning Program staff to provide background information for the Technical Committee on subjects such as pollution conditions and sources, port development, marshland protection, and resource management organizations used in other areas.

6) The Committee and the University of Rhode Island jointly sponsored a workshop entitled "Rhode Island Marine Resources: Problems and Opportunities" for members of the General Assembly. The workshop was held on December 6, 1969, at the University's Narragansett Bay Campus.

These studies and activities form the basis for the Technical Committee's report and recommendations. Part One of the report defines the coastal zone and describes its importance to the state. Part Two inventories the agencies involved in the coastal zone - federal, regional, state, and local - and their responsibilities and programs. Activities in the coastal zone and the resulting current and potential problems and conflicts between activities are reviewed in Part Three. These findings are brought together in Part Four in an analysis of the need for a resources management

program for the coastal zone. Alternative courses of action are evaluated. Part Five presents the Technical Committee's recommendations.

Staff assistance to the Technical Committee was provided by the Rhode Island Department of Natural Resources, the Rhode Island Statewide Comprehensive Transportation and Land Use Planning Program, and the Graduate School of Oceanography, University of Rhode Island. The principal staff members involved are:

University of Rhode Island:

Mr. Sidney Feld (on assignment to the Department of Natural Resources)

Statewide Planning Program:

Mrs. Susan P. Morrison
Mr. Patrick J. Fingliss (June-September, 1969)

Valuable assistance was also provided to the Committee in formulating and analyzing alternative recommendations by Mr. Robert Di Censo, Rhode Island Department of Administration, and in investigating jurisdictional problems by Professor Daniel Wilkes, Political Science Department, University of Rhode Island.

PART ONE: THE RHODE ISLAND COASTAL ZONE

Thirty of the fifty states border on the sea coasts and the Great Lakes. In none of these is the relationship between the coastal waters and inland areas, the continuous interaction of land and sea, more important than it is in Rhode Island. This is true for many reasons which go far beyond the accident of location. Rhode Island has a total salt water shoreline 419 miles in length, and a total land area of 1,057 square miles. The state is deeply indented by Narragansett Bay and the Providence River, which extend almost 30 miles inland from the Atlantic. No point in the state is more than 25 miles from this shoreline. When considered together with the general absence of other significant topographic features and the lack of traditional mineral resources, Narragansett Bay and the coastline represent not just a factor in the state's geography, but a determining factor in its history, economy, and way of life.

In the past this resource has provided the reason for colonial settlement, the development of shipbuilding, international and coastal trade, and commercial fishing industries, and the growth of resort communities such as Newport, Narragansett Pier, and Watch Hill. Since access to markets through marine commerce was essential to the agriculture of the eighteenth and early nineteenth centuries, and the industrialization which became dominant in the latter nineteenth century depended on water for power, processing, and transportation, Narragansett Bay and the coastal areas can be considered an essential basis for the state's economy throughout its history.

Today Narragansett Bay and the coastal area mean many things to Rhode Island and its citizens. Some of these are readily apparent. Three Navy installations are major users of shorefront land and contributors to the economy. The importance of the coastal zone as a recreational resource is reflected by the 14,800 pleasure motor boats registered in the state (a 35 percent increase over the previous year)[4] and the use of 21 miles of sand beach frontage for swimming, surfing, scuba diving, and other water sports.[5] Sports fishing is a major activity on both water and the shore. The Port of Providence is the fourth largest port in New England, handling approximately 9 million tons of cargo annually.[6] Commercial fishing

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4 U.S. Coast Guard, Boating Statistics - 1968, CG-357 (Washington, D.C.: 1969), p. 19.

5 Rhode Island Statewide Planning Program, Plan for Recreation, Conservation and Open Space (Interim Report), Report Number 8 (Providence: 1968), p. 25.

6 E.B.S. Management Consultants, Inc., The Freight Transportation Development Potential of the Port of Providence, Rhode Island (Washington, D.C.: 1969), Tables 7 and 8.

continues to be a significant industry although some species of finfish and shellfish are declining, and some have disappeared. About 1,150 fishing boats of all types are based in Rhode Island ports and their total catch approximates 50 million pounds annually.[7]

Year-around and seasonal housing development and industry absorb large quantities of land, and frequently conflict with each other and with recreational activities in their demand for land and for access to the waterfront. Tourism is a rapidly growing activity which is based largely on the aesthetic and recreational values of the coastal region.

Some of the other things which the coastal zone means to Rhode Island are not so obvious. Narragansett Bay has become one of the nation's most important centers of marine research. Beginning in a single building at Fort Kearney in 1936, the complex at the University of Rhode Island Narragansett Bay Campus now includes the University's Graduate School of Oceanography, the Northeast Marine Health Sciences Laboratory, the Narragansett Marine Game Fish Research Laboratory, the National Marine Water Quality Laboratory, the Charles J. Fish Laboratories, the North Laboratory, the Bunker Armsted Laboratories, the Bunker Cram Laboratories, the Marine Building Laboratories, the Claiborne Pell Library, and the state's nuclear research reactor. Other major research facilities located on Narragansett Bay include the Raytheon Corporation Marine Research Laboratory and the U.S. Navy Underwater Research Laboratory. More than 4,000 acres of salt marsh have been identified in the coastal zone.[8] These tidal marshlands provide spawning grounds for fish, breeding grounds for birds, animals, and shellfish, produce food for all of these, and are part of the aesthetic quality of the shore region. Perhaps least apparent to the casual observer is the use of Narragansett Bay and the coastal waters for waste disposal. Municipal and institutional sewerage systems discharge almost 100 million gallons of waste water each day.[9] Because of the way population, industries, and sewage treatment plants are located, more

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7 Robert R. Nathan Associates, Developing Marine Industries (Boston: New England Regional Commission, 1968), pp. 37-38, 44-45.

8 Survey by the Division of Conservation, R.I. Department of Natural Resources, 1965.

9 Rhode Island Statewide Planning Program, Plan for Public Sewerage Facility Development, Report Number 11 (Draft) (Providence: 1969), Table 1 and Figure 11.

than 99 percent of this waste water flows into Narragansett Bay. Virtually all of this effluent is treated before it is discharged, and about 70 percent receives secondary treatment. Nevertheless, each treatment plant is recognized as a source of pollution. Pollution is also caused by more well publicized incidents such as oil spillage and refuse dumping and burning, and by wastes from thousands of pleasure boats and Navy and commercial ships.

One way of measuring the importance of all of these activities which take place in and around Narragansett Bay and the sea coast is in terms of its economic impact. A partial tabulation of these has identified $346 million in annual expenditures (or income) directly related to Narragansett Bay alone in 1967-68.[10] This total includes primary expenditures and opportunity costs such as for waste disposal, but excludes imputed values for recreational activities or direct expenditures by participants in these activities, nor is an attempt made to quantify the aesthetic values of the bay. This $346 million in spending generates other economic activity and provides personal income. Through multipliers these primary expenditures have been estimated to generate transactions totaling over $826 million, of which more than $372 million was personal income, in 1967-68 (wages, salaries, profits, interest, and rent). The importance of Narragansett Bay in the state's economy is indicated by the fact that this personal income was about 13 percent of the total personal income for the state for that year.

Figures 1 and 2 illustrate the economic activity and personal income generated by selected activities for Narragansett Bay alone, and relate these to total expenditures and personal income for the state as a whole. These figures do not reflect the economic significance of our coastal region, and may seriously understate its value because 1) the data is limited to Narragansett Bay, omitting the ocean section of the coastal region, and 2) non-monetary values, although very real and perhaps more important than direct expenditures and personal income, are not included because of problems in quantification.

Narragansett Bay and the shore region mean many things to Rhode Island, but the potential uses of this resource have not yet been exhausted. New uses of this resource will continuously arise, some desirable and some undesirable, but all increasing the complexity of functions which this resource performs for this state, and the probability of conflict between activities.

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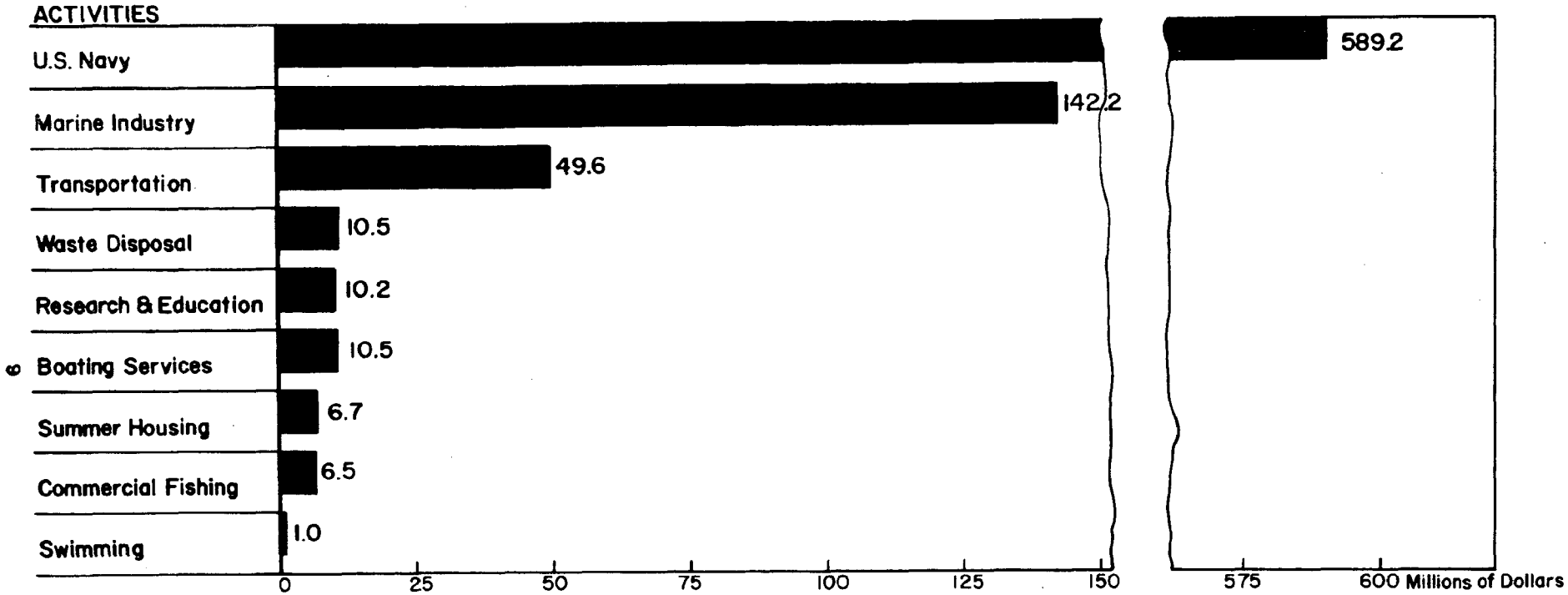
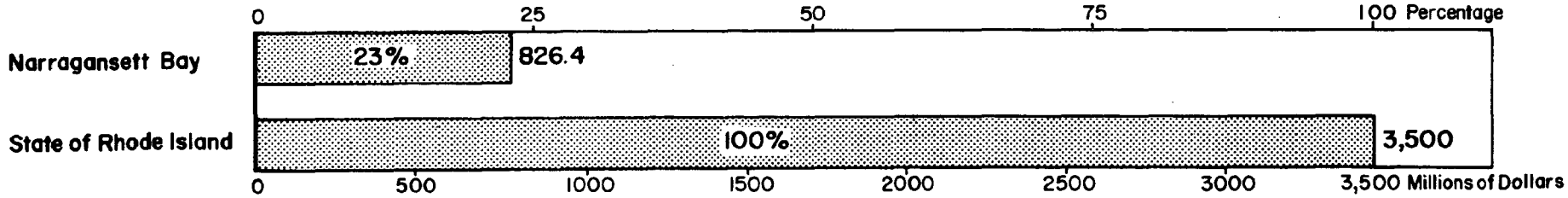
10 Rorholm, Niels and others, A Socio-Economic Study of Narragansett Bay, Rhode Island (final draft) (Kingston, R.I.: University of Rhode Island, 1969), pp. 32-35.

FIGURE I

EXPENDITURES GENERATED BY NARRAGANSETT BAY ACTIVITIES - 1967 - 68



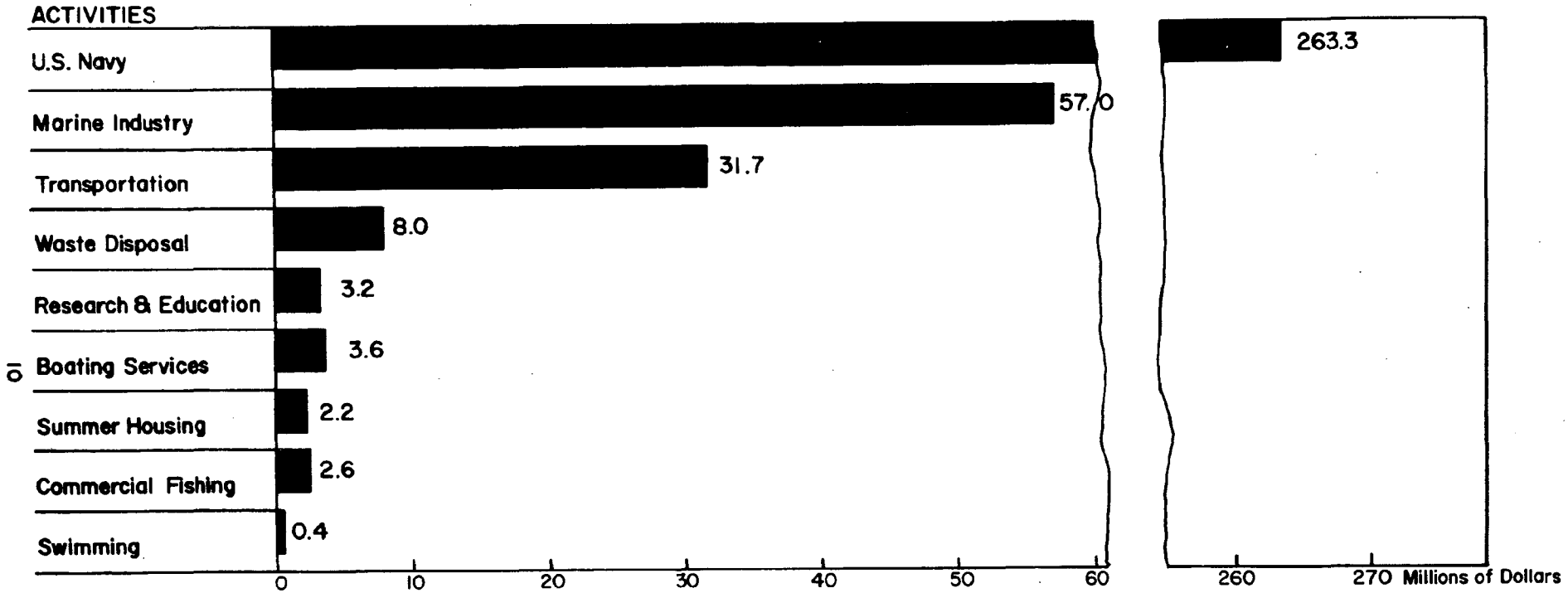
TOTAL EXPENDITURES GENERATED FROM NARRAGANSETT BAY '67-'68 VS. TOTAL EXPENDITURES FOR THE STATE-1964



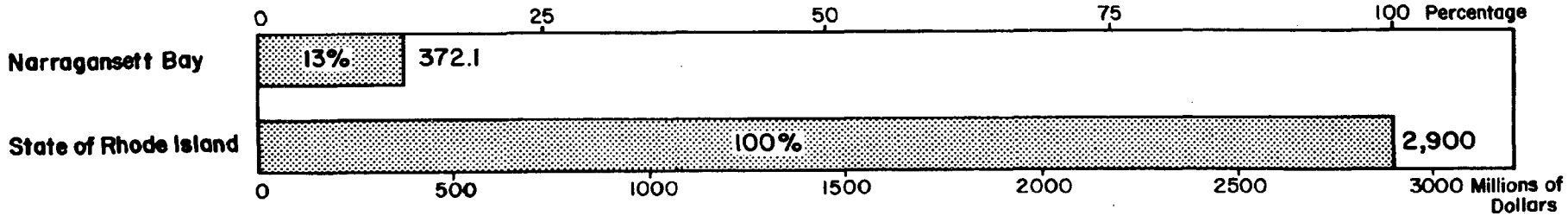
Source: "A Socio-Economic Study of Narragansett Bay" University of Rhode Island, 1969

FIGURE 2

PERSONAL INCOME GENERATED BY NARRAGANSETT BAY ACTIVITIES-1967-68



TOTAL PERSONAL INCOME GENERATED FROM NARRAGANSETT BAY VS. TOTAL PERSONAL INCOME FOR THE STATE-1967



Source: "A Socio-Economic Study of Narragansett Bay" University of Rhode Island, 1969

Some of the potential uses of this resource can be anticipated. One of these is the construction of one or more nuclear power plants. It appears that this source of power will have to be used to meet the growing demand for electrical energy in the state and region if this is to be accomplished on an economical basis and without substantially increasing air pollution. A tentative site for a nuclear power plant has been identified at Rome Point in North Kingstown. Another potential activity, which may ultimately be tied to the construction of nuclear power plants, is the development of desalination plants to meet part of the state's and region's water supply needs. Improved technology in this area and utilization of the available surface and ground water sources for water supply or other purposes may combine to make desalination a feasible means of water supply in this area by the end of this century.

New methods of transportation may also appear in the bay. Use of hydrofoil craft for commuter transportation between middle and lower bay communities and downtown Providence has been considered. New high capacity oil tankers may use the Port of Providence, even though the present channel deepening project will not accommodate the largest of the "super tankers," and ships equipped to handle "containerized" cargo and requiring specialized cargo handling facilities on the docks may also use the port. As waterfront land becomes more scarce and the demand for this limited commodity grows, proposals to fill some of the shallower areas can be expected. New types of one-and-two passenger high-speed pleasure water craft will appear in growing numbers in the next few years, bringing safety problems comparable to those created by the "skimobiles" in the northern areas. Aquaculture, the cultivation of water-dwelling animals and plants under controlled conditions, may expand rapidly on a commercial basis. Mineral extraction has already begun with sand and gravel dredging operations near Portsmouth, and may expand to other areas and to other minerals. The sea may also prove to be an important source of medicines and drugs.

This brief review of the many ways in which Rhode Island uses its coastal waters and lands, and the even greater opportunities for their utilization in the future, gives some idea of the impor- of this resource to the state, and the urgent need for a management program which can find the optimum balance between preservation and use of this resource, and which will take those steps necessary to insure that this resource is both conserved and used in the best interests of the state.

This management program must be focused on a specific geographic area - the state's coastal zone. This area has been defined in proposed federal legislation as:[11]

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11 Senate bill 2802, 91st Congress, 1st Session (August 8, 1969), section 303 (a); the proposed "Coastal Zone Management Act of 1969".

> . . . lands, bays, estuaries, and waters within the territorial sea or the seaward boundary, whichever is the farther offshore, of the various coastal States and States bordering the Great Lakes and extending inland to the landward extent of maritime influences.

Thus the coastal zone centers on the shore line, and extends outward on both the seaward and landward side. The extent of the coastal zone seaward is established by the extent of the state's jurisdiction. At the present time the federal government recognizes this jurisdiction as extending three geographic miles out from the shoreline or baseline established to provide a reference line for measurement from estuaries such as Narragansett Bay.[12]

The landward extent of the coastal zone is more difficult to establish. The definition cited above refers to the "landward extent of maritime influences." This has been further defined in the bill to include:[13]

> . . . such amount of land running back from the high water mark which in contemplation of human and natural ecology may be considered to come under the direct and immediate influence of the . . . sea . . . .

Using these definitions, the Technical Committee on the Coastal Zone has defined three areas of concern in formulating a management program for the Rhode Island Coastal Zone.

The primary study area, the coastal zone itself, centers on the salt water shoreline. On the seaward side the coastal zone extends out to the extent of the state's jurisdiction, and includes Narragansett Bay and other salt water bodies such as Point Judith Pond, Ninigret Pond, and Winnapaug Pond. On the landward side, the coastal zone includes that land within the coastal drainage basin, as defined by topography and drainage patterns. This area is shown on Figure 3. It includes all or part of 26 Rhode Island cities and towns, extending across the entire Atlantic coastline and northward around Narragansett Bay to include most of Pawtucket and part of Central Falls. This definition of the coastal zone, based on natural features which can be located both on maps and on the ground, includes sufficient area to encompass the ecological considerations cited in the federal Coastal Zone Management bill, but does not include any large area which is extraneous to these considerations.

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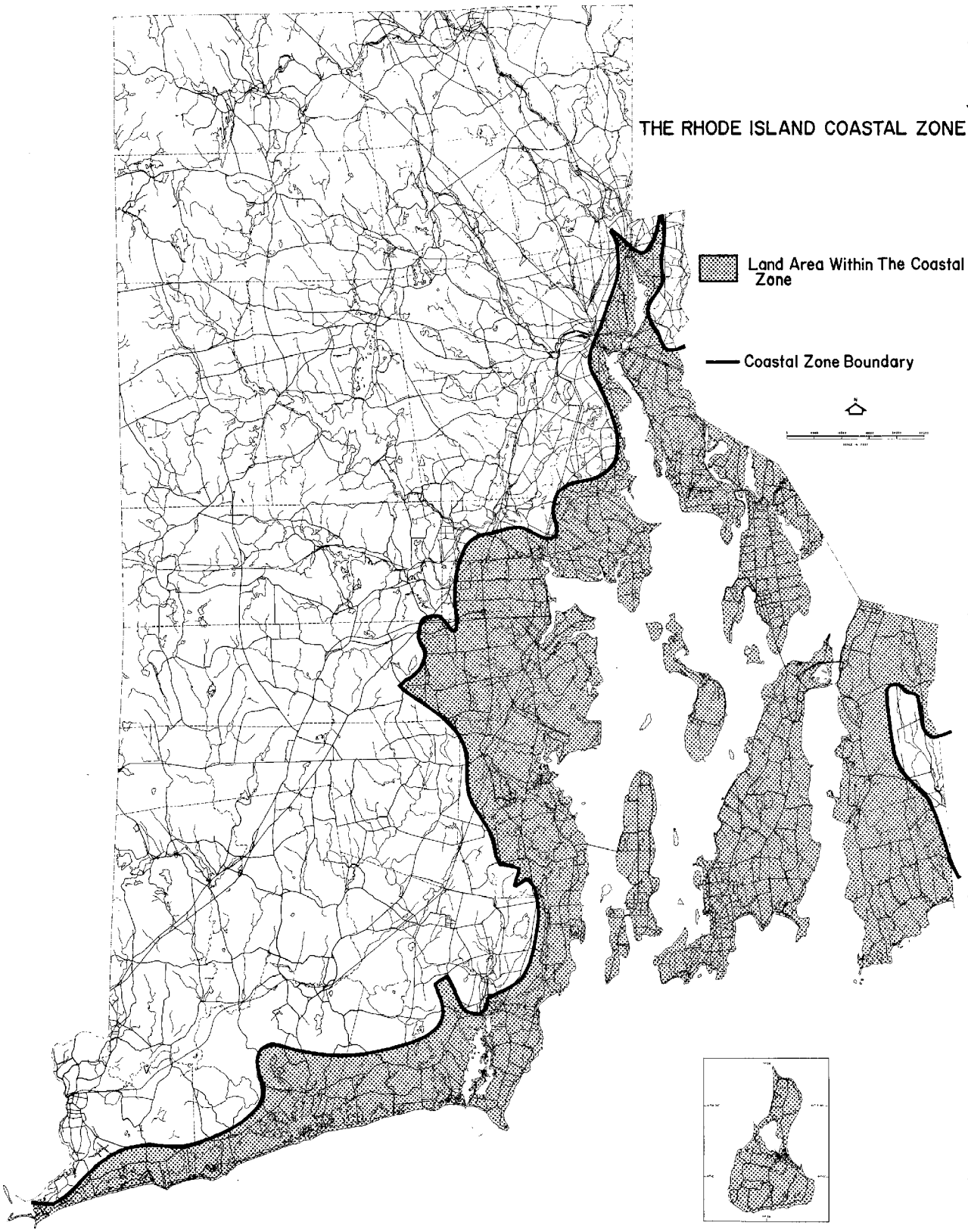
12 This interpretation has been challenged by the Atlantic Seaboard Conference of Attorneys General.

13 Section 303 (f).

FIGURE 3


THE RHODE ISLAND COASTAL ZONE
Land Area Within The Coastal Zone
Coastal Zone Boundary

Secondary study areas must be delineated for study of each of the activities and problems found within the coastal zone. For example, a source of pollution located outside of the coastal zone, and perhaps outside of Rhode Island, which affects a stream draining into the coastal zone, must be considered in dealing with problems of pollution. Consideration of activities in the Port of Providence involves the port's hinterland in southeastern New England and other ports which trade with the Port of Providence. Each of these secondary areas is a study area related to an existing or potential function of Rhode Island's coastal zone.

Finally, an area must be delineated for application of any regulations or controls which the state finds it necessary to adopt to insure that the coastal zone is utilized and conserved in ways which provide the greatest possible benefit to the people of the state. This area must be defined so as to permit an adequate degree of control over those activities which significantly affect the ecology and environment of the coastal zone, but it need not be as extensive as the primary study area described above. This area is defined as including:

1) All inland tidal water bodies, the territorial sea and contiguous seas subject to state jurisdiction;

2) the adjoining land areas and included water bodies to a maximum elevation of 20 feet above mean high water, or to a maximum distance of 200 feet from the seashore at mean high water, whichever is the greatest distance inland; and

3) all islands within this area except Aquidneck, Conanicut, Prudence, and Block Islands, which should be subject to the same rule as mainland areas.

Regional aspects of Rhode Island's coastal zone must also be considered. Roughly half of the drainage basin of Narragansett Bay and its major tributaries, the Blackstone and Taunton Rivers, is located outside of Rhode Island. The major population centers of Fall River, Taunton, and Worcester are located within this area. In the extreme southwestern area of the state, the Pawcatuck and Stonington areas of Connecticut adjoin Little Narragansett Bay. Consequently, the interests of other states, and of the southeast New England region as a whole, must be considered in formulating management programs for the state's coastal zone.

PART TWO: INVENTORY OF GOVERNMENTAL RESPONSIBILITIES IN THE COASTAL ZONE

Public concern is manifested at several levels: federal, regional, state, and local. With so much interest, one would imagine that the problems of the Rhode Island coastal area are being carefully attended to. However, much criticism has been directed at this diffusion of government jurisdiction, as it is felt that it greatly hinders meaningful and effective management. The critics contend that at each level of government, responsibility is indiscriminately and haphazardly assigned to an agency, resulting in a serious lack of coordination between these agencies and also between the different levels of government.

The federal government has recently approached the problem by urging a more unified federal effort within one agency and by proposing the creation of state coastal zone management authorities with lead responsibility. The state of Rhode Island, via this Technical Committee, has explored the desirability of altering the state's approach to coastal affairs. Of paramount importance in any decision is an appraisal of the effectiveness of present government controls. This section will review all government involvement in the Rhode Island coastal zone.

A. FEDERAL

It is important to realize that the scope of most of these programs is much broader than the estuarine zone and, in fact, freely crosses over the geographic boundaries of our coastal area. This is not to say that within the estuarine zone specific national interest is not evident. Clearly, the federal government envisions its programs as an approach to three functional necessities relevant to this area. Commerce and navigation, national security, and protection and development of natural resources are commonly referred to as the leading motivations for federal involvement. The criteria for this federal action are those powers specified in the United States Constitution and the framework of a federal system which recognizes a division of power between national and state entities. Specifically, the four most relevant provisions of the Constitution which Congress has interpreted as cause for coastal zone action are the Commerce Clause, the National Defense power, and the Federal Property power on the federal side, and the reserved power clause of the Tenth Amendment on the state side. Adding to this an expansive interpretation of the federal government's role within the federal-state framework, the federal government has become a significant regulator of the coastal zone.

Federal jurisdiction over the development and use of coastal resources is maintained through both direct ownership and regulation. The intensity of these activities varies dramatically. In a recent report to Congress prepared by the Federal Water Pollution Control Administration, four general categories are developed to view overall federal activity in the estuarine zone. "These are: 1.) those activities and programs having a direct and significant operational effect; 2.) programs or activities having indirect or related effect; 3.) activities primarily of a research and study nature; and 4.) activities of a planning and co-ordination nature."[14] The following table shows the F.W.P.C.A.'s classification of the thirteen federal agencies it reviewed.

1. Department of the Interior

The Department of the Interior has much of the federal jurisdiction over the conservation, management, and development of our nation's natural resources. Within this broad responsibility there are many specific activities which strongly affect the Rhode Island coastal zone. Those activities pertinent to Rhode Island include the operation of the Federal Water Pollution Control Program; the conservation and development of our nation's mineral, fish, and wildlife resources; the promotion of outdoor recreation programs; and the stimulation of research in the water resources field. These programs are carried out by several administrative bodies within the Department of the Interior.

a. Federal Water Pollution Control Administration

The Federal Water Pollution Control Administration was created under the Water Quality Act of 1965, and its powers and funding ability were significantly expanded under the Clean Water Restoration Act of 1966. Basically, this Administration is concerned with meeting the objectives of a federal water pollution control program. Its goal is to supply water of adequate quality for all worth-while purposes, including public water supply, agricultural and industrial use, and propagation of fish and wildlife. Among its more important programs are establishment of quality standards for interstate waters, comprehensive river basin planning and strong support for river basin organization, construction of waste treatment facilities, and research and demonstration programs.

The Administration offers financial assistance for research and development of new and improved pollution control devices, for construction of waste treatment plants, for planning of water quality control in river basins, and for state and interstate administration of pollution control programs. It also provides technical assistance to agencies at all levels of government concerned with pollution control.

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14 United States Department of Interior, Federal Water Pollution Control Administration, National Estuarine Pollution Study, Vol. III (Washington, D.C.: November 3, 1969), v, 6-36.

Table 1

CLASSIFICATION OF FEDERAL AGENCY COASTAL ZONE ACTIVITIES

FEDERAL AGENCIES	DIRECT & OPERATIONAL EFFECT	INDIRECT OR RELATED EFFECT	RESEARCH & STUDY	PLANNING & COORDIN-ATION
Dept. of Interior	X			
Dept. of Commerce	X			
Corps of Engineers	X			
Dept. of Transportation	X			
Dept. of Housing and Urban Development		X		
Dept. of Agriculture		X		
Dept. of Health, Education, and Welfare		X		
National Science Foundation			X	
The Smithsonian Institution			X	
National Academy of Sciences			X	
Water Resources Council				X
Atomic Energy Commission				X
Federal Power Commission				X

Under these financial support programs, the state of Rhode Island has received substantial aid in meeting its water pollution problems. The Water Supply and Pollution Control Division within the Department of Health receives from the Federal Water Pollution Control Administration 48.52 percent of the cost of administering its program. Under the federal resource base, this amounted to an allocation of $109,000 in fiscal year 1970. Additional funds have been requested for fiscal year 1970 in the event proposed federal legislation is passed to increase available federal funds. Of even greater economic significance to the state is the Federal Water Pollution Control Administration's program to assist in the construction of municipal waste treatment plants. The federal share may be as much as 55 percent, with state and local governments supplying 25 percent and 20 percent, respectively. In fiscal year 1969, the federal administration made available to Rhode Island about $1.5 million for this purpose.

The Administration, under its technical support program, conducts water quality surveillance and sampling projects, and prepares special studies on specific pollutants. Under the latter responsibility, the Administration has studied vessel waste, dredging activities, municipal and industrial discharges, thermal pollution, land drainage and salt water intrusion. These studies represent an expertise that Rhode Island may draw upon in attacking its water pollution problems.

The F.W.P.C.A. also may use enforcement powers to abate pollution in the estuarine zone and to insure the maintenance of state water quality standards in certain circumstances.

b. Bureau of Mines

The Bureau of Mines operates a program to promote the conservation and development of mineral resources. This program is primarily of a research and information nature. The Bureau's responsibility in the coastal area is evident in two distinct ways. Under its Mineral Resource Evaluation Study, the Bureau has developed technology in marine mineral extraction. Factors of special interest are: water supply, power, and water transportation, and how they can be used to complement marine mining. The Bureau also has jurisdiction over that portion of the solid waste program which involves mineral extraction wastes. These activities have relatively little significance to the Rhode Island coastal zone at present, but future development may quickly reverse this situation.

c. Bureau of Outdoor Recreation

The Bureau of Outdoor Recreation functions as the central force within the federal government for outdoor recreation matters and, as such, is responsible for preparing a long-range, continuing, nationwide, outdoor recreation plan. Under the Land and Water

Conservation Fund Act, the Bureau provides grants to states for planning, acquisition, and development of recreation areas and facilities. In the present fiscal year, the Bureau has supplied up to 50 percent of the monies needed on ten recreation projects within the Rhode Island coastal zone. These projects comprise approximately 700 acres of coastal land and represent Bureau expenditures of slightly over $1.5 million.

The Bureau also administers several activities under the Federal Water Projects Recreation Act. The most important provisions include: calculation of the costs and benefits associated with recreation; determination of natural resource requirements needed to preserve recreation potential; creation of overall plans for recreation development by agencies which administer and construct federal water facility projects; and recommendation of fee schedules. These studies should be properly utilized by Rhode Island in order to provide the most efficient and beneficial recreation environment possible.

d. Fish and Wildlife Service

The Fish and Wildlife Service was established by the Fish and Wildlife Act of 1956. This Service, under the supervision of the Commissioner of Fish and Wildlife, has jurisdiction over two separate bureaus: the Bureau of Sports Fisheries and Wildlife and the Bureau of Commercial Fisheries.

-Bureau of Sports Fisheries and Wildlife

Under the Fish and Wildlife Coordination Act, the Bureau of Sport Fisheries and Wildlife has been assigned major responsibility in the conservation and preservation of the estuarine habitat in the coastal zone. As a part of this broad charge, the Bureau investigates and approves water resource development programs prior to construction or licensing by the federal government. In effect, Corps of Engineers permits are subject to comment by the Bureau on the probable impact of such projects on fish and wildlife resources. The Bureau also recommends steps for enhancing the environmental conditions of these resources. This program requires the Bureau to conduct research and disseminate its findings. It also studies the effect of pollution on fish and wildlife; keeps population statistics and sets regulations pertaining to waterfowl; provides federal funds to the states for acquisition of wetlands; and encourages improved and expanded facilities for hunting and fishing. Many of these activities are supplemented in Rhode Island through the facilities of the Narragansett Marine Game Laboratory, which is an affiliate of the Bureau of Sport Fisheries and Wildlife.

-Bureau of Commercial Fisheries

The Bureau of Commercial Fisheries maintains continuous

contact with the Bureau of Sports Fisheries and Wildlife, and conducts many activities similar to the latter bureau in order to supply assistance whenever commercial fisheries' problems are involved. The Bureau's major objective is to promote an adequate, reliable, and diverse supply of fish and shellfish products. In order to meet this objective, the Bureau carries out extensive research at many of its biological laboratories. Its studies delve into such aspects of an estuarine environment as resource development, pollution problems and management techniques.

In addition, the Bureau of Commercial Fisheries is responsible for three financial assistance programs which are intended to offset, in part, the cost differentials that presently prevail between American fishermen and foreign competition. These programs consist of loans for fishing vessels and gear, mortgages and loan insurance for fishing boats, and subsidies for fishing vessel construction. The Bureau also administers several grant-in-aid programs to the states for research and development toward more effective management of commercial fishing resources.

e. Geological Survey

The Geological Survey is a highly technical and scientific service which is committed to defining the nation's natural resources. The Geological Survey maps the physical, hydrologic, and cultural features of the land, from which it prepares this country's standard geologic and topographic map series. In addition, this agency is responsible for coordinating all data collected by federal agencies pertaining to streams, lakes, estuaries, reservoirs and groundwater. To facilitate this task, it maintains a central catalogue on all water data. This information, along with the maps, is invaluable as a basis for planning. In such problem areas as pollution abatement, irrigation, flood control, power development, recreation, and municipal and industrial water supplies, a reliable knowledge of the physical nature of the area is essential. The Geological Survey encourages a close liaison with all planning agencies in the hope that its information will be utilized in land use decisions.

f. Office of the Water Resources Board

The Office of the Water Resources Board was established by Congress in 1964 under the Water Resources Research Act. Through grants and contracts with the academic community, private firms, individuals, and public agencies, this office promotes programs in water research and training. Past studies have placed emphasis on such areas as expansion of the water supply, conservation, water quality management, water resources planning, and the hydrological cycle. These technical studies represent an additional effort by the federal government to expand existing knowledge in this area in the hope of creating a sound basis for future policy decisions.

2. Federal Power Commission

The Federal Power Commission is an independent agency which has been given statutory responsibilities related to the planning, construction, and operation of water resources projects, most significantly with regard to the power industry. Its powers are assigned under provisions of the Federal Power Act, the Water Resources Planning Act, the Natural Gas Act, and the several flood control and river and harbor acts. To meet this responsibility, the Commission issues preliminary permits and licenses for construction and operation of hydro-electric projects on navigable waters, such as the Narragansett Bay and coastal waters of Rhode Island. These licenses are awarded when, in the Commission's judgment, the project is fully compatible with a comprehensive basin plan for the waterway. The Commission is deeply concerned with maximizing the overall utilization of the nation's coastal waters and will deny a license when it feels other uses such as recreation and conservation are unnecessarily exploited. The Commission also conducts many studies and appraises reports by others to aid it in reaching just decisions.

3. Atomic Energy Commission

At present the Atomic Energy Commission has no jurisdiction over the estuarine system of Rhode Island, but it does promise to play a significant role in the future due to the growing demand for electric power. The projected demand for electricity in Rhode Island, coupled with the technological advances in atomic energy plants, makes the likelihood of such a project a certainty in the near future. Already, studies are underway evaluating the possibilities of a plant at Rome Point in North Kingstown, and any further progress toward construction will undoubtedly bring controversy and much attention to the Atomic Energy Commission.

The Commission's responsibility in the coastal zone is to ensure an environment safe from radiological waste pollutants. However, a weakness exists in that licensing of atomic plants is at present based only on radiological safety. Other aspects of atomic projects such as thermal pollution, effect on wildlife, and detection and abatement of pollutants are of major concern to the Commission but are limited to research activity.

4. Department of Transportation

The Department of Transportation has lead federal responsibility in the regulation of our nation's transportation facilities and services. One of the major modes of transportation is water, and its development and improvement come under the jurisdiction of the United States Coast Guard (now a subdivision of this Department).

Coast Guard activities are varied and have a very direct and significant effect on the coastal zone. Certainly one of its most

important charges is to serve as the enforcement agency for all federal laws on the navigable waters of the United States. Part of this charge is to assist in the enforcement of water pollution abatement. Of major concern is the problem of oil pollution. Under the Oil Pollution Act of 1924, the Coast Guard was assigned enforcement and research activities, with the result that the agency has become, in conjunction with the Corps of Engineers, the major force in oil pollution problems.

Additional responsibilities are: developing and operating aids to navigation; regulating and administering bridges over the navigable waters; administering the Federal Boating Act of 1958; establishing anchorage areas; providing icebreaking facilities; assisting in port security through controls over the movement of vessels and dangerous cargoes; conducting oceanographic research; and providing search and rescue facilities for the promotion of safety. Certainly no other federal agency has so much direct contact with the users of the state's coastal waters as the Coast Guard.

5. Department of Commerce

The Department of Commerce has under its jurisdiction several agencies with programs strongly oriented to water resource planning. This Department's involvement in the estuarine zone is primarily motivated by a recognition that the nation's waters have distinct commercial uses which require policy and planning to further their development. Within the Department, a Water Resources Co-ordinator has been designated whose responsibility it is to collect centrally all water-related materials. This office then assists the many separate agencies within the Department with their studies and policy recommendations in water resources development.

a. Economic Development Administration

The Economic Development Administration was established under the Public Works and Economic Development Act of 1965. Its primary function is to supply technical and financial assistance to regions defined as economically depressed, based on such indicators as level of unemployment and per capita income. Many of its projects are located within the coastal zone and, as such, are of concern to the state's coastal development. The Economic Development Administration may cooperate with Rhode Island state and local officials in a redevelopment project at the port of Galilee.

b. Environmental Science Services Administration

In 1965, a reorganization established the Environmental Science Services Administration and brought together several important Department of Commerce activities. Those activities most pertinent to coastal regions include the Weather Bureau, the Coast and Geodetic Survey, and the Environmental Data Service. This

Administration is primarily a research and information organization. Very essential data, such as on coastal tides and currents, river height, ocean currents, and structure and shape of ocean basins, is collected and has proved invaluable in coastal planning. The Administration's prevention program includes a warning system against hurricanes, floods, tornadoes, and other environmental dangers.

-The Weather Bureau is responsible for operating the national weather service. This activity is of extreme importance in the coastal zone because of this area's susceptibility to extremes in weather conditions. The Bureau's weather warnings and reports on flood and river conditions have been most successful in enhancing the economy of the estuarine zone and the safety and welfare of its inhabitants. In addition, the Bureau is interested in water resources planning and has instituted many studies in an effort to provide others with the basic physical data of the environment.

-The Coast and Geodetic Survey is responsible for charting the coasts and harbors of the United States. These maps provide fundamental data for engineering, scientific, commercial, and defense needs, and are most useful to government agencies involved in water projects.

-The Environmental Data Service is charged with collecting and distributing environmental data. Much of this material is water-oriented and thus the Service is recognized as a leading source of water resource information. To aid in the dissemination of this material, the Service maintains several data centers.

c. Maritime Administration

Under the Merchant Marine Act of 1920, the Maritime Administration assumed the responsibility for developing ports and related commercial transportation facilities in order to promote the United States Merchant Marine fleet. Several active programs are involved in this undertaking. The Administration investigates present techniques used in commercial water transportation and recommends new and imaginative approaches to further the industry's economic position. The Administration provides assistance to communities in planning for the location of piers, wharves and water terminals, and it evaluates the impact of water projects on commercial trade and reports on their practicality.

In the last few years, the Maritime Administration has been studying harbor pollution and is presently involved in an effort to solve this dilemma. Of particular concern is the increased use in harbors of nuclear-powered vessels with radioactive discharge. The Administration has set up strong standards in an attempt to curb this contamination. Also in the area of pollution, the Administration assists in the development of devices to detect and prevent oil pollution.

6. Department of Health, Education, and Welfare

The Department of Health, Education, and Welfare's involvement in the coastal zone is predicated on the much broader responsibility of assuring a compatible interaction between man and his environment. Those estuarine-oriented activities that it does administer come under the jurisdiction of the Public Health Service. This Service functions primarily through a number of other H.E.W. agencies and oversees a number of programs aimed at protecting the health and well-being of all Americans in their utilization of coastal resources. For example, the Food and Drug Administration operates pesticides and shellfish sanitation programs. These projects call for evaluation of food additives and pesticides in seafood, study of the bacteria content of coastal waters, assurance of sanitary production of shellfish, and development of fish protein concentrate. Another sub-structure within the Public Health Service is the Bureau of Water Hygiene, which researches water quality and its impact on shellfish production, recreation, and water resource planning. The Bureau of Radiological Health concerns itself with radiological pollutants and their effect on marine ecosystems. And, lastly, the Bureau of Solid Waste Management is responsible for arriving at some solution to the ocean disposal problem.

In addition, studies prepared by the Public Health Service cover the health-related aspects of water and related land resources projects. Of major concern are recreational use of water, water supply, and food-growing waters. In conclusion, extensive assistance is offered to state and local health agencies as provided for under the Public Health Service Act.

7. Department of Agriculture

The Department of Agriculture's activities in the coastal zone are principally of an indirect nature, with the major emphasis directed toward the land forms of the estuarine environment. Nevertheless, the Department does supply valuable services through two of its administrative bodies.

a. Soil Conservation Service

The Soil Conservation Service assists local governments with planning and financing watershed conservation projects and with other flood prevention measures. In addition, assistance is available for projects that promote the conservation, development, and utilization of water through the small watershed program. The Soil Conservation Service also operates an erosion prevention program, which is invaluable to an estuary since it limits the accumulation of sediment and permits the system to carry out its normal biological role more effectively.

b. Farmers Home Administration

Under the Consolidated Farmers Home Administration Act of 1961, this agency is authorized to provide funds for the preparation of comprehensive plans for water and waste disposal systems in rural areas. Plans needed to qualify rural communities in Rhode Island for this assistance have been submitted to the Farmer's Home Administration.

8. Department of Housing and Urban Development

The Department of Housing and Urban Development is a relatively new administrative body, having been created under provisions of the Department of Housing and Urban Development Act of 1965. The Department provides the bulk of federal assistance for housing and community development. The coastal zone, being a most important population region both in absolute terms and in growth rate, is involved in varying degrees in practically all of the Department's programs.

Perhaps the most widely used H.U.D. program is the Comprehensive Planning Grants-Section 701 planning assistance program. These monies are used in developing sound land use and management procedures. Plans developed for the estuarine zone are encouraged by the Department of Housing and Urban Development to consider carefully the ecological and natural resource base of the environment. This assistance is available to all levels of government, and at present the state of Rhode Island and all but two of its coastal towns and cities have received this financial aid. The state or local government's share is 25 to 33 percent of the total cost, depending on a formula instituted by H.U.D.

Additional programs of the Department include grants for open-space lands, urban renewal, urban beautification, historic preservation, and water and sewer facilities. These programs have stimulated much development and improvement in the Rhode Island coastal area. For example, the town of Narragansett promises to undergo a tremendous revitalization as a result of its forthcoming urban renewal project. This single grant has made Narragansett the beneficiary of $2.25 million in fiscal year 1970. Several projects under this program have been completed in Providence, and projects are in progress in Newport and planned in East Providence and Bristol.

The Open-Space Land Program makes grants available to communities to acquire undeveloped lands in urban areas for the purpose of promoting recreation, conservation, and scenic use. This program is very popular among the coastal municipalities, and most of them have availed themselves of these funds.

A relatively new activity with very direct application to the coastal environment is the National Flood Insurance Program. This program requires local or state areas to adopt a land use provision to limit future development of areas susceptible to flooding. Areas that do not institute control measures consistent with flood prevention will not qualify for this insurance. Although this coverage has not been applied in Rhode Island to date, several communities have expressed a definite interest in it, and the Statewide Planning Program has been designated to coordinate state and local aspects of this program.

9. The Smithsonian Institution

The Smithsonian Institution conducts several scientific activities in the marine field. Its basic responsibility is the worldwide collection of biological and geological samples. This material is then analyzed by the Smithsonian Institution in order to obtain a greater knowledge of the fauna, flora, and sediments in the estuarine setting and to help understand the changes occurring on the estuarine biota. To facilitate this program, the Institution maintains the Smithsonian Oceanographic Sorting Center which processes these specimens to scientists throughout the world.

The Institution also sponsors special conferences and studies pertinent to the marine environment. Its research projects have covered such subjects as sedimentation, beach erosion and population, and distribution of marine plants and animals.

10. National Science Foundation

The National Science Foundation is a research-oriented agency charged with sponsoring a wide range of scientific endeavors. Within this broad responsibility, a major emphasis has evolved in the pursuit of scientific research pertaining to the estuarine-related sciences. Funding for its marine science programs has been set at approximately $45 million for fiscal year 1970.

Certainly, the National Science Foundation's most significant activity to Rhode Island is its involvement in the National Sea Grant Program, which was established under the National Sea Grant College and Program Act of 1966. This legislation charges the Foundation with initiating, developing, and supporting the Sea Grant Program. The three major objectives of this program are to support manpower training in the highly specialized marine fields; to initiate and support marine research with special emphasis on creating regional capabilities to handle regionally oriented problems; and to disseminate marine resource knowledge through its extension and advisory services. Projected spending for the Sea Grant funding program has been set at $10 million for fiscal year 1970. Of this, the University of Rhode Island has been allocated $685,000,

which constitutes a most significant share of the total funds available.

11. National Academy of Sciences and National Academy of Engineering

The National Academy of Sciences and the National Academy of Engineering, although not official government agencies, do hold Congressional charters and maintain a close tie with the federal government. These organizations are dedicated to the furtherance of scientific knowledge and are required under their charters to investigate any study area requested by federal departments. With respect to the estuarine environment, these Academies have made very significant contributions which have been extensively utilized in the development of rational management systems for the coastal regions.

Many studies and conferences have been held in the marine sciences area through the efforts of the National Academy of Sciences' Committee on Oceanography (NASCO) and of the National Academy of Engineering's Committee on Ocean Engineering (NAECO). These bodies represent groups of scientists with the highest expertise in their respective disciplines. Their ability to provide guidance to decision-makers will undoubtedly place these Academies in a very prominent position in the future development of estuarine areas.

12. Water Resources Council

The Water Resources Council was established by the Water Resources Planning Act of July 22, 1965. The Council serves as the principal coordinating mechanism for the bulk of marine programs at the federal and state levels.

Direct contact with individual states is maintained in two ways. In order to assist states in the development of comprehensive water resource plans, the Council provides financial grants representing approximately 50 percent of the cost of these activities. Each state's allotment of funds is determined by a formula based on population, land area, and need. Within the state of Rhode Island, the Water Resources Board serves as the liaison with the Council for this program. The Council also promotes comprehensive planning projects for specific river basins. This activity is assigned to federal-state river basin commissions. The state of Rhode Island participates in the New England River Basins Commission, whose activities will be discussed in the section dealing with regional agencies.

In addition, this Council is required to make continuing studies and to report to the President on the adequacy of water supplies; the relationship between specific water programs and their compatibility with the requirements of the larger regions of our

country; and the adequacy of existing water and related land resources programs of federal agencies, with major emphasis on establishing a more coordinated program.

13. Department of Defense

a. U. S. Army Corps of Engineers

Over the years an extensive body of legislation has evolved which places within the Corps of Engineers broad and far-reaching powers in the marine environment. This responsibility is predicated on the Corps' authority to investigate, develop, and improve the nation's water and related land resources, with special emphasis on navigational and flood control aspects.

Under its Civil Works Program, the Corps of Engineers maintains extensive resource development activities in a great number of marine-related fields. Areas of concern include hurricane protection, flood control, shore and beach restoration, navigation, major drainage, hydroelectric power development, water supply, water quality control, fish and wildlife conservation, and outdoor recreation. Table 2 contains a listing of recently completed and proposed Corps' projects for Rhode Island.

The Corps of Engineers' permit-control activities have a very direct and influential impact on the development and protection of the Rhode Island coastal zone. Army policy requires permit applicants to acquire state approval before its own consideration of the request. The Division of Harbors and Rivers within the Rhode Island Department of Natural Resources has been assigned this authority. The Corps' permit is necessary for all modifications made on the navigable waters of Rhode Island. The permit system, with its broad power, has been criticized on two grounds. First, if a recent Federal District Court decision is upheld, the Corps may only be able to deny a permit if impediment to navigation results. Second, the Corps does not possess sufficient personnel and facilities to protect against coastal alterations which may occur without its authorization.

b. U. S. Navy

The Navy's operations are distinct from those of other federal agencies in that its responsibilities extend beyond the estuarine environment. Its program is one of national defense, and any benefit or assistance to specific coastal regions is purely incidental to this main objective. An exception to this policy is the Naval Underwater Weapons Research and Engineering Station located at Newport. Although this facility has never been utilized by the state, it does possess both the authority and the capability to offer valuable technical and research assistance on regional coastal problems.

Table 2

U.S. ARMY CORPS OF ENGINEERS' PROJECTS IN RHODE ISLAND
1957 to PRESENT

Location	Date	Total Cost
Navigation Projects:		
Sakonnet Harbor, Little Compton	Completed 1957	$560,000
Bullocks Point Cove, E. Providence-Barrington	" 1959	290,000
Fall River Harbor (R.I. & Mass.)	" 1959	4,443,000
Apponaug Cove, Warwick	" 1963	262,000
Pt. Judith Harbor of Refuge & Pt. Judith Pond	" 1963	1,926,000
Wickford Harbor	" 1964	217,000
Pawtuxet Cove, Cranston - Warwick	" 1966	590,000
Warwick Cove	" 1966	286,000
Providence River & Harbor	Work in progress	13,900,000*

Navigation Studies (recently completed or in progress):
- Bissell Cove, North Kingston
- Bristol Harbor
- Dutch Island Harbor, Jamestown
- Fall River Harbor (Rhode Island and Massachusetts)
- Greenwich Cove, East Greenwich - Warwick
- Providence River and Harbor
- Sakonnet Harbor, Little Compton
- Seekonk River, East Providence - Pawtucket
- Warren River

Shore Protection Projects:
- Cliff Walk, Newport - Authorized 1964 $1,400,000

Comprehensive River Basin Study:
- North Atlantic Regional Water Resources Study - Authorized 1965
- Northeastern Water Supply Study - Authorized 1965

Hurricane & Tidal Flood Protection:		
Fox Point Barrier, Providence	Completed 1966	$16,000,000
Narragansett Pier (inactive)	Authorized 1962	2,490,000*
Point Judith (design complete)	" 1962	7,100,000*
Westerly	" 1965	5,700,000*

* Estimated figures

The Navy's activities have the most obvious and far-reaching effect of all federal agencies involved in Rhode Island's coastal region. This very unique relationship is principally due to the Navy's extensive land holdings and manpower requirements. Given the large size of its physical plant, the Navy is bound to strongly affect overall land and water use as well as the economic significance of the state's coastal region.

Pertinent facts relevant to the Navy's operations in Rhode Island include:

A total value of plant and equipment in the Narragansett Bay area, exclusive of ships, exceeding $400 million;

Employment of over 40,000 civilian and military personnel, making the Navy the largest employer in the state;

Activities responsible for over 70 percent of the total monetary expenditures and personal income generated from all Narragansett Bay activities;

Control over 30.7 miles of shoreline; and

Jurisdiction over portions of Narragansett Bay for such purposes as torpedo testing, anchorage, and dumping.

Table 3 lists the different naval commands situated at Newport, Quonset Point, and Davisville, the three locations at which Navy facilities are clustered.

Table 3

U.S. NAVY FACILITIES IN RHODE ISLAND

NEWPORT

Naval Base, Newport
Naval Station, Newport
Naval Supply Center, Newport
Navy Public Works Center, Newport
Marine Barracks, Newport
Navy Finance Office, Newport
Naval Communication Station, Newport (including stations in Jamestown and Middletown)
Fleet Training Center, Newport
Naval Hospital, Newport
Naval Dental Clinic, Newport
Naval Justice School, Newport
Naval Officer Candidate School, Newport
Naval Schools Command, Newport
Naval Underwater Weapons Research & Engineering Station, Newport
Naval Destroyer School, Newport
Naval War College, Newport
Service Squadron Two, U. S. Atlantic Fleet, Newport
Newport Detachment, U. S. Atlantic Fleet Combat Camera Group
Commissary Store, Newport
Sub-Board of Inspection and Survey, Newport
Mobile Technical Unit Eight, Newport
Cruiser-Destroyer Force, U. S. Atlantic Fleet, Newport

QUONSET POINT

Naval Air Station, Quonset Point
Fleet Weather Facility, Quonset Point
Naval Air Rework Facility, Quonset Point
Commander, Fleet Air, Quonset

DAVISVILLE

Naval Construction Battalion Center, Davisville
Naval Schools Construction, Davisville
Headquarters, Construction Battalions, U. S. Atlantic Fleet, Davisville

B. REGIONAL

The interstate compact serves a necessary and often vital role in the management and control of a state's coastal region. Natural and man-made forces which affect marine resources are unaffected by arbitrary political boundaries. Rhode Island's coastal resources, and any utility its inhabitants may derive from them, may be seriously threatened by actions and policies well removed from the state's political jurisdiction. Because of this strong interdependency among neighboring states, and to insure coordination and maximum efficiency, the interstate agency must be recognized as a most valuable level of governmental control.

1. New England River Basins Commission

The New England River Basins Commission, comprising the six New England states and New York, was established by President Johnson on September 6, 1967, under the authority of the Water Resources Planning Act of 1965. Its operational costs are evenly divided between the federal government and the seven participating states, with Rhode Island's contribution amounting to $10,000 annually. The Commission's main function, for which it has lead responsibility, is to assure continuing coordination between the New England states and the federal government in the planning and management of water and related land resources.

The Commission's first major study, which is slated to begin in fiscal year 1970, has much significance to Rhode Island's coastal region. This report, A Comprehensive Study of Water and Related Land Resources of Southeastern New England (SENE), will recommend a ten-to-fifteen year action program to conserve and develop water and related land resources for southeastern New England (an area which includes Narragansett Bay and Little Narragansett Bay). The report, estimated to cost $4 million, will be conducted by state, federal, and NERBC officials and promises to be the most comprehensive analysis ever presented on these resources.

Other studies and activities of NERBC include promoting wise use of flood plains; protecting against potential dangers of dams and helping to create positive values from the waters so impounded; coordinating between electric power development and other water resource values; and encouraging cooperative regional action in the management and control of water quality.

2. New England Regional Commission

The New England Regional Commission is a federal-state body authorized under Title V of the Public Works and Economic Development Act of 1965. It is composed of a federal co-chairman and the Governors of the six New England states. In general, the Commission

promotes the economic and social development of the New England region, with major emphasis placed on coordinating existing programs at the federal, state, and local levels.

In respect to the region's coastal area, the Commission has made a study of the marine industry of New England. More recently, the Commission has directed its efforts toward the environmental problems of the region. To determine the states' needs in this area, it sponsored a seminar on regional approaches to environmental control. Presently, the Regional Commission is considering taking on major responsibility for assuring a quality environment in New England. Recommended actions would have the Commission formulating policy, conducting research, and educating the public on pollution and related environmental problems.

3. New England Interstate Water Pollution Control Commission

Membership in the New England Interstate Water Pollution Control Commission consists of the six New England states and New York. The Commission performs advisory, planning, research, and coordination functions in water pollution research and policy-making. The Commission is primarily a liaison organization. Its principal function is to serve as a referee to member states in solving pollution problems of an interstate nature.

Over the years, the Commission has been active in many projects aimed at restoring the water quality of the region and at improving use of water. In 1947 it adopted a best-use classification system for interstate water. More recently, it was instrumental in setting water quality classification standards in virtually all the inland waters of its member states. It has also been suggested that the NEIWPCC be given training and enforcement responsibilities in dealing with the water pollution problem.

4. Atlantic States Marine Fisheries Commission

Rhode Island is a member of the Atlantic States Marine Fisheries Commission. This Commission is a research and deliberative body concerned with better utilization of the marine, shell, and anadromous fisheries of the Altantic seaboard. Its programs include research, preservation, and protection against overfishing, waste, and depletion; they are aimed at assuring a continuing yield of fisheries resources along the Atlantic seaboard. In addition, the Commission studies migratory species and coordinates state fishing policies and regulations among its fifteen member states.

This interstate compact operates on a budget of approximately $25,000 a year. The United States Fish and Wildlife Service functions as its official research agency.

5. Atlantic Waterfowl Council

Membership in the Altantic Waterfowl Council consists of all the Atlantic seaboard states; the states of Pennsylvania, West Virginia, and Vermont; and several Canadian provinces. The Council is concerned with coordinating the management of migratory waterfowl on the Atlantic Flyway. To achieve this, the Council recommends and reviews all interstate regulations pertaining to the management and protection of migratory birds. In addition, it facilitates the exchange of information and research conducted by the many independent state agencies represented.

6. New England Board of Higher Education

The New England Board of Higher Education, located at the University of New Hampshire, is a compact formed by the six New England state universities. This body serves as a liaison, coordinating educational programs at the separate universities in order to avoid wasteful duplication. In the field of marine education, the Board has designated the University of Rhode Island as the Graduate Degree University in Oceanography. The Board was instrumental in reaching an agreement whereby graduate students from other New England states pursuing a degree in oceanography at the University of Rhode Island not offered in their own states pay the same tuition as Rhode Island residents.

7. New England Council for Economic Development

The New England Council for Economic Development serves as a forum at which business, industry, and economic development leaders are brought together to investigate present and future opportunities in the New England area. The Council's involvement in the coastal environment is evidenced by a special program aimed at stimulating oceanographic and marine-oriented business in the region.

8. Coastal States Organization (Proposed)

In the beginning of 1970, representatives from 22 coastal states met in Savannah, Georgia, and a majority voted in favor of creating a new interstate agency to be known as the Coastal States Organization. The proposed Organization will become a reality when at least ten Governors of states, territories, and commonwealths bordering on the ocean, the Gulf of Mexico, or the Great Lakes apply for membership. The Rhode Island representative to this preliminary meeting, Dr. Lewis Alexander, voted favorably on a resolution to adopt the Provisional Articles of Organization and, in a letter to Governor Frank Licht, strongly recommended that Rhode Island become a member of this Organization and appoint a delegate to the Governing Board.

The Organization, if established, promises to confer on member states a more powerful voice in coastal decisions. Its functions, as set forth in Article IV of the Articles of Organization, are to:

"A. Gather, analyze and disseminate information on marine and coastal affairs of interest to the States in the management, development and regulation of their marine and coastal resources.

"B. Identify problems of mutual concern with marine and coastal resources.

"C. Develop programs to improve cooperation among the States and between such states and the Federal Government relating to the use and conservation of marine and coastal resources, and to marine science and engineering.

"D. Provide a means by which the States may be adequately involved and represented on a continuing basis in the formulation, development, and implementation of national marine and coastal resource programs and policies."

C. STATE

The Rhode Island state government is a distinct governmental entity in its own right. The people of Rhode Island have agreed to be governed under the provisions of a Constitution and a series of statutes conforming to the state's constitutional powers. Within its legal framework, the state government possesses powerful and direct authority relevant to its coastal zone. To a large extent, this authority is sanctioned by the police power of government. This power has the broadest range within state government and, in essence, permits the state to exert control over the use of private property and the actions of individuals.

The states possess all of the ingredients necessary for lead responsibility in their respective coastal zones: financial and personnel resources, administrative mechanisms, enforcement powers, and constitutional authority. One of the most important conclusions reached by the Commission on Marine Science, Engineering and Resources is that the states have failed to rationally assume this key position. The federal role, although a significant one, is primarily envisioned as a support and technical assistance program for states, with regulatory activities provided for by a limited number of specific federal services. These programs are extremely vital to the coastal zone but, at present, are not being fully utilized. The problem is principally one of poor coordination, and it is the states that are largely to blame. The state of Rhode Island should serve as the central link among all kinds of coastal participation within its territorial boundaries. However, the fragmentation and diffusion of the state's programs seriously hinder the effectiveness of any federal-state relationship and simultaneously create an inherently weak and strained internal structure. This situation is typical of coastal states and has been cited as justification for each state to establish an agency with broad responsibilities in the coastal zone. Such a body would be able to work efficiently with the federal government and, at the same time, to deal with the totality of complex problems of the estuarine environment.

1. Department of Natural Resources

The Department of Natural Resources has broad responsibility over all the natural resources of the state and, as such, is charged with ensuring their protection, development, and utilization. The Department operates through six separate divisions (Parks and Recreation, Conservation, Harbors and Rivers, Enforcement, Planning and Development, and Agriculture), a seven-member Governor's Advisory Council, and a Department Director and Deputy Director. Many of these governmental bodies, in full recognition of the state's substantial endowment of water-related resources, perform a multiplicity of activities relevant to the state's marine environment.

a. Division of Parks and Recreation

This Division carries out all activities related to the operation and maintenance of state parks and recreation areas. Many of these facilities are located within the Rhode Island coastal zone, more specifically, on the shoreline of Narragansett Bay and Rhode Island Sound. Those parks and beaches located on the coastline are most indicative of the state's commitment to coastal outdoor recreation. In total, they utilize just under eleven miles of saltwater coastline.

Table 4 lists state-owned recreational facilities along the saltwater coast and shows access to saltwater or activities available at each site.

b. Division of Conservation

The Division of Conservation is responsible for the management and operation of the natural areas of the state, representing a total of over 30,000 acres. Many of these management areas, such as marshes and wetlands, boat launching sites, research facilities, conservation areas, and public fishing areas add most significantly to the utilization of the coastal environment.

The Division's water-related operations include marine research, management of shellfish and finfish, game management and research, management of a sport fisheries program, delineating intertidal salt marshes under the state's zoning and filling laws, and operation of fish hatcheries. This Division also serves as the liaison with federal grants-in-aid programs that support wildlife and fishing activities.

c. Division of Harbors and Rivers

The Division of Harbors and Rivers is heavily involved with the navigable waters of Rhode Island. This Division administers laws pertaining to the development and improvement of state rivers and public tidewaters. It has responsibility for the construction and operation of dams, reservoirs, and coastal works. It administers programs in river diversion, flood control, and shore erosion and has responsibility in watershed drainage and marshland preservation. The Division, through the issuance of permits, has control over all construction that takes place in tidal waters and rivers. In performing most of these activities, the Division works closely with the United States Army Corps of Engineers and other concerned federal agencies.

Another co-operative effort exists between this Division and the United States Geological Survey. The Division maintains fifteen steam-guaging stations to acquire data on run-off from certain

Table 4

STATE RECREATIONAL FACILITIES ON THE SHORELINE OF NARRAGANSETT BAY AND RHODE ISLAND SOUND

Salt Water Beaches	Salt Water Shoreline	Activities*
Block Island	2,640 ft.	B, H, L, O
Sand Hill Cove	1,760 ft.	B, K, O, P
Scarborough	1,760 ft.	B, H, L, O, W
East Matunuck	1,760 ft.	B, H, K, L, S
Misquamicut	3,520 ft.	B, H, K, L, O, S, W
Teddy's Beach	390 ft.	B, K
Goddard Park	1,485 ft.	B, H, L, O, W
Grinnell's	250 ft.	B, H, K
Galilee	660 ft.	B
Other Waterfront Areas		
Colt	8,750 ft.	D, K, O
Haines	2,800 ft.	A, K
Fort Adams	7,000 ft.	Under Construction
Brenton's Point	9,300 ft.	D, F, K, O
Charlestown Breachway	1,050 ft.	B (Unsupervised), L, R, T
Quonochontaug (partial)	450 ft.**	F, L, R
Ninigret Conservation	13,200 ft.	B (Unsupervised), F, T, R

*CODE:

A - Boat Launching Area
B - Supervised Bathing
D - Scenic Drive
F - Fishing
H - Bathhouse and Rest Rooms
K - Picnicking
L - Parking Lot
O - Observation Area
P - Playground
R - Rest Rooms
S - Surfing
T - Trailer Camping
W - Boardwalk

** Does not include footage on Pond.

watersheds. The U.S. Geological Survey meets approximately 50 percent of the cost of maintaining and operating these stations.

Additional activities of this Division are maintaining state piers and making berthing space available to pleasure, charter, and commercial fishing boats; leasing state-owned waterfront buildings and land; licensing and regulating bay pilots; and administering fishing tournaments.

d. Division of Enforcement

In fiscal year 1968, the Division of Enforcement established a separate marine patrol whose activities relate to both coastal land and water in Rhode Island. This patrol is comprised of eighteen men and seven patrol boats. Among its responsibilities (for which it has the power of arrest) are patrolling coastal waters in order to prevent theft and vandalism on boats; enforcing pollution laws for the Department of Health in respect to shellfishing in uncertified areas; enforcing all hunting and fishing laws; conducting boat inspections for compliance with the safety provisions of the motorboat laws; investigation of boating accidents; recovery of stolen boats; and enforcement of lobster and shellfish laws. These activities are carried out in co-operation with local enforcement agencies, State Police, the state Department of Health; and the U.S. Coast Guard. The Park Police Section also has responsibility in the coastal zone, as it is charged with enforcing all laws and rules at public beaches and park areas.

The Division also maintains a licensing system whereby it issues lobster and shellfish permits, in addition to all other fishing and hunting licenses. It also assists and supervises the registration of motorboats which is carried out by the Registry of Motor Vehicles.

e. Division of Planning and Development

The Division of Planning and Development consists of three sections: Land Acquisition, Engineering, and Information and Education.

The Green Acres Land Acquisition Program was created by a legislative act in 1964. Its objective is to aid cities and towns in acquiring and developing land for open space preservation, recreation, and conservation uses. The program is supported through federal, state and local participation. Federal funds are made available by the Bureau of Outdoor Recreation and the Department of Housing and Urban Development. The state's contribution is financed by special bond issues. The municipalities, which are the beneficiaries of the land, contribute approximately 25 percent of its total cost. Since many of these projects are located within the coastal area of Rhode Island, this program represents a

significant effort to promote public recreation and conservation interests in the marine environment. This program has led to the purchase and development of 767 acres of land along the scarce coastal shoreline and has provided 36,110 feet of public access to coastal waters.

The Division's Engineering Section provides engineering and other technical skills which are utilized in planning new projects and developing existing ones for the other five divisions of the Department of Natural Resources. All new projects, facilities, construction, and improvements that take place in the estuarine environment are first evaluated and researched by this Division.

The Information and Education Section provides literature, films, lectures, displays, and informative tours on various subjects pertaining to the natural resources of the state. Many of these programs have a very direct effect in educating the public to the delights and problems to be found in the coastal area.

2. Department of Health

The Department of Health is designated as the state's water pollution control agency. The Director of Health is assisted by an Advisory Water Pollution Board. This Board is composed of five members: four public members appointed by the Governor, plus the Director of Natural Resources, ex officio. The Board is charged with advising and recommending to the Director those policies, plans, and goals it deems desirable.

The Director of Health is assigned very definite duties in connection with water pollution. The Division of Water Supply and Pollution Control was established to carry out the following activities specified in the General Laws, Section 46-12-3:

"to develop comprehensive programs for the prevention, control and abatement of new or existing pollution of the waters of this state;

"to advise, consult and cooperate with other agencies of the state, the federal government, other state and interstate agencies and with affected groups, political

subdivisions and industries in the furtherance of the purposes of this Act;

"to accept and administer loans and grants from the federal government and from other sources, public or private, for the carrying out of any of its functions, which loans and grants shall not be expended for other than the purposes for which provided;

"to adopt, modify or repeal and promulgate, after due notice and hearing, standards of water quality and to classify the waters of the state accordingly;

"to administer state grants to municipalities and political subdivisions for the construction of sewage treatment works;

"to issue, continue in effect, revoke, modify or deny under such conditions as he may prescribe, to prevent, control or abate pollution orders of approval for the discharge of sewage into the waters of this state and for the installation, modification or operation of disposal systems or any part thereof;

"to make, issue, amend and revoke reasonable rules and regulations for the prevention, control and abatement of pollution and the enforcement of orders issued thereunder."

The law further increases the control of the Director of Health by making it unlawful to cause any pollution of the waters of the state. As specified in Section 46-12-4, Department of Health approval is required before one may carry out the following activities:

"the construction, installation or modification of any sewage disposal system ...; any activity which may increase the volume or strength of any sewage discharge occurring at the time of the enactment of this chapter; the construction or installation of any industrial, commercial or other establishment or any modification thereof or addition thereto or do any undertaking, the operation of which may result in a discharge of sewage into the waters of the state."

If the Director of Health believes that a violation is occurring, an investigation is made. A hearing is held to obtain testimony on behalf of the person believed to be polluting the waters. If the violation is upheld, the person is given a reasonable amount of time to correct the violation and is advised of possible solutions to the pollution problem. Violation of orders from the Director of Health carries a fine of up to $500 and/or imprisonment for not more than 30 days, and each day that the violation is repeated or continued will be considered a separate and distinct offense.

The Department of Health's classification of the waters of the state is one of its most important functions. The basic five-level quality classification for salt water incorporates the following use restrictions:

Class SA - suitable for all sea water uses including shellfish harvest for direct human consumption, bathing and other water contact sports.

Class SB - suitable for bathing, other recreational purposes, industrial cooling and shellfish harvesting for human consumption after depuration; excellent fish and wildlife habitat; good aesthetic value.

Class SC - suitable fish, shellfish and wildlife habitat; suitable for recreational boating, and industrial cooling; good aesthetic value.

Class SD - suitable for navigation, industrial cooling, and navigation of fish; good aesthetic value.

Class SE - nuisance; unsuitable for most uses.

Effluent surveillance is conducted monthly by the Department of Health at all major or critical municipal and industrial waste treatment plants. In addition, operators of waste treatment plants are required to submit daily reports on the plant's operation. To evaluate water quality in tidal streams and areas, samples at various stages are collected and analyzed periodically. Routine weekly samples are taken at critical points in upper Narragansett Bay, Mount Hope Bay, Greenwich Bay, the Warren and Barrington Rivers, and other water bodies as required.

3. Department of Public Works

The Division of Roads and Bridges within the Department of Public Works is responsible for the acquisition, design, construction, operation, and maintenance of all state roads and bridges. Since many of these arteries are interwoven within the coastal land and cross over the water, their presence greatly affects the development of the region. Special procedures are employed to assure that Public Works projects do not indiscriminately disturb the estuarine environment. The Department of Public Works is required to hold public hearings where it presents several alternative corridors in an attempt to find the most desirable route. The Department of Natural Resources is charged with evaluating these routes with respect to the potential damage inflicted on fish and wildlife. A second review is required on the proposed design of the new project. The Department of Natural Resources may again criticize the plans if, for example, it believes drainage aspects of the project will seriously alter neighboring water bodies and/or marshes. And lastly, all proposed bridges which span the navigable waters of Rhode Island must receive a permit from the Division of Harbors and Rivers. It is hoped that these checks will protect the natural resource base and other uses of the coastal zone.

4. Department of Community Affairs

The Department of Community Affairs was established in recognition of the state's obligation to supply technical and financial aid to its municipalities. This assistance is primarily aimed at enabling communities to effectively plan and conduct physical, economic, and resource programs for community development. In meeting this responsibility, the Department coordinates relevant activities of the state, other levels of government, and private interests.

This agency's broad involvement in the coastal subdivisions of the state is evidenced by its authority in most aspects of community development. Specific coastal activities include assistance to municipalities in preparing plans for land use, zoning controls,

water supply, flood control, parks, recreation areas, and conservation of natural resources. The Department promotes the utilization of state resources and coordinates federal programs in order to aid the municipalities' development in these areas. To accomplish this, the Department is involved in such federal and state financial assistance programs as open space, water supply facilities, sewage and waste treatment works, water development, conservation, and urban beautification.

5. Rhode Island Development Council

The Rhode Island Development Council, responsible for promoting economic development within the state, can look with pleasure at its marine environment. The coastal region, in close proximity to all parts of Rhode Island, enhances the state's ability to attract industry. This feature of the coastal zone will undoubtedly become more significant in the future, as congestion and other environmental problems reach higher proportions in other regions of the country, causing industry and labor to seek out a quality environment more actively.

The Development Council has initiated several activities within its Division of Business and Industry and its Tourist Promotion Division which should strengthen the economic position of the coastal region.

a. Division of Business and Industry

In 1967, a recreation development program was established whereby the Division works with the prospective private developer of a recreational facility from initial inquiry to consummation. Assistance is given in locating desirable sites, financing, and meeting zoning requirements and pre-construction tests. Through the Division's financing plan, loans arranged with brokers and other local institutions are guaranteed by the state. This program has already demonstrated the state's ability to promote the region's private recreational development; new coastal recreational facilities aided include several motels and a beach cottage development.

An Oceanography Development Program, also established in 1967, is geared towards establishing marine research and oceanography as a major growth industry. Communication has been established by letters, telephone calls, and personal visits to firms throughout the country engaged in oceanography or about to enter the industry. The Development Council's campaign highlights the specific advantages Rhode Island offers as a site for ocean-research facilities. Through its efforts, an oceanographic research park adjacent to the University of Rhode Island's Marine Campus has been proposed. Problems associated with sewage and water supply have not yet permitted the Council to offer the land to prospective firms, but the

success of this project is confidently anticipated by the Council.

b. Tourist Promotion Division

The Tourist Promotion Division operates a program aimed at attracting visitors to Rhode Island. It has been firmly established that the state's appeal to tourists is largely due to the aesthetic and recreational attributes offered by the coastal region. This Division's methods consist of advertising in newspapers and other media, encouraging tourist inquiries, circulating films about Rhode Island, participating in travel shows, and distributing literature. The Division's total effort in this area is predicated on the belief that tourism can and should be a major industry of Rhode Island.

6. Water Resources Board

The Water Resources Board is charged with major responsibility for planning and coordinating all programs for the development of the water resources of the state. In conjunction with this responsibility, the Board is required to formulate a long-range plan for the development, conservation, and use of water resources. Its powers include the ability to acquire land, to construct water supply facilities, and to review and approve all municipal and private activities involved in the distribution of potable water.

The Water Resources Board maintains a close association with interstate bodies which have a direct concern with Rhode Island's coastal waters. The Board participates in the New England River Basins Commission's activities and is actively involved in that agency's Southeastern New England Water and Related Land Resources Study, which will include a comprehensive study of the Narragansett Bay. The Board also represents the state at the North Atlantic Regional Water Resources Study Co-ordinating Committee meetings. This compact is charged with the effective and orderly growth of water and related land resources for the entire northeastern part of the United States. The Board also maintains a close tie with the Water Resources Council at the federal level.

At present, Rhode Island's coastal waters are not used for drinking purposes, but future developments may make desalination a practical and economic solution to its water needs. If this comes to pass, the Water Resources Board will undoubtedly assume very significant control over the use of these waters.

7. The Statewide Comprehensive Transportation and Land Use Planning Program

The Statewide Comprehensive Transportation and Land Use Planning Program is sponsored by the Rhode Island Departments of Public Works and Community Affairs. Technical and financial assistance is

supplied by the United States Departments of Housing and Urban Development and Transportation, and by the New England Regional Commission. This agency is basically authorized to establish long-range plans and programs for the state in cooperation with local, federal and other state authorities.

The general problem areas of the Program are the environment, economic development, conservation and use of natural resources, transportation, and public facilities and services. All of these issues have, to a varying degree, a bearing on the coastal region; and as plans and recommendations are submitted by the Statewide Planning Program, they will undoubtedly have a significant effect on the development of estuarine areas.

Projects currently underway which are of distinct significance to the coastal region include plans for land use, water supply and distribution, sewage services, and recreation. In addition, the Program has assisted in a special study on public rights-of-way to the water and has actively participated and provided staff for the Technical Committee on the Rhode Island Coastal Zone.

8. University of Rhode Island

Approximately ten years ago, the University of Rhode Island decided to direct its efforts actively toward the sea. Today, the University's marine programs represent the major force in marine education and research in the state and have propelled the University to national as well as worldwide prominence.

The Graduate School of Oceanography has been officially designated by the state as having the responsibility for education in the marine sciences and related technologies. To aid it in carrying out its activities, the Graduate School receives an annual state operating appropriation of approximately $700,000 and is awarded contracts and grants from other sources totalling over $1.5 million. At the present time, the University's marine educational programs include graduate courses in biological, chemical, geological, and physical oceanography; ocean engineering; marine resources economics; marine affairs; and marine pharmacology and pharmacognesy. There are also undergraduate programs leading to degrees in fisheries and marine technology and in marine food technology. In addition, other departments such as biology, botany, agronomy, civil engineering, and community planning are involved in special marine-oriented programs, in recognition of their disciplines' adaptability to this area.

The University is also actively involved in marine-oriented research and related activities. For example, the Graduate School supports a Marine Experiment Station on the shore of Point Judith Pond. This station's research is directed at fully utilizing the sea's potential as a source of food. The Graduate School also

operates the research vessel Trident, a 180-foot vessel. Since its acquisition from the federal government in 1962, this ship has made extensive ocean research expeditions. The R/V Trident is entirely supported by federal contracts and grants from the Office of Naval Research and the National Science Foundation. Subjects of other marine research projects currently underway or recently completed include bio-economic management models for ocean fisheries, aquaculture techniques, economic impact of Narragansett Bay, alternative uses of the shoreline, tidal marsh productivity, improving the effectiveness of fishing gear, waste disposal problems, erosion problems on the south shore beaches of Rhode Island, pollution in Narragansett Bay, control of oil spills, and the impact of electric power plants located on the Rhode Island shoreline.

In addition, the University supports several organizations with a marine orientation. The New England Marine Resources Information Program is designed to establish communication links between sources of technical information, and commercial and industrial users. The International Center for Development of Marine Resources offers its expertise on marine resource problems to less-developed nations; initial emphasis has been placed on fisheries management and marine resource decision-making. The Law of the Sea Institute is concerned with legal problems of ocean resource development which may encompass state, national, and international jurisdictions. Finally, the newly-created University of Rhode Island Marine Advisory Program will coordinate all the advisory services now offered by the University to the marine public.

9. Other Agencies

Several other independent agencies have a limited but nonetheless very distinct responsibility in the coastal zone.

-Within the Executive Department, the Registry of Motor Vehicles is responsible for the registration of all motorboats; and the Division of State Police assists the Department of Natural Resources' Division of Enforcement and the U.S. Coast Guard in enforcing all laws and regulations relevant to the coastal environment.

-The Division of Public Utilities, operating out of the Department of Business Regulation, supervises and regulates the utility companies of the state. Many of these companies, notably electric utilities, operate along the shoreline, and others utilize Narragansett Bay for transmission purposes.

-The Rhode Island Atomic Energy Commission advises the Governor and legislators with respect to atomic industrial development. The proposal of a nuclear power plant along the Rhode Island coastline appears a certainty in the near future, and this body will be

responsible for advising its construction and operation.

-The state has also established a number of special agencies and commissions to look into specific problems involving the coastal environment and to make necessary recommendations. These advisory bodies are:

1. Commission on Discovery and Utilization of Rights-of-Way;

2. State Boundary Lines Adjustment Commission (inactive);

3. Commission to Study Flooding at Beavertail Road, Jamestown;

4. Commission to Study and Recommend Methods of Correcting the Polluted Bottom of Upper Narragansett Bay;

5. Commission to Study Enactment of a State-wide Zoning Code; and

6. Commission to Study the Feasibility of Forming a Marine Patrol within the State Police.

D. LOCAL

The municipalities which are included in the Rhode Island coastal zone possess the power to control substantially the development of the marine environment. Their ability to do so is derived from the delegation of responsibility, usually through legislative acts, by the state government. This arrangement, which has given very broad powers to local areas, produces an uncertain arrangement whereby communities are in a position to assume as much or as little responsibility as they desire. In reality, each political subdivision determines on the basis of its needs and resources the role it will assume in such marine activities as coastal recreation, pollution control and waste disposal, navigation, and economic development. Thus, there does not exist any single description of local action. At the same time, in many instances little information is available on the coastal activities of a specific community. This Committee recognizes the need for closer study of the powers and jurisdiction of local entities in order to evaluate more accurately the effectiveness of public management of the state's coastal resources.

1. Zoning

The traditional mechanism by which local governments guide physical development is land-use regulation. In theory, zoning is a most powerful tool. It can permit municipalities to designate areas as residential, commercial, industrial, or recreational. Within industrial areas, it can determine whether development is for heavy or light industry, for fishing, or for a port. It can specify the type and location of harbor development and can strongly influence agricultural activity. Potentially, zoning can help assure the proper allocation of valuable coastal property. In practice, local zoning ordinances may not always be successful. Pressures from industrial, commercial, or residential owners, coupled with the growing demand for tax revenue (which is heavily dependent on land use), may permit political factors to outweigh sound land-use policy.

Municipalities have been exercising the powers of zoning and using the concepts of land-use planning for many years. It must be noted, however, that zoning is a prerogative of the state, that it is constitutionally a state power and may be reviewed periodically by the state government. Several coastal states have recognized the weaknesses inherent in local zoning and, in order to insure proper utilization of their coastal property, have enacted zoning ordinances. For example, shoreline zoning is exercised by the states of Wisconsin, Hawaii, and Oregon. Federal involvement in coastal zone management has strongly supported state zoning. In Our Nation and the Sea, a report prepared in 1969 by the Commission on Marine Science, Engineering, and Resources, the Commission states that "rapidly intensifying use of coastal areas already has outrun the capabilities of local governments to plan their orderly

development and to resolve conflicts". Further criticism is presented in a report entitled Coordinating Governmental Coastal Activities, prepared by the Task Group on Interagency Coordination, Federal-State Relationships, and Legal Problems of the Committee on Multiple Use of the Coastal Zone. Their research concluded that:

> "Coastal zoning decisions made by municipalities are normally based upon what is best for that locality, generally with short-range returns being the dominant consideration. It must be clear that such decisions will not always coincide with the national (or State) interest...."

2. Other Activities

In addition to local planning and zoning boards, which basically set the limitations and create the framework from which most coastal activity follows, there exist among the municipalities many functionally-structured commissions whose responsibilities relate to individual coastal activities. Harbor commissions, recreation boards, conservation commissions, development commissions, waterfront authorities, port divisions, and a commercial fishing development commission occur in varying numbers among the coastal municipalities.

a. Recreation

Communities' responsibilities in the field of recreation are to plan and provide facilities for the recreational needs of their citizens. Water-based activities are clearly one of the most popular forms of recreation. Municipally-owned beaches, public fishing areas, parks, boat launching sites, and other recreational facilities accounted for 9.56 miles of coastal shoreline in 1967. In all, fifteen coastal communities own, operate, and manage at least one beach. New Shoreham will soon be added to the list, with the establishment of its first town beach set for late 1970. In addition, thirteen boat launching sites are owned and operated by seven municipalities.

b. Waste Disposal and Pollution Control

Waste disposal and sewage treatment are predominantly local responsibilities. Municipal sewer systems and/or treatment plants along the Narragansett Bay handle an estimated 150 million gallons per day of liquid wastes. As of the beginning of 1969, 20 percent of these wastes received primary treatment (30-50 percent of polluting material removed); 70 percent received secondary treatment (90-95 percent removed); and less that 1 percent received tertiary treatment (all pollutants removed). Those coastal communities which do not maintain any municipal sewer systems or treatment plants are Charlestown, South Kingstown, North Kingstown, Barrington, Tiverton, Little Compton, Portsmouth, Jamestown, and New Shoreham. These

towns must rely on cesspools, leaching fields, and other devices in meeting their waste disposal problems. The effectiveness of these methods is questionable, as there is always the danger that untreated wastes may enter the bay and coastal waters through natural seepage. As population continues to shift to the lower bay and southern Rhode Island towns, these municipalities must begin to meet their responsibilities in this area (many have initiated plans already).[15]

A rough estimate of Rhode Island municipalities' share in waste disposal and marine pollution activity was prepared from a federally-sponsored questionnaire. The findings revealed that 80 percent of the planning, 100 percent of the development and operation, and 75 percent of the financing is carried out by Rhode Island communities.[16] The state government supplies the remaining effort, in planning and financing, and is totally responsible for regulating these activities.

c. Conservation

In 1965, the state of Rhode Island passed enabling legislation for the creation of Conservation Commissions within local communities. Section 45-35-1 of the legislation gives certain responsibilities applicable to the coastal zone to these proposed bodies:

"to promote and develop the natural resources;

"to preserve natural aesthetic areas within said municipalities;

"to keep an index of all open spaces with the city or town... including open marshland, swamps and other wetlands for the purpose of obtaining information on the proper use of such areas;

"to recommend a program for the better promotion, development, utilization, or preservation of open areas, streams, shore, wooded areas, roadsides, swamps, marshlands, and natural aesthetic areas."

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15 Rorholm et al.,p. 163.

16 Maton, Gilbert, et al., A Perspective of Regional and State Marine Environmental Activities: A Questionnaire Survey, Statistics and Observations (Washington, D. C.: Thompson and Company, 1968), II, e, 6.

In addition, Section 45-35-3 allows the commissions, with town approval, to receive or acquire lands, buildings, and other properties on behalf of the municipality and to arrange these properties in accordance with the provisions of 45-35-1.

The following coastal communities have established conservation commissions: Barrington, Bristol, Cranston, East Greenwich, East Providence, Middletown, Narragansett, Newport, North Kingstown, Portsmouth, South Kingstown, Tiverton, Warren, Warwick, and Westerly. The commissions are extremely limited in their finances, which in turn restricts their acquisitions and their overall activities.

The commissions have formed an Association of Conservation Commissions, a body composed of members from the separate commissions. In addition, the Department of Natural Resources assists in the performance of the commission's duties.

d. Harbor and Port Activity

The use of the coastal zone for water transportation falls squarely within the constitutionalauthority of the federal government. Nevertheless, several communities maintain a role in this activity, in recognition of the American federal system as being one of shared responsibility. The local governments' involvement in navigation ranges from limited control and regulation of maritime commerce, to development and promotion of harbors and ports. Coastal municipalities identified as maintaining harbor commissions and/or harbormasters include Bristol, Jamestown, Portsmouth, Providence, Cranston, East Providence, and Newport.

The Port of Providence stands out as the single most important water transportation facility in the state. The City of Providence, through its Port of Providence agency within the Public Works Department, is responsible for its operation. In addition, the City owns the port's largest and most active public wharf. The Municipal Wharf, situated at Fields Point, can accommodate six large vessels simultaneously, has available 45 acres of open storage space and an additional 143,000 square feet in warehouse facilities, and offers leased areas to private firms at the north end of its property.

Concern over the lack of growth in tonnage in recent years and over the heavy dependency on two products, petroleum and coal, has led many to question the port's economic strength. The Port of Providence agency has initiated a three-fold program to revitalize the port and its revenue-producing capacity. The program consists of (1) revising the tariff schedules; (2) instituting new lease schedules to encourage more efficient use of city-owned property; and (3) promoting new industry in Rhode Island and encouraging existing firms to utilize the port's facilities.

e. Economic Development

Economic development is a concern of every community. To encourage and guide economic development, a number of municipalities have established special commissions. They have a variety of names, and although their organizational structures may differ, their common aim is to promote economic growth. The shoreline and adjacent land area offer a highly lucrative base from which to generate economic activity. Coastal communities have, with varying success, attracted tourist and oceanographic facilities, industrial firms, and public utilities to their localities. Those coastal towns and municipalities having commissions responsible for economic development are Bristol, Charlestown, North Kingstown, Providence, Cranston, East Providence, Newport, and Warwick.

f. Fisheries

Local governments are only slightly involved with fisheries. Some communities provide shore-based facilities and marinas used by recreational fishermen, but, on the whole, municipal functions are not thought of as including fishing activity. In the state of Rhode Island there is one exception to this passive role: the City of Newport has established a Commercial Fishing Development Commission to study needs and to recommend programs to improve the local commercial fishing industry.

E. PRIVATE SECTOR

A listing of organizations involved in Rhode Island's coastal zone would not be complete without mention of the many associations which have dedicated themselves, for various reasons, to the state's marine environment. These private groups represent an additional sphere of influence; their activities often fill in areas where public action is wanting. Sometimes they help to shape government priorities into closer conformance with the wishes of the citizenry. In other instances, they serve as protective mechanisms to insure that their interests in the coastal region are upheld. Public management of the coastal zone must recognize and be prepared to work with these interest groups and, where justified, must meet their requests.

The following is a partial list of private organizations in the coastal zone which in this Committee's opinion serve a vital function and represent a substantial number of Rhode Island citizens.

1. Conservation and Preservation

Audubon Society of Rhode Island
Ecology Action of Rhode Island, Inc.
League of Women Voters
Natural Resources Group
Rhode Island Clean Waters Association
Rhode Island Historic Preservation Society
Rhode Island Wildlife Federation

2. Recreation

Federated Rhode Island Sportsmen's Clubs, Inc.
Narragansett Bay Yachting Association
Rhode Island Family Camper's Association
Rhode Island League of Anglers
Rhode Island Mobile Sportsfishermen's Association
Rhode Island Party and Charter Boat Association

3. Commercial Fishing

Eastern Seafood Shellfish Cooperative
Narragansett Bay Fishermen's Association
Point Judith Fishermen's Cooperative Association, Inc.
Rhode Island Fishermen's Association

4. Tourism

Rhode Island Hotel and Motel Association
Rhode Island Tourist/Travel Association

5. Navigation and Shipping

Rhode Island Dredger's Association
Rhode Island Pilot's Association
Rhode Island Propeller Club

6. Marine-Oriented Industry

Rhode Island Marine Trade Association
Rhode Island Petroleum Association
Narragansett Electric Company (and other utilities)

7. Economic Development

Greater Providence Chamber of Commerce
Southern New England Marine Science Association
Financial institutions

8. Marine Research

Nereus Corporation
Raytheon's Marine Research Laboratory

PART THREE: ACTIVITIES AND PROBLEMS

The preceding section, in outlining government agencies, provides some indication of the tremendous variety of activities which are involved in the coastal zone, the area shown in Figure 3. This section describes activities and conditions more fully as to intensity and location, adding others which are not covered by the discussion of existing agencies.[17] It then identifies major problem areas which arise from such activities.

Activities and Conditions

A. RECREATION, CONSERVATION, AND OPEN SPACE

Recreation and conservation comprise one of the principal uses of the coastal zone, and one which is probably more spread out over the total land and water area than any other. The following brief overview, for instance, shows such diversified forms as swimming and diving in the water, boating and operation of other vehicles on or in the water, fishing and hunting along the coast or offshore, participation in assorted sporting activities inland, and enjoyment of land set aside for conservation.

1. Swimming, Surfing, and Sports Diving

Rhode Island's beaches are among its most famous assets; the state has almost 60 miles of sandy beach frontage, although only about 35 percent is now being used for water-oriented recreation.[18] A count shows over 70 separate beaches located in the coastal zone (see Figure 4). About fifty of these are open to the public, including eight state beach facilities as well as municipal beaches in fifteen towns. The areas are scattered along the entire coastline except for Providence Harbor, the Seekonk River, the western shores of Little Compton and Block Island, and Navy-owned portions. The heaviest concentrations of beaches can be found along the south shore and just north of Point Judith. In terms of use, it was estimated in 1965 that on a typical summer Sunday upwards of 200,000 people visited Rhode Island salt water beaches (their total optimum capacity at any one time was 179,000 persons).[19]

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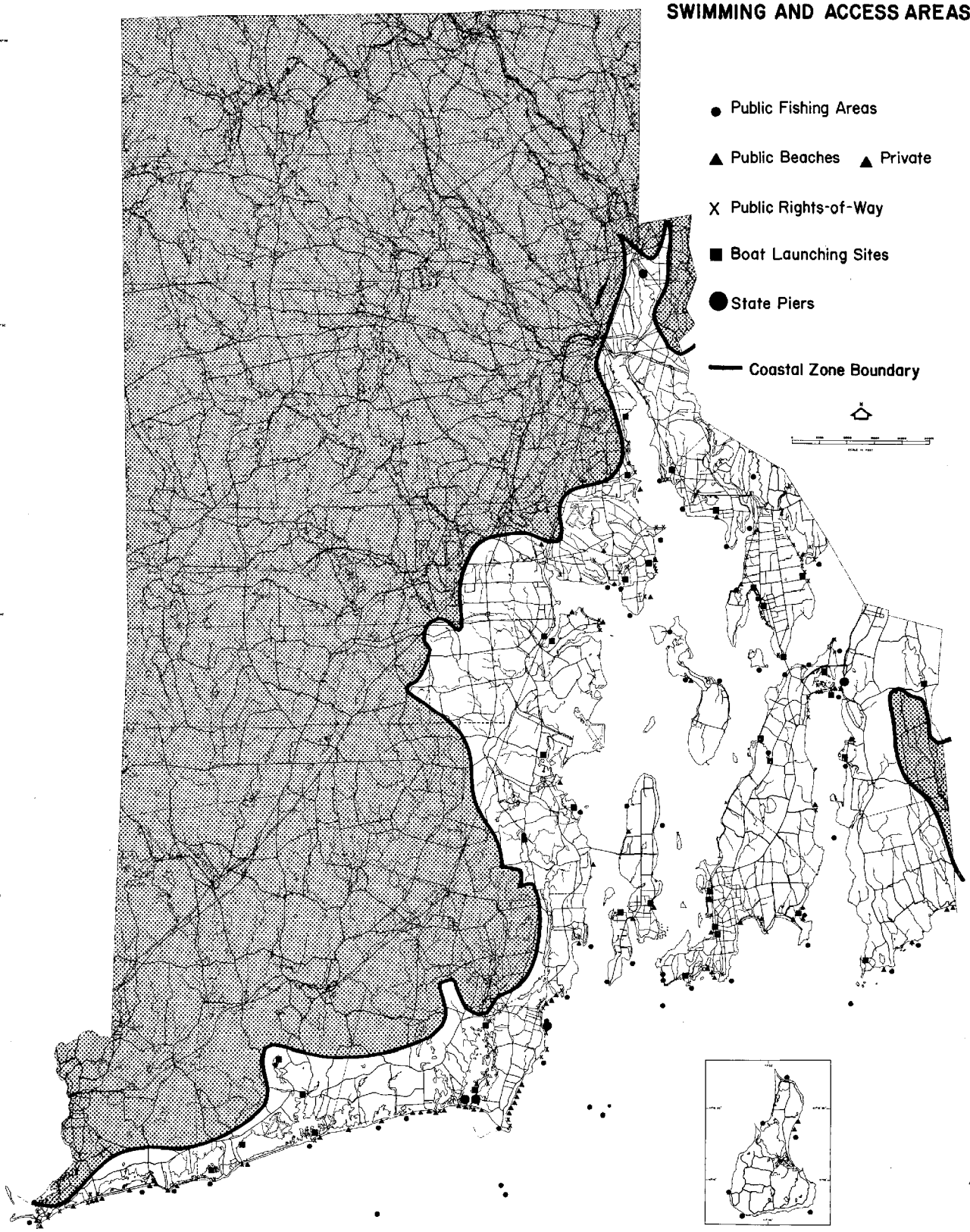
17 A more detailed analysis can be found in the Rorholm study.

18 Rhode Island Statewide Planning Program, Plan for Recreation, Conservation, and Open Space, p. 25.

19 Ibid., p. 30.

FIGURE 4

RECREATIONAL FISHING, SWIMMING AND ACCESS AREAS



As for surfing, some of the most popular sites are Point Judith, the southern end of the Narragansett Town Beach, Deep Hole and Green Hill in South Kingstown, East Beach in Charlestown, and Easton's Beach in Newport.

The waters of Narragansett Bay are highly attractive to skin divers and scuba divers because of their relative accessibility, warmth, clarity, and rocky bottom. The most-frequented areas are the extremities of the mainland and islands: Sakonnet Point in Little Compton; Sachuest and Easton's Points in Middletown; Cliff Walk, Land's End, Kings Beach, Brenton Reef, Butterball Rock, Agazzis Beach, and Castle Hill in Newport; Fort Wetherill and Beavertail Point in Jamestown; and Narragansett Shores and the Point Judith breakwater in Narragansett. One source estimates that 500 to 600 divers operate in the bay on a good Saturday or Sunday. Also, in 1967 Rhode Island was the site of seventeen official regional competitions, drawing nearly 2000 participants in all.[20]

2. Boating and Use of Other Vehicles

As noted in an earlier section, nearly 15,000 pleasure motorboats were registered in the state in 1968. To this figure must be added sailboats and other non-powered craft, and boats registered outside the state but used in Rhode Island. Different sources disagree on the number of user-days which are generated, but some idea of the level of associated shoreline activity can be gained by looking at boating facilities.

Narragansett Bay yacht clubs and marinas provided mooring or dock space for 4,545 boats during the summer of 1967[21]; this does not include the five yacht clubs, nine yacht basins, eight boatyards, and numerous state-owned berthings on the southern shore and Block Island. Within the entire coastal zone, there are 26 yacht clubs, 25 yacht basins and harbors, 35 boatyards, and eight charter boat enterprises (see Figure 5). In addition, the state Department of Natural Resources provides guest moorings at ten separate locations (see Figure 5); maintains five state piers, two of which have space available for pleasure boats (see Figure 4); and has opened a large complex of finger piers at Galilee. Other government-run facilities include municipal finger piers at Jamestown and Newport, a former state pier at Bristol which was transferred to town ownership in 1968, and a Coast Guard pier at Galilee.

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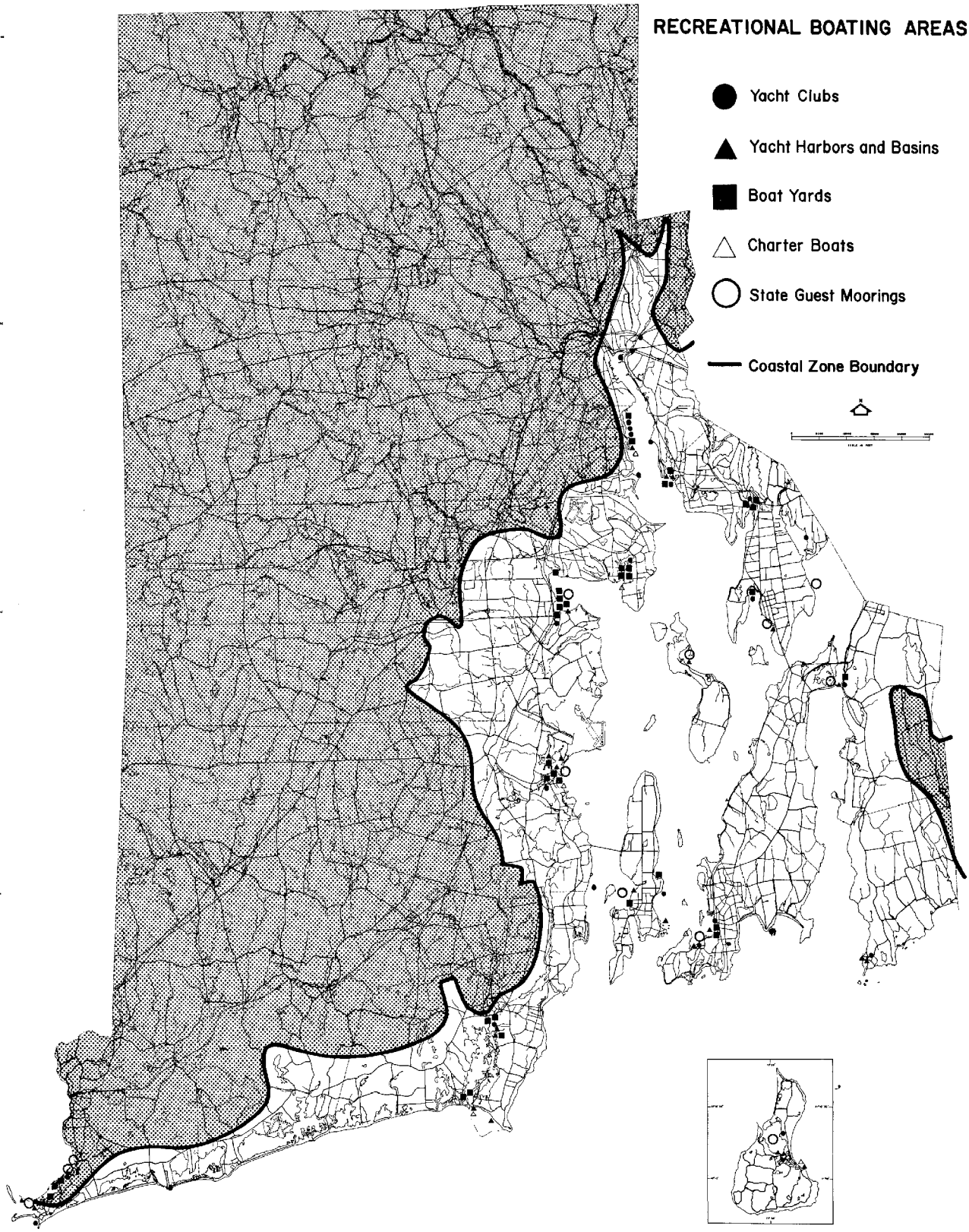
20 Rorholm *et al.*, pp. 117-21.

21 *Ibid.*, p. 91.

FIGURE 5


RECREATIONAL BOATING AREAS
Yacht Clubs
Yacht Harbors and Basins
Boat Yards
Charter Boats
State Guest Moorings
Coastal Zone Boundary

These figures, moreover, do not take into account boats merely passing through Rhode Island waters, boats kept at private docks, and boats trailered to the shore. There are 37 boat launching ramps in the coastal zone, and there are about 40 public rights-of-way which either are now used for boat launching or have been judged capable of development into launching points[22] (see Figure 4).

Recreational boating areas, for obvious natural reasons, are more closely grouped than beaches. Clusters of activity occur near Watch Hill, Point Judith Pond and Breachway, Wickford, East Greenwich, Warwick, Edgewood, Bullock Cove, Bristol Harbor, Tiverton, Newport, Sakonnet, and Block Island.

Beach-buggy driving has a following in Rhode Island and takes place mostly on the south shore. Other kinds of vehicles (surface and underwater) and waterskiing can be observed with increasing frequency but do not appear exclusively in any particular locations in the coastal zone.

3. Fishing and Hunting

The popularity of sportsfishing in Rhode Island is attested to by the fact that 18,762 fishing licenses were issued by the Department of Natural Resources in fiscal year 1967-1968. This total includes resident, non-resident, tourist, and permanent licenses as well as over 2,500 licenses for various kinds of shellfishing. It does not take into account saltwater fishing, however, for which a license is not required.

Recreational fishing can take place (1) from boats, (2) along the shore, and (3) in shallow water. Boating has already been discussed (it is estimated that sportsfishing is carried on during about two-fifths of all the time spent on boats in Narragansett Bay and adjacent areas).[23] Shoreline fishing, second, occurs wherever access is possible -- from bridges, piers, beaches, and public rights-of-way. In addition, the Department of Natural Resources has identified over 50 public fishing areas which fall within the coastal zone (see Figure 4). Rights-of-way are discussed in greater detail in the section of this report dealing with problems, under "Marine Development." Fishing in shallow water, third, is another method if shellfishing is considered. Quahogging, the primary activity of this type, provides recreation in upper sections of the bay and in salt ponds.

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22 Rhode Island Statewide Planning Program, Public Rights-of-Way to the Shore (Providence: 1970).

23 Rorholm et al., p. 105.

Hunting for waterfowl attracts fewer participants than fishing but is a significant sport, since Narragansett Bay is a migratory stop and wintering place for over 30 species--the most predominant being scaup and black duck. The average stock of waterfowl in the bay in 1968 was put at 18,500, and 2,500 Migratory Bird Hunting Stamps (required of hunters) were sold. Practically all of the bay is open to scaup hunting, with the exception of closed tidal areas and inland ponds.[24]

4. Inland Sports Activities

Although swimming, diving, boating, fishing, and waterfowl hunting constitute the major kinds of marine-oriented recreation, a broad consideration of uses must also include assorted inland sports activities which are found in the coastal zone (see Figure 6). Examples are hiking and picnicking, camping, golf, and hunting. Nearly twenty state picnic groves, about ten state-designated "scenic view sites," five developed state parks (in Narragansett, Warwick, Pawtucket, East Providence-Barrington, and Bristol), numerous municipal parks and playgrounds, and over twenty camps are located throughout the coastal zone. There are about twenty golf courses, half of them open to visitors. As for hunting, there are five sportsmen's clubs in the Rhode Island coastal region (in Narragansett, Warwick, Warren, Tiverton, and New Shoreham) and a state management area in Tiverton (Seapowet Marsh) which is open to hunting. The Department of Natural Resources granted 14,925 hunting licenses of all types in fiscal year 1967-1968, although this figure is not very significant to coastal zone activity since most of the licenses were probably used for hunting in forested areas elsewhere in the state.

5. Conservation Areas

Conservation areas (undeveloped parks, management areas, bird sanctuaries, and wildlife preserves) are another important use of the coastal zone (see Figure 6). They may be under state or private ownership. The state has three undeveloped parks which fall within the coastal zone, one in North Kingstown and two in Newport; one bird sanctuary, in Narragansett; and eight management areas, three in Charlestown and one each in South Kingstown, Cranston, Barrington, Tiverton, and Jamestown. Ten of these twelve state-owned areas are located along the shore.

Private conservation areas in the coastal zone include a wildlife refuge in Westerly owned by an individual and seventeen wildlife refuges, bird sanctuaries, salt marshes, and other parcels

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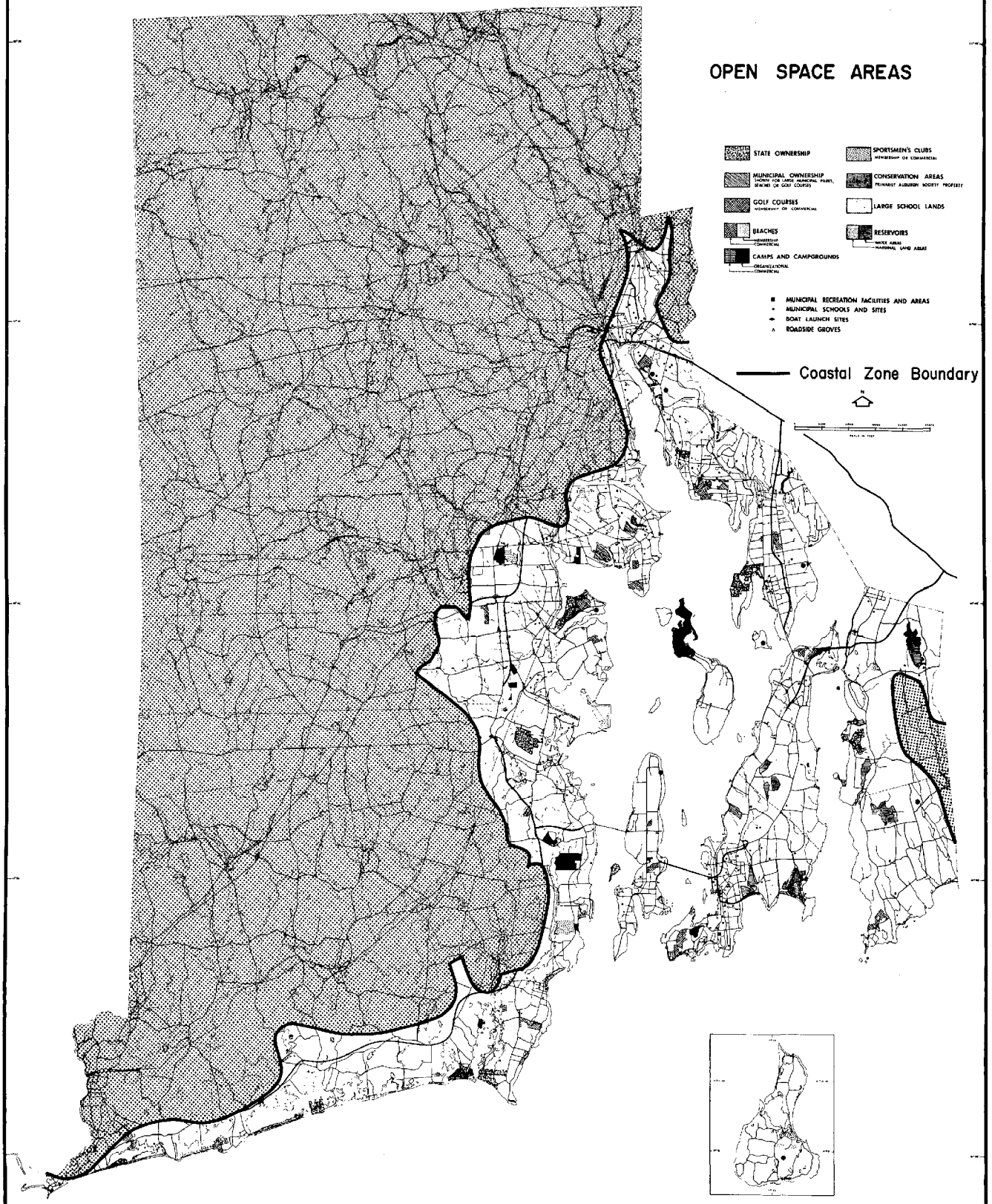
24. Rhode Island Department of Natural Resources.

FIGURE 6


OPEN SPACE AREAS
STATE OWNERSHIP
SPORTSMEN'S CLUBS
MEMBERSHIP OR COMMERCIAL
MUNICIPAL OWNERSHIP
SHOWN FOR LARGE MUNICIPAL PARKS, BEACHES OR GOLF COURSES
CONSERVATION AREAS
AUDUBON SOCIETY PROPERTY
GOLF COURSES
MEMBERSHIP OR COMMERCIAL
LARGE SCHOOL LANDS
BEACHES
MEMBERSHIP
COMMERCIAL
RESERVOIRS
WATER AREAS
MARSHALL LAND AREAS
CAMPS AND CAMPGROUNDS
ORGANIZATIONAL
COMMERCIAL
MUNICIPAL RECREATION FACILITIES AND AREAS
MUNICIPAL SCHOOLS AND SITES
BOAT LAUNCH SITES
ROADSIDE GROVES
Coastal Zone Boundary
N

owned by the Audubon Society. The Audubon properties are found in the following municipalities: Barrington, East Greenwich (two, one partly in North Kingstown), Jamestown (three), Middletown (two), Newport, North Kingstown (two), Portsmouth, South Kingstown (two), Tiverton, and Warwick (two). Of the total eighteen conservation areas in the coastal zone, eleven border directly on salt water, while seven are situated farther inland.[25]

B. WASTE DISPOSAL

A completely different type of use is waste disposal. Narragansett Bay drains an area including most of Rhode Island and a considerable portion of Massachusetts; it receives wastes from an estimated 90 percent of Rhode Island's population[26] and from practically all of its manufacturing plants. Many different kinds of users can be identified: municipalities (which may include residential, commercial, and institutional use), other institutions, military operations, industry, utilities, agriculture, and transportation (which may include commercial, military, and recreational vessels).

The extent of use can be gauged in a number of ways: economically, biologically, or geographically. In monetary terms, the value of the bay's function in waste disposal has been calculated at between $6 and $8 million annually, while the cost of the reduced shellfish harvest caused by pollution is said to be about $1 million.[27] In biological terms, waste disposal has made about 30 percent of the bay's waters unclean; i.e., unsuitable for at least one of several types of use.[28]

From a geographic point of view, large areas in the upper part of the coastal zone have been affected (see Figure 7). The state Department of Health's five classes of water quality indicate how conditions in an area determine use. For instance, beginning with

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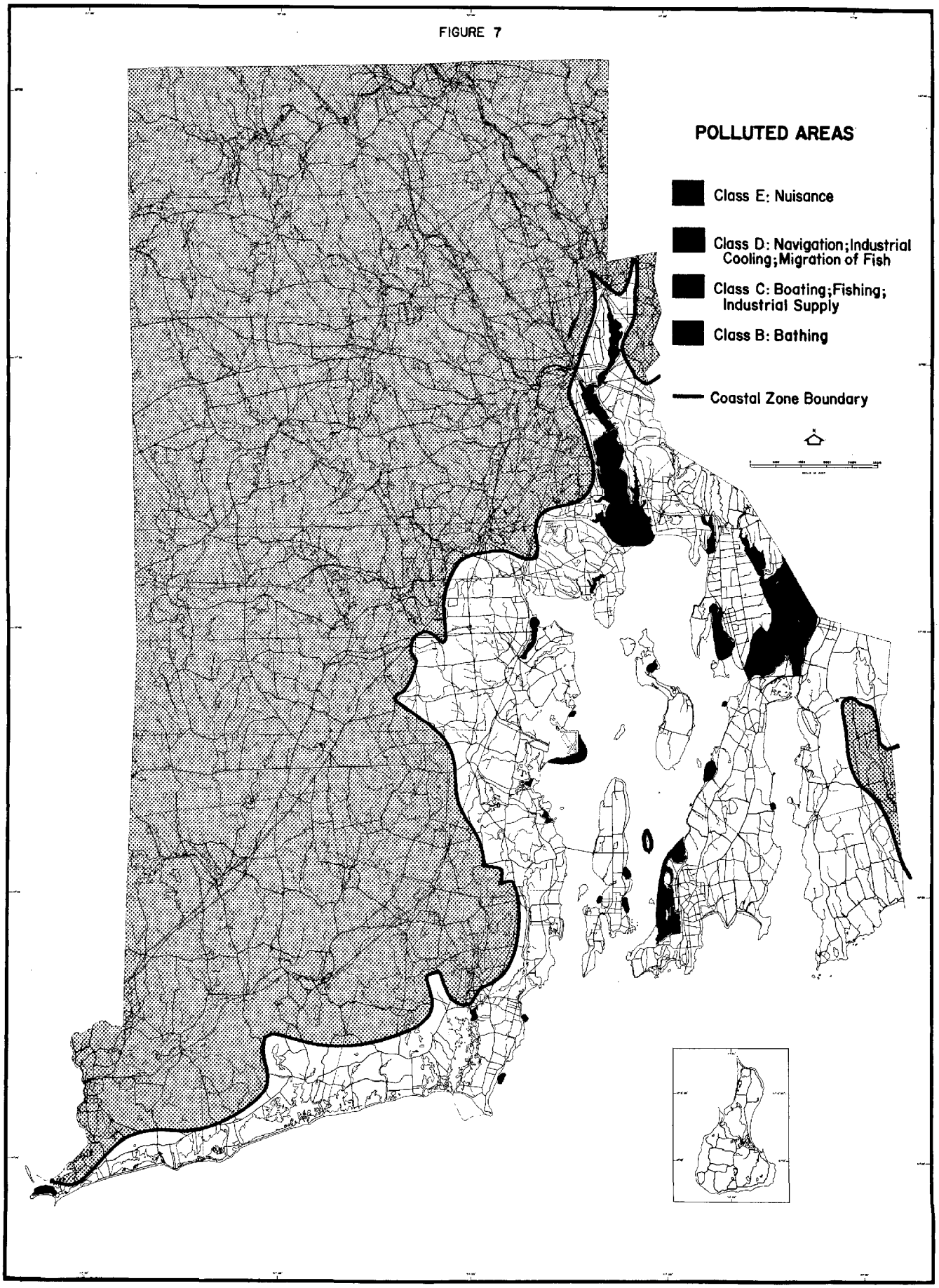
25 Rhode Island Statewide Planning Program, Plan for Recreation, Conservation, and Open Space.

26 Alexander, Lewis M., Narragansett Bay: A Marine Use Profile (Kingston, Rhode Island: University of Rhode Island, 1966), p. 74.

27 Rorholm et al., p. 173.

28 Ibid., p. 160.

FIGURE 7


POLLUTED AREAS
Class E: Nuisance
Class D: Navigation; Industrial Cooling; Migration of Fish
Class C: Boating; Fishing; Industrial Supply
Class B: Bathing
Coastal Zone Boundary

the worst, Class E water ("nuisance; unsuitable for most uses") is found in the Seekonk River and Class D ("suitable for navigation, industrial cooling, and migration of fish; good aesthetic value"), in the Providence River north of Riverside and in a section of Mount Hope Bay near the Tiverton-Fall River line. Class C ("suitable for fish and wildlife habitat, recreational boating, and industrial cooling; good aesthetic value") is the category for the lower Providence River; another section of Mount Hope Bay; the Quonset Point area; Newport Harbor; waters adjoining built-up centers of East Greenwich, Warren, and Bristol; and other scattered spots near sewage treatment plants and military installations. Class B water, suitable for most uses except that shellfish harvested for human consumption must be depurated, is found in scattered locations. The rest of the bay and coastal zone waters are Class A, or open to all uses, although from time to time they receive wastes, especially from boats. The use of the coastal zone for waste disposal is taken up again in the "problems" section discussion of pollution.

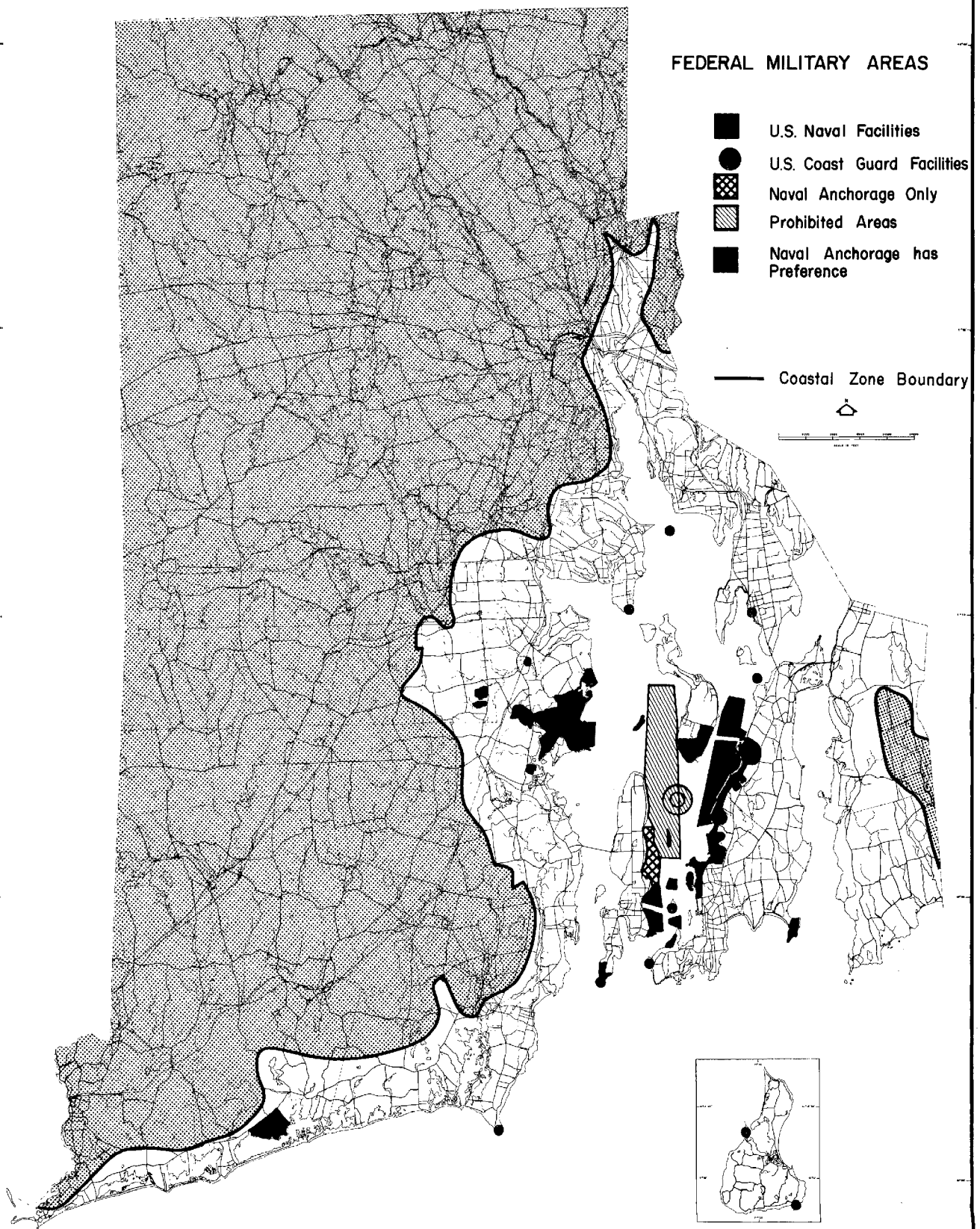
C. FEDERAL MILITARY AREAS

Also extremely prominent in the coastal zone is federal military activity, mostly the Navy but including the Army and the Coast Guard. The Army Reserve Training Center in Narragansett (Fort Greene) occupies a large piece of land not far from the shore. The Coast Guard has a maintenance depot in Bristol and stations at Point Judith in Narragansett, Castle Hill in Newport, and Block Island (see Figure 8). In addition, there are lighthouses with resident personnel at Point Judith; Castle Hill; Beavertail, Jamestown; Conimicut and Ponham Rocks, Warwick; Hog Island Shoals, Portsmouth; Rose Island, Newport; and Southeast Light and Great Salt Pond Breakwater, Block Island.

Navy installations are by far the most extensive, however (see Figure 8). As noted in earlier sections, the Navy controls 30.7 miles, or between 7 and 8 percent, of the total shoreline in the coastal zone. It owns substantial amounts of land in Charlestown, North Kingstown (Davisville and Quonset), Jamestown, Portsmouth, Middletown, and Newport. Included are three of the small islands in Narragansett Bay and the southern ends of Prudence Island and Conanicut Island (Jamestown). The land is used for all sorts of activities: public works and supply centers, communications stations, weather and research units, schools, offices, housing, a hospital, and of course, the main naval station, naval air station, and naval construction battalion center facilities.

The Navy also controls sizable portions of the bay's waters. Between Jamestown and Portsmouth, a circular area is reserved for explosives anchorage, and a much larger segment is a "prohibited area" due to underwater weapons testing. Naval vessels have exclusive anchorage in an area off Jamestown north of the former

FIGURE 8


FEDERAL MILITARY AREAS
U.S. Naval Facilities
U.S. Coast Guard Facilities
Naval Anchorage Only
Prohibited Areas
Naval Anchorage has Preference
Coastal Zone Boundary

ferry approach, and they have preference in several other anchorages east of Jamestown and west of Aquidneck Island.

D. COMMERCIAL ACTIVITIES

The Rhode Island coastal zone is used extensively for commercial purposes, chiefly fishing, shipping, and tourism. (Commercial activities which are not marine-related will be discussed in a later section on general land use.)

-Fishing

Rhode Island's commercial fishing industry is extremely diversified; it includes handraking and dredging for clams and other shellfish, setting pots and trawling for lobsters, and landing finfish. In 1965 the total catch amounted to 48.7 million pounds, valued at $4.6 million. Finfish, mostly "trash" fish for reduction, accounted for about 90 percent of the volume and about half of the value.[29] Also as of 1965, there were 1,831 fishermen in Rhode Island, of whom about 1,000 were classified as "regular."[30] The fleet consisted of 107 motor vessels (large boats for trawling and dredging) and 1,151 other boats (mostly small motorboats).[31]

Fishing activity takes place both in the bay and in waters to the south (see Figure 9). Clams are found mostly in upper parts of the bay and in salt ponds, although they cannot be removed from the polluted sections unless they are transplanted. Small quantities of scallops appear in a few places. Lobsters are distributed in the middle and lower portions of the bay as well as offshore. As for finfish, there are some floating fish traps near the entrances to the bay, but the majority of the catch comes from offshore grounds.

A related commercial activity in the coastal zone is operation of fish plants. The value of fish products processed in Rhode Island in 1965 amounted to $2.9 million.[32] Point Judith accounts for more of this sum than any other location, but there are about 30 wholesaling and processing establishments in all throughout the state[33] (the major ones are shown in Figure 9). Point Judith

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29 Nathan Associates, pp. 45-46.

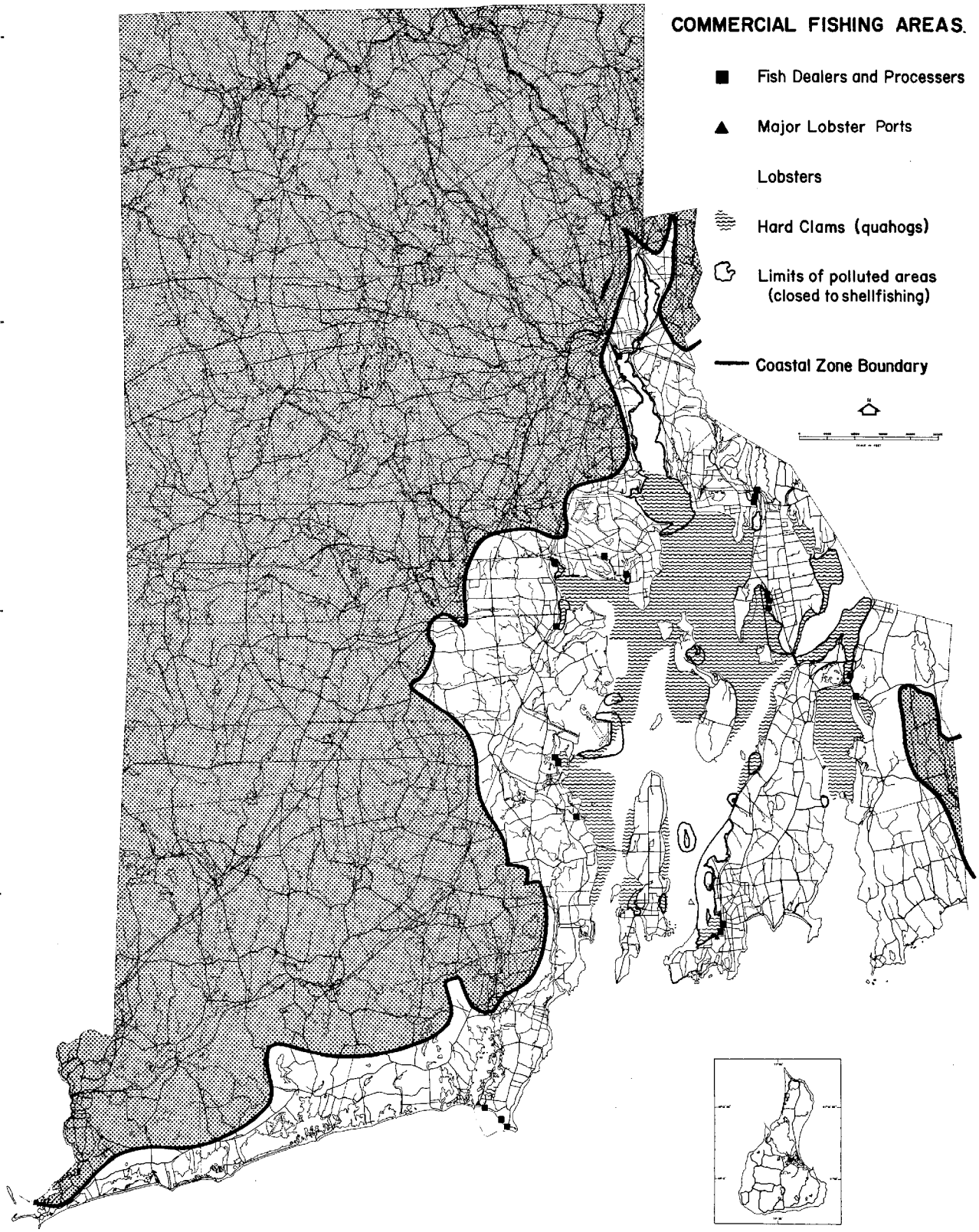
30 Ibid., p. 41.

31 Ibid., p. 38.

32 Ibid., p. 57.

33 Ibid., p. 60.

FIGURE 9


COMMERCIAL FISHING AREAS.
Fish Dealers and Processers
Major Lobster Ports
Lobsters
Hard Clams (quahogs)
Limits of polluted areas (closed to shellfishing)
Coastal Zone Boundary

receives the bulk of the fish and shellfish landed in Rhode Island, followed by Newport and Sakonnet.

-Shipping

In 1965 about nine million tons of cargo passed through the port of Providence, ranking it fourth in New England, after Boston, Portland, and New Haven.[34] In 1969 this figure fell to 8.5 million tons, according to the Port Director. The facilities at the port proper include 25 piers, wharves, and docks and four private warehouses,[35] and it is served by nearby highway and rail transportation (see Figure 10). The main channel, in the Providence River, is presently being dredged to a depth of 40 feet (see Figure 11).

Although the overwhelming bulk of shipping activity in the coastal zone consists of Providence-bound traffic, there are several minor ports in the state. The Seekonk River handled 114,000 tons of petroleum in 1965; Newport was next with 94,000 tons of petroleum, fish, and other products; and Portsmouth and Point Judith followed with 55,000 and 24,000 tons of cargo, respectively. Wickford, Block Island, Tiverton, and the Warren River also attracted some shipping trade.[36] Other shipping channels, besides the one in the Providence River, are located in the Seekonk River, in Mount Hope Bay, and at approaches to Navy facilities in North Kingstown and Middletown (see Figure 12).

-Tourism

Another significant commercial use is tourism; in 1968 tourists spent $70 million in Rhode Island.[37] Much of this expenditure either took place in the coastal zone or took place elsewhere in the state but can be attributed to the drawing power of the shoreline. Tourist activity involves not only the coastal zone recreational resources already discussed but also such special attractions as the two fishing tournaments at Galilee, the America's Cup Race trials and start of the Bermuda Race at Newport, the Newport music festivals, the summer theaters at Warwick, South Kingstown, and Little Compton, and historic-cultural tours in the Newport and Providence areas. Hotels, motels, and restaurants are located throughout the coastal region; over 300 were listed in a 1968 directory of the whole state.

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34 E.B.S. Management Consultants, Inc., Table 7.

35 Ibid., pp. 31 & 35.

36 Ibid., Table 8.

37 Rhode Island Tourist/Travel Association, Annual Report, 1969 (Providence, 1969), p. 1.

FIGURE 10

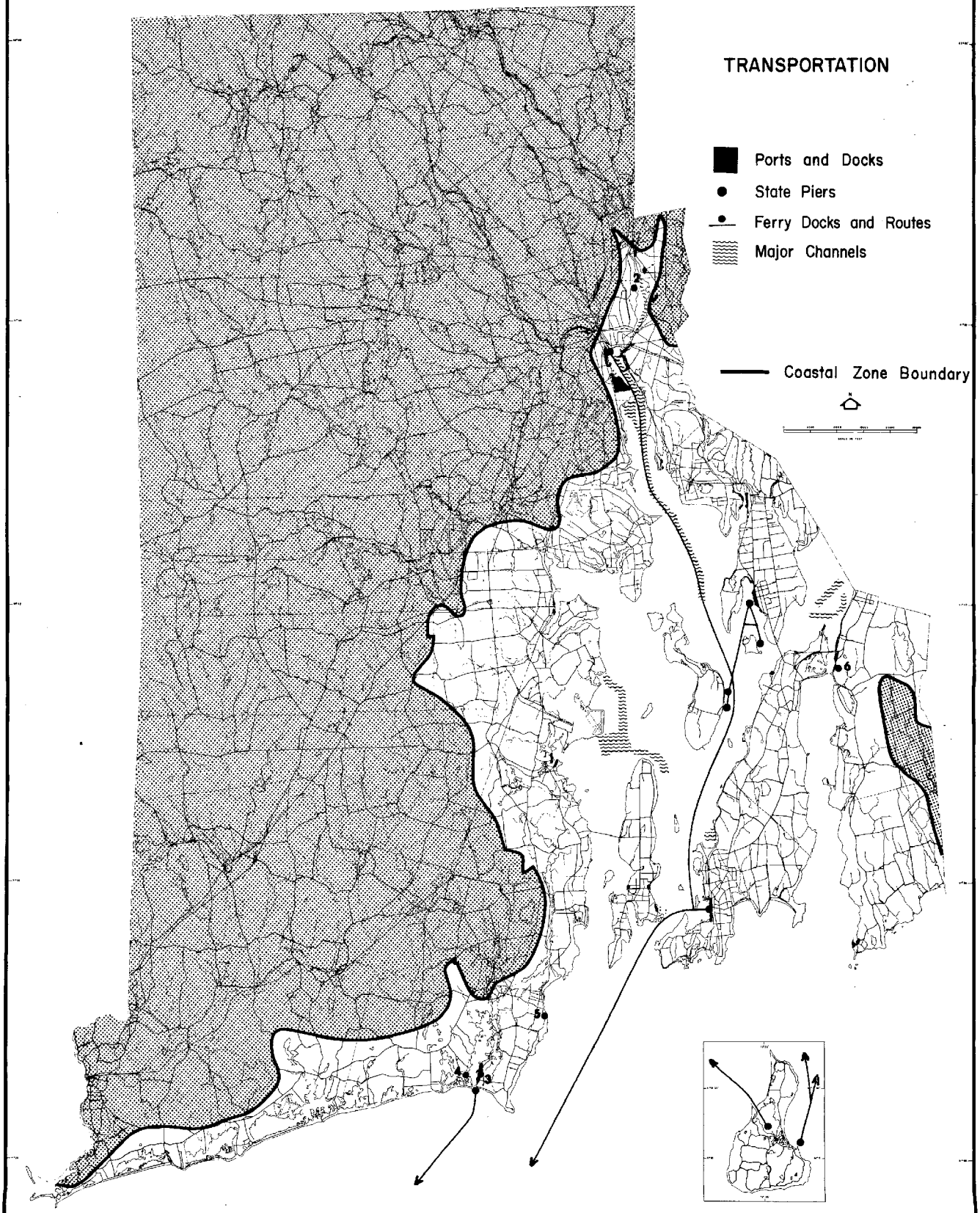

TRANSPORTATION
Ports and Docks
State Piers
Ferry Docks and Routes
Major Channels
Coastal Zone Boundary

FIGURE 11

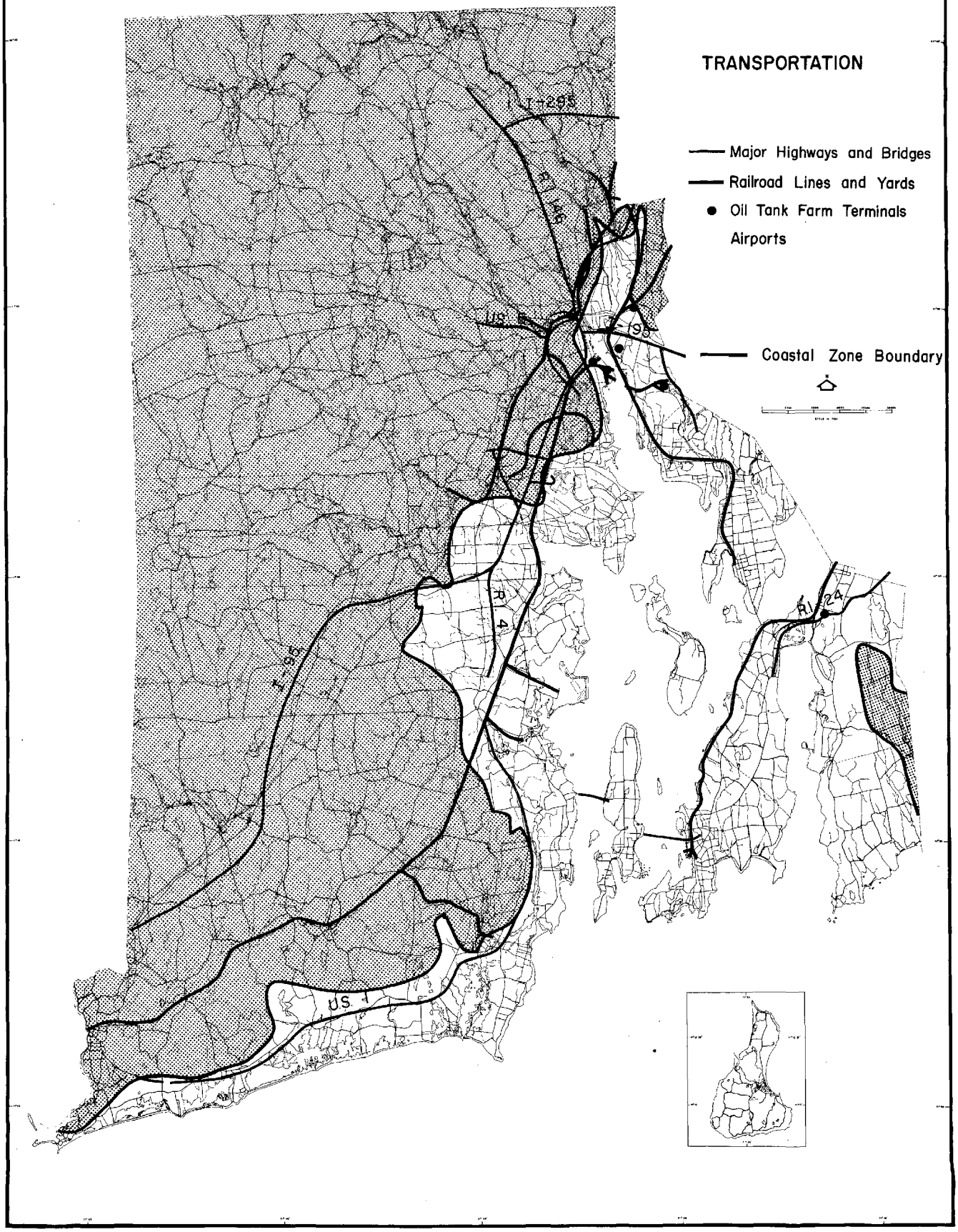
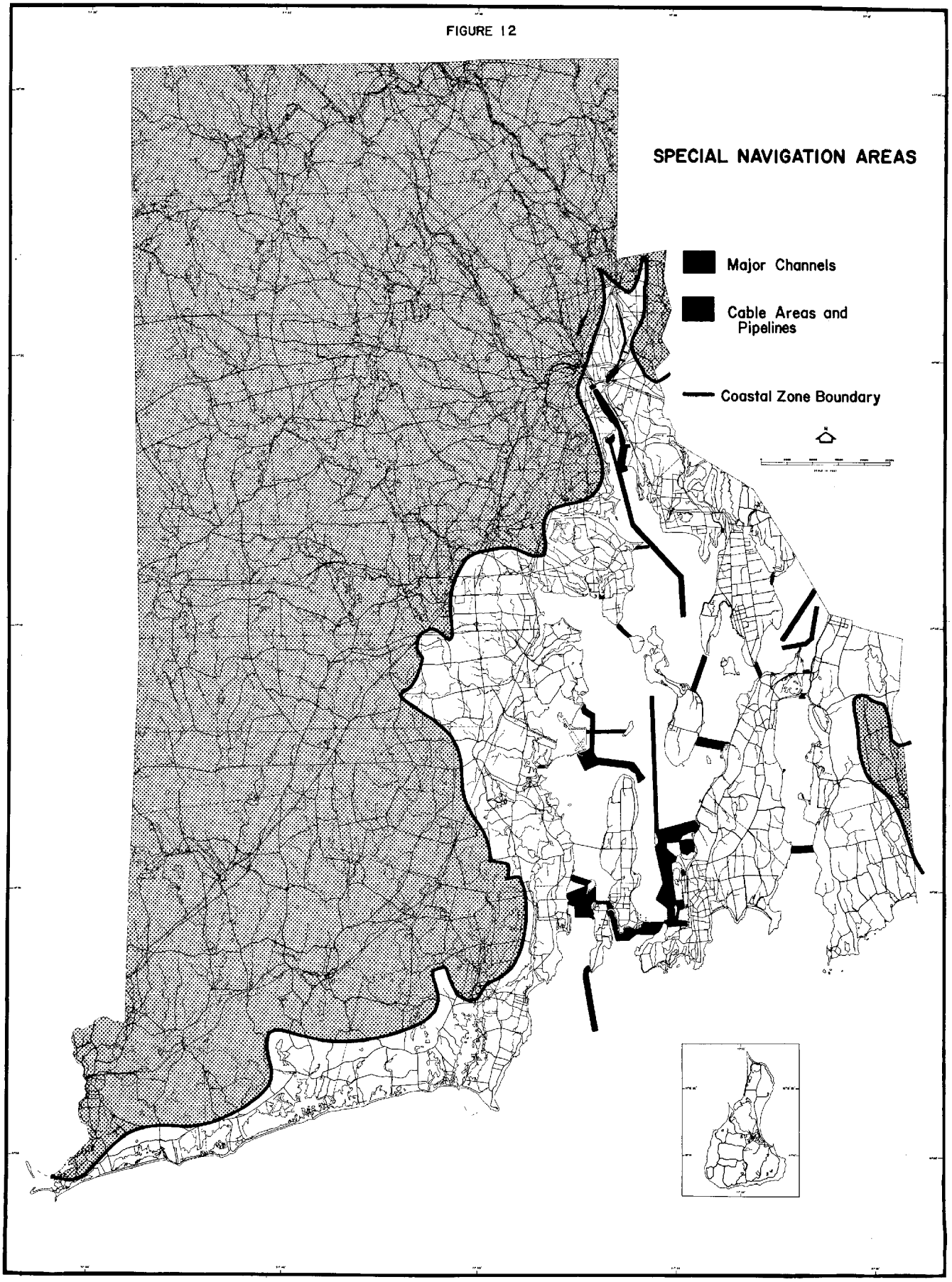

TRANSPORTATION
Major Highways and Bridges
Railroad Lines and Yards
Oil Tank Farm Terminals
Airports
Coastal Zone Boundary
I-295
R.I. 146
US 6
I-95
R.I. 4
I-95
R.I. 24
U.S. 1

FIGURE 12


SPECIAL NAVIGATION AREAS
Major Channels
Cable Areas and Pipelines
Coastal Zone Boundary

Of the dozen new lodgings started or completed in Rhode Island in the past year or two, ten are located in coastal zone communities: Jamestown, Middletown, Narragansett, Newport (including a recreational complex on Goat Island), Pawtucket, Portsmouth, Providence, South Kingstown, and Warwick.[38]

E. TRANSPORTATION

Transportation activity is manifested in many forms (see Figures 10 and 11). On land, multilane divided highways nearly encircle the coastal zone: route 95, to the west, and just outside it for the most part; routes 1 and 4, closer to the water on the south shore and western side of the bay; routes 195 and 24, on the eastern side. Local roads and scenic routes follow the coastline even more closely. A series of bridges -- Jamestown, Newport (toll), Sakonnet River, and Mount Hope (toll) -- allow traffic to cross the bay.

Railroad lines within or skirting the coastal zone run from Westerly to Providence, with offshoots to Wakefield and Quonset-Davisville. East of Providence, one line goes to Bristol, while another from Fall River and points north terminates in Newport. There are railroad yards at Providence, East Providence, Newport, and the Navy base, and oil tank farm terminals at Providence, East Providence, and Tiverton.

Three airports are situated in the coastal zone, and a fourth is immediately outside its boundary line. The largest, Theodore Francis Green State Airport, is used by a half dozen airlines and occupies a 965-acre area in the Hillsgrove section of Warwick. The Block Island State Airport takes up 135 acres in the central part of the island; the Newport Air Park in Middletown (also state-owned) consists of 220 acres. Adjacent to the coastal zone is the 320-acre Westerly State Airport, which has two 4,000-foot runways.

Water transportation patterns are also diversified. The major non-military ports and docks, to recapitulate, include Providence, Pawtucket, East Providence, Warren, Bristol, Tiverton, Newport, Sakonnet, Block Island, Point Judith, and Wickford. State piers are found in Galilee, Jerusalem, Narragansett, Tiverton, and Pawtucket. On the water itself, there are several ferry routes: from Point Judith to Block Island, from Providence to Newport and Block Island, and from Bristol to Hog and Prudence Islands. The commercial and military shipping channels have already been described. As for transportation of utilities, the bay and harbors are crisscrossed with numerous cable areas and pipelines (see Figure 12).

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38 Ibid., p. 6.

F. RESEARCH

The amount of research carried on in the coastal area has been increasing rapidly. Besides the facilities of the University of Rhode Island listed in Parts One and Two of this report, there are research programs conducted by both government agencies and industrial concerns. On the federal government level, the Navy maintains the Naval Underwater Weapons Research and Engineering Station in Newport. The Department of the Interior runs the Narragansett Marine Gamefish Laboratory and the National Marine Water Quality Laboratory at the University's Bay Campus; and the Public Health Service has its Northeast Marine Health Sciences Laboratory at the same location. On the state level, the Atomic Energy Commission owns a reactor at the Rhode Island Nuclear Science Center, also along with the University facilities; and the Department of Natural Resources operates a Marine Fisheries Station in Wickford.

A number of industrial firms are also involved in marine research. An example is Raytheon's Submarine Signal Division in Portsmouth, which works on a great variety of scientific studies.

G. OTHER LAND ACTIVITIES

The remaining major activities occur on land but are as vital to coastal zone development as those which take place actually in or on the water or which are strictly marine-related. Such activities are residential, commercial, industrial, and institutional in nature. Their locations are shown in Figure 13, as they now exist, and in Figure 14, as they are provided for in zoning ordinances. Central Falls, Coventry, Exeter, and West Greenwich are excluded from this discussion since they have negligible amounts of land in the coastal zone.

1. Residential Use

The most prevalent existing land use category in the coastal zone (not considering "vacant" as a use) is residential. Of the municipalities or portions of them which fall within the coastal zone boundary, those with the heaviest residential concentrations are Barrington, Cranston (the Edgewood section), Newport, Warwick, and West Warwick. In the case of Barrington and Newport, however, the density is not as great as it might seem in all sections, because of the larger size of individual properties. Residential use is also intensive in the coastal zone portions of East Providence, Pawtucket, and Providence, although there it is matched by commercial and industrial use. Concentrations of seasonal residences occur in coastal Charlestown, Narragansett, South Kingstown, and Westerly (about 60 percent of Narragansett's total housing units were seasonal in 1960; 50 percent of

FIGURE 13

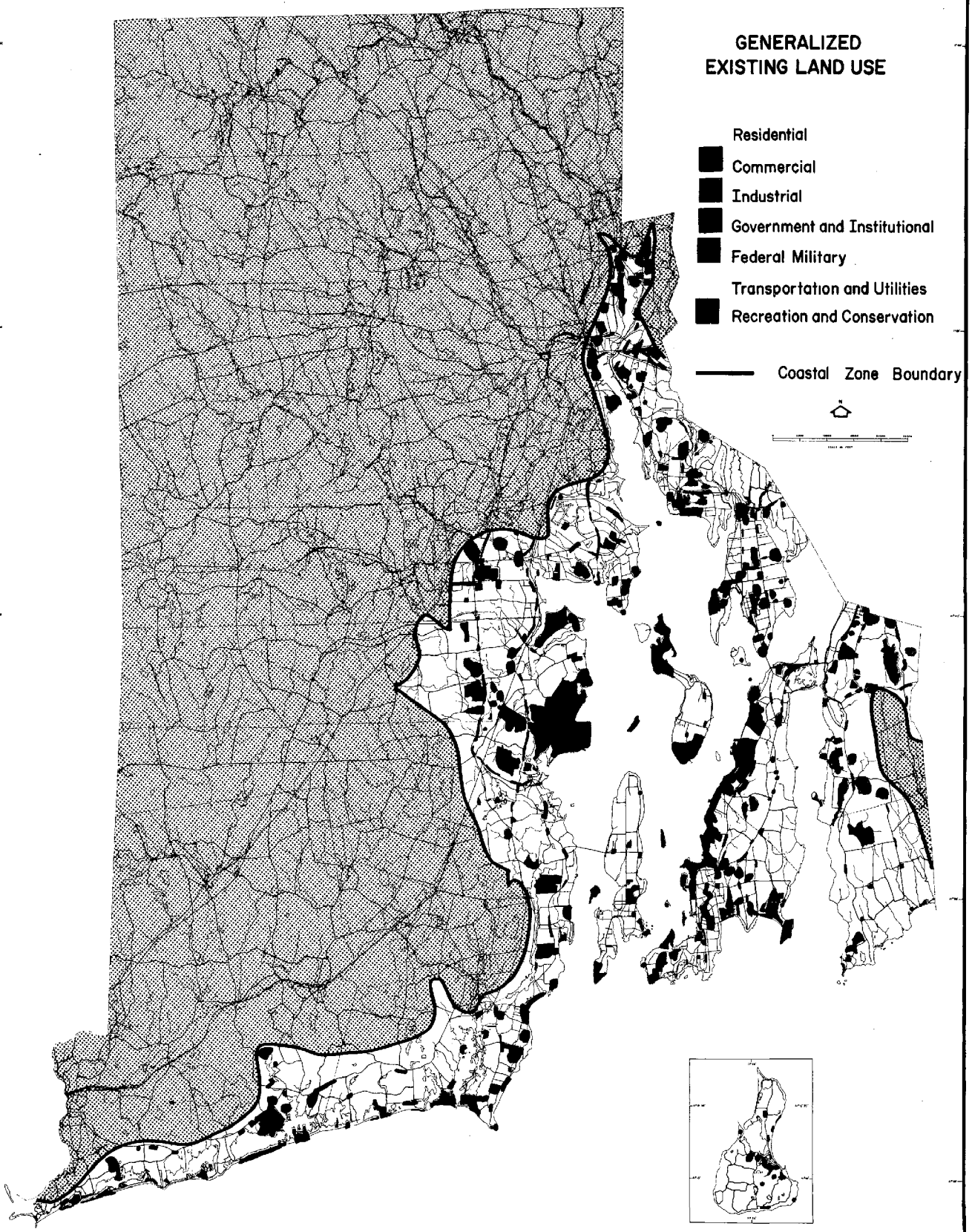
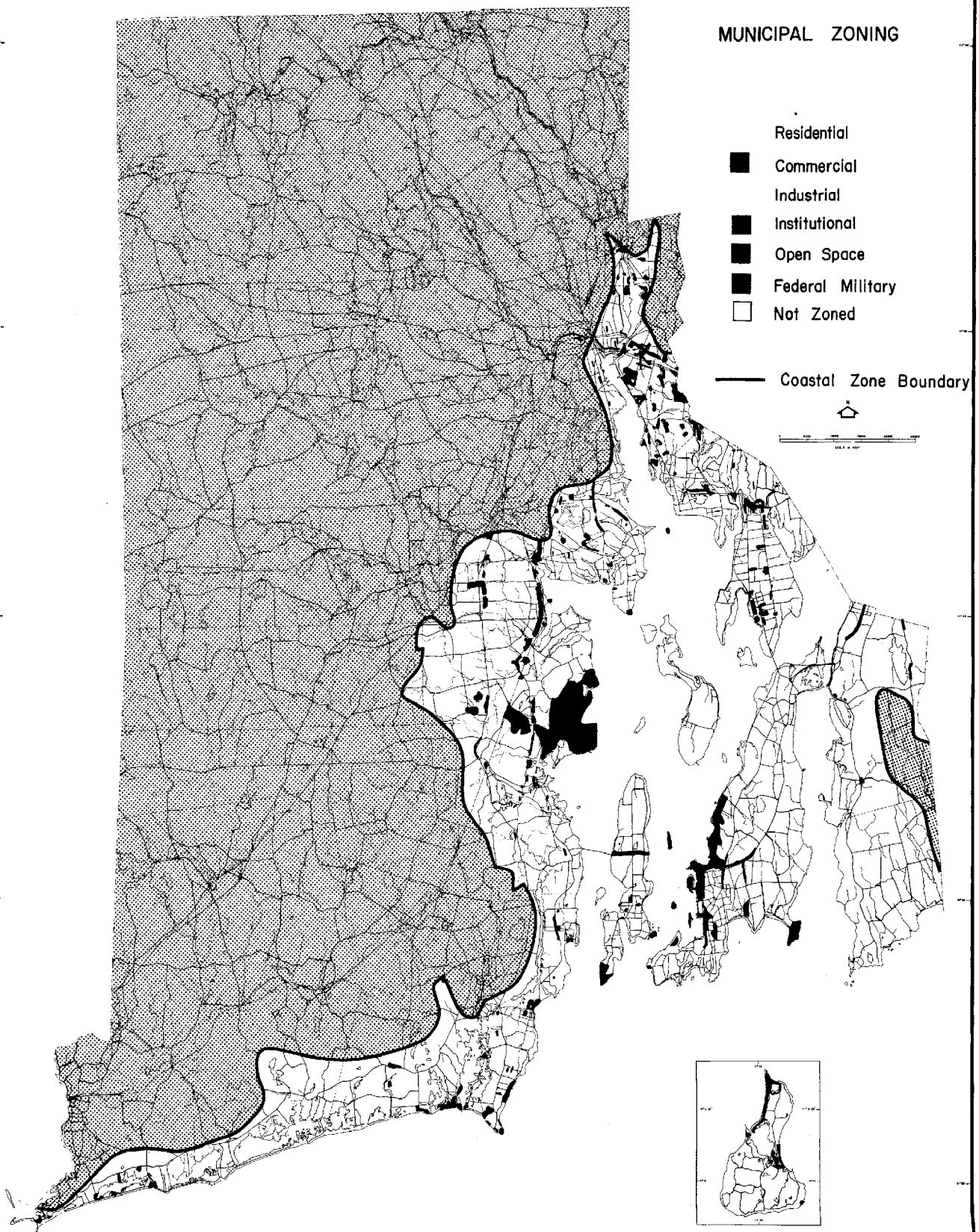

GENERALIZED
EXISTING LAND USE
Residential
Commercial
Industrial
Government and Institutional
Federal Military
Transportation and Utilities
Recreation and Conservation
Coastal Zone Boundary

FIGURE 14


MUNICIPAL ZONING
Residential
Commercial
Industrial
Institutional
Open Space
Federal Military
Not Zoned
Coastal Zone Boundary

Charlestown's).[39] More moderate residential use is characteristic of parts of the coastal zone which lie in Bristol, East Greenwich, Jamestown, Middletown, North Kingstown, Portsmouth, Tiverton, and Warren; while Little Compton, New Shoreham, and the part in South Kingstown are sparsely populated, in general. As for residential use directly on the coast, the greatest incidences are found in the south shore communities, Barrington, Cranston, Newport, and Warwick.

Looking at current zoning for residential development, it is notable that this is overwhelmingly the predominant category and particularly that it nearly monopolizes the shoreline. Exceptions are Charlestown, Portsmouth, and Little Compton, which have no zoning.

2. Commercial Use

Commercial land use in the coastal zone follows expected patterns, with most areas situated along roads or in urban centers. Commercial activity occurs near the water especially in Westerly, Narragansett Pier, Wickford, East Greenwich, sections of Warwick, Providence, Pawtucket, East Providence, Warren, Bristol, Tiverton, Newport, and Block Island.

If a map showing these patterns were generalized it would approximate the actual zoning pattern. Possible exceptions are Jamestown and Narragansett, which have strips of land zoned "commercial" but presently used for other purposes.

3. Industrial Use

Relatively little land in the coastal zone is in use for industry, except in Providence, Pawtucket, East Providence, and Tiverton. There are also two large parcels near the coast in Portsmouth. Some industrial activity takes place in coastal zone areas of Barrington, Bristol, Charlestown, East Greenwich, Middletown, North Kingstown, Warren, and Warwick. None, or a much smaller amount in terms of land area, is carried on in coastal zone segments of other municipalities.

Zoning for manufacturing presents a far different picture. Sizable pieces of land now largely vacant are zoned for industrial use in such communities as West Warwick, Warwick, Pawtucket, East Providence, Warren, Bristol, Tiverton, and Newport. This fact is of course indicative of the desire to attract industry because of its economic importance to the coastal region.

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39 Rhode Island Development Council, Rhode Island Basic Economic Statistics (Providence: 1968), p. 40.

4. Institutional Use

Institutional land use is a category which includes hospitals, churches and cemeteries, schools, other public facilities, and the like. This type of activity is scattered throughout the coastal zone, with more of it in Providence than in any other place. Also especially noticeable is a private camp occupying the northern end of Prudence Island.

The sole instance of land zoned as institutional in the coastal zone is a cemetery on the Seekonk River in Pawtucket.

Problems and Conflicts

With such a wide spectrum of overlapping uses, it is inevitable that problems occur, not only within the confines of each activity but also between conflicting interests. The major problems which came to the attention of the Technical Committee can be grouped into six general categories: pollution, management of resources, marine-oriented development, related development, competing uses, and governmental jurisdiction. The following section attempts in summary form to evaluate their effects and to suggest some potential solutions. The intent is not to provide comprehensive descriptions or definitive solutions but merely to indicate the range of problems. In many areas, extensive studies of the problems have already been done by experts in the field; in virtually every area, further analysis of these problems and of their possible solutions is required.

A. POLLUTION

1. Water Pollution

Of all the problems in the coastal zone, foremost in the public consciousness is the pollution of coastal waters. It may be in the form of municipal and industrial wastes, agricultural effluents, thermal and radioactive pollution in the event of future nuclear power plants, debris, or discharge from vessels (including oil spillages). The effects of water pollution can include damage to personal health and property; harm to fish and wildlife (which in turn affects conservation, recreational, commercial fishing, and tourism interests); and prevention of different kinds of recreational use as well as future industrial or municipal use.

-Municipal and industrial pollution

At present the biggest offender is municipal and industrial pollution. The state of Rhode Island has initiated vigorous attempts at abatement through such approaches as establishment of water quality standards and classification of water bodies, passage and implementation of a state water pollution law, stimulation of state and federal aid for construction of treatment plants, and improved coordination of planning at the local and interstate levels. The impending construction of a sewage treatment plant at Fall River, Massachusetts, will ameliorate conditions in affected areas, as will improved collection systems in Providence, North Providence, and Newport.

Although progress has reached a point where only 1 percent of municipal sewage receives no treatment, it is recognized that the effects of municipal and, particularly, industrial pollution are still growing worse and require additional action. Experience would indicate the following measures to be most promising for the future: continued state encouragement of voluntary waste pre-treatment by firms and of willingness on the part of municipalities to have firms use their sewage treatment facilities; better coordination of state industrial promotion and development activities with state pollution control efforts so that plants are judiciously sited; state policy to establish tolerance levels for waste disposal in various areas of the coastal zone as part of an effort to evaluate competing uses; and, above all, raising of funds -- more federal aid, and more state and local appropriations for the upgrading of sewage collection and treatment facilities and for better pay of employees at treatment plants. The following figures show the estimated expense, based on first-quarter 1969 costs, of sewage collection and treatment facilities which will be needed in Rhode Island by 1990:[40]

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40 Rhode Island Statewide Planning Program, Plan for Public Sewerage Facility Development, p. 92.

Total cost	$115,466,400
Federal share	43,128,470
State share	19,603,850
Local share	52,734,080

The state has already raised over half of its share, but it is dependent upon federal funds which have not yet been appropriated. The latter should preferably be actual rather than promised, funded initially rather than by a reimbursement procedure, and without restrictions on the tax status of matching-fund bonds.

-Agricultural effluents

This type of pollution (mainly chemical effluents) occurs on a much smaller scale than others found in the coastal zone. It is noteworthy that from 1945 to 1969 the number of commercial farms in Rhode Island dropped from 3,600 to about 800, and farm production also fell "drastically."[41] Research has shown, however, that certain elements of the marine environment are suffering adverse effects from the use of pesticides; and a bill was presented before the Rhode Island General Assembly in the 1970 session which would prohibit use of chlorinated hydrocarbons (such as DDT) except in emergencies.

-Thermal and radioactive pollution

In the future, an incalculable threat may be posed by thermal and radioactive pollution. The result of use for industrial cooling, thermal pollution upsets the ecological balance by decreasing the amount of oxygen in the water, thereby slowing down the rehabilitation of polluted water. The increase in water temperatures also affects fish by altering their metabolic rate, feeding, growth, and reproduction. In addition, nuclear plants discharge a continuous small amount of radiation into the water and air; the amount of harm is disputed by experts. It is agreed that a major accident is extremely unlikely, due to high safety standards and excellent operating records, although if one did occur it could be disastrous.

Rhode Island now has no nuclear power plants, although a site is currently under investigation at Rome Point in North Kingstown. The possibility is not remote, however, since the clean-air advantage is appealing and since the need is growing: the demand for electric power doubles every decade,[42] and it is estimated that

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41 Madden, Michael, "R.I. Farms Becoming Just a Memory," Providence Sunday Journal, August 31, 1969, p. 1.

42 New England Marine Resources Information Program, Newsletter 7 (Narragansett, Rhode Island: December, 1969).

nuclear power will supply about 60 percent of the Northeast's electricity by 1980.[43] Another reason for precautionary action is that no federal agency has direct jurisdiction over thermal pollution. The Atomic Energy Commission does regulate the radiation aspect, but its jurisdiction is being challenged by several states which desire more stringent standards.

For the state of Rhode Island, the best method of avoiding trouble is careful early planning and research so that the siting and operation of plants may be controlled. Considerable general data is already available; what is needed is state action to set limits on temperature levels and to establish policy on pollution treatment methods and on advance studies.

-Pollution by boats

Boats may cause pollution either by dumping sewage or refuse or by spilling oil. The first problem has been observed in yacht harbors and in ports, but the state Department of Health considers the Navy to be the primary source. Helpful remedies might include greater authority or facilities for local and state enforcement officers, and insuring that Navy vessels adhere to pollution laws. (A federal law will gradually require installation of sanitary facilities on pleasure boats: but military craft remained exempt until an executive order of February, 1970, ordered them to comply with state standards by the end of 1972.) With oil spills, the best antidote is of course prevention, as by encouraging or requiring special boat equipment and port facilities. Further research into the effects of various detergents on fish and wildlife would also be useful.

-Debris

Debris is a type of pollution which may include sunken barges, deteriorating docks, and floating refuse from improperly controlled dumping and filling. It has similar effects as municipal and industrial effluents, with the addition of two others: it is particularly damaging to aesthetic values, and it is a potential safety hazard. To counter it, stiff fines could be set for littering; state and local marine police patrols could be stepped up; dumping could be more stringently restricted; a major clean-up program could be initiated; and local building codes and code enforcement could be strengthened to require better maintenance of waterfront structures.

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43 Electric Power in the Northeast 1970-1980, A Report to the Federal Power Commission, prepared by the Northeast Regional Advisory Committee (December 2, 1968).

2. Air Pollution

Air pollution is a problem of growing concern. It is not as directly related to the coastal zone as water pollution, but it does merit attention here for two reasons. The first is simply that it takes place within the geographical scope of this report. Second, it is often inextricably linked with water pollution, since abatement of either problem may result in a negative "trade-off" with the other. (For example, switching from fossil fuel to nuclear power may reduce air pollution but intensify water pollution of the thermal type.)

The area immediately responsible is along the Providence and Seekonk Rivers -- the industrial areas of Pawtucket, Providence, East Providence, and Cranston--in addition to scattered local dumps in coastal communities. The proximity of major population centers, a power generating plant at the port of Providence, and an extensive transportation network exacerbates the problem. In a broader sense, conditions along the entire Northeast coast, especially pollution from the New York-New Jersey region, must be considered as within the scope of the problem. The chief effects of air pollution are damage to personal health and property, as well as to the aesthetic quality of the environment.

Along with the recent growth of professional and public knowledge of the problem, the state has been motivated to enact an air pollution law. Firms are being required to curb their noxious emissions, and local dumps are being supervised more closely. However, state officials complain that "the law is awkward; it doesn't give us any teeth."[44] Beyond providing the teeth, there is little more that the state could do except to promote federal and regional anti-pollution measures.

B. MANAGEMENT OF RESOURCES

Air and water pollution are not the only ways in which the environment can be spoiled: a related problem area is the inadequate management of such resources as fish and shellfish, minerals, and shoreland in the coastal zone.

1. Fish and Shellfish

By 1960, oyster and scallop production in Rhode Island had

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44 Kaull, James T., "Where There's Smoke There's Austin," Providence Sunday Journal, December 1, 1968, Rhode Islander Magazine Section, p. 17.

ceased. Yet the oyster catch was over 15,000,000 pounds in 1910, and the scallop catch reached a peak of over 2,000,000 pounds in 1940. Similarly, lobstering has recently yielded 200,000 to 300,000 pounds a year, while in 1921 the figure was over 2,000,000 pounds. Quahog production, presently the most valuable shellfish industry, was cut in half from 1955 to 1961.[45] The same source reported in 1966 that "there is no indication that the Bay's fin fish resources are in danger of serious depletion due to overfishing,"[46] but more recently both commercial and sports fishermen have complained about the decline of certain species at offshore grounds.

These problems are vital to the coastal zone. The commercial fishing industry, despite its dependence on uncontrollable natural forces, obviously has much greater potential. Even in its present condition, it has been described as a small factor in the total economy of the state but a high-yield activity which is important to certain localities. As for sports fishing, its role in tourist commerce comprises "an important economic contribution" which "could be a significantly more important activity."[47]

In addition, of course, fish resources are important for the purely recreational interests of the coastal zone and for preservation of the ecological balance.

Numerous proposals have already been advanced for better fish management, besides overall abatement of water pollution. Almost all involve new legislation and regulations. For instance, there has been a revival of interest in the oyster industry (through raft culture), and the state would now be legally required to lease all oyster beds existing in 1914--a vast amount of the bay--and to have beds marked by stakes. The quahog industry abounds with problems; suggested legal changes have been to allow artificial depuration from polluted water and to switch management policy to a state authority structure.[48] Further examples of legislative improvements would be establishment of different limits on fish taken and appropriation of more funds for existing state programs. Greater interstate and international cooperation is also desirable. (Other measures will be mentioned in the discussion of related problems).

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45 Alexander, Lewis M., pp. 46-51.

46 Ibid., p. 45.

47 Friday, Ernest, "Fishing Activity in Narragansett Bay," prepared for the Natural Resources Group, 1967.

48 Marshall, Nelson, "On the Management of the Shellfisheries of Rhode Island," prepared for the Natural Resources Group, 1967.

2. Minerals

The problem with mineral resources is that no law exists to preserve and exploit them in the state's interest. For example, gravel mining from the sea bottom is an industry which is just beginning to emerge; the state Department of Natural Resources has recently received more inquiries on the subject. Offshore oil drilling is another conceivable development. The lack of regulation of mineral extraction could lead to depletion of resources, disastrous pollution, numerous adverse effects on the ecology, and loss of potential state revenue. The harm would be felt by the fishing industry, the tourist industry, the entire state economy, and conservation and recreation interests.

The possible methods of regulating this activity are to zone portions of the coastal region, to enforce a permit system or limits on amounts, or to establish a rate structure. The state's maximum allowable territory must also be legally established and precisely defined; it is presently not taking advantage of its full potential jurisdiction.

3. Coastal Land

One of the most valuable resources of the coastal zone is the shoreline, and it is constantly undergoing alteration by addition or removal of land and by abandonment of vessels and docks. (Construction of major facilities will be discussed under another heading.)

-Alteration of Land

During a period of one year the state usually grants over fifty permits for minor developments such as dredging, filling, and construction of piers and retaining walls. Many of these man-made operations are either beneficial or harmless, and they are governed by the state Division of Harbors and Rivers in the Department of Natural Resources. Some, however, may be inimical to the ecology by threatening marine life or by lowering aesthetic values. Those affected are commercial interests (fishing and tourism), recreation and conservation interests, and property owners and local residents.

The situation in the Rhode Island coastal zone has not reached dire proportions, but some specific problems demand attention: the lack of broad state policy regarding all shoreline alterations, and specific inadequacies of the laws governing coastal wetlands and inter-tidal salt marshes. With the former, the problem is that the Department of Natural Resources' decisions on permits are left to its discretion in the absence of established criteria; and since the provision falls under the chapter "Obstructions to Navigation" in the General Laws, at least one case has raised the question of whether a permit can be refused on grounds other than creation of a

navigational hazard. The state needs to establish coastal development policy on a less narrow basis than this permit system, since issues of preservation and use conflict are also at stake. As for the wetlands and salt marsh laws, they use conflicting definitions of a salt marsh, and the wetlands law is difficult to enforce since it permits an owner to file suit for "damages" on land which is ordered protected.

-Abandoned Wrecks and Docks

This type of blight is a matter of concern to several communities in the coastal zone, particularly Warwick and East Providence. The effects can be to endanger personal safety and navigation (commercial, recreational, and military), to discourage recreational use, to cause diseconomies (commercial and municipal) by reducing available dock space, and to offend aesthetic interests.

State law provides for removal of sunken vessels and unauthorized structures, but the law has certain drawbacks. The cause for removal can only be "obstruction to the safe and convenient use of such waters for navigation and other lawful purposes."[49] This may preclude removal of mere eyesores, especially because, again, the chapter referred to is on "obstructions to navigation." Another problem is that if the owner cannot be found or refuses to remove the object, the state must appropriate funds to pay the expense, and it may recover its costs under state law only by bringing suit for willful or malicious sinking or abandonment. Certain cases may be subject to Admiralty suits by the state.

C. MARINE DEVELOPMENT

In a sense, the entire coastal zone may be considered as a single valuable resource which could be better protected and utilized, beyond abating pollution and managing specific resources more wisely. Marine development improvements could, for example, change such conditions as poor access to recreation areas, lack of shore facilities, inadequate control of pleasure craft, and need for planning and development of harbors and channels.

1. Poor Access

An overwhelming complaint of Rhode Island citizens is the difficulty of access to the shore. Probably over 150 public rights-of-way exist along the Rhode Island coast; but many are unknown, obstructed, without parking space, or otherwise unavailable for use. This is a missed opportunity particularly for local residents, for fishermen, and for the tourist industry, which would like to attract more out-of-state fishermen. The Conservation Division of the Department of Natural Resources works to acquire and develop access sites for fishermen, but money is limited.

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49 General Laws, Section 46-6-8.

Steps have recently been taken to insure that the recreational interests of the state are better served. A legislative commission on public rights-of-way has been reactivated and has organized a study to investigate access points and to make recommendations for development. It has found 148 rights-of-way (see Figure 4), and others probably exist in North Kingstown, Jamestown, Tiverton, and Little Compton, where more exhaustive research is necessary. The commission has made two legislative proposals: to institute shoreline zoning, and to make the ownership status of land between the high and low water marks uniform throughout the state. It further recommends that 53 of the sites be studied for future development for recreational use by the Department of Natural Resources, that the others be marked, and that the commission continue its research.[50] Another proposal is to indicate public access points on a state map. What is needed now is money to carry out these measures.

2. Lack of Shore Facilities

A related problem is the lack of shoreline facilities (launching ramps, piers, bulkheads). Future development would be of benefit in several different ways:

-Facilities for recreation

Residents of Barrington, Tiverton, Portsmouth, and other towns have commented that not enough public boat launching sites have been constructed or that those which exist should have been located elsewhere; some claim that ramps have been built so that they are dangerously steep. Undoubtedly recreation and tourism interests would like to see more facilities, but it must also be pointed out that nearly 40 public launching sites (some including more than one ramp) have been developed and mapped in the coastal zone, in addition to facilities at private yacht clubs and marinas (see Figures 4 and 5). Further construction requires funds, from either state appropriations or fees (beach user fees, boat registration fees, or an overall rate structure). The other problems might be remedied by having the state re-evaluate the siting and construction of existing ramps, and by more careful development in the future.

Also in the area of recreational facilities, such communities as Charlestown and Narragansett claim that state beaches are not adequately maintained; this again might require imposition of a fee structure.

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50 Rhode Island Statewide Planning Program, Public Rights-of-Way to the Shore.

-Facilities for commercial fishing

On a more localized level, the commercial fishing industry of Newport would benefit greatly from construction of a public pier there. State piers are presently located in Pawtucket, Tiverton, and Narragansett (three-- at Galilee, Jerusalem, and Ocean Road); yet there is none at Newport, one of the major fishing ports in the state. Pressure is mounting on two fronts. On the one hand, the growth of the tourist industry, chiefly motels, has created a land squeeze for local fishermen, according to the head of a Newport commercial fishing association. At the same time, alleged widespread stealing on the New Bedford docks has caused at least six boats from that fleet to start unloading their catches in Newport, instead, and it is maintained that more would follow suit if Newport had additional facilities and buyers (it now has only three major buyers). Even in 1968, the increase in business meant that Newport, combined with Sakonnet, took in $2,900,000 worth of fish and shellfish.[51]

-Facilities for protection

Other facilities such as bulkheads are vital to protecting the shoreline, in the interest of local residents and property owners, commercial establishments, recreation seekers, and conservationists alike. Not only immediate activities and special interest groups but all future use and preservation of the coastal zone is at stake. Chief examples of problems are the deteriorated bulkhead at Galilee and the erosion along Cliff Walk at Newport, for which federal improvement funds have recently been requested. For the rest of the state, a development plan for the shoreline is necessary to determine the extent of needs and the type of improvements called for.

3. Inadequate Protection and Control of Pleasure Craft

Another marine development problem is inadequate policing of small pleasure boats in the coastal zone. There are really two types of situations: where controls exist but are not sufficiently enforced, and where there are no controls at all.

Several towns, notably in the more congested upper portions of Narragansett Bay, assert that better control of motorboats is needed, under existing regulations regarding speed, recklessness, littering, vandalism, and fire. The dangers to boating and other water activities are obvious. Possible suggestions for improvement include the following: stepping up police and fire protection by the Enforcement Division of the Department of Natural Resources by increasing their manpower; establishing a state marine police force; granting more authority to local harbormasters; and stimulating better coordination between municipalities which border on the same water body.

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51 Merriner, James L., "Fishing Boats Switch to Newport," Providence Journal, January 18, 1970, pp. 1 and 14.

The situation in which there is no control at all is that of the use of small subsurface and surface watercraft which may become popular in the future: jetboards, hydrocycles, hydrofoils, air-cushion vehicles, recreational submarines, and the like. (The analogous land vehicle, the snowmobile, has proved to be exceedingly hazardous if allowed to run unrestricted in trafficked areas.) The state should consider establishing regulations for their registration and operation, or including provisions for their use in an overall water zoning scheme.

4. Need for Planning and Development of Harbors and Channels

A fourth type of marine development which would be beneficial to activities in the coastal zone is improvement of harbors and channels. Specific problems include silt build-up, inadequate channel markers, harbor obstructions, and congestion and use conflict among different kinds of vessels. The effects are to endanger or discourage all types of navigation -- fishing, commercial shipping, military, and recreational. These problems have been observed throughout the coastal zone; examples include loss of water depth in Newport Harbor and Point Judith Pond, alleged lack of channel markers in the vicinity of East Greenwich and North Kingstown, hazardous utilities pipelines across Providence Harbor, and interference of sailboat racing with commercial shipping.

Many of these problems require individual solutions (increased publicity to small boat owners and yacht clubs regarding such navigational dangers as long tow lines, cable areas, main shipping channels, and night cruising; better coordination or regulation in laying pipelines). Others involve continued efforts in obtaining commitments for projects from the Army Corps of Engineers, the Coast Guard, and other government bodies. Corps navigation projects for Providence Harbor and River, Point Judith Harbor and Pond, and Narrow River in Narragansett are included in the recently announced federal budget. Other beneficial measures would be standardization and coordination of harbor regulations and markings or, one step further, development of a policy and plan encompassing all harbors and providing for zoning of water areas to relieve congestion.

D. RELATED DEVELOPMENT

The Rhode Island coastal zone must be considered in a broad sense, as a region dominated by the sea and its tributaries but sometimes extending inland to include the entire state. The following development issues, for example, fall into the categories of industry and commerce, housing, and transportation, but they all relate closely to the coastal zone.

1. Industry and Commerce

-Encouragement of marine-oriented industry

It has been suggested that Rhode Island is lacking in both

policy and action to promote marine-oriented industrial development, although the Development Council works to attract industry in general, and that the state is thereby deprived of potential benefits which could bolster its long-range economic growth. (In 1968, for instance, less than 3 percent of the firms new to the state in the previous two years were marine-based.[52]) Other conceivable effects of this absence of promotion might be to create disadvantages for existing marine industries which need secondary industries; to underutilize local research resources; and to reduce potential state and municipal government revenue. In short, this issue is in the nature of an unrealized opportunity rather than a problem.

Two events have occurred, however, to indicate that the situation is already improving. First, an agency called NEMRIP (New England Marine Resources Information Program) has been formed to provide a wide range of information and extension services to the "marine community," which may ultimately improve Rhode Island's attraction for marine-oriented industry. Supported by federal and state funds, NEMRIP is located at the University of Rhode Island. Secondly, the Rhode Island Development Council, through a newly-formed non-profit corporation, is applying for federal aid to acquire land and construct facilities for an oceanographic research and industrial park in a 90-acre area adjoining the Narragansett Bay Campus of the University of Rhode Island. It is estimated that twelve to fourteen good industrial sites would be provided, resulting in 2,300 new jobs. The plan calls for eventually doubling the size of the park.[53]

-Future of the port of Providence

The development of the port of Providence is a matter of concern to the economy of the city, the state, and the region, not only in view of its relative decline over the past few decades but also in light of the projection that by the year 2000 its commerce could increase by 45 percent over the present level of tonnage if certain measures were taken.[54]

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52 Rhode Island Development Council, Rhode Island Directory of Manufacturers (Providence: 1969).

53 Charles A. Maguire & Associates, Inc., Rhode Island Industrial Foundation Oceanographic Park (Providence: 1969).

54 E.B.S. Management Consultants, Inc., Table 29.

Numerous recommendations have been offered for realizing the port's potential, and the City of Providence has begun to implement them under the vigorous administration of its new Port Director. Examples of recent actions include upward revision of the tariff schedule; establishment of a more equitable and lucrative formula for leases; and, in cooperation with the Rhode Island Development Council, promotion of new trade from other New England ports and from industry elsewhere in the United States and abroad. Also, projects for navigation, removal of debris, and operation and maintenance of Providence Harbor and River have been requested of the Army Corps of Engineers in the new federal budget. Other suggestions for improvement would be further acquisition and development of harborfront land by the city, and preparation of an overall plan to better regulate land and water use at the port.

-Shortage of skilled labor in marine industries

A more specific problem is the shortage of skilled labor in marine industries--both boatbuilding craftsmen and scientific research personnel. This is a difficulty frequently mentioned by existing firms and has wider economic implications in terms of limiting the attraction of additional marine-based industry.

A list of possible solutions might include organization of manpower training programs and vocational high school courses in marine-related skills; continued promotion and information activities by such groups as NEMRIP and the state Development Council; and, on the part of industry itself, higher wages and education of the public to its needs. Overall enhancement of the aesthetic quality of the coastal region is also a significant factor in attracting labor.

-Economic problems of commercial fishermen

The commercial fishing industry in Rhode Island is healthier than in the rest of New England: from 1960 to 1967 at Point Judith (the major fishing port) landings did not decline, the number of vessels was constant, the number of fishermen increased, and tonnage doubled.[55] There are problems which demand attention, however: dramatically increased foreign competition at offshore grounds (the New England share of the catch from the Continental Shelf dropped from 93 percent to 35 percent between 1960 and 1965[56]); inadequate

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55 Department of Food and Resource Economics, University of Rhode Island.

56 Bailey, Merrill R., "R.I. Fishermen 'Relatively' Prosperous," Providence Journal, March 10, 1968, p. 16.

handling, processing, and support facilities; a federal prohibition against purchasing foreigh-made boats; difficulty of obtaining capital; slow pace of technological improvement; laws which require overhauling; and, of course, pollution. The effects of a sharp decline in commercial fishing would be disastrous to the economy of the South Kingstown - Narragansett area and to other groups scattered throughout the state (fish valued at $5.5 million were landed in Rhode Island in 1967, and much more income is generated in secondary activities[57]).

Remedies which have already been used are technical assistance from the University of Rhode Island through a new extension service and special classes for fishermen; and organization into cooperatives to improve financial strength. The principal need now is for pressure at the federal level to modify commercial fishing laws, to relax import restrictions on fishing vessels, and to commit aid for facilities and equipment.

-Need for tourist facilities

Tourist spending in Rhode Island increased from $18 million in 1950 to $40 million in 1960[58]; it rose to $70 million in 1968 and could reach as high as $150 million by 1975[59]. Every million dollars spent turns over several times, adds about 100 new jobs, and gives the state $320,000 more in tax revenue.[60] The importance of the tourist industry is obvious; the problems are that provision of facilities must be brought into line with the tremendous potential and that preservation of natural resources must keep pace with growing use. The Bureau of Outdoor Recreation estimates that by the year 2000, marine recreation in the United States will quadruple in terms of user-days.[61] In Rhode Island, it is estimated that tourist accommodations must double by 1972 to meet projected demand.[62]

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57 Bailey, Merrill R., p. 16.

58 Rhode Island Development Council.

59 Rhode Island Tourist/Travel Association, p. 1.

60 Rhode Island Development Council.

61 The Commission on Marine Science, Engineering and Resources, p. 53.

62 Rhode Island Tourist/Travel Association, p. 6.

Although the private sector is extremely vigorous in promoting Rhode Island tourism, the state also has a role in these efforts. Numerous goals for improvement have been drawn up by the Rhode Island Tourist/Travel Association, most of them necessitating state action. These include raising the total and individual loan guarantee limits of the Rhode Island Recreational Building Authority to stimulate construction of hotels, motels, and sports and entertainment facilities; restoring the Rhode Island Development Council's full budget allotment for tourist promotion; revising the fee structure at state beaches and other areas, in order to upgrade and expand facilities; improving access to the shoreline; increasing the number of highway information booths (the one on Interstate Route 95 near the Connecticut border served 70,000 people in the 1968 summer season, a 40 percent increase from the previous year[63]); and, in general, maintaining the quality of the environment. Another desirable measure would be to zone portions of the coastal area to reduce the conflict of tourist with other uses, as in cases where there is interference with commercial fishing or where municipalities do not zone enough land as commercial.

2. Housing

-Shortage of Navy housing

Rhode Island's extensive Navy installations create another problem related to the coastal zone: a severe shortage of housing for military personnel. In the Quonset-Davisville area, it has been estimated that 1,600 recently arrived military families need housing, with 500 on a waiting list as of May, 1969.[64] In Newport, which has an already tight housing market, one source stated that as of summer, 1969, 916 qualified enlisted men were on a housing waiting list, 1,100 men were "involuntarily separated from their families," and 1,300 men were "unsuitably housed."[65] This is of concern not only to the people directly involved but also to other area residents (particularly low-income renters) who suffer from the shortage of living quarters. A special impact on the coastal zone is to intensify pressures on land development. The main solution for this problem is to persuade the federal government to provide more military housing, perhaps temporary units because of the uncertainty of the Navy's presence. Overall improvement in local housing supply situations would also alleviate conditions.

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63 Rhode Island Tourist/Travel Association, p. 4.

64 Rhode Island Department of Community Affairs.

65 Stocklin, Alma K., "Statistics on the Housing Situation in Newport, R.I." (1969), p. 1.

-Blighted housing

A development problem in the same field is the increasing amount of blighted housing along the shore. This often occurs where seasonal units are taken over for year-round use, such as in coastal sections of Warwick, Narragansett, South Kingstown, and Charlestown. This type of housing becomes deteriorated much more easily than others, either because it is taken over as the cheapest available space for rental to low-income families, and then is inadequately maintained; because it is not built to withstand year-round occupancy, overcrowding, and the continuous changes of tenancy which commonly occur; or because it is more exposed to harsh weather. The problem could spread beyond a few isolated locations, since in ten of the 26 coastal zone communities at least 20 percent or at least 1,000 of the total number of housing units were counted as seasonal by the 1960 United States Census. In only eight of the 26 were there fewer than 10 percent or 200 units classified seasonal. Dilapidated seasonal housing is not only harmful to health and safety but also discouraging to other recreational investment (residential, commercial, or public)--besides being economically and aesthetically a waste of valuable land.

Countless remedies for blighted housing have been put forth, and many of them would be as beneficial to seasonal units as to any other kind. Those most pertinent to seasonal housing, however, are the following: better local code enforcement programs, inclusion of waterfront rehabilitation programs in urban renewal projects, amendment of building codes to provide special construction requirements for houses subject to flooding, and development of a comprehensive plam for the coastal zone including a residential element.

3. Transportation

-Highway traffic along the coast

One transportation problem which is closely related to coastal zone activities is automobile traffic near beaches during the summer. Residents of East Greenwich, Bristol, and especially south shore towns like Charlestown and Narragansett have identified highway and parking congestion as a serious complaint in their areas. Life and property are endangered, and conflicts are stimulated between recreational use and other activities such as commercial fishing.

Some possible solutions might be to provide better parking facilities at shore access areas (using the proceeds from fees or right-of-way development funds); to establish higher parking fees in order to encourage people to use public transportation where possible; to expand and promote special bus service to recreation areas; and to try to re-route through-traffic away from the areas of greatest recreational activity.

-Adjustment of Jamestown to the Newport Bridge

A broad problem, but one which originates in a transportation change, is the adjustment of Jamestown to the new Newport Bridge. The closing of the ferry has led to a severe drop in business for the now-bypassed commercial section of the town. On the other hand, the advent of the bridge may cause a residential boom; the number of residential building permits rose sharply in 1969 after a three-year decline.[66] The increase in population would require expansion of municipal services and particularly of the school budget. (The town has only an elementary school, so older pupils must be transported to Newport at a cost which has increased substantially since the demise of the ferry.)

In coping with these problems, Jamestown will have to guide the transition of the business section (from tourist-oriented to resident-oriented commerce), to control future land development, possibly to attract industry and additional commercial enterprises, and to make changes in the tax structure and in the extent of municipal services. Financial and technical assistance is needed from the state and federal governments.

E. CONFLICTS IN USE

From the preceding discussion it is evident that conflicts in land and water use constitute one of the most critical problem areas for coastal zone management. In many instances, the conflicts have not yet surfaced (although they are anticipated) or at least have not reached an intense stage in the Rhode Island coastal zone. A mere nuisance or irritation has the potential of becoming a serious problem, however, especially as the amount of marine activity spirals upward, and this might be averted by advance planning and precautionary measures. The following types of conflicting uses are examples; a detailed analysis is made in the Rorholm study.

1. Recreation and Commercial Shipping

Both small-boat operators and pilots for commercial vessels complain about interference with each other's activities. Recreational boating enthusiasts often are unaware of the location of established shipping routes or may be oblivious to such perils as long underwater tow lines and nighttime cruising. They have even been accused of laying sailing race courses across shipping channels. On the other hand, commercial vessels are at fault for discharging oil and refuse, and they sometimes disrupt marinas by creating a

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66 Taylor, Robert, "Bridge, Highway Bring Change to Jamestown," Providence Journal, December 7, 1969, p. 1.

giant wake (especially the new larger ships).

Much of this danger and discord could be avoided if greater communication and understanding were fostered between the two groups, as by alerting operators of small boats to "rules of the road" and to certain navigational hazards. Also immensely important is giving greater attention to potential conflicts when planning commercial or recreational development (port expansion, new yacht harbors) which will result in different types, locations, or levels of activity. As for pollution, requirement of special facilities and equipment to prevent excessive oil spillage would help alleviate matters. Finally, more drastic overall moves would be to regulate water use through zoning restrictions or to establish schedules for commercial vessels leaving ports.

2. Recreation and Commercial Fishing

The major confrontation between recreation and commercial fishing interests occurs along harborfronts. Tourists seek parking room and access to beaches and piers; yachtsmen want moorings and services; developers desire prime land for hotels, motels, and restaurants. Meanwhile, commercial fishermen need space for docking and handling as well as for processing plants. This conflict, presently found in Point Judith and Newport, could definitely worsen with the expected increase in recreational activity and with the possible growth of the fishing industry.

Another source of antagonism is the disturbance of fish traps by sportsfishing and other recreational vessels, but this problem is rated as secondary by commercial fishermen when compared with some of their other problems.

Several solutions which have been mentioned in connection with other problems would also be of benefit in reducing this kind of conflict. They include providing more access areas and facilities for recreation, adding dock space for commercial fishermen, relieving automobile traffic congestion near shore areas, and redeveloping harbors and channels. The most direct solution, and the most effective if the dissension builds, would be to zone portions of the coastal area in order to separate conflicting uses.

3. Different Kinds of Recreation

With the multiplicity of recreational activities found in the coastal region, it is not surprising that they may be carried on in opposition to each other. For instance, surfing and water skiing may be at variance with swimming; all kinds of water vehicles with each other and with swimming and diving; beachbuggy driving with bathing beaches; sports fishing from boats with shore fishing and skindiving; fishing with camping. For the most part these are occasional conflicts, but in a few places they have become chronic,

and sometimes they threaten to cause personal or property damage. For instance, surfing and swimming are activities which are absolutely incompatible in an area where more than a few people are congregated. Similarly, other conflicts will become intolerable as recreational use of the bay increases.

Suggestions for avoiding conflicts are to upgrade and expand (or clarify) access and public facilities for distinct uses; to establish controls for powered watercraft where they are needed and to improve enforcement of existing controls; to plan and implement harbor and channel development; and to restrict land and water use by some type of zoning.

4. Recreation and Military Vessels

Recreational interests sometimes find themselves in contention with military operations in the coastal zone. One case is where water areas restricted by the Navy at certain times (see Figure 8) may not be adequately patrolled. This could become a more serious problem as use of small boats and other vehicles, perhaps underwater varieties, becomes more popular in Narragansett Bay. Efforts should be made to increase awareness on the part of small boat operators of prohibited areas and other hazards.

A second case of conflict is where pollution from military vessels causes extensive damage to yachts and discourages other recreational uses like swimming and fishing. The Navy is aware of the difficulty and is experimenting with sewage treatment remedies, such as an incinerator-electrolysis unit and a biological system using activated charcoal.[67] Also, the President has recently ordered military vessels to comply with state water quality standards. On the whole, the responsibility for resolving this issue is the federal government's - - establishing standards for equipment, financing its installation, and enforcing its use. The state, however, will have the role of promoting the necessary federal legislation and making arrangements for some kind of monitoring system in order to ascertain whether its water quality standards are being met. Meanwhile, Navy ships continue to be major polluters. (Recreational-military conflicts in land use will be considered in a later section.)

5. Commercial Shipping and Utilities

A very specific conflict is that between commercial shippers

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67 "Tough, Varied Problems Remain," Providence Evening Bulletin, November 3, 1969, p. 10.

and utilities (see Figure 12). The former feel that the port of Providence is not deep or wide enough to begin with, even taking into account ongoing navigation projects, and they deplore the laying of a gas company pipeline and a city water line across the harbor from Providence to East Providence. They say not only that the lines drastically curtail the port's capacity but also that in a storm it would be possible for a ship to drag anchor, striking one of the lines. The conflict thus threatens commercial vessels and all other users of the harbor, both physically and economically.

The controversy over pipelines will be lessened only by more careful port development in the future: better coordination in siting industries and facilities and, possibly, regulation of water and shoreline use. The danger posed by pipelines in certain locations should be of special concern in planning.

6. Waste Disposal and Other Uses

Water pollution has already been discussed in previous sections, but it should be noted again here that it causes a conflict in that waste disposal is inherently incompatible with other uses, depending on the degree of pollution and the type of use.

7. Land Use

Of all the conflicts involved in the coastal zone, conflicts in land use are the most far-reaching in terms of both geography and implications for future development. In fact, most of the water activities are determined by what is happening on the shore, and what occurs on the shore is in turn affected by factors farther inland. The instances of competition for land, actual and potential, are therefore endless; they can best be discussed by choosing a few salient examples and by suggesting a few immediately available solutions (the most common being preparation and implementation of a comprehensive coastal zone plan to coordinate land use).

-Military Land Use

The federal government's military bases in Rhode Island create two types of land use conflict in the coastal zone. One is that the Navy desperately needs additional land for construction of housing at Quonset-Davisville and Newport, yet the adjacent land is already in high demand for private commercial and residential development. Furthermore, in both North Kingstown and Newport most residential areas have been zoned to prevent all but low-density settlement (below 2.5 dwelling units per acre), thereby excluding large-scale housing complexes for Navy personnel.[68] A change in municipal

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68 Rhode Island Statewide Planning Program, Community Development Goals and Policies, Technical Paper Number 13 (Providence: 1967), p. 23.

zoning would be desirable, although the overall market situation is unavoidable.

Another type of conflict is potential: it is the question of how the land would be used if the Navy presence were reduced or eliminated. Competition would be sharpest among residential development (Newport's housing shortage is common knowledge, and North Kingstown had a population increase of over 20 percent from 1960 to 1965[69]), industrial development and utilities (the sites are frequently large, flat, and well-serviced, with convenient railroad spurs and dockage facilities), and open space or recreational development (the Navy's shoreline and island properties are often ideal for seasonal homes, marinas, beaches, and conservation areas). Fortunately there would be land available for each type of activity, but it is necessary that land use be allocated according to a comprehensive plan which takes this contingency into account. Also, it would be desirable for the state to have a prior agreement regarding some sort of option on certain military property which could be put to public use.

-Open Space

Another pair of present-potential conflicts is found between open space and other types of land use. Currently, most open space areas (including recreation and conservation in this category) are located along the southern shore and in upper east shore communities like Bristol and Barrington (see Figure 6). Coastal portions of Providence, East Providence, and Pawtucket, however, where low-income residents are concentrated, are seriously lacking in public open space. (One auspicious exception is the proposed park at India Point which would replace a junk yard.) Implementation of a coastal zone plan would help reverse this trend, as would the following measures: inclusion of recreation-oriented waterfront programs in urban renewal projects, siting of new industrial plants farther inland, and protection by the state of salt marshes and coastal wetlands even if they are in currently polluted areas.

The future conflict is even more critical, since pressures on coastal land will become more intense and since "open space" bargains from a less powerful position than other interests. One important step would be for cities and towns to include open space in their zoning laws. Presently, this is done by only East Providence, New Shoreham, Pawtucket, and South Kingstown; and there is no municipal zoning at all in Charlestown, Little Compton, and Portsmouth

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69 Rhode Island Development Council, Rhode Island Basic Economic Statistics, p. 34.

(see Figure 14). Policies, planning, and regulatory devices on the part of the state to provide more open space and public recreation areas will also be needed.

-Residential and commercial land use

Excessive amounts of residentially zoned land inhibit not only open space but also commercial development. On the western shore of Narragansett Bay, for example, there is practically no shore land between East Greenwich and Narragansett Pier where commercial use is permitted, except at Wickford (see Figure 14). On the eastern shore, commercial structures may be erected only in the port sections of Bristol, East Providence, Tiverton, and Warren (in Little Compton, the scarcity and cost of land compensate for the lack of zoning regulations). Residential growth on the coast is not undesirable, but the land is too valuable a resource to be completely open to residential development, to the exclusion of commercial activity. More hotels and motels are cited as a major need for out-of-state visitors and would bolster the tourist industry, and, especially important, more commercial beaches and marinas would help to even the balance between public and private use of the coastal zone.

F. JURISDICTIONAL PROBLEMS

In many of the preceding problem areas there is another issue at stake: jurisdictional conflict. It may take various forms: duplication of overlap of jurisdiction, vying for jurisdiction of another, lack of jurisdiction. It may take place within or between all levels of government. Municipal and state jurisdictional confusion will be included in this section, while interstate and federal conflicts have been covered in material summarized in the appendix. The intent is not to catalogue all such problems but to provide a few examples which prove their existence and indicate their characteristics.

1. Between Municipalities

A typical area of disagreement between coastal zone municipalities involves pollution. For instance, the Providence dump is of grave concern to the residents of Cranston who suffer from its ill effects but are unable to control it. A similar problem arises in Barrington, which would like to see better policing of boats on the adjoining Warren River but is powerless since the town of Warren has complete jurisdiction. On a broader scale, planning for the coastal zone must obviously be coordinated among the numerous communities involved, not by scattered local attempts. In all these cases, the state should play the role of overseer, either coordinating or directing municipalities.

2. Between Municipalities and the State

At the next level, municipal-state, difficulties have also

developed in coastal zone affairs. Some examples have already been pointed out: complaints of towns that state beaches are inadequately maintained, or that state funds are needed for construction of protective facilities, or that state technical assistance is essential for such projects as developing public rights-of-way or readjusting Jamestown's economy. On the other hand, the state can accuse municipalities of failing to comply with state pollution laws and of enacting shortsighted and overly restrictive local zoning ordinances.

Solutions for these conflicts vary, but it is generally up to the state to initiate action -- by preparing a bond proposal or new legislation, by prodding an existing state agency or supplying it with needed resources or authority, by filling administrative or policy voids, and by instituting zoning or similar controls beyond the jurisdiction of an individual town or city.

3. Between State Agencies

The latter type of jurisdictional conflict points up another, which occurs at the intrastate level; i.e., where the number of state agencies concerned with coastal zone affairs has multiplied rapidly, or, conversely, where no state agency exists to provide a needed function. The proliferation of agencies is usually not so much a matter of duplication of work as it is of division of responsibility. For instance, many government bodies regulate use of the shoreline (and this is a technical necessity), but coordinated development is impossible in the absence of an overall coastal zone plan or administrative mechanism. Many commissions study separate legislative needs (which again is only practical), but no single group is charged with insuring the review of all marine-related laws. Occasionally, however, a conflict in function does result, as with motorboat regulation: patrolling is carried on by the Division of Enforcement of the Department of Natural Resources, along with the State Police, Coast Guard, and local officials; yet registration records are kept by the state Registry of Motor Vehicles and are not available on weekends, when most violations occur.

The opposite situation, where there is a total vacuum of state participation, is equally serious. The lack of an organization to regulate gravel mining from the ocean bottom is a prominent example. (Part Four discusses these problems further.)

PART FOUR: THE NEED FOR A RESOURCES MANAGEMENT MECHANISM

The Technical Committee found, through all groups appearing before it, a general recognition of the need for an overriding body to provide the direction and leadership for the development and utilization of Rhode Island's vital coastal zone, a management body that could determine basic policy guides, that could develop and maintain a workable coastal zone plan, that could implement this plan, that could coordinate the efforts of all governing agencies and groups in this endeavor, and that could carry out necessary study and investigational work to solve conflicts and other coastal problems.

A. POLICIES

Though a large number of government agencies and other groups have an interest in and a responsibility for coastal zone activity, there are some serious deficiencies that are not being resolved by the existing structure. One example is the determination of the degree to which the marine environment may be allowed to be altered by development and use. Such change is influenced to a great extent by pollutants: chemical, organic, thermal, solid, and others. Setting tolerance levels would serve as an important policy guide for those agencies having responsibilities in pollution control and managing various portions of the coastal system. It should be pointed out that it will take considerable research and monitoring to accomplish this task.

Shoreline alteration also occurs through filling or removing earth by man's efforts. As land becomes increasingly dear, pressures will mount to push out into the water areas. Though controls exist, there is little to limit this activity, other than when navigation is seriously threatened or when strong local objections arise which can successfully prove damage to adjacent property. In reaching sound policy decisions on future alterations, the state must consider all ramifications regardless of geographic location or difficulty in quantifying effects.

Similarly, it was noted that various state agencies charged with administering statutes pertaining to health, harbor utilization, and fish resource management operate in a policy vacuum and therefore act on numerous permit requests strictly on a local public reaction basis, which is not necessarily in the best interests of all the people. In addition, many of the programs and statutes they administer have been in operation for years, with no one reviewing or evaluating their need or usefulness. It is unrealistic to expect the agencies which administer these statutes to make recommendations that might, in fact, suggest a reduction in the agencies' responsibility or activity.

The Technical Committee was struck by the lack of marine-oriented industry in Rhode Island. Although our state is richly endowed with a natural ocean front, a well protected bay, and very respectable ocean-oriented research facilities, there has been little utilization of these advantages except by the military. One concern expressed by some existing marine-oriented industries is the lack of facilities to train the skilled labor needed in this industry. The Committee notes that the Rhode Island Industrial Foundation and the Rhode Island Development Council are actively endeavoring to create an oceanographic industrial park, which is a most encouraging sign. An opportunity is present for Rhode Island to bolster its economy and image by using various incentives to attract new marine investment.

As natural resources become more scarce and as technology enables us to obtain needed resources from once difficult locations, the exploration and utilization of submerged land becomes a real possibility. Sand and gravel are the principal minerals extracted in Rhode Island, comprising about 60 percent of total mineral tonnage in 1967.[70] A recent national study shows that the United States is using up its onshore deposits at a rate of 6 percent per year, suggesting that total depletion will come in about 17 years.[71] Offshore deposits will become the major source for these products in the future. In fact, in the last few years, construction companies in Portsmouth have extracted quantities of gravel from Rhode Island's submerged lands. These activities have created pollution, affected the ecology, and displaced other users of the area without receiving permission from or paying compensation to the state. It is evident that Rhode Island is not presently prepared to handle requests in this area and that no satisfactory method of determining leases, fees, and safeguards now exists.

The utilization of the surface water and the water body itself by a wide variety of water craft and devices -- of different speeds, propellant methods, maneuverability, visibility, and size -- presents serious problems related to health, safety, and use. Coupled with the desire for restricted-use areas for recreation, fishing, and waste disposal, these problems cause further conflicts that would be difficult to resolve under the present framework. Even such a responsibility as channel marking of lesser water areas has not been set. The free and open use of the public waters by all can only lead to chaos.

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70 "The Mineral Industry of Rhode Island," Bureau of Mines Minerals Yearbook (Washington, D.C.: United States Department of Interior, 1967), p. 1.

71 "Coming Soon: Sand Mining on the Continental Shelf," New England Marine Resources Information Program Newsletter 1 (Narragansett, Rhode Island, May, 1969), p. 1.

In regard to shoreline construction, the Committee noted little evidence of orderly control. Some areas have harbor lines -- most do not -- yet building goes on, with only the voices of adjacent landowners to resist haphazard development of the coastline. Structures that are placed by private and sometimes public investment often deteriorate and blight the watefront, yet no one is responsible and the public ends up paying dearly in rehabilitation costs or loss of use. And how much of this shoreline is available to the general public? Less than 5 percent. The Commission on Discovery and Utilization of Public Rights-of-Way has been working hard on identifying and re-opening public ways, but who determines if this is adequate for a population approaching 1,000,000?

The Committee described, in the previous section, a number of problems confronting our coastal area. Who is going to resolve them and how are they to be resolved? In the coastal area, problems must not only be recognized but also be anticipated well in advance to prevent situations arising which are irreversible. Once a marsh is filled, a permanent structure such as a bridge committed, there is no turning back. Often these problems cross functional lines and thus no single agency is able to resolve the situation. The establishment of criteria for evaluating problems and of methodology for solving them is most urgently needed.

B. LAWS

The legal questions raised are as compelling as the policy and management needs. The Committee found that the territorial limits of the state have not been fully determined; that the seaward boundary between Massachusetts and Rhode Island has not been resolved; that the New York boundary adopted by Rhode Island in April, 1942, should be reviewed in light of the possible extension of the state's offshore jurisdiction;[72] and that the federal government's jurisdiction, particularly of submerged offshore lands, is very much unanswered. The importance of this is obvious, especially since a potential revenue source is at stake. With a clarification of these jurisdictions, the state would be in a much better position to prevent, now and in the future, the exploitation of the many living and non-living offshore resources that exist there.

Turning toward the inland waters and the lands beneath them, the question arises, "Under whose jurisdiction do they fall?" Underwater gravel excavation has already taken place with little concern. Yet, is this not public property? Can such activity destroy or damage shellfish beds, and other uses of these waters?

Perhaps the answer exists, but the Committee was unable to determine, in many instances, the extent to which coastal and bay municipal jurisdiction extends beyond the mean high tide line. Policing and taxing problems have already been posed, and there are many associated activities that require the determination of clear-cut jurisdictional responsibility.

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72 Chapter 996, Public Laws of 1942.

There further appears to be limited knowledge of public rights and private rights to the shore. For years it has been presumed that the state owns or has jurisdiction over lands below mean high water on one side of Narragansett Bay and mean low water on the other. There now seems to be good reason to question this point. Rights of Rhode Islanders to have a say in activities adversely affecting this state by sister states is not clearly understood. The question of rights or privileges regarding littoral owners should be clarified. The question of who can use many public rights-of-way to the shore and who is responsible for their maintenance remains unanswered. Functional governmental agencies do not seem to be able to deal with these various legal problems.

A brief review of the many administrative statutes relating to the bay and coastal zone area indicates considerable permissiveness to carry out activity with mixed responsibility among all levels of government. An example of this is Chapter 46-4, General Laws of 1956, the Harbors and Harbor Line statute, which permits harbor lines to be established by the state and gives powers to the town harbor masters to enforce laws and ordinances. Harbor lines may or may not exist where waterfront development takes place, and towns may or may not control waters of the state. Other statutes are limited in scope. Chapter 46-7, on stakes and buoys, provides for marking of the Pawtucket (Seekonk) River but nowhere else. Others are inadequate. Chapter 46-22, the motorboat law, requires registration of boats yet has no provision for navigation aids or operator's control. Still others are antiquated. Chapter 20-10, Oyster Bed Leases, would cause serious use-conflict problems if oysters were to return to Rhode Island waters. These are but examples of a need to review and update statutes relating to the coastal zone.

Other examples of areas requiring new legislation are: the need for preventive pollution control based on proof that the disposal of waste will not pollute rather than on the present "reasonable and feasible" principles; maintenance of structures; uniform harbor management; and control mechanisms such as zoning, leases, and fees to limit multiple-use conflicts and to assure proper allocation of the resource base.

C. COORDINATION

The great variety of agencies concerned with the coastal zone is evidenced in Part Two of this report. The Committee believes that it is imperative that coordination of these efforts be initiated to control what is taking place in the area, to prevent waste and duplication, and to receive the maximum value from investments made.

The Committee noted that a number of regional and federal activities are broadly based, with no comparable state agencies.

As a result, often a functional agency is designated to provide liaison with the federal agency. This presents practical problems for the state agency in insuring that adequate liaison with other functional divisions within the state exists, and can result in the liaison agency expanding its activities beyond its legal responsibilities. A second possibility may arise whereby many state agencies work with the regional or federal agency, producing a great deal of wasted and excess manpower energy at the state level attending meetings, making reports, and so forth. At the other extreme, if no state counterpart exists, and a communicative responsibility is not assigned, a serious void can develop whereby the state will have only limited knowledge of what is going on at the federal level. An example of this is the Department of the Interior's Bureau of Mines, whose activities are not directly related to any state agency.

Another example of this problem is presently before us: the newly-formed coastal states organization. It seems appropriate that Rhode Island be an active participant in this organization. However, with no arm of the state government concerned with the whole problem, only fragmented sections, it appears very unlikely that this new body can be truly beneficial to our state.

Another example of need for an overall agency concerned with the coastal area relates to the present weakness in the state's handling of specific coastal problems. For example, Rhode Island has one man working parttime on the offshore boundary issue. The problem is highly significant and definitely beyond the scope of any one person. In general, coastal issues are intricate and require the pooling of knowledge from many diverse disciplines. One way of achieving this is to maximize the coordinating effort of the state to assure that all relevant factors are considered in any final management decision.

Perhaps of greatest importance concerning coordination is the forthcoming federal legislation related to the coastal zone. The Magnuson Bill in the Senate (S-2802), the Mosher and Lennon Bill in the House (H-14730), and the Administration bills (S-3183 and H-14845) all require rather definite state authority for participation in new federal programs that will have a marked impact on our coastal zone's development. Authority to make master plans, to implement plans through zoning regulations, to acquire land, and to exercise other control mechanisms are all integral parts of the legislation. In addition, these bills provide for extensive financial assistance to the states' efforts in coastal zone management. Passage of one of the bills appears likely during this session of Congress, and Rhode Island has both the need and the opportunity to derive many benefits from the federal government by complying with its suggested program. Our present structure and controls do not meet the requirements of these bills. Again, what is needed is leadership provided by some overriding body responsible for coastal affairs.

D. PLANNING

The key to any orderly and beneficial development is to proceed with a comprehensive plan designed to fulfill the basic desire of the people of a region. The federal legislation described above demands this, and it is most likely that how and where federal assistance flows into a region will be governed by such plans. The Committee thus recognizes the necessity for a plan. Without it, agencies charged with the supervision and development of certain coastal areas such as harbors do not know how to proceed, for they do not know for what purpose they are to develop. As a consequence, spot development takes place, in much the same manner that unplanned and uncontrolled communities develop. The resulting problems and drain on financial resources frequently are insurmountable, and deterioration of the area occurs. We need only look to our major ports to be aware of the problems. In addition, a system of priorities is needed. Presently there is no one to set these priorities other than the federal government. We believe that within the Rhode Island coastal area, the state rather than federal agencies should determine its destiny, with the exception of national security matters.

The Technical Committee believes that the evidence expressed herein of the needs of our coastal zone for basic policy determination; for development and implementation of plans; for coordination of a vast number of agencies and programs; for resolving countless competing public desires; for clarifying numerous jurisdictional questions; for revising, updating, and amending a most complex mixture of statutes, laws, rules and regulations, is sufficient to justify a management mechanism for Rhode Island's coastal zone.

E. ALTERNATIVE MANAGEMENT MECHANISMS

In full recognition of the many unresolved problems of the coastal zone, the Committee carefully reviewed alternative management mechanisms which, it felt, could perform the necessary tasks. Many management systems were considered, taking into account the fundamental goals for our coastal area, compatibility with the existing overall state organization, and compliance with proposed federal legislation. After many trade-offs and further analyses, the list was substantially narrowed to two fundamental alternatives: creation of a new organization outside of the existing structure, or creation of a new unit within the Department of Natural Resources. The other alternatives considered represent variations of these, and their advantages and disadvantages are very similar to one or the other of these basic alternatives.

1. A Separate Coastal Zone Agency

A possible organization chart for an independent agency is shown on Figure 15. As an independent body, the Council would possess a prestigious position within the governmental structure and, as a result, would lend greater visibility to coastal affairs. Initial enthusiam for such an agency, from both the general public and the federal government, would undoubtedly be strong and might enable the Council to hire personnel and receive financing more readily. In addition, a separate entity would have substantial freedom and would more easily be able to perform its operations -- formulate policies, administer regulations, and maintain relationships with other state agencies and the University of Rhode Island.

The creation of a new agency has a number of shortcomings. First, it contributes to the proliferation of agencies at the state level. Second, it represents a more complicated form of governmental structure with the addition of so-called independent boards. Third, it may not be a desirable type of organization for the administrative or line functions which would become increasingly important. Fourth, once initial excitement wears off, it may find itself gradually removed from the Governor's direct line of authority. And last, it increases the opportunity for "empire building."

2. A New Division Within The Department of Natural Resources

Placement of the Coastal Zone Council within the Department of Natural Resources, as shown in Figure 16, would result in a minimum of organizational and administrative problems and would expedite the use of knowledge and expertise already gained in similar areas. Total coordination between this new division and the many other activities of the Department relating to the marine environment would be maximized. It would help maintain the principles of strong executive leadership and clear lines of authority and responsibility. Its powers would be more easily controlled, and in the long run a sense of permanency would be built into the structure. And finally, this Department appears to be a most logical location for what is essentially a natural resource matter.

The principal problem of this type of organization is the ambiguous position of the Council in relation to the staff and the Director of the Department of Natural Resources. Also, it may encounter difficulty in coordinating activities of those agencies with coastal zone interests which are outside of the Department.

FIGURE 15

A SEPARATE COASTAL ZONE AGENCY

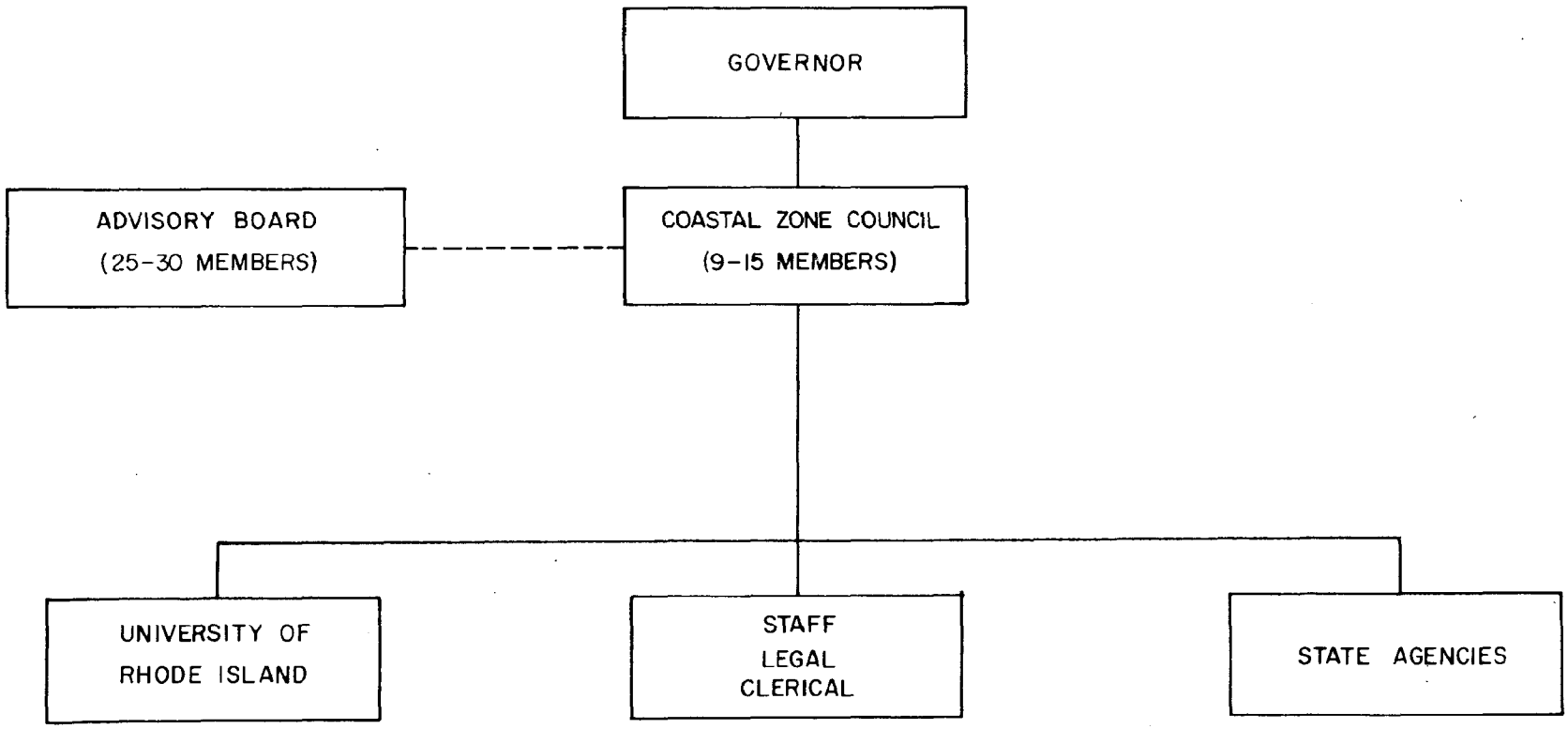
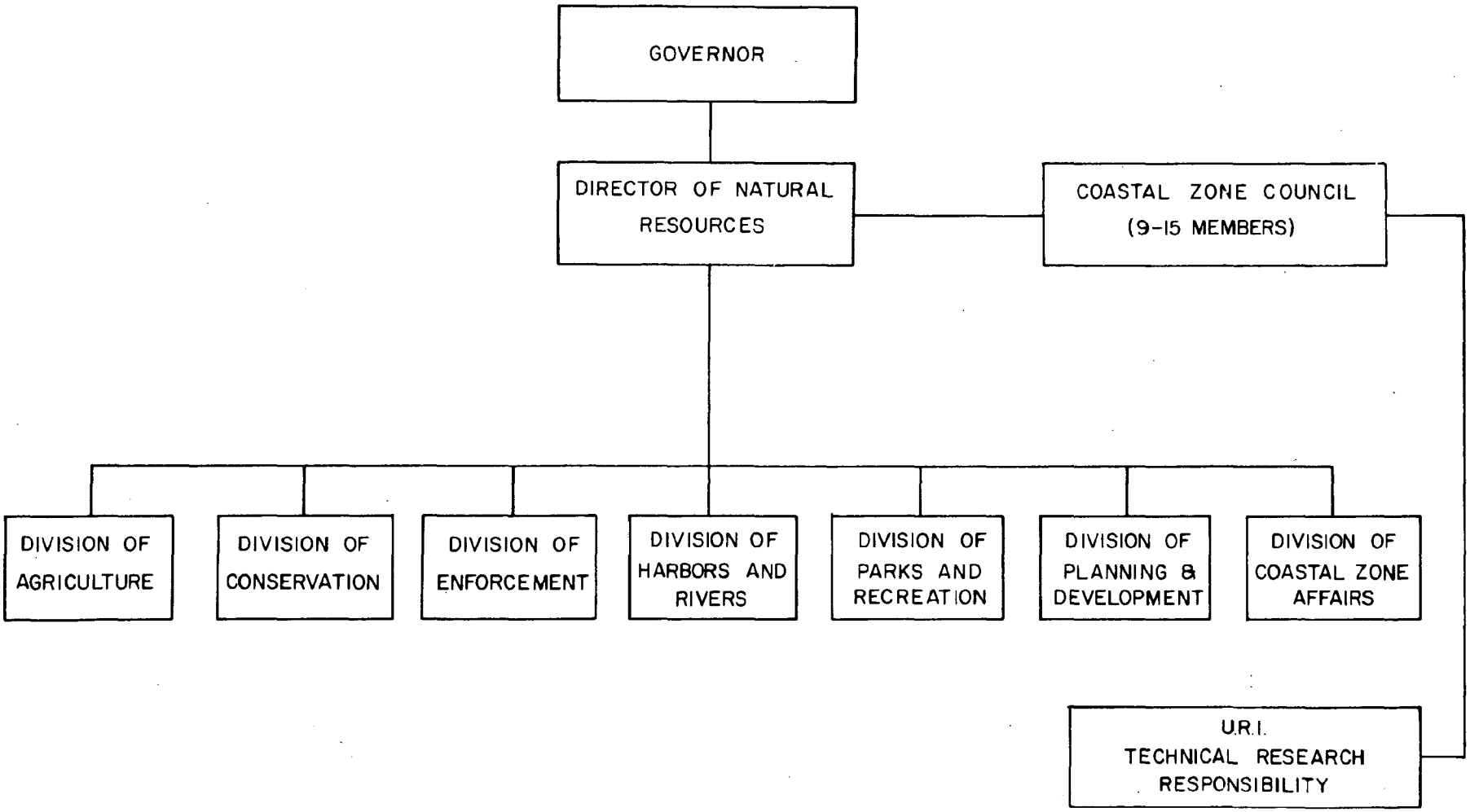


FIGURE 16

A COASTAL ZONE DIVISION WITHIN THE DEPARTMENT OF NATURAL RESOURCES



PART FIVE: RECOMMENDATIONS FOR RHODE ISLAND'S COASTAL ZONE

The Governor's Technical Committee on the Coastal Zone has investigated the importance of the coastal zone and its many resources to the state, the complex and frequently overlapping governmental programs which affect and impinge upon these resources, the present and potential development of the coastal zone, and the problems and conflicts which arise from these activities. The Committee has also reviewed the concern of many organizations, associations, institutions, and individuals for the proper long-range use and protection of this region, and has considered the overall structure of state government, the appropriate location for an effective resources management function, and the alternative organizational forms which such a management agency might take.

On the basis of these studies, the Technical Committee makes the following recommendations:

1. That the State of Rhode Island recognize and declare that its Coastal Zone, rich in a variety of natural, commercial, industrial, recreational, and aesthetic resources, is of immediate and potential value to the present and future development of this state; that unplanned or poorly planned development of these resources has destroyed, or has the potential of destroying, the basic natural environment of such areas, and has restricted the most efficient and beneficial utilization of such areas; that it shall be the policy of this state to preserve, protect, develop, and, where possible, to restore the resources of the state's Coastal Zone for this and succeeding generations through comprehensive and coordinated long-range planning and management designed to produce the maximum benefits for society from the Coastal Zone; and that preservation and restoration of ecological systems and historic and aesthetic resources shall be the primary guiding principles upon which environmental alteration of the Coastal Zone will be measured, judged and regulated.

2. That the principal mechanism for management of the Rhode Island coastal zone be a Coastal Zone Council, created by the General Assembly and comprised of an eleven-member policy body appointed by the Governor, with an Executive Director and such staff and consultants as are necessary to its work. The Coastal Zone Council staff should be placed in the Department of Natural Resources as a unit for purposes of coordination with the other activities of that department and for routine administrative matters, but its operations shall be under the direction and control of the Coastal Zone Council, This type of organization

is recommended in order to make the most effective use of the expertise, personnel, and facilities of the Department of Natural Resources.

3. That the University of Rhode Island be designated the state's Coastal Zone Laboratory, and be given the principal technical research responsibility to carry out investigations and surveys required to enable the Coastal Zone Council to make appropriate policy and management decisions and to find adequate solutions to coastal zone problems. This responsibility should include construction of an ecological model of the coastal zone and determination of practical means of identifying changes in ecological systems and measuring their effect.

4. That the Coastal Zone Council immediately begin preparation of a plan for the coastal zone, utilizing all federal financial and technical assistance which may be available for this purpose. In preparing this plan, appropriate state, town, district and federal authorities shall be consulted, in addition to examining rules, and consulting with agencies of this and other states, and private groups as they are concerned with the aesthetic, recreational, commercial, and industrial development of the coastal zone. The Coastal Zone Council shall take into account, among other things, population trends, water currents and tidal movements, and future needs. The plan shall set forth the general planning principles and distinct standards to reach the expressly-stated goals desired, within the framework of the policy of the State of Rhode Island stated in establishing the Coastal Zone Council.

5. That the Coastal Zone Council identify the actions necessary to clarify the legal jurisdiction of the state and its political subdivisions in coastal zone lands, waters, and submerged lands, and to insure that adequate jurisdiction is established where it does not exist by recommending appropriate action to the General Assembly or the federal government.

6. That the Coastal Zone Council undertake a complete review of existing statutes relating to the coastal zone and recommend such amendments or additions as are necessary to the proper management of the Coastal Zone.

7. That the Coastal Zone Council review all current programs and projects which affect the coastal zone, evaluating these in terms of their impact on the region and their relationship to other programs and projects, and make recommendations concerning the future direction of these

programs and projects.

8. That the Coastal Zone Council develop and maintain an inventory of the shoreline and estuarine resources of the coastal zone.

9. That the General Assembly amend Section 42-1-1 of the General Laws of 1956, as amended, to provide that: The territorial limits of this State extend one marine league from its seashore at the mean low-water mark or baseline for the territorial seas of this state, without prejudice to existing state ownership up to the high-water mark. When an inlet or arm of the sea does not exceed eight marine leagues in width between its headlands, a straight baseline from one natural entrance point to the other is equivalent to the shoreline, where permitted by law.

These recommendations are described more fully in the following sections. Section A lists the responsibilities and duties of the proposed Coastal Zone Council and the authority which the Council needs to carry out its responsibilities. The organization of the proposed Council is discussed in Section B. The areas in which the Council should exercise jurisdiction are described in Section C.

A. RESPONSIBILITIES AND AUTHORITY OF THE COASTAL ZONE COUNCIL

The proposed Coastal Zone Council must be assigned responsibilities and given specific authority which are appropriate to its overall purpose, management of the resources of the coastal zone. These responsibilities and authorities are:

1. Coastal Zone Plan

The Council must formulate a comprehensive plan for the development and preservation of the coastal zone which is consistent with any statewide development plans which may be adopted. The Council is authorized to revise or modify the plan. To assist in developing the plan, the Council should have authority to:

a. Secure assistance from the Coastal Zone Laboratory of the University of Rhode Island.

b. Secure assistance from state agencies. It is the responsibility of such agencies to assist the Coastal Zone Council within their capacity to do so.

c. Hold public hearings, following adequate notice, on the coastal zone plan or on any subsequent modification of the plan.

2. Implementation of the Plan

In order to implement the plan, the Coastal Zone Council should have authority to:

a. Recommend allocations of land, submerged land, water areas, and related air space to specified activities or types of development together with regulations designed to control these activities or development to the General Assembly, and to administer these regulations, either directly or through delegation to other governmental agencies, when enacted.

b. Review any proposed development or use of land, submerged land, water area, and related air space, and any programs, rules, regulations, or other administrative action or decision, and reject or modify any of these which are not in conformance with the coastal zone plan or the policies or standards set forth in the plan. There shall be a full opportunity for hearings and appropriate review in the courts, in accord with Chapter 42-35 of the General Laws of 1956 as amended (the Administrative Procedure Act).

c. Exercise the same review function with interim authority to suspend or defer any proposed development or use of land, submerged land, water area, and related air space for a period of not more than three years after the date on which the Coastal Zone Council is created, which the Council reasonably expects will conflict with the coastal zone master plan when it is completed. There shall be a full opportunity for hearings and appropriate review in the courts, in accord with Chapter 42-35 of the General Laws of 1956 as amended (the Administrative Procedure Act).

d. Establish, after public hearing, such license fees or other charges the Council deems appropriate for the use of state lands, submerged lands, and water areas, including the air space related to them, under its jurisdiction, or the resources therein and to make regulations governing the use or lease of these. The administration and collection of fees and charges may be performed by the Coastal Zone Council or delegated to other governmental agencies.

e. Acquire land, submerged land, or water areas through purchase, condemnation, gift, or other means, or acquire interests or rights in land, submerged land, and water areas through purchase or condemnation of rights-of-way, easements, lease, or other means.

f. Establish pierhead and bulkhead lines for shorelines within the coastal zone.

g. Develop and operate any facilities or vessels necessary to carry out the coastal zone plan, responsibility for which is not given by the General Assembly to any other agency.

3. Studies and Investigations

The Coastal Zone Council should be empowered to make any studies and investigations of coastal zone conditions, activities, or problems needed to carry out its responsibilities. In making these studies and investigations the Coastal Zone Council should have authority to:

a. Hold public hearings on any matter under study, after adequate notice.

b. Subpoena witnesses and records.

c. Advise the Governor, Legislature, and citizens of the state of its findings and conclusions.

d. Recommend legislation to the Governor and the General Assembly.

4. Coordination

The Coastal Zone Council is established as the agency of state government with primary concern for the Rhode Island coastal zone. Consequently, the Council should play a major role in all state interaction with federal, regional, and local governmental agencies and private groups, firms, and individuals which take place in or ultimately affect the coastal zone. The Council should provide liaison between the state government and other interests, or assist other state agencies designated to perform this function. To perform these functions, the Council should have authority to:

a. Coordinate state, federal, regional, local, and private efforts to carry out programs and activities in the coastal zone.

b. Represent the state in regional or interstate activities and bodies concerned primarily with the coastal zone.

c. Inventory federal and regional grants-in-aid and other programs applicable to the coastal zone and advise state agencies, local governments, and private interests of these programs.

5. Other Authority

The Coastal Zone Council should have authority to exercise any

other functions necessary to guide the use and development of the coastal zone in accordance with the coastal zone plan which are not specifically delegated to some other agency.

6. Staff and Consultants

The Coastal Zone Council should have authority to employ the staff and consultants necessary to carry out its responsibilities. The Council should be able to contract for research and other necessary services.

7. Finance

The Coastal Zone Council should receive an annual appropriation from the General Assembly, through the budget of the Department of Natural Resources. As the state's coastal zone management agency, the Council should receiwe federal and regional assistance available for preparing or implementing a coastal zone plan. The Council should also be authorized to accept funds from foundations, gifts, and other sources, including bonds when requested by the Council of the General Assembly and duly approved for issue. To prowide for initial staffing, equipping, and preparation of a work program, the sum of $50,000 should be appropriated for the fiscal year beginning July 1, 1970.

B. ORGANIZATION OF THE COASTAL ZONE COUNCIL

The Technical Committee recommends that a new organization be created to carry out the program described in the preceding sections. This organization should consist of a Coastal Zone Council comprised of appointed and ex-officio members and a staff. The organization should be administratively assigned to the Department of Natural Resources, but should have sufficient stature and independence to permit it to formulate and implement policies to preserwe, protect, develop, and where possible to restore the resources of the Rhode Island coastal zone through comprehensive planning and effective resources management.

The recommended organization of the Coastal Zone Council is shown in the chart on the following page, which also indicates the relationship of the Council to the Gowernor and the Department of Natural Resources. These are described more fully in the sections following.

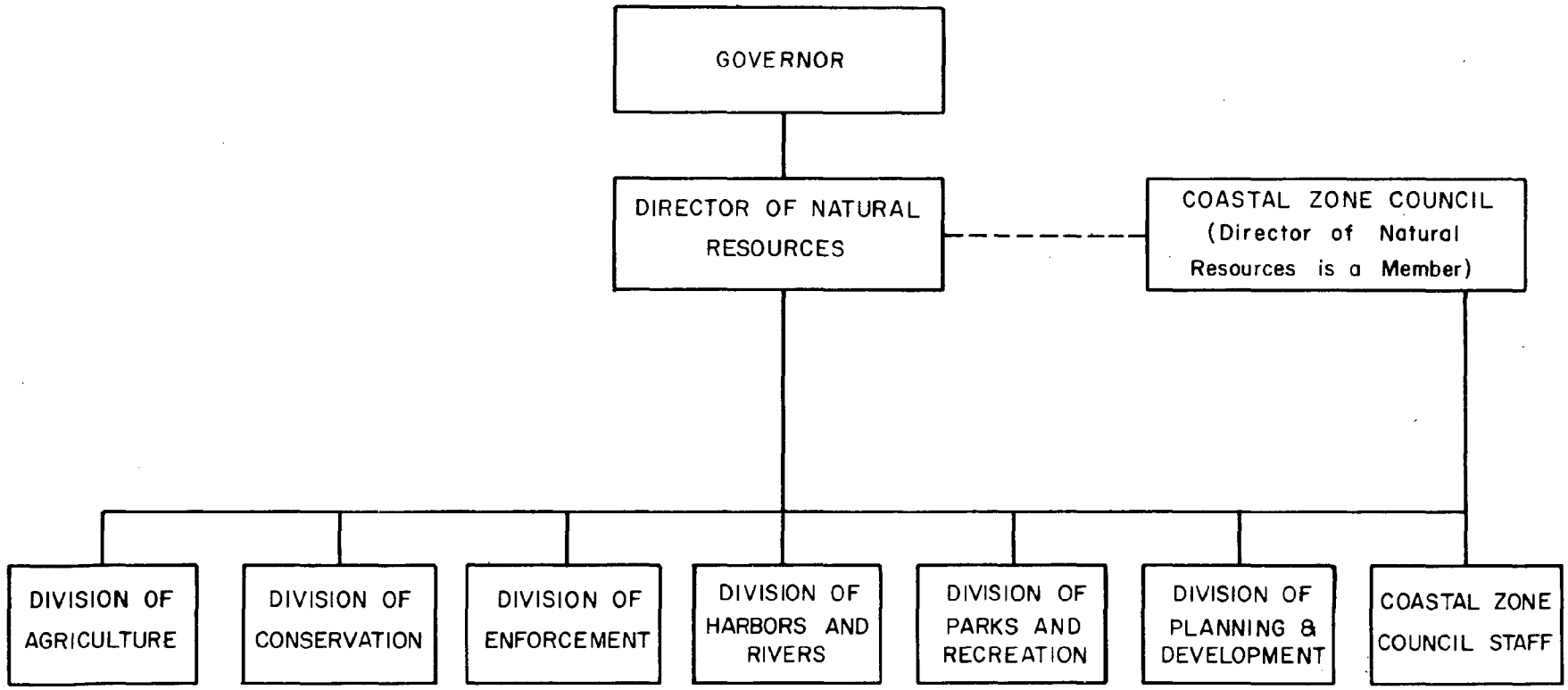
1. The Coastal Zone Council

The Coastal Zone Council should be created as the principal agency for planning, resources management, and inter-governmental coordination in the state's coastal zone. The Council should be made up of eleven members:

a) Four ex-officio members:

FIGURE 17

ORGANIZATION OF THE PROPOSED COASTAL ZONE COUNCIL AND THE DEPARTMENT OF NATURAL RESOURCES



1) The Director of the Department of Natural Resources, to represent the state's interest in recreation, conservation, propogation of wildlife, and related natural resources matters.

2) The Director of the Department of Health, to represent the state's interest in pollution control and abatement and related public health matters.

3) The Executive Director of the Rhode Island Development Council, to represent the state's interests in industrial development and promotion of recreation and tourism and the Industrial and Recreational Building Authorities.

4) The Director of the Department of Community Affairs, to represent the state's interests in insuring effective joint participation by state and local governments in coastal zone management activities.

The ex-officio members should serve as voting members of the Council during their period of appointment as directors of the agencies named. Each ex-officio member should be authorized to designate a member of his staff to represent him on the Council.

b) Seven public members appointed by the Governor. These members should represent the following interests:

1) Two members representing conservation, recreation, wildlife, or aesthetic concerns.

2) Two members representing commercial fishing, business, industry, or tourism.

3) One member representing research or education.

4) Two members representing local government.

The appointed members should be appointed for terms of three years, staggered so that the terms of at least two members expire each year.

Provision should also be made for inclusion of additional members who serve in an advisory capacity without vote. Advisory members should be invited to serve by either the Governor or the Council. These members would represent the General Assembly, federal agencies such as the Navy, Coast Guard, Corps of Engineers, Public Health Service, and Federal Water Pollution Control Administration, and regional agencies such as the New England River Basins Commission and New England Regional Commission, as well as any other group or interest not otherwise represented.

The Coastal Zone Council should have authority to form committees or other advisory groups as needed from both its own members and others. Provision should be made for designation of a Chairman and a Vice Chairman by the Governor, the Chairman to be designated from among the appointed members, and selection of a Secretary by the Council from among its membership or staff.

A quorum shall be an absolute majority of the voting members of the Council, and decision shall be by a majority of the voting members present, except that in the case of a tie the Chairman shall have an additional vote to break the tie.

2. Staff Assistance to the Council

The Council should be authorized to employ a staff to assist it in carrying out the responsibilities described in Section A preceding. For administrative purposes the staff would be assigned as a unit to the Department of Natural Resources. The staff should be headed by an Executive Director, who should be appointed by the Council and be in the unclassified service, All other staff members should be appointed by the Executive Director and be within the classified service.

The Executive Director and staff report to the Coastal Zone Council in operational matters. The responsibility and authority described in Section A preceding should be vested in the Council, but the Council should have authority to delegate functions to the staff for administration or execution. The staff should prepare all necessary studies itself or with the assistance of the Coastal Zone Laboratory of the University of Rhode Island, other state agencies, and consultants as needed. The staff should prepare and continuously update the coastal zone plan and recommend the plan and modifications to the Council for adoption; recommend regulations for development of land, submerged land, and water areas and related air space; review all proposed development or use of land and water areas and related air space and advise the Council on their conformance with the plan; recommend and continuously review a schedule of license fees and other charges; make studies and surveys needed by the Council; and perform other work as directed by the Council.

Placement of the staff organization within the Department of Natural Resources is designed to strengthen coordination and cooperative action by the Council and the Department. Most of the activities of the Department are closely related to or take place in the coastal zone, and although the Coastal Zone Council will have to work with many state agencies, its principal contacts will be with the Department of Natural Resources. The Department should also provide basic administrative supervision of personnel, accounting, purchasing, and similar areas for the Council.

C. AREAS OF JURISDICTION OF THE COASTAL ZONE COUNCIL

As noted in Part One, the Coastal Zone Council must be concerned with a variety of geographic areas, depending upon the activity or problem under consideration. Two of these areas should be defined in the legislation creating the Coastal Zone Council. These are the areas to be covered by the coastal zone plan and the area to be covered by any regulations or controls adopted by the Coastal Zone Council or the General Assembly to implement the plan.

1. Planning Area

The area to be covered by the coastal zone plan is the immediate coastal zone drainage basin. This area is described in Part One and on Figure 3, and is delineated on the Water Quality Classification Plans adopted by the Department of Health.

In preparing and adopting a plan, the Coastal Zone Council should be empowered to formulate and adopt a plan for the entire area, or plans for sections which cover a territorial or a functional subdivision of the coastal zone.

2. Area for Regulation or Control

The area to be covered by regulations or controls, including review of proposed development or use of land, submerged land, water areas, and related air space need only be large enough to insure that the intent of the regulations or controls can be achieved. This area should include (1) all inland tidal water bodies, the territorial sea and any contiguous seas subject to state jurisdiction; (2) the contiguous land areas above the mean high-water mark and included water bodies to a maximum elevation of 20 feet above the mean high-water mark or to a maximum distance of 200 feet inland from the seashore at the mean high-water mark, whichever is the greatest distance inland; and (3) the full area of all islands within this area except Aquidneck, Conanicut, Prudence, and Block Islands, which should be subject to the same rule as mainland areas.

APPENDIX

APPENDIX A: STATEMENT OF THE COMMITTEE'S CHARGE

The Technical Committee has been appointed by Governor Licht as "the first step toward drafting future management policies for Narragansett Bay". At the organizational meeting held on April 7, the Governor further explained this charge, emphasizing the value of the bay to the state as a natural resource and noting two specific points which must be observed:

1) The Committee must involve the significant interests in the bay in its work, and should consider expanded membership as one means of reflecting any such interests not now involved.

2) The Committee's recommendations must be submitted by January 1, 1970, so that any legislation needed can be introduced into the next session of the General Assembly.

The basic objective of the Technical Committee in responding to the Governor's charge is to provide the people of Rhode Island with a mechanism which will insure that their interests in Narragansett Bay and coastal waters are realized. To meet this objective, the Committee must formulate and propose a workable mechanism or framework through which the state can guide the development and use of its coastal land and waters, including other areas which have a significant influence on this coastal zone. This framework or mechanism must also be able to work effectively and cooperatively with the many federal, regional, state, local, and private interests which are concerned with the preservation, utilization, and regulation of the coastal zone.

The Committee's geographic area of concern must be broad enough to insure that the objective stated above can be met, but must be limited by a realistic appraisal of what can be considered within the Committee's time frame. To facilitate the Committee's work, two areas of concern are identified:

1) The <u>primary</u> area is the coastal zone. This zone centers on the salt-water coastline. All water areas included within the territorial sea and internal waters as defined by international convention are within the coastal zone. Thus, the coastal zone includes those areas within three nautical miles of the coastline, all of Narragansett Bay and adjoining water bodies, and other salt water bodies such as Point Judith Pond, Ninigret Pond, and Winnapaug Pond. Landward, the coastal zone includes those adjoining land areas which are directly related to the coastline, and the tributary streams flowing through these areas.

2) The secondary area of concern is delineated by the problems

and activities found within the coastal zone. This area varies with the function under consideration. For example, transportation activities require a very large area of concern, while pollution problems may be contained within a much smaller area.

Neither the coastal zone nor the secondary area can be precisely defined at this time, nor is it necessary to do so. A flexible view of both areas must be maintained, at least until the major problems and activities, and their complex interrelationships, are more fully understood.

There are two basic approaches, or orientations, which the Committee can follow in carrying out its charge. The first emphasizes the administrative aspects of the problem: formulation of a mechanism or an organization which can manage this natural resource and coordinate the efforts of all concerned in study and solution of its problems.

The second possible approach emphasizes the technical aspects of the problem: study of the activities which affect this natural resource, identification of the resulting problems, formulation of solutions, and proposal of implementation programs.

These alternative approaches are not mutually exclusive. Selection of either one also requires consideration of factors which are central to the other. However, in view of the Governor's emphasis on the need for management policies in his charge to the Committee, the conclusion of the "Report on Administration of Narragansett Bay by the Natural Resources Group" and of "Our Nation and the Sea" by the President's Commission on Marine Science, Engineering, and Resources, the limited technical resources which the Committee members have available over the next few months, and the need to prepare definitive recommendations for consideration by the 1970 session of the General Assembly, the Committee will follow the first approach outlined above.

In following this approach, the Committee will investigate and make recommendations in the following areas:

1) The present and potential problems of the coastal zone and their source and magnitude.

2) The extent of jurisdiction of various agencies in the coastal zone, the degree to which this authority is being exercised and the problem areas in which jurisdiction is lacking, confused, or weak.

3) Policies which should be established to form a framework or guidelines for the proper supervision of the bay and coastal areas for their optimum preservation, use, and development.

4) Alternative mechanisms for establishing and implementing policies for the coastal zone and for solving or alleviating problems of this area.

The Committee will then recommend the actions which it feels the state should take to protect the present and future interests of its citizens in the coastal zone, in a format suitable for translation into recommended legislation.

Approved by the Committee on May 5, 1969.

APPENDIX B: LEGISLATIVE WORKSHOP PROGRAM

A legislative workshop on "Rhode Island Marine Resources: Problems and Opportunities" was sponsored jointly by the University of Rhode Island and the Technical Committee on December 6, 1969. An all-day session, it was held at the Claiborne Pell Marine Science Library at the University's Narragansett Bay Campus. The program was as follows:

Morning Session

Dr. John A. Knauss, Provost for Marine Affairs, URI, chairman.

Welcome and orientation

Dr. Werner A. Baum, President of the University.
The Honorable Frank Licht, Governor of Rhode Island.

"RHODE ISLAND: The Coastal Zone and Economy" -

Dr. Niels Rorholm, Chairman, Department of Food & Resource Economics, College of Resource Development.

"Residential and Recreational Uses of the Coastal Zone" -

Panel Discussion: David Fischer, Assistant Professor, Department of Food & Resource Economics; Dieter Hammerschlag, Associate Professor of Urban Design, Department of Community Planning; Calvin B. Dunwoody, Chairman, Governor's Technical Committee on Narragansett Bay and the Coastal Zone; Walter J. Gray, Director, URI Marine Advisory Services Program, moderator.

Afternoon Session

Jack Thompson, Federal Coordinator, Governor's Office, chairman.

"Man's Effect on the Marine Environment" -

Panel Discussion: Dr. Saul B. Saila, Professor of Oceanography, Graduate School of Oceanography; Dr. Clarence Tarzwell, Research Aquatic Biologist, National Marine Water Quality Laboratory; Dr. Candace Oviatt, Research Associate, Graduate School of Oceanography; Carleton E. Maine, Chief, Division of Water Quality Control, state Department of Health, moderator.

Coastal Management:

"A Broad Look at Multiple Uses of the Coastal Zone" - Dr. Carl N. Shuster, Adjunct Professor of Oceanography.

"Planning for Rhode Island" - Daniel W. Varin, Chief, Statewide Planning Program; Rep. Robert E. Sweeney (D-North Providence).

"Opportunities in the Coastal Zone" - Dr. John A. Knauss

Final discussion

APPENDIX C: ANNOTATED BIBLIOGRAPHY OF WORKING PAPERS

Number 1: Address List for Mailing Questionnaires

This list contains names and addresses of individuals and groups interested in the Rhode Island coastal zone. There are 67 entries, not including agencies represented on the Technical Committee (in some cases, major or representative groups of a particular type were selected). The following types of interests were included: federal; regional; municipal; commercial and industrial; recreation, conservation, and tourism; and regulatory and enforcement.

Number 2: Classification of Water Bodies in the Rhode Island Coastal Zone

This paper describes in detail the water quality standards adopted by the Rhode Island Department of Health for five water use classes. A map is attached showing the classification of all fresh and salt water bodies in the state's coastal zone, as determined in 1967.

Number 3: Review of the Report Water and Related Land Resources, Priority Programs, Fiscal Years 1971-1975 published by the New England River Basins Commission (NERBC)

This working paper outlines the NERBC report and comments on its usefulness to the Technical Committee. The 180-page report discusses water and related land use problems in New England and New York and makes suggestions for strengthening certain existing programs. State and river basin summaries are included, with recommended future studies in order of priority. The identification of Rhode Island's major problems is noted as the part most relevant to the Committee's charge.

Number 4: Pollution: Types, Treatment Methods, and Sources in the Coastal Zone

This paper describes three types of water pollution (municipal sewage, industrial waste, and agricultural and other wastes) and the three levels of treatment (primary, secondary, and tertiary). It then lists 30 municipal and industrial polluters in the Rhode Island coastal zone, giving their location, volume of effluent, and type of treatment, if any.

Number 5: Review of McAteer-Petris Act as Amended in 1969

This paper provides a chapter-by-chapter analysis of the legislation which created the San Francisco Bay Conservation and Development Commission and, in 1969, gave it permanent status. This landmark act was intended to control filling and development in the Bay

itself and 100 feet inland. It contains sections on findings and declarations of policy; definition of the area of jurisdiction; organization, powers, and duties of the Commission; and the actual plan.

Number 6: Review of the Report Entitled The Freight Transportation Development Potential of the Port of Providence, Rhode Island

This paper summarizes a 1969 consultants' study of the port of Providence which inventoried existing facilities, examined earnings and expenses, analyzed the competition, and recommended a development program. The consultants felt that the Port of Providence could attain modest growth through improvement of administration, upgrading of specific facilities, and promotion of trade by various means. Four statistical tables are appended to this working paper.

Number 7: Rhode Island Law Protecting Intertidal Salt Marshes

This paper reviews the 1965 state law (amended in 1967 and 1969) which provides penalties for disturbing the ecology of an intertidal salt marsh by dumping or excavating without a permit from the Department of Natural Resources.

Number 8: Rhode Island Law Governing the Use of Coastal Wetlands

This paper summarizes the 1965 state law which allows the Department of Natural Resources to restrict the use of coastal wetlands by issuing a protective order which takes precedence over local zoning and other regulations.

APPENDIX D: SUMMARY OF "LEGAL PROBLEMS IN CONSTRUCTIVE USE OF FEDERAL-STATE JURISDICTIONAL LIMITS," BY PROFESSOR DANIEL WILKES

This paper on legal issues related to the coastal zone was prepared by Professor Wilkes to accompany the Technical Committee's report. It covers such topics as "fixing the boundary of the state of Rhode Island," "exploiting the Submerged Lands Act grants from 1953," "coastal zoning amd federal-state jurisdiction," "the problem of state and federal overlaps," "pollution," "bases for jurisdiction over acts outside state waters," and "compacts and other devices for regional cooperation."

The conclusions of the paper are reproduced in full as follows:

ONE OF THE MOST COMPELLING REASONS for immediate and strong action by this legislative session is that Rhode Island is faced now, and will be faced swiftly, with opportunities which can be easily lost unless we put our state in a position to grasp them.

1. The first of these opportunities is the chance to exploit our territorial seas, internal waters and the bottomlands beneath them.

The federal authority to do so was granted and confirmed in 1953. We have not reaped a nickel from this in the 17 years since, and the reason is simply that we have not had an authority whose job it was to do so.

If we continue even one legislative session more to fail to provide that regulatory authority and to assert our full jurisdiction over coastal waters, Rhode Island risks several types of losses we cannot afford:

--first, the irreparable loss of an entire resource through lack of awareness or express charges to preserve it; examples of these include nursing grounds unknowingly destroyed by chemical additives or ecological disturbances, or optimal future navigational routes lost by ad hoc decisions without the means to look at total use of resources, or lost revenues from gravel beds over which silt might be unwittingly dumped; and

--second, the irretrievable loss of state jursidiction through a failure to assert our fullest jurisdictional claims in a timely manner; an example of this lies in our archaic six-mile Bay Closing Line Statute which has limited state authority long after the Supreme Court has authorized certain bays under 24 miles wide, such as Narragansett Bay, to be closed off.

RECOMMENDATION NO. 1--That the first type of risk be minimized by creating a Coastal Zone Authority with an adequate program for acquiring the data needed --through staff studies, requests of other agencies, and public hearings with subpoena powers-- and for proposing the regulations needed to preserve and exploit resources of our coastal waters.

RECOMMENDATION NO. 2--That General Laws 42-1-1 be amended to establish Rhode Island's maximum allowable internal waters, territorial seas and sea-bottoms, as provided under either Appendix 1 or Appendix 2 bills below.

RECOMMENDATION NO. 3--That any amendment to General Laws 42-1-1 be open-ended so that a successful court ruling in our favor of government agreement to a wider territorial sea immediately has the effect of extending our jurisdiction, as provided in Appendix 1 or 2 bills below.

RECOMMENDATION NO. 4--That such amendment be without prejudice to the existing state ownership up to the highwater mark where such ownership now exists, as provided in Appendix 1 or 2 below. This phraseology preserves both current state claims to all shorelines up to the highwater mark and yet allows an owner who would so contest this jurisdiction in the courts to do so.

2. <u>The second crucial now-or-never opportunity is to put this state in the position to receive federal coastal zone management funds</u>.

Some of these funds will only be made available to those with well-crystallized projects for their coastal zone; since the pattern of spending is to authorize sums often far larger than those actually appropriated, first-in-time may well be the key for these project-designated funds, as under the St. Germain-Tiernan Bill, HR 14875. Some of those funds would be made available solely to those states which have met specific requirements of coastal zone reorganization, as under the Magnuson Bill, S. 2802.

RECOMMENDATION NO. 5--That the Coastal Zone Authority established by Rhode Island be one in a position to seize these opportunities (a) by combining authority to submit project proposals with an express charge to do so plus the capacity to formulate and carry out such projects, and (b) by meeting the requirements for federal coastal zone aid from the start.

For example, if the authority is to qualify under the Magnuson Bill with its relatively modest dollar authorization from the start, <u>it must have</u>:

1) A charge to produce a Master Plan

(a) after consulting all state, town, district and federal authorities,

(b) which has as its goal "the comprehensive planning and development of the coastal zone", defined in terms of the seaward reach of Rhode Island jurisdiction (or responsibility) and the full landward extent of maritime influences,

(c) which sets forth i) general planning principles, ii) a statement of desired goals, and iii) distinct standards (against which the arbitrariness or non-arbitrariness and carrying out of legislative purposes in actions taken pursuant to the Plan may be measured). N.B.: This function may well determine a later action's constitutionality, and the charge to provide these standards must not be taken lightly.

(d) and which is arrived at by examining rules, agencies, adjacent states, and private groups as they are concerned with the commercial, industrial, recreational and esthetic development of the coastal zone, including population trends, water currents and tidal movements and future needs, through (among other things) public hearings.

2) A charge to draw up land-use and zoning regulations to control public and private development in order to assure compliance with the master plan and to resolve conflicts among competing uses. N.B.: This does not usurp the Legislature's function in passing upon what is so drawn up. Further, if the Authority must consult with "all local authorities", the town's role in this formulation can be an active one.

3) Authority and a charge to acquire land (and modification or termination of rights in and to waters of the Coastal Zone where constitutionally required to do so) by (a) eminent domain, and (b) purchase without eminent domain, including the power to borrow money by issuing bonds. N.B.: In this state, it would appear that such a power would be the power to request a bond issue, say for purchase of marshland above ordinary high tide to the extent this may be deemed desirable for the future of the state.

4) Authority to develop and operate coastal public facilities necessary to carry out the Master Plan, such as beaches, parks, marinas and the like. N.B.: Nothing says Rhode Island cannot designate existing agencies as the operating agency under an integrated plan nor to so designate it for any new facilities providing that undesignated facilities needed for the Authority in the future may be managed by it directly when no one else has been assigned the job of doing so.

5) Reviewing duties (a) to look at all proposed projects in the coastal zone affecting it directly, whether by any State or local authority or by a private developer (as included in the Magnuson Bill);

(b) with the duty to accept (directly or conditionally) a

proposal wherever it is consistent with the Master Plan -- to the extent of the standards and objectives stated in it;

(c) subject to full opportunity for hearings; and

(d) subject to judicial review.

N.B.: These last are readily met by a reference to the Administrative Procedure Act, adding (advisably) protective provisions for the opportunity to present evidence in writing or orally, and in writing or orally to provide questions for those proposing or opposing an action or their witnesses, for

--officials from any interested federal, state or municipal agency,

--any affected party, and

--a representative from any interested private group; plus ii) a reference to General Law 42-35 court proceedings.

6) Authority "to exercise such other functions as are determined necessary to enable the orderly development of the coastal zone in accordance with such Master Plan". N.B.: This might be covered by an "incidental functions" clause.

ANOTHER COMPELLING REASON is that our present and future crises in the Coastal Zone come too fast for existing agencies to prepare us for them in advance.

We have customarily operated on the assumption that we can take care administratively of each case which presents itself and the future will take care of itself. We have discovered again and again --in air pollution, in fresh water resources, in water pollution, to name but a few-- that "the future" does <u>not</u> take care of itself.

The trouble is that understaffed agencies <u>must</u> let the future go under the press of presented needs. What is needed, therefore, is an organization which cannot duck the duty to provide for states of affairs which are developing to a head within the next decade or two because it has those needs for the coastal zone as its sole job and has the means to carry that job out.

Perhaps the two most striking examples are the twin demands for our offshore sands and for our deepwater harbor which will require major decisions in the next year or so.

Immense needs for sand to be cheaply brought by barge to seaside locations have already arisen. For the airport expansion of Logan Airport in Boston, for example, millions of yards of sand will be bid for. The only RI major sand deposit of such dimensions that it would make up a sizable part of this demand lies just off Rhode Island's southern beaches. In short, a possible tradeoff between leased sand deposits and sand available for beaches to be replenished will be up for decision shortly. The same will be true when bids come in for sand for fill for Boston's Expo '76.

Another demand predictably just ahead is to dredge through the lower Bay so as to accommodate maximum draft tankers. Bulk oil carriers capable of carrying one million tons of oil are on the drawing boards; 500,000-ton tankers with 85-foot drafts are on the ways. The probable result, according to one ocean engineer, will be that the state will be asked to connect its 110' channel between Jamestown and Newport with the open sea by 5½ miles of dredging and permit offshore unloading in the protected site which such tankers will then be able to reach. In the light of the Commerce Oil Company refinery permit on Conanicut Island held up by court action some years ago, the large bulk carriers are sure to pose difficult problems of coastal zone management which we are yet unprepared to handle.

A FINAL COMPELLING REASON for establishing a Coastal Zone Authority is that the constructive uses of federal jurisdiction in solution of state problems which are discussed above require an agency whose job it is to keep abreast of federal options and limitations and to get out citizens' federal tax dollars' worth by using those options to the full. The examples given above were intended to spell out some of the needs for such an authority and are far from exhaustive. They do provide some point of departure for a host of specific studies which must be made if Rhode Island is to get its full value from its coastal zone in terms of revenues earned, aesthetic and historical resources saved, and ecological abundances of sports fish, ducks, swans, mollusks, lobster, crabs and flatfish sustained.

APPENDIX E: PARTIAL LIST OF STATE STATUTES AFFECTING THE COASTAL ZONE

This appendix lists and briefly summarizes the Rhode Island statutes which relate to the coastal zone. All references are to title and chapter of the General Laws of Rhode Island of 1956 as amended, unless otherwise noted.

Title	Purpose	Remarks
2-1	Provide for zoning of marshlands by state	Permissive; weak in damages clause
2-46.1	Require permit for filling or excavating a marsh (based on disturbing ecology)	Mandatory
20-1	Set responsibility and authority for enforcement of fish and game and shellfish laws (certain responsibilities for propagation and management)	Mandatory (Dept. of Natural Resources)
20-2	Authorize receipt of federal funds for fish and wildlife projects	Permissive
20-3	Prevent dumping of fish offal and oil extracts in tidewaters, and placing woody matter in Charlestown Pond	Mandatory (local enforcement)
20-4	Provide for setting aside areas for experiments in management, planting, cultivating, and propagating shellfish and for removal of obstructions to passage of fish; promote cultivation of shellfish	Permissive
20-6	Protect R.I. commercial fishermen from certain competition from out-of-staters by restricting equipment, type of shellfish, and fish that may be taken	Mandatory

Title	Purpose	Remarks
20-7	Provide for registration of boats and gear used in marine fishing, shellfishing, and lobstering; for reporting catches; for marking pots and buoys; for protecting traps	Mandatory
20-8	Authorize governor to enter into compact with other Atlantic Seaboard states for better utilization of marine, shell, and anadromous fisheries	Permissive
20-9	Set shellfish and blue crab seasons; provide for licensing individuals and corporations; define use of dredges; set size and possession limits	Mandatory
20-10	Provide for leasing of oyster grounds; set rates of leases; define areas; provide for enforcement of illegal taking of oysters	Permissive; needs updating
20-11	Define size and possession limits for quahogs and other clams; specify method of taking and type of apparatus; provide for licensing of individuals and boats, enforcement procedures, control of dredging areas, and transfer of shellfish from polluted areas	Mandatory
20-12	Provide for protection and propagation of lobsters: setting restrictions, licensing, and enforcement (Sakonnet Harbor control by town)	Mandatory
20-13	Perpetuate scallops by regulating catches; provide for licensing and penalties	Mandatory
20-14	Limit size and method of catching striped bass; provide penalties	Mandatory

Title	Purpose	Remarks
20-15	Restrict taking of menhaden to licensees, from July 1 to October 31	Mandatory
20-16	Permit opening of Salt Pond Breachway by Director of Natural Resources	Permissive
20-17	Permit town to regulate fisheries in Nonquit Pond and Great Salt Pond (Tiverton and New Shoreham)	Permissive
20-18	Control commercial finfisheries by regulating trapping, by licensing, and by enforcing	Mandatory
20-19	Regulate setting of seines by length and location; enforce same	Mandatory
20-20	Provide means of combating starfish menace; protect shellfish	Permissive
23-7	Permit towns to control mosquitoes on private lands	Permissive
42-1	Define territorial limits of state; cede certain parcels of land to federal government	Inadequate; not in keeping with legal claim permitted by federal government
42-2	Permit federal government to acquire land for certain purposes (civil and criminal authority retained with state)	Permissive
42-33	Establish commission to define, mark, and open rights-of-way	Restricted to existing rights-of-way
45-24-1	Permit local flood plain zoning	Permissive; limited use
46-1	State responsibility for preservation, development, and improvement of harbors and tide waters	Permissive; not vigorously utilized

Title	Purpose	Remarks
46-2	Have state and local gov't. cooperate with federal gov't. (protect and improve harbors, stop flooding, prevent shore erosion)	Permissive
46-3	Protect shore property from storm damage (state funding ran out in 1956); cooperate with towns	Permissive; no longer of significant value
46-4	Permit establishment of harbor lines; set up harbor master system	Permissive; weak and inadequate
46-5	Assert of right of state to acquire and develop port facilities and to set out guest moorings	Permissive; lacks guidelines
46-6	Control dumping and construction in public tidewaters; provide for removal of obstructions from tidewaters	Mandatory; no guidelines other than navigation
46-7	Provide for marking Pawtucket River; control use of chemical markers	Mandatory; limited coverage
46-8	Require registration of outboard motors	Mandatory
46-9	Give maximum safety to vessels using R.I. waters and to persons and property; set up Pilotage Commission	Mandatory; certain vessels excepted
46-10	Set responsibility for preserving and selling shipwrecked property (town authority)	Mandatory
46-11	Permit residents of Barrington to gather seaweed from town beach	Mandatory; of questionable value today
46-12	Protect public property and natural resources from detrimental effects of pollution in waters of state	Mandatory; "practical and reasonable" principle; penalties weak

Title	Purpose	Remarks
46-13	Protect public from contaminated water by testing, investigating, surveying, and examining water systems	Mandatory
46-15	Set up Water Resources Board for developing and conserving water resources of state	Does not relate supply and disposal
46-16	Authorize participation in New England Water Pollution Control Commission	Permissive
46-17	Authorize participation in northeastern water and related land resources compact	Permissive
46-22	Control use of motor boats in R.I. waters (require registration, certain safety devices); control regattas	Does not provide for navigation aids or operator control
46-25	Provide guidelines for constructing a drainage ditch across another's land	Mandatory (town council)
Chap. 1145 G.L.	Set N.Y. - R.I. seaward boundary	Ratified by R.I., N.Y., and U.S.

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