User Perceptions of the Environmental Quality and Governance System of Narragansett Bay

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USER PERCEPTIONS OF THE ENVIRONMENTAL QUALITY AND GOVERNANCE SYSTEM OF NARRAGANSETT BAY

BY

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UNIVERSITY OF RHODE ISLAND

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ABSTRACT

This paper hypothesizes that there will be differences in perception between the users and managers of Narragansett Bay with respect to (1) the Bay's environmental quality; and (2) the effectiveness of the governance system established to manage and regulate the Bay. Any discrepancies in the perception of the quality of Narragansett Bay's shoreline and water resources among various user groups are likely to contribute to conflicts between users, and a less efficient approach to the management of Bay resources.

Thus, the identification of where management policies may diverge from the interests of public user groups will serve to improve resource management efforts and the overall governance system. The ultimate goal of this research is to provide managers and regulators with an improved understanding of resource users' perceptions and needs with respect to specific management issues affecting Narragansett Bay. Such information will, in turn, result in the more effective management of the Bay and the improvement of the quality of its resources.

The perceptions of three groups were included in this study: public user groups (shellfishermen, boaters, and residents of the Narragansett Bay area); special interest groups (Save the Bay, the Rhode Island Shellfishermen's Association, and the Rhode Island Marine Trades
Overflow Unit and the Water Quality Standards Unit of the Department of Environmental Management, and the Coastal Resources Management Council).

The data for this study were collected in several ways. The public user group data set was obtained from surveys of several user groups pertaining to respondents’ perceptions of environmental quality and other specific Bay-related issues conducted during the summer of 1985.

In addition, ranking members and staff of the special interest groups and government agencies were interviewed in an effort to identify the concerted perception of each interest group and agency regarding the environmental quality of the Bay and the effectiveness of the governance system. The same questions utilized in the 1985 public user group surveys were posed to special interest group and government agency representatives.

The study found that differences exist between all public user groups, special interest groups, and government agencies in their perception of (1) the environmental quality of Narragansett Bay, and (2) the effectiveness of the governance system in managing and protecting Narragansett Bay and its resources.

The following sub-hypotheses were also supported by this study:

Differences exist among the general public user groups with respect to perceptions of both environmental quality and government effectiveness.
Differences exist among the special interest groups with respect to perceptions of environmental quality.

Differences exist among the government agencies with respect to perceptions of government effectiveness.

These hypotheses highlight several potential management and regulatory program ramifications. Differences in perception which exist among user groups and special interest groups increase the difficulty of managing Narragansett Bay's resources, since management decisions which benefit one group might adversely affect the needs of another. This, in turn, will affect perceptions of government effectiveness.
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CHAPTER I - RESEARCH PROBLEM

INTRODUCTION

The basic premise behind Garrett Hardin's "The Tragedy of the Commons" is that uncontrolled access to commonly owned resources will lead to the depletion of those resources and, ultimately, the destruction of those resources.\(^1\) Government intervention, therefore, is necessary to manage common, public resources, especially since there are often multiple users and interests which could potentially conflict with and exclude one another.\(^2\)

During the environmental movement of the late 1960's and early 1970's, federal, state and municipal governments as well as the general public throughout the United States developed an increased awareness and understanding of the importance of natural resource protection and regulation of public resources. This may have been stimulated by several environmental catastrophes, including the massive Santa Barbara oil spill of 1969 resulting from an offshore oil drilling accident and the overall degradation of the nation's rivers, wetlands, and coastal waters from ocean dumping, discharges from inadequate sewage treatment facilities, and non-point sources of pollution. These incidents highlighted the absence of consistent government
control and regulation resulting in irreparable resource
damage, depletion, and exploitation.

Accordingly, several environmental protection programs
were established during this period to allow the federal
government to exercise its public interest responsibilities
which are to protect, restore and maintain the country's
commonly used air and water resources for this and future
generations.

One of the laws enacted during this period of
environmental awareness was the National Environmental
Policy Act of 1969 (NEPA, U.S. Public Law 91-190, as
amended), the first national environmental protection effort
founded upon a comprehensive and interdisciplinary approach
to resource protection. The basis for NEPA is the
comprehensive environmental impact statement which must be
prepared by federal agencies for any federal action which
significantly affects the environment. The Act requires all
tagencies of the federal government to:

...utilize a systematic interdisciplinary approach [to]
insure integrated use of the natural and social
sciences...in planning and in decision-making which may
have an impact on man's environment.\(^3\)

Thus, NEPA required federal agencies to incorporate
environmental values into their decision-making process.

Also in 1969, the U.S. Commission on Marine Science,
Engineering and Resources (known as the Stratton Commission)
issued its report *Our Nation and the Sea*. This report
recommended for the first time that national coastal zone
management legislation be enacted to provide both policy objectives for the coastal zone and federal grants to facilitate the establishment of state programs to manage the nation’s coastal waters and resources.⁴

The coastal areas of the United States include some of the most densely populated counties, and population density within 50 miles of the coast has significantly increased since 1960. A 1990 study conducted by the National Oceanic and Atmospheric Administration’s National Ocean Service indicates that population density in the coastal northeast—already accounting for one third of the nation’s coastal population—is projected to increase in excess of ten percent over the next two decades.⁵ This population trend within coastal areas was responsible, in part, for greater attention being turned toward coastal resource management and remains a significant concern today, especially in light of the competing demands among residential, recreational, commercial, and industrial uses along the nation’s coasts.

The Stratton Commission report recognized the particular significance of the nation’s coastal resources. The Commission’s report, coupled with the trend toward increasing populations in the coastal areas of the country, prompted immediate legislative response. Several bills which called for a national coastal management program were introduced during the 91st Congress (1969-1970), but no final action was taken on any legislation.
Congress eventually passed the Coastal Zone Management Act of 1972 (CZMA, U.S. Public Law 92-583) during the 92nd Congress (1971-1972). The CZMA acknowledged that the resources of the coastal zone provide several important economic and ecological purposes, and that uncontrolled growth and increasing and competing demands on coastal resources were resulting in the significant loss of important, sensitive resources and habitat.

The CZMA, like NEPA, is founded on a comprehensive, interdisciplinary approach to resource protection and management. The CZMA’s legislative intent is to establish a national policy and develop a national program for the management, beneficial use, protection, and development of the land and water resources of the nation’s coastal zones in an effort to preserve, protect, develop, and, where possible, enhance the resources of the coastal zone. The legislation also acknowledges that the most effective method for ensuring the protection and proper use of coastal resources would be accomplished by encouraging and assisting individual states in developing land and water use programs for their specific coastal zones. These programs would include unified policies, criteria, standards, methods, and processes to assist coastal resource managers and regulators in making land and water use decisions. Another objective encouraged the development of coastal plans specifically tailored to address the issues germane to individual states’
particular coastal interests and needs. Thus, the stage was set to allow for individual coastal states to control the destiny of their coastal resources, albeit in conformance with federal requirements. This was accomplished by identifying coastal issues which warranted particular consideration and attention.

The CZMA also encouraged the participation of the public, in addition to federal, state and local governments and regional agencies, in the development of coastal zone management programs. Participation is the vehicle by which the general public and interest groups influence the governmental decision-making process. The level of public involvement in the process is dependent, in part, upon how aware the public is of specific issues and whether they perceive their interests are directly affected by governmental decisions.

One of the primary purposes of incorporating public participation into the coastal planning process was to more clearly identify and respond to public interests before plans are finalized, thereby establishing an effective management program which reflects the public’s needs and perhaps reduces resource conflicts among competing users. Citizen involvement in the development of states’ coastal management programs not only ensures that public interests will ultimately be reflected in coastal resource use
decisions, but also generates public support for the program.

Individual states were also required to identify how their respective coastal management programs would be implemented upon adoption. In the case of Rhode Island, the Coastal Resources Management Council (CRMC) had been created by statute in 1971 and was appointed as the principal agency to administer and implement the state's coastal resources management program. The CRMC is authorized to act upon all development projects proposed (1) in Rhode Island's tidal waters; (2) on a shoreline abutting tidal waters or a coastal pond; and/or (3) within the 200-foot contiguous area landward of all coastal features (coastal beaches and dunes, barrier beaches, coastal wetlands, cliffs, bluffs, embankments, rocky shores, and manmade shorelines). 9

Finally, Rhode Island's state program requires that all appropriate agencies of state government, as well as federal agencies, must act in accordance with the policies and objectives of the coastal management program.

Also in 1972, Congress amended the federal Water Quality Act of 1965 which had originally required states to enact water quality standards for interstate navigable waters. 10 The effect of the 1965 legislation was merely the allocation of portions of interstate navigable waters to different uses, and did little in the area of improving and protecting water quality.
The Federal Water Pollution Control Amendments of 1972, known as the Clean Water Act (CWA, U.S. Public Law 92-500, as amended), changed the focus of the 1965 legislation by instituting a goal of no unpermitted pollution discharges to the nation’s surface waters. All discharges of pollutants into receiving waters were to be reviewed and regulated based upon specific criteria and water quality standards, and were deemed illegal under the CWA unless authorized by permit.

In addition, the CWA authorized individual states to establish and implement the pollution discharge elimination programs according to federally-developed guidelines. Federal regulations specify that water quality standards should, whenever attainable, provide water quality suitable for the protection of fish, shellfish, and wildlife and for recreation in and on the water. State water quality standards should also consider the use and value of surface waters for public water supply, habitat, and other purposes including agriculture, industry, and navigation.

The CWA also provides federal monies for states to implement water pollution control projects, such as providing grants for upgrading municipal sewage treatment facilities.

The state Department of Environmental Management (DEM) implements Rhode Island’s pollution discharge elimination program. The management of Narragansett Bay pursuant to
this program requires that the agency balance the need to meet the objectives of the CWA and protecting public health and safety with promoting economic development.

RESEARCH PROBLEM

The Rhode Island CRMC and state Department of Environmental Management (DEM) regulate and manage the state’s coastal resources pursuant to specific policies and standards. In order for the resource management programs established by these policies and standards to be effective, there must be agreement between the agencies which administer these programs and the interests of the public for whom the resources are managed. In this way, management and planning strategies can be implemented and developed more effectively.

However, if the goals of these management and regulatory programs differ from public interests, even the most well-intentioned resource management efforts are, from the public’s perspective, doomed to fail. Accordingly, it is essential to determine if the government’s perceptions of environmental resource quality and government program effectiveness differ from those of the general public in order to achieve success in resource management.

It is also important to establish a representative cross-section of the general public and organized special interest groups in an effort to determine whether the
governance system successfully addresses the diverse multiplicity of needs. Accordingly, the representative public user groups and organized special interest groups selected for this study comprise both passive and active, commercial and recreational Bay users.

For the purposes of this study, the proprietary interest groups are identified as:

- the general public (comprised of residents of adjacent towns, recreational boaters, and shellfishermen);
- several organized groups representing specific resource interests (environmentalists, boaters and marine tradespeople, and commercial shellfishermen); and
- the managers and regulators of Narragansett Bay's shoreline and water resources.

It is the purpose of this study to test the hypothesis that these groups with proprietary interest in Narragansett Bay and its resources differ in their perception of the environmental quality of the Bay and in their perception of the relative success of the state's governance system in managing the resource. The significance of these perceptions will be assessed among the identified user groups, and comparisons of perception between the public, special interest groups, and managers will be drawn.

Further, this study will test whether the perceptions of the Narragansett Bay public user groups differ from the various special interest organizations to determine whether environmental and user group organizations are representative of the interests and needs of the general
public. This is particularly important since managers will likely be more receptive to the needs and demands of organized special interest groups compared to individuals because of the interest groups' seemingly greater political influence.

Perceptions play an important role in the formulation of public policy. However, perceptions of environmental quality or governance system effectiveness are not accurate representations of actual conditions. Rather, they relate to the way in which individuals, user groups, or managers interpret the natural environment or governance system success based on their own needs, behavior, attitudes, past experiences, or expectations. Therefore, it must be assumed that the perceptions of managers or user groups only reflect either group's interpretation of the actual physical environment or management efforts, based on a variety of economic, scientific and emotional factors.

RESEARCH HYPOTHESIS

It is hypothesized that there will be differences between the general public, special interest groups, and resource managers, in their perception of (1) the environmental quality of Narragansett Bay and (2) the success and effectiveness of the Bay's governance system. This study will test whether perceptions differ among the managers and the general public user groups and special
interest groups for whom the resources are managed. The specific groups are identified in Figure 1.

A subsidiary hypothesis will also determine whether differences in perception exist among these three groups regarding environmental quality and governance system success. Each group's perceptions of environmental quality will also be analyzed to determine whether or not they serve as indicators of the groups' respective perception of government effectiveness.

Finally, the study will test whether public participation in the government decision-making process increases the awareness of governmental responsibility and effectiveness of user groups and special interest groups.

For the purposes of this study, a distinction is made between the user groups and the organized special interest groups. The former includes a broad cross-section of the general public which has not organized itself for the purposes of advancing a particular point of view. While this group does include members of special interest groups, the "general public" represents the total population. Special interest groups are therefore a subset of the general public who have a particular interest in the resource and who have organized for purposes of advancing their interest in both the resource and policy issues.
FIGURE 1
GROUPS WITH PROPRIETARY INTEREST IN
NARRAGANSETT BAY AND ITS RESOURCES

Policy Makers
Managers/Regulators
Special Interest Groups
User Groups
General Public

LEGEND:

Managers/Regulators: R.I. Coastal Resources Management Council; R.I. Department of Environmental Management (DEM) Water Quality Standards Division; R.I. DEM Combined Sewer Overflow Division

Special Interest Groups: Save the Bay; R.I. Shellfishermen’s Association; R.I. Marine Trades Association

User Groups: Residents; Shellfishermen; Boaters
Previous Research

There have been several studies which relate to perceptions of the natural environment and the use of perceptions in the public policy decision-making process. Overall, this research suggests that public policy is more successful when public perceptions are incorporated.

Hazard Perceptions and Behavior

Burton, Kates, and White conducted extensive research on public perception of flood hazards and the environment, defining several parameters for human response to hazards. These include the magnitude of the hazard event, the frequency with which the event occurs, the duration of the event, and the areal extent of the event.\(^\text{14}\) Their research concluded that individuals are aware of the existence of possible hazardous events, but their perception and definition of hazardous events differs markedly from the estimates made by professionals and experts.\(^\text{15}\) Further, people living in hazard-prone areas have different views of the hazard than do scientists studying the same natural phenomena. The authors suggest that each group is not necessarily incorrect in its appraisal of events, but each pays attention to different characteristics and often deals differently with probabilities given its particular needs.\(^\text{16}\) The perceptions of managers are based upon the scientific information available to them in their professional
capacity, while the public's perceptions are more likely to be influenced by its emotional responses to hazards based, in part, on the parameters identified above.

Burton, Kates and White's work also indicates that the magnitude, frequency, duration, and areal extent of the event each affects the way in which the public and managers respond to and accommodate hazardous events. For example, more-frequent events or events which affect a larger areal extent and impact a broader segment of the society may elicit a greater need for response than less frequent events of greater magnitude.

Similarly, the general public's and special interest groups' perceptions of Narragansett Bay's environmental quality may be influenced, in part, by several environmental parameters, such as the magnitude and frequency of pollution events, the duration of such events, and the areal extent over which resultant environmental degradation occurs.

In addition, the public may have a basic awareness that the government plays a role in managing and regulating the Bay, and its perception of the governance system's effectiveness and success is likely to be influenced by its perception of Narragansett Bay's overall environmental quality.

Public perception of the governance system's ability to address pollution off the Bay may depend on whether pollution is perceived as being chronic or acute, the
duration of environmental degradation which may result from a pollution event, and the total area of Narragansett Bay perceived as degraded by the pollution.

Also similar to the findings of Burton et. al. is that the public’s perceptions of the Bay’s environmental quality will differ from those of government managers. Members of the public will likely base their perceptions of both environmental quality and governance system success on emotional responses to pollution events, while government managers will perceive of environmental conditions differently than the public based on scientific data available to them professionally.

Finally, the difference in environmental quality perceptions between the public and managers manifests itself in the way in which government agencies address pollution problems in Narragansett Bay. As the research by Burton et al. regarding response to hazards indicates, chronic pollution events in the Bay may lead the public to believe that the governance system is ineffective or unwilling to address the source of the pollution, regardless of whether or not managers are working toward correcting the problem within the confines of their respective programs.

Because they are directly affected by management and regulatory strategies and have an economic stake in the management of the Bay, the public user groups such as boaters and shellfishermen which utilize the Bay and its
resources are likely to have a greater awareness of the existence of the governance system than the general public. A similarity was raised by Saarinen’s research, which found that wheat farmers in the most drought-prone areas of the Great Plains have the most accurate perceptions of drought risk.\textsuperscript{18} This research further found that perception of the hazard was greatest where it directly related to or affected resource use. For example, livestock farmers perceived of drought less accurately than did wheat farmers.\textsuperscript{19}

However, since the special interest groups included in this study were specifically established in order to protect and further their particular interest in using the Bay’s resources, the awareness of their leadership with respect to the Bay’s governance system is likely to be greater than that of the public users groups. In addition, perceptions of environmental quality between user groups and special interest groups will also differ since special interest group members are more likely to base their perceptions on scientific, economic, and other data, not on emotional responses to pollution events.

Sewell’s research on the environmental perceptions of engineers and public health officials found that there were significant differences in perceptions between these two groups with respect to the management of reservoirs.\textsuperscript{20} The difference in perception was attributed to each group’s utility of the resource: the perceptions of health officials
were based on their mandate to manage drinking-water resources so as to protect public health and safety, while engineers' objectives were to maintain reservoir water resources for multiple uses, even though these uses may have actually precluded use of the reservoir for potable water.²¹

Likewise, the environmental quality and government effectiveness perceptions of the various users of Narragansett Bay will likely differ based on each group's resource use objective. This, in turn, will be the basis for their respective resource management needs. For example, water quality which can sustain the harvesting of direct-consumption shellfish is of great importance to shellfishermen, yet lesser water quality may meet the satisfaction of boaters whose use of the Bay is less dependent upon excellent water quality.

Finally, wilderness perception research conducted by Lucas regarding potentially conflicting uses of parks found that motorboat users perceived of the term "wilderness" differently than canoeists.²² Canoeists were more bothered by crowding, noise, and roads than those using motorboats in the same park. Thus, different users' needs were incorporated into park management decisions, whereby parks were zoned to provide diversity to suit the varying needs of several users.²³ Similarly, identification of where Narragansett Bay user perceptions diverge or conflict may
aid managers in establishing plans and programs to satisfactorily meet the wide range of needs.

**The Narragansett Bay Project**

The Narragansett Bay Project (NBP) has done extensive research on the environmental issues facing Narragansett Bay in an effort to set the project's research agenda. The NBP is part of the National Estuary Program, created by Congress in 1984 as a national program focusing on the pollution problems facing several of the country’s estuaries, including San Francisco Bay and Long Island Sound.

During the initiation of the NBP in 1985, it was decided early on that the comprehensive study sponsored by the federal Environmental Protection Agency (EPA) and Rhode Island DEM should incorporate the general public’s and user groups’ concerns regarding the Bay’s environmental quality. This was accomplished by surveying both active and passive users of the Bay for the purpose of identifying their concerns and needs.24

In addition, the existing management structure which governs the Bay and its resources has been identified by the NBP, and the planning and regulatory duties of all applicable municipal, state, and federal government agencies have been detailed.25
Need for Research

Managers and regulators of coastal resources are often accused of not fully considering public interests and needs when regulating uses or conducting long-range planning, notwithstanding both explicit and implicit requirements in recent environmental legislation on both the federal and state levels. The reason for this may be because most managers are perceived as being part of political and bureaucratic systems and, as such, somewhat removed from the resource and the users. Consequently, managers may not be fully aware of local resource issues. To make matters even worse, managers are often made aware of public and/or special interests only on an issue-by-issue or crisis-by-crisis basis, which does not provide an opportunity to study the aspects of human behavior and response to not only pollution events, but to the governance system as well which may have very significant impacts on the Rhode Island’s coastal resources.

The identification of how management policies may diverge from the interests of user groups and the general public will serve to improve resource management and the regulatory system. The NBP has laid the groundwork for improved management of Narragansett Bay by identifying not only the public’s concerns with respect to the Bay’s environmental quality, but the most significant factors affecting the viability of the Bay as well.
However, the project has not identified how the perceptions of the general public and user groups compare with the state government agencies pertaining to the successful management of the Bay. Any discrepancies in the perception of the quality of the Bay among the various groups with a proprietary interest in the Bay are likely to contribute to conflicts and a less efficient approach to the management of the Bay’s resources.

This research will test differences in perceptions among different user groups and government agencies. The results from this study will complement the work of the Narragansett Bay Project in an effort to develop a more comprehensive governance system for the Bay.

The ultimate goal of this research is to provide managers with an improved understanding of both passive and active users’ perceptions and needs with respect to specific Narragansett Bay management issues. Such information will, in turn, result in the more effective management of the Bay and the improvement of the quality of its resources.
CHAPTER II - DATA COLLECTION AND METHODOLOGY

DATA

The data for this study were collected in several ways. One data set was obtained from several public user groups including Bay-area residents, commercial shellfishermen, and recreational users including beachgoers, boaters, and tourists, who were surveyed as part of a comparative study initiated in 1984 in Narragansett Bay and San Francisco Bay. The study was funded in part by the Rhode Island Sea Grant office and was undertaken by several researchers at the University of Rhode Island. Only the data from Narragansett Bay will be used in this study.

The overall intent of the national estuary study was to evaluate the biological, chemical, and physical characteristics of a cross-section of estuaries in the U.S., including San Francisco and Narragansett Bays, identify the way the bays have been managed and the impacts of public policy on estuary-related issues including waste disposal, recreational uses, and coastal development, and analyze the effect that environmental quality and the management have on actual bay usage. All groups were surveyed to test for perceptual differences pertaining to environmental quality and other specific Bay-related issues.

Portions of the data from the national study which focus on perceptions of environmental quality and the
governance system are used in this study, specifically, the public user group surveys pertaining to Narragansett Bay.

In addition, ranking members and staff of several organized special interest groups were interviewed in an effort to identify the concerted perception of each interest group regarding the environmental quality of the Bay and the effectiveness of the state's governance system. The same questions utilized in the general public user group surveys were also posed to special interest group representatives.

Special interest groups have also been included in this study to provide an additional level of insight into public perceptions. Interviews with representatives from Save the Bay (STB), the Rhode Island Shellfishermen’s Association (RISA), and the Rhode Island Marine Trades Association (RIMTA) were conducted in order to detail each of these special interest groups' concerns with respect to the environmental quality of the Bay. An added objective was to identify their perceptions of the government’s success in responding to specific management concerns. These groups were selected as a subset of the public user groups because it was assumed that their respective special interests would parallel the three public user groups which comprise the "general public" as defined in this study.

Interviews with staff of the CRMC and several divisions of DEM were also conducted in order to determine whether the perceptions of the environmental governance system and
existing management, planning, and regulatory programs differ from the perceptions of both the general public and special interest groups. Once again, the same questions utilized in the nationwide estuary study’s public user group surveys and in interviews with special interest groups were also posed to government officials.

Finally, the data set generated by the NBP pertaining to the general public’s perception of the most significant issues affecting Narragansett Bay was utilized to supplement the survey findings and special interest group interviews, and to further identify the public’s overall concerns with respect to the Bay’s environmental quality and management.  

The realm of issues facing Narragansett Bay is vast and varied, and the scope of this study does not allow for the investigation of all relevant issues. Thus, the NBP data set and research also helped identify the most significant common management issues facing the Bay, thereby helping to narrow the field of special interest groups and government agencies upon which this study focused.

METHODOLOGY

User Groups

Narragansett Bay is a resource which is utilized by various, often competing user groups, and as such it is difficult to develop a comprehensive management strategy for the Bay which will address the concerns and needs of all Bay
users. In order to both develop a comprehensive management strategy for a resource which is utilized in different ways by many different, competing users, and determine whether management of Bay resources has ultimately been successful, it is important to determine whether the public and managers share the same perception of the environmental quality of the Bay and its resources. It is also essential to determine whether the different user groups which comprise the general public share the managers’ perception of environmental quality.

User groups’ perceptions of the overall environmental quality of Narragansett Bay and its resources will likely mirror their appraisal of the government’s success in managing the Bay: poor environmental quality as perceived by the general public can be equated to poor management of the resource. Therefore, a comparison of the perceptions of public user groups, special interest groups, and government agencies with respect to the Bay’s overall environmental health will also aid in identifying if and where management weaknesses may exist.

Further, differences in perception of the Bay’s overall quality among user groups may reflect a particular group’s dissatisfaction with the governance system, especially if that user group believes that an issue is addressed at the expense of what it perceives as another more important issue. Accordingly, the user group may perceive of the
governance system as ineffective since the system has failed to meet their group's particular needs.

Several general public user groups were surveyed between 1985 and 1986 as part of the Rhode Island Sea Grant Estuary Project to identify, in part, their perceptions of (1) the environmental quality of Narragansett Bay, and (2) the effectiveness of the current governance system in managing the Bay and its resources.

This thesis utilized survey results from the following three user groups: Narragansett Bay-area residents, commercial shellfishermen, and recreational boaters.

Several of the survey questions which were included in this study provided the user group respondents with a series of alternative responses from which to choose. This was done in an effort to control the survey and keep responses within a workable, statistically-testable field, especially with respect to identification of government agencies. All survey respondents were guaranteed confidentiality in order to allow more openness in their expression of views. The survey questions which were posed to all three general public user groups are provided in Appendix A.

All randomly selected survey respondents were asked to rate Narragansett Bay's overall water and shoreline quality. They were also asked to identify those portions of Narragansett Bay which they perceived as exhibiting both the best and the worst water quality.
Respondents were also asked to compare their perceptions of both water and shoreline quality at the time of the survey to conditions which existed both 5 and 10 years prior to the survey in an effort to determine whether the respondents' perceptions of temporal change in water and shoreline quality had occurred. Answers to this question also established a "track record" for the governance system. If respondents identified conditions as better than those which existed 5 or 10 years prior to the survey, it could reflect a relatively successful management strategy as perceived by respondents. Any indication that conditions were the same or worse than 5 or 10 years prior to the survey would reflect an ineffective management strategy as perceived by respondents.

With respect to the Narragansett Bay governance system, respondents were asked to identify those agencies which they believed were responsible for managing and improving the Bay, and to identify the one agency which was most effective in managing the Bay's resources and rate the effectiveness of that agency. Respondents were also asked to identify the issues which they believed the governance system had been least effective in addressing.

The governance system questions are utilized in this study to determine whether the public user groups have a real knowledge of both the state governance system established for Narragansett Bay and the issues which most
affect the Bay's overall environmental quality, especially if the user groups perceived that the "system" is ineffective. If the public is uninformed about the actual agencies responsible for managing and regulating the Bay's water resources, and cannot specifically identify the more pertinent Bay-related issues, then the perceptions of those user groups would likely be based on subjective opinions rather than a direct knowledge of the governance system. Further, it may also reflect that the governance system is not necessarily ineffective in managing the resource, but may instead be deficient in increasing public awareness of its accomplishments.

Finally, public participation in the decision-making process is essential to ensure that public opinion and needs are incorporated into and considered in final management and regulatory decisions. Accordingly, it is important to determine whether and, if so, how often the public user groups take advantage of the public participation process. It is also important to note whether any one user group participates more often in the process than any another, and in doing so shapes public policy and management strategies according to their own agenda which may not necessarily be shared by the other user groups.

Between May 14 and June 6, 1985, 100 residents living in municipalities which directly abut the Bay were randomly selected from telephone directories based on each town’s
percentage of the state's total population according to 1980 census data. Each resident was mailed a copy of a self-administered survey which also included a brief description of the purpose of the study. Each resident was asked to complete and return the survey; 42 individuals responded.

It was found that 31.7% of returned surveys (14 surveys) came from Providence residents; 9.8% (4 surveys) each were returned from Cranston and from Riverside; 7.3% (3 surveys) each were returned from Warwick, Pawtucket, and Middletown; 4.9% (2 surveys) each were returned from North Kingstown, East Providence, and Bristol; and 2.4% (1 survey) each were returned from Narragansett, Barrington, Newport, Portsmouth, and Jamestown.

Between August 12, 1985 and September 1, 1985, 50 recreational boaters were personally interviewed at several randomly selected marinas and public boat launch areas surrounding Narragansett Bay located in East Greenwich, Bristol, Newport, and Jamestown.

In addition, 48 commercial shellfishermen throughout the Narragansett Bay area were also surveyed via telephone interviews. Fishermen were selected randomly from lists provided by the Rhode Island Fishermen's Alliance. Shellfishermen who agreed to participate in the survey were mailed copies of the questionnaire prior to the interviews to use as a reference during the telephone interview.
The three user groups provide a stratified random sample of that portion of the general public which utilizes Narragansett Bay and its resources. The sample size of the three public user groups is small, due, in part, to reliance on the voluntary return of self-administered surveys by residents, and to the relatively small statistical universe of shellfishermen and boaters within the Narragansett Bay area.

Data from the general public user group surveys were coded numerically and entered into the mainframe computer at the Academic Computer Center at the University of Rhode Island for data processing. Data files were created for each user group, and SAS, a comprehensive statistical analysis program, was used to analyze each user group data set.

Organized Special Interest Groups

Because of their vested interest in Narragansett Bay and its resources and their resultant awareness of Bay issues, organized special interest groups may provide a greater insight into the effectiveness of the Bay governance system than the public in general. Accordingly, to expand upon the general public's perception of Narragansett Bay's environmental quality and governance system effectiveness, interviews with members and/or staff of organized special
interest groups which generally parallel the three public user groups were also incorporated into this study.

Identification of organized groups’ perceptions is extremely important since government agencies are more likely to consider comments, criticism, and recommendations from organizations over individual members of the public. This is due to the groups’ often far-reaching political influence.

The three special interest groups targeted for this study are Save the Bay, the Rhode Island Shellfishermen’s Association, and the Rhode Island Marine Trades Association. Interviews with members and/or staff were conducted in November of 1991 seeking the same information as identified in the previous section with respect to the general public user groups’ perceptions of the Bay’s water and shoreline quality and the effectiveness of the governance system.

In addition, since it was already established that all respondents’ organizations actively participate in the governmental decision-making process, the interview sought information as to whether respondents perceived of their organization as successful in influencing the process and whether the governance system provided ample opportunity for public participation. Respondents were also asked whether they believed their organizations parallel and truly reflect the interests and needs of the general public.
Unlike the user group surveys, the interviews were open-ended to allow the participants' answers to guide the interviews, based on the issues which they identified as most important to their organization. Although the interviews were not as structured as the user group surveys, all interview participants were ultimately asked all questions contained in the survey. All respondents were guaranteed confidentiality to allow more open responses.

**Government Agency Interviews**

In December 1991 and February 1992, the staff from three state government agencies were interviewed in order to obtain the same information pertaining to Narragansett Bay's water and shoreline quality, governance system effectiveness, and public participation opportunities. Both staff and management level interviews were conducted to identify the day-to-day working conditions which respondents perceived as playing a role in either impeding the achievement of goals or aiding in accomplishment of their Narragansett Bay agenda. Staff of both the state Department of Environmental Management (DEM) Division of Water Resources and the state Coastal Resources Management Council (CRMC) were interviewed. Once again, complete confidentiality was guaranteed to all respondents in order to decrease inhibition in responses.
Narragansett Bay Project Data Sets

The selection of the three general public user groups, the three special interest groups, and both the DEM and the CRMC was influenced by the preliminary findings of the Narragansett Bay Project (NBP). According to a NBP 1990 Progress Report, there are 4 significant problems currently facing the Bay: (1) pollution; (2) human health risks from contaminated seafood; (3) health and abundance of living marine resources; and (4) population growth and land use. These four problems are based, in part, on the NBP's preliminary finding that the public strongly objects to the use of the Bay as a waste receptor because it ultimately degrades water quality and infringes upon all other uses of the Bay.

Finally, in an effort to supplement the NBP's published reports, staff of the NBP were interviewed in November of 1991 to discuss the project's status since the 1990 progress report was published.
The primary research hypothesis tests whether there are differences between the managers, the special interest groups, and the users of Narragansett Bay in their respective perceptions of both the environmental quality of the Bay and the success and effectiveness of the Bay's governance system.

However, it is first necessary to determine whether there are differences in perception among the public user groups before comparisons can be drawn between all user groups and the special interest groups and managers. The following provides the detailed results of the 1985 surveys conducted with the three public user groups.

Chi square tests were conducted on all user groups. Chi square analysis tests whether a significant difference exists between a set of observed and expected responses. According to Siegel, this non-parametric statistical test is suitable for analyzing nominal data or data which fall into distinct categories.31

A map of Narragansett Bay (Figure 2) was provided to aid respondents in identifying those portions of the Bay which they perceived exhibited the best and worst water and shoreline quality. The Bay was divided into western and eastern portions, which were further broken down to upper,
mid, and lower areas to help respondents identify specific Bay locations.

WATER QUALITY

All respondents were asked to identify that portion of the Bay which they perceived as exhibiting the best water quality. A chi square test run on the aggregated survey results indicated that there is a very significant statistical difference (at the 0.01 level) in perception among user groups (Table 1).

The majority of residents (28.8%) and boaters (36.2%) surveyed identified the lower eastern portion of the Bay (Figure 2) as exhibiting the cleanest water, while the majority of shellfishermen (29.5%) believe that the middle western portion of the Bay has the best water quality. The top responses for each user group are provided below. The number in parentheses identifies the actual number of respondents:

<table>
<thead>
<tr>
<th>Residents:</th>
<th>28.8% lower east (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26.9% lower west (28)</td>
</tr>
<tr>
<td></td>
<td>22.1% middle east (23)</td>
</tr>
<tr>
<td></td>
<td>16.3% middle west (17)</td>
</tr>
<tr>
<td>Shellfishermen:</td>
<td>29.5% middle west (39)</td>
</tr>
<tr>
<td></td>
<td>20.5% lower west (27)</td>
</tr>
<tr>
<td></td>
<td>18.2% lower east (24)</td>
</tr>
<tr>
<td></td>
<td>14.4% middle east (19)</td>
</tr>
<tr>
<td>Boaters:</td>
<td>36.2% lower east (34)</td>
</tr>
<tr>
<td></td>
<td>33.0% lower west (31)</td>
</tr>
<tr>
<td></td>
<td>17.0% middle west (16)</td>
</tr>
<tr>
<td></td>
<td>13.8% middle east (13)</td>
</tr>
</tbody>
</table>
TABLE 1

CHI SQUARE RESULTS

DIFFERENCES IN PERCEPTION OF ENVIRONMENTAL QUALITY

<table>
<thead>
<tr>
<th>Degrees of Freedom (DF)</th>
<th>0.01 Chi Square</th>
<th>0.02 Chi Square</th>
<th>0.05 Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERY SIGNIFICANT (0.01 level)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas exhibiting best water quality</td>
<td>6</td>
<td>16.81</td>
<td>17.25</td>
</tr>
<tr>
<td>Shoreline quality rating</td>
<td>4</td>
<td>13.28</td>
<td>13.60</td>
</tr>
<tr>
<td>Water quality rating</td>
<td>4</td>
<td>13.28</td>
<td>13.37</td>
</tr>
<tr>
<td>Water quality compared to 10 years prior to survey</td>
<td>6</td>
<td>16.81</td>
<td>17.37</td>
</tr>
<tr>
<td>Shoreline quality compared to 10 years prior to survey</td>
<td>6</td>
<td>16.81</td>
<td>22.11</td>
</tr>
<tr>
<td>SIGNIFICANT (0.02 level)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas exhibiting worst water quality</td>
<td>6</td>
<td>15.03</td>
<td>15.08</td>
</tr>
<tr>
<td>Shoreline quality compared to 5 years prior to survey</td>
<td>6</td>
<td>15.03</td>
<td>15.47</td>
</tr>
<tr>
<td>NOT SIGNIFICANT (0.05 level)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water quality compared to 5 years prior to survey</td>
<td>6</td>
<td>12.59</td>
<td>6.01</td>
</tr>
</tbody>
</table>
Respondents were also asked to identify that portion of the Bay which they perceived as exhibiting the most degraded water quality conditions. A chi square test run on the aggregated survey results indicated that there is a statistically significant (at the 0.02 level) difference in perception among user groups (Table 1).

The majority of residents (34.7%) surveyed identified the upper western portion of the Bay (Figure 2) as exhibiting the most-degraded water, while the majority of both shellfishermen (33.3%) and boaters (47.7%) believe that the upper eastern portion of the Bay has the most-degraded water quality. The top four responses for each user group are provided below:

- **Residents:**
  - 34.7% upper west (35)
  - 32.7% upper east (33)
  - 16.8% middle west (17)
  - 9.9% middle east (10)

- **Shellfishermen:**
  - 33.3% upper east (37)
  - 31.5% upper west (35)
  - 13.5% middle west (15)
  - 11.7% middle east (13)

- **Boaters:**
  - 47.7% upper east (41)
  - 44.2% upper west (38)
  - 4.7% middle east (4)
  - 3.5% middle west (3)

Respondents were then asked to rate the overall water quality of Narragansett Bay. A chi square test run on the aggregated survey results indicated that there is a very significant difference in perception (at the 0.01 level) among user groups (Table 1) with respect to their perception of the overall water quality of the Bay.
The majority of residents (34.1%) and boaters (46.9%) surveyed indicated that overall water quality is good, while the majority of shellfishermen (56.3%) rated the overall water quality as fair. The responses for each user group are provided below:

Residents: 34.1% good (14)
            31.7% fair (13)
            26.8% poor (11)
            4.9% very poor ( 2)
            2.4% excellent ( 1)

Shellfishermen: 56.3% fair (27)
            25.0% good (12)
            12.5% poor ( 6)
            4.2% very poor ( 2)
            2.1% excellent ( 1)

Boaters: 46.0% good (23)
            40.0% fair (20)
            6.0% excellent ( 3)
            6.0% poor ( 3)
            2.0% very poor ( 1)

Finally, respondents were asked to compare water quality conditions which existed at the time of the survey (1985) to those which existed both 5 and 10 years prior to the survey. While there was no statistically-significant difference in perceptions of conditions which existed 5 years prior to the survey (Table 1), a chi square test run on aggregated results indicated that there is a statistically significant difference (at the 0.01 level) in perception when respondents compared 1985 conditions to those which had existed 10 years prior to the survey (Table 1).
The majority of residents (35.7%) and boaters (36.0%) indicated that 1985 water quality conditions were better than those which had existed in 1975, while the majority of shellfishermen (37.5%) indicated that 1985 conditions were worse than those exhibited in 1975.

<table>
<thead>
<tr>
<th>Group</th>
<th>5 yrs -</th>
<th>10 yrs -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents</td>
<td>40.5% same (17)</td>
<td>35.7% better (15)</td>
</tr>
<tr>
<td></td>
<td>28.6% better (12)</td>
<td>31.0% worse (13)</td>
</tr>
<tr>
<td></td>
<td>26.2% worse (11)</td>
<td>23.8% same (10)</td>
</tr>
<tr>
<td></td>
<td>4.8% don't know (2)</td>
<td>9.5% don’t know (4)</td>
</tr>
<tr>
<td>Shellfishermen</td>
<td>31.3% worse (15)</td>
<td>37.5% worse (18)</td>
</tr>
<tr>
<td></td>
<td>29.2% better (14)</td>
<td>33.3% don’t know (16)</td>
</tr>
<tr>
<td></td>
<td>29.2% same (14)</td>
<td>18.8% better (9)</td>
</tr>
<tr>
<td></td>
<td>10.4% don’t know (5)</td>
<td>10.4% same (5)</td>
</tr>
<tr>
<td>Boaters</td>
<td>32.0% better (16)</td>
<td>36.0% better (18)</td>
</tr>
<tr>
<td></td>
<td>30.0% same (15)</td>
<td>36.0% don’t know (18)</td>
</tr>
<tr>
<td></td>
<td>20.0% worse (10)</td>
<td>16.0% worse (8)</td>
</tr>
<tr>
<td></td>
<td>18.0% don’t know (9)</td>
<td>12.0% same (6)</td>
</tr>
</tbody>
</table>

SHORELINE QUALITY

All user groups were also asked to rate Narragansett Bay's overall shoreline quality. A chi square test run on the aggregated survey results indicated that there is a very significant statistical difference in perception (at the
0.01 level) among user groups with respect to shoreline quality (Table 1).

The majority of residents (43.9%) and shellfishermen (54.2%) surveyed indicated that the overall shoreline quality of the Bay is fair, while the majority of boaters (53.1%) perceive of overall shoreline quality as good.

Additional responses for each user group are provided below:

<table>
<thead>
<tr>
<th></th>
<th>Residents:</th>
<th>Shellfishermen:</th>
<th>Boaters:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43.9% fair</td>
<td>54.2% fair</td>
<td>53.1% good</td>
</tr>
<tr>
<td></td>
<td>41.5% good</td>
<td>35.4% good</td>
<td>26.5% excellent</td>
</tr>
<tr>
<td></td>
<td>9.8% poor</td>
<td>6.3% poor</td>
<td>14.4% fair</td>
</tr>
<tr>
<td></td>
<td>4.9% very poor</td>
<td>2.1% excellent</td>
<td>4.1% poor</td>
</tr>
<tr>
<td></td>
<td>0.0% excellent</td>
<td>2.1% very poor</td>
<td>2.0% very poor</td>
</tr>
</tbody>
</table>

Respondents were also asked to compare the quality of the Narragansett Bay shoreline in 1985 to the Bay’s shoreline quality as perceived both 5 and 10 years prior to the survey. A chi square test run on aggregated results indicated that there is a statistically significant difference in perception (at the 0.02 level) when respondents compared 1985 conditions to those which had existed 5 years prior to the survey, and a very significant difference in perception (at the 0.01 level) of shoreline conditions when compared to 10 years prior to the survey.
The results of the survey with respect to a comparison of shoreline quality are as follows:

<table>
<thead>
<tr>
<th>User Group</th>
<th>5 yrs -</th>
<th>10 yrs -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents</td>
<td>42.9% same (18)</td>
<td>38.1% better (16)</td>
</tr>
<tr>
<td></td>
<td>33.3% better (14)</td>
<td>28.6% same (12)</td>
</tr>
<tr>
<td></td>
<td>21.4% worse (9)</td>
<td>21.4% worse (9)</td>
</tr>
<tr>
<td></td>
<td>2.4% don’t know (1)</td>
<td>11.9% don’t know (5)</td>
</tr>
<tr>
<td>Shellfishermen</td>
<td>37.5% same (18)</td>
<td>34.0% worse (16)</td>
</tr>
<tr>
<td></td>
<td>33.3% better (16)</td>
<td>27.7% don’t know (14)</td>
</tr>
<tr>
<td></td>
<td>16.7% worse (8)</td>
<td>23.4% same (11)</td>
</tr>
<tr>
<td></td>
<td>12.5% don’t know (6)</td>
<td>14.9% better (7)</td>
</tr>
<tr>
<td>Boaters</td>
<td>57.1% same (28)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.3% don’t know (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.3% worse (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.2% better (5)</td>
<td></td>
</tr>
</tbody>
</table>

USER GROUP PERCEPTIONS OF THE NARRAGANSETT BAY GOVERNANCE SYSTEM

Respondents were asked to identify those government agencies which they perceived as having primary responsibility for managing and improving Narragansett Bay. A chi square test run on survey results indicated that there is an extremely significant difference in perception (at the 0.001 level) among all three user groups with respect to those agencies which they perceive as having responsibility for managing and protecting the Bay and its resources (Table 2).
The majority of residents surveyed (33.0%) indicated that Save the Bay had primary responsibility; the majority of shellfishermen (46.8%) identified the federal Environmental Protection Agency (EPA) as having primary responsibility within the state of Rhode Island; and the majority of boaters (56.1%) identified DEM as the agency with primary authority.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Percentage</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents:</td>
<td>33.0%</td>
<td>Save the Bay (32)</td>
</tr>
<tr>
<td></td>
<td>15.5%</td>
<td>DEM (15)</td>
</tr>
<tr>
<td></td>
<td>13.4%</td>
<td>RI Sea Grant (13)</td>
</tr>
<tr>
<td></td>
<td>12.4%</td>
<td>CRMC (12)</td>
</tr>
<tr>
<td></td>
<td>4.1%</td>
<td>EPA (4)</td>
</tr>
<tr>
<td>Shellfishermen:</td>
<td>46.8%</td>
<td>EPA (22)</td>
</tr>
<tr>
<td></td>
<td>23.4%</td>
<td>DEM (11)</td>
</tr>
<tr>
<td></td>
<td>4.3%</td>
<td>CRMC (2)</td>
</tr>
<tr>
<td>Boaters:</td>
<td>56.1%</td>
<td>DEM (37)</td>
</tr>
<tr>
<td></td>
<td>21.2%</td>
<td>CRMC (14)</td>
</tr>
<tr>
<td></td>
<td>18.2%</td>
<td>EPA (12)</td>
</tr>
</tbody>
</table>

Respondents were also asked to identify the agency which they perceived as being the most effective in managing the Bay’s resources. Only 21 of the 50 boaters surveyed responded to this question, and all 21 identified DEM as the most effective agency. A chi square test was run on the aggregated survey results for the residents and shellfishermen. This test indicated that there was no statistically significant difference (at the 0.05 level) between these two user groups with respect to their perceptions of the most effective government agency (Table 2).
### TABLE 2

**CHI SQUARE RESULTS**

**DIFFERENCES IN PERCEPTION OF GOVERNANCE SYSTEM**

<table>
<thead>
<tr>
<th>Degrees of Freedom</th>
<th>Extremely Significant (0.001 level)</th>
<th>Very Significant (0.01 level)</th>
<th>Not Significant (0.05 level)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(DF)</td>
<td>DF</td>
<td>DF</td>
</tr>
<tr>
<td>Agencies with resource management responsibility</td>
<td>4</td>
<td>0.001</td>
<td>18.46</td>
</tr>
<tr>
<td>Effectiveness of 1st choice</td>
<td>6</td>
<td>0.01</td>
<td>16.81</td>
</tr>
<tr>
<td>Most effective agency (residents and shellfishermen only)</td>
<td>2</td>
<td>0.05</td>
<td>5.99</td>
</tr>
</tbody>
</table>

**CHI SQUARE COULD NOT BE PERFORMED**

Issue least effectively managed
Residents: 40.5% Save the Bay (30)
10.8% RI Sea Grant (8)
9.5% DEM (7)
9.5% CRMC (7)
Shellfishermen: 31.0% EPA (22)
29.6% DEM (21)
15.5% CRMC (11)
Boaters: 100.0% DEM (21)

A chi square test run on data indicates that there is a significant difference (at the 0.01 level) in respondents’ perceptions of the level of effectiveness of their first choice (Table 2). The majority of residents (45.1%) rated their first choice as moderately effective; the majority of shellfishermen (44.4%) and boaters (56.7%) rated their first choice as effective.

Residents: (STB) 45.1% moderately effective (32)
23.9% very effective (17)
21.1% highly effective (15)
9.9% not very effective (7)

Shellfishermen: (EPA) 44.4% effective (20)
37.8% moderately effective (17)
11.1% not very effective (5)
4.4% very effective (2)
2.2% highly effective (1)

Boaters: (DEM) 56.7% effective (17)
20.0% very effective (6)
20.0% moderately effective (6)
3.3% not very effective (1)

The survey also asked all user groups to identify the issues which they perceived as being addressed least-effectively by the governance system. A chi square test could not be performed on this data set since responses were so varied and could not be categorized for testing purposes. Instead, the data is presented here to identify the range of responses which were provided by the survey participants.
 Residents:  
(13) 52.0% sewage  
(3) 12.0% Providence water quality  
(2) 8.0% public use  
(1) 4.0% shellfish issues  
(1) 4.0% dumping from boats  

Shellfishermen: (42) 45.7% untreated sewage from inadequate treatment plants  
(17) 18.5% sewage from individual disposal systems  
(17) 18.5% industrial effluent  
(13) 14.1% urban runoff  

Boaters:  
(17) 70.8% chemical pollution  
(6) 25.0% sewage
CHAPTER IV - SPECIAL INTEREST GROUP INTERVIEWS

Staff of three special interest groups were interviewed in 1991 utilizing the same questions posed to public user groups during the 1985 surveys. This was done to compare perceptions between users and representatives from government agencies with jurisdiction in the Bay regarding the same issues. The three user groups were selected for inclusion in this study because they most closely paralleled the three public user groups which were surveyed in 1985.

The following details the results of the interviews with staff of Save the Bay (STB), the Rhode Island Shellfishermen’s Association (RISA), and the Rhode Island Marine Trades Association (RIMTA).

IDENTIFY AREAS EXHIBITING THE BEST AND WORST WATER QUALITY (see Figure 2, page 34), AND RATE NARRAGANSETT BAY’S OVERALL WATER QUALITY

Save the Bay, the Rhode Island Shellfishermen’s Association, and the Rhode Island Marine Trades Association all agreed that the lower Bay exhibited the best water quality, and the upper Bay exhibits the worst water quality. Save the Bay and RISA rated overall water quality in the Bay as fair, while RIMTA rated overall water quality as good.

The Rhode Island Shellfishermen’s Association also indicated that the middle western portions of the Bay
exhibit the best water quality. In addition to its rating of fair overall, STB rated certain areas within the upper Bay as very poor.

The Rhode Island Marine Trades Association also identified the middle western and middle eastern portions of the Bay as possessing the best water quality. In addition, RIMTA indicated that Newport Harbor also possesses poor water quality which they attributed to inadequately treated sewage discharges.

**COMPARISON OF 1991 WATER QUALITY TO CONDITIONS WHICH EXISTED 5 AND 10 YEARS PRIOR TO THE INTERVIEW**

All three interest groups felt that the Bay’s water quality is better now when compared to both 5 and 10 years prior to the interview (1986 and 1981, respectively).

**RATING OF NARRAGANSETT BAY SHORELINE QUALITY**

All three special interest groups rated the Bay’s overall shoreline quality as fair.

**COMPARISON OF 1991 SHORELINE QUALITY WITH CONDITIONS EXISTED 5 AND 10 YEARS PRIOR TO THE INTERVIEW**

STB and RISA indicated that 1991 shoreline conditions were better than in 1986 and 1981. The Rhode Island Marine Trades Association perceived 1991 shoreline conditions to be the same as 5 and 10 years prior to the interview.
Save the Bay believes that public access to the shoreline had improved over the 10 year period, and that shoreline development had been controlled somewhat and was in better shape than if CRMC did not exist.

However, RISA believes that development within the watershed has increased and is not as well controlled as it should be, while public access to the Bay has improved, and RIMTA indicated that some portions of the Bay shoreline had been adversely affected from development during that 10 year period.

AGENCIES WITH PRIMARY MANAGEMENT RESPONSIBILITY

The interviews with members and/or staff of the three special interest groups revealed that all three interest groups identified DEM as having primary water quality authority for Narragansett Bay. In addition, STB and RISA identified CRMC as having authority over upland development, and indirect water quality responsibility as well since the Council regulates both upland development within the watershed and the placement of in-water structures, both of which also affect water quality.

MOST EFFECTIVE AGENCY AND RATING OF EFFECTIVENESS

All three special interest groups rated DEM as moderately effective. Save the Bay and RISA rated CRMC as moderately effective as well.
ISSUE LEAST EFFECTIVELY MANAGED

Save the Bay

Save the Bay faulted DEM for its inability or unwillingness to address the water quality problems plaguing the upper Bay. The organization criticized DEM for its tendency to concentrate on preventing future degradation of water quality rather than correcting existing degradation and reclaiming the water resources of the Bay. For example, STB contends that DEM has claimed prohibitive costs in identifying every pipe which discharges into Narragansett Bay. Save the Bay believes that DEM has been unsuccessful in controlling the quality of the state’s water resources since it does not adequately address cumulative impacts. They also believe that DEM’s current approach is politically safer than taking an active, aggressive role in improving upper Bay water quality.

With respect to CRMC, STB believes that its decisions are frequently politically-influenced since the Council is comprised of political appointments. According to STB, members of CRMC are not accountable to one entity such as the governor, and are not censured for votes which may conflict with state environmental standards.

Save the Bay criticized the lack of coordination between the CRMC and its staff and between both the CRMC and the DEM as well. While STB praised the abilities of DEM and CRMC staff, the problem as perceived by STB lies in poor
coordination between the agencies, and between the Council and its staff. Save the Bay also identified a disproportionate response from the CRMC based on the size of an individual project: The larger the project, the less CRMC seems to respond to public input and staff recommendations.

Save the Bay also criticized the CRMC for its lack of long-term proactive planning for development throughout the coastal areas of the state, and accused the Council of updating its regulations only in response to crises.

According to STB, another area where CRMC has been ineffective is enforcement. A chronic shortage of staff and the issuance of after-the-fact permits does little to discourage potential violators.

Rhode Island Shellfishermen's Association

According to RISA, the one area where DEM has been least effective is the abatement of CSOs. RISA also indicated that CRMC is ineffective in three areas. The first is in managing and controlling overdevelopment of the upland which often results in nonpoint source pollution. The second concerns the agency’s management and control of in-water structures. The third area cited by the organization concerns the placement of moorings which are detrimental to shellfish resources.

The Rhode Island Shellfishermen’s Association spoke highly of the caliber of staff at both DEM and CRMC. RISA
believes that the water resources-related units of DEM are doing the best that they can with very limited financial resources and staffing.

Rhode Island Marine Trades Association

The Rhode Island Marine Trades Association felt that the governance system has been least effective in establishing and approving a Bay-wide in-water disposal site for dredged material. This is the primary issue impacting a significant number of the organization’s membership, and the lack of an in-water site adversely affects their economic viability.

The Rhode Island Marine Trades Association perceived of the DEM as both disjointed and uncoordinated, both within the agency itself and in their relationship with CRMC.

The organization also indicated that the CRMC’s regulatory process is lengthy and, in some cases, adversely affects the economy of several marine trades industries. They believe that the boating industry is over-regulated, especially in light of its perception that discharge of sewage from boaters is minimal compared to combined sewer overflow discharges in Providence.

Rhode Island Marine Trades Association also accused DEM and CRMC of spending too much money on studies and not enough money and effort on solutions to the issues they identified.
SIGNIFICANT ISSUES FACING NARRAGANSETT BAY

In an effort to identify each special interest group's perspective on where it believes future government efforts should be focused, representatives from each special interest group were asked to identify the significant issues facing Narragansett Bay in addition to the management issues described above.

Save the Bay

Save the Bay identified nonpoint source pollution as the most significant issue facing the Bay, specifically, combined sewer overflows, urban runoff in the upper Bay, and discharges from individual septic systems. The organization also specifically identified impacts from toxics present in effluent from industrial point discharges, especially from smaller jewelry manufacturers which may not be able to afford implementation of state-of-the-art treatment methodology.

Rhode Island Shellfishermen's Association

The Rhode Island Shellfishermen's Association specifically identified development within the Narragansett Bay watershed and the associated development of individual septic systems which contribute to nonpoint source pollution within the Bay. The organization also identified discharges
from combined sewer overflows as a significant issue facing Narragansett Bay.

The Rhode Island Shellfishermen’s Association also indicated that the control of discharges from marine sanitation devices is a significant issue affecting the Bay’s water quality and shellfish resources as well.

The organization identified the increase in the number of moorings and structures in the Bay as adversely impacting shellfish resources by both limiting access to the resource and by increasing the number of illegal discharges from marine sanitation devices. In addition, structures can act as a barrier to the free flow of ice in the winter, holding ice in coves and limiting access to the resource.

The Rhode Island Shellfishermen’s Association also identified dredging and the disposal of dredged materials in Narragansett Bay as a primary concern of the organization’s membership, and the associated shellfish impacts from both dredging and from disposal.

Rhode Island Marine Trades Association

The Rhode Island Marine Trades Association identified the lack of an in-water disposal site for dredged material as their primary Bay-related concern. The organization also identified nonpoint source pollution as another issue facing the Bay.
The organization indicated that the control of discharges from marine sanitation devices is a significant concern of the organization, and that the lack of pump-out facilities for marine sanitation devices Bay-wide emphasizes the need to accommodate vessel-generated sewage. However, the organization also identified discharges from CSOs, urban runoff, and waterfowl feces as significant water quality issues facing Narragansett Bay, and perceives of these pollution sources as more significant contributors to Bay water quality degradation than infrequent illegal discharges from marine sanitation devices.
CHAPTER V - GOVERNMENT AGENCY INTERVIEWS

The four major Narragansett Bay issues identified in the NBP’s 1990 progress report are pollution in the Bay, human health risks from seafood, the health and abundance of living marine resources, and population growth. All of these issues either affect or are affected by the Bay’s water quality. In addition, the issues identified by the public user group survey results and by the organized interest group representatives interviewed indicate that water quality as affected by several sources, including effluent from treatment plants and combined sewer overflows, is a significant concern to users of the Bay and residents of the Bay area.

Accordingly, rather than attempt to include all units of DEM which may somehow play a role in managing and regulating the Bay and its numerous resources, this study has concentrated on those divisions of DEM with specific responsibility for addressing the issues raised by the NBP, the user groups, and the organized special interest groups. The units of DEM’s Division of Water Resources included in this study are the Water Quality Standards Program (WQS) which includes the state’s 401 Water Quality Program, and the Combined Sewer Overflow (CSO) Program.

In addition, upland and in-water development within the Narragansett Bay watershed affect water and shoreline
quality from a variety of activities. These include the installation of individual septic disposal systems (ISDS), increasing demand on sewage treatment plants from upland development, and the placement of in-water structures for marine recreation and the resultant potential for water quality impacts from recreational boats. Further, public access to the Bay was identified by RISA as an important issue facing Narragansett Bay, and was also identified during the course of interviews with STB representatives. Therefore, interviews with CRMC staff have also been included in this study to determine the agency’s perception of how well it addresses these issues.

**IDENTIFICATION OF AREAS WITH THE BEST AND WORST WATER QUALITY, AND RATING OF NARRAGANSETT BAY WATER QUALITY**

The Water Quality Standards unit of DEM, the Combined Sewer Overflow unit of DEM, and staff of CRMC all identified both the lower eastern and lower western portions of the Bay as exhibiting the best water quality overall. All three agencies also identified the water in the upper eastern and upper western portions of the Bay as the most degraded. Staff of CRMC also identified Newport Harbor as exhibiting poor water quality.

All three agencies rated Narragansett Bay’s overall water quality as good.
COMPARE 1991 WATER QUALITY CONDITIONS WITH THOSE OCCURRING 5 AND 10 YEARS AGO

Staff of the Water Quality Standards and the Combined Sewer Overflow units of DEM, and the CRMC all perceive that 1991 water quality conditions were better that those which existed in 1986 and 1981.

Water Quality Standards staff expanded on this question by noting that there have been some isolated areas in the middle and lower Bay which have become degraded during the 10-year period. However, staff emphasized that state and federal laws allow discharges to Narragansett Bay, and allow the impacts to water quality which result from such discharges. Therefore, discharges to Narragansett Bay will continue as long as the need to assimilate effluent for municipal sewage treatment and industry continues. It is therefore unlikely that the entire Bay will ever attain fishable, swimmable standards, especially in the northern reaches of the Bay.

RATING OF NARRAGANSETT BAY SHORELINE QUALITY

Staff of all three government agencies interviewed for this study rated the Bay’s overall shoreline quality as good. Staff of CRMC acknowledged that it is difficult to quantify the quality of the entire shoreline since perceptions of good quality shoreline are very subjective. Staff noted instead that portions of the Bay shoreline are
very densely developed, while other areas are less developed.

**COMPARE 1991 SHORELINE QUALITY WITH CONDITIONS WHICH EXISTED 5 AND 10 YEARS AGO**

Staff of all three government agencies interviewed indicated that 1991 shoreline conditions were better than those which existed in both 1986 and 1981. CRMC staff acknowledged that the public may perceive of shoreline quality as poor since the upland is more developed and therefore not as it was 10 to 50 years ago.

**RATING OF AGENCY’S EFFECTIVENESS**

The Water Quality Standards unit of DEM perceives the overall efforts of the Division of Water Resources as moderately effective. Staff indicated that the Division is striving to strengthen laws pertaining to maintenance of ISDS, to develop wastewater management districts, and to develop effective stormwater and nonpoint source pollution control programs. However, staff note that although there have been some gains in water quality in the upper Bay through control or improvement of treatment plant discharges, there has also been a decrease in water quality in some coves elsewhere in the Bay from nonpoint sources and from ISDS inputs. Staff also acknowledge that these
isolated episodes will no doubt affect the general public’s perception of the agency’s overall effectiveness.

The Combined Sewer Overflow unit of the DEM rates their efforts as effective, and acknowledges that although the program has not yet eliminated CSOs, it is proceeding toward that goal with very limited funding resources. Staff also acknowledge that the public does not share the agency’s perception of their effectiveness or success. According to staff, much of what the program does and the assistance it provides CSO municipalities is too technical for the general public to understand.

CRMC staff perceive of their agency as very effective, and view their coastal management program as one of the strongest in the nation, based on a well-defined set of standards. Staff acknowledge that the CRMC suffers from a public perception problem which they believe, for the most part, is unwarranted.

**AREA OF LEAST EFFECTIVE MANAGEMENT**

The Water Quality Standards unit of DEM indicated that the agency mostly concentrates on preventing additional degradation of the water quality and additional closure of shellfish beds, and therefore cannot focus on addressing currently degraded areas. In addition, staff identified the state’s inability to establish and approve an in-water
disposal site for dredged materials as an issue which needs greater management attention.

The Combined Sewer Overflow unit of DEM identified the program's inability to eliminate all CSO discharges in Narragansett Bay as a weakness, but stressed that the program has not been ineffective. Staff pointed out that CSOs exist in some of the oldest municipalities in the Bay area, and that correcting a problem which has existed for years will not occur overnight.

CRMC staff indicated that control of nutrient inputs to Narragansett Bay from ISDS, and the inability to develop wetland regulations and classifications are two areas where the governance system has been least effective.

SIGNIFICANT ISSUES FACING NARRAGANSETT BAY

Staff of all three agencies interviewed indicated that nonpoint source pollution in general and the continuation of combined sewer overflows in the upper Bay are two of the most significant issues affecting the quality of Narragansett Bay.

The Water Quality Standards and Combined Sewer Overflow units of DEM also identified cumulative impacts of upland and in-water development as an extremely important issue. Staff of the Water Quality Standards unit expounded upon their response, indicating that the level of current development is, in their opinion, in excess of what the land
and water resources of the Bay can safely accommodate. The quality of the Bay’s resources is further compromised by the inevitable development of pre-existing, nonconforming lots which, if reviewed according to today’s environmental standards would not have been approved.

In addition, the Water Quality Standards unit believes that a Bay-wide education program is essential to clarify the different programs currently in place to improve and protect the Bay’s resources, and to help the public identify those agencies which have primary responsibility. For example, the public may confuse the DEM’s water quality standards with the CRMC’s water typing scheme for in-water uses, or may assume that the CRMC issues water quality certificates in conjunction with their review. A public outreach effort, in turn, could address the differences in perception between the public and the governance system by making the public better aware of government programs and victories.
CHAPTER VI - ANALYSIS

The primary hypothesis of this study tests whether differences among the general public, special interest groups, and resource managers exist in their perception of (1) the environmental quality of Narragansett Bay and (2) the effectiveness of the governance system in managing and protecting Narragansett Bay and its resources.

Before this main hypothesis can be thoroughly tested, however, the following three sub-hypotheses must be tested:

There will be differences in the perception of environmental quality and governance system effectiveness (1) among the user groups; (2) among the special interest groups; and (3) among the government agencies selected for purposes of this study.

Testing for differences in perception among these three groups will aid in comparing perceptions among all user groups, special interest groups, and government agencies. The results from this test will then determine the extent of perceptonal differences among all groups, if they indeed exist.

Identification of any differences in the perception of environmental quality which may exist among and between public user groups, special interest groups, and government agencies will help identify whether conflicts exist between user needs and governance strategies. Perceptions of environmental quality will likely reflect each group’s actual use of Narragansett Bay and their respective level of
satisfaction with the management of the Bay’s resources by
government agencies. For example, perceptions of
inefficient or inadequate management efforts could be
manifested in a description of poor environmental quality by
user groups, and conflicts could be identified if one user
group’s needs appear to be satisfied, presumably, at the
expense of another’s needs.

SUB-HYPOTHESES: PERCEPTIONS AMONG GROUPS
PUBLIC USER GROUP SURVEYS
WATER AND SHORELINE QUALITY

There is a very significant difference between residents’, shellfishermen’s, and boaters’ perceptions of
water quality in Narragansett Bay. There is no general
agreement among these groups as to which area of the Bay
exhibits the best water quality. While the majority of
boaters and residents believed the mouth of the Bay
possessed the cleanest water, shellfishermen indicated that
the middle western portion of the Bay—the location of
frequently harvested shellfish beds—exhibited the best
water quality. In addition, although statistically
significant differences in perception do exist, the top two
answers of all three user groups identified either the upper
western or upper eastern portion of the Bay as exhibiting
the worst water quality conditions. This would indicate
that there is some limited agreement that the upper Bay has, overall, the most degraded water conditions.

Very significant statistical differences in perception exist among the three user groups with regard to the rating of overall Bay water quality. While there was no agreement among groups, responses given by the majority of all three user groups identified either fair and good. In fact, the combined percentages of the top two responses of all three user groups (65.8% of residents, 81.3% of shellfishermen, and 86.0% of boaters) identified fair and good more often than poor and very poor combined (31.7% of residents, 16.7% of shellfishermen, and 12.0% of boaters). None of the groups' majority responses, but only 2.4% of residents, 2.1% of shellfishermen, and 6.0% of boaters, rated water quality as excellent.

In fact, more residents and shellfishermen perceived of overall water quality as poor or very poor compared to those who rated water quality excellent. The same percentage of boaters surveyed (6.0%) rated overall Bay water quality either poor or excellent. Only 2.0% of boaters rated water quality very poor. This may reflect the fact that boaters are more often exposed to open water areas in the Bay and are able to travel to areas which exhibit better water quality conditions. However, shellfishermen are limited to fixed shellfish beds in the Bay which are often closed to harvesting by poor water quality, and residents’ views of
the water are limited to the shore where water quality problems may occur more frequently than in open water portions of the Bay.

The data pertaining to comparisons of 1985 water quality conditions to those which existed five years prior to the survey showed no statistical difference in user group perceptions. However, the statistical differences in perception among user groups with respect to water quality conditions which existed ten years prior to the survey were very significant. User groups could not agree on whether conditions ten years prior were better, worse, or the same as conditions in 1985.

With respect to ten year water quality comparisons, 35.7% residents perceived that 1985 water quality conditions were better than in 1975, but 31.0% thought conditions in 1985 were worse than in 1975. Thus, a similar number of residents believed 1985 conditions were both better and worse than ten years prior to the survey.

However, more shellfishermen (37.5%) believed that 1985 conditions were worse than in 1975 than perceived water quality conditions as better during that ten year period (18.8%). The same percentage of boaters surveyed (36.0%) either could not compare conditions or believed that 1985 water quality conditions were better than in 1975, while 16.0% of boaters perceived 1985 conditions as worse than 1975.
There is also a very significant difference in user group perceptions of the Bay's overall shoreline quality rating. There was no agreement among user groups as to whether the Bay's shoreline quality overall was excellent, good, fair, poor, or very poor. The majority of residents and shellfishermen rated overall 1985 shoreline quality as fair, and the majority of boaters believed shoreline conditions were good. Again, this may be related to boaters' ability to view different portions of the Bay shoreline from within the Bay. Further, upland development is viewed differently by these groups. For example, additional upland development of marinas may be viewed favorably by boaters as additional opportunities for access to the Bay, but may be perceived by shellfishermen as poor development due to potential impacts to shellfish resources.

None of the groups' majority responses rated shoreline quality as excellent. In fact, none of the residents surveyed rated shoreline quality as excellent. However, more boaters rated shoreline conditions as excellent than rated conditions poor and/or very poor.

There is a statistically significant difference between user groups' perceptions of 1985 shoreline quality conditions compared to 1980, and a very significant difference when respondents were asked to compare 1985 shoreline conditions to those existing in 1975.
The majority of residents and shellfishermen believed that 1985 shoreline conditions were the same as those in 1980. However, residents believed that 1985 shoreline quality had improved over 1975 conditions, while the majority of shellfishermen indicated that 1985 shoreline conditions were worse than those existing in 1975. Only 14.9% of shellfishermen perceived that 1985 shoreline conditions were better than in 1975. This may be linked to the adverse impacts perceived by shellfishermen as associated with upland development, especially in light of the waterfront development boom during the 1980's.

The majority of boaters perceived 1985 shoreline quality as the same as in both 1980 and 1975. However, more boaters perceived of 1985 shoreline conditions as worse than in either 1980 or 1975 than rated conditions as better.

According to these survey results, there is a significant difference among user groups with respect to environmental quality perceptions. Therefore, the study's sub-hypothesis that there will be differences in environmental quality perception among the general public user groups is accepted. These differences should be accounted for in the overall management strategy for Narragansett Bay, since management of the resource to the benefit of one group may adversely affect another.
PERCEPTIONS OF GOVERNMENT AGENCY EFFECTIVENESS

The three user groups differed significantly in their perception of which government agencies have primary responsibility for managing Narragansett Bay's coastal resources. The majority of residents (33.0%) identified Save the Bay and 13.4% identified Rhode Island Sea Grant, two non-government agencies, as having primary management responsibility. In fact, more residents identified Save the Bay than identified RIDEM and RICRMC combined (27.9%).

The majority of shellfishermen (46.8%) identified EPA, a federal agency with no direct state-level regulatory or management power, as having primary responsibility for managing Narragansett Bay. More respondents identified EPA than identified both DEM and CRMC combined (27.7%).

The top two boater responses were DEM (56.1%) and CRMC (21.2%). These are the two state agencies which have direct regulatory, planning, and management responsibility for Narragansett Bay's water and shoreline resources.

The three user groups were also asked to identify the agency which was the most effective in managing the Bay's resources. The top two residents' responses were Save the Bay and Rhode Island Sea Grant; more than one-half of resident respondents believed that two non-governmental organizations were the most effective in managing Narragansett Bay's resources. The majority of
shellfishermen identified EPA. All boaters who responded to this question identified DEM.

All respondents were then asked to rate the effectiveness of their choice as most effective agency, utilizing a scale of not very effective, moderately effective, effective, very effective, or highly effective. There was a very significant difference in perception of the effectiveness of each group's first choice. Regardless of the organization or agency identified, none of the user groups' majority responses rated the organization or agency as highly effective.

The top three residents' responses rated Save the Bay as moderately effective, very effective, and highly effective, respectively, equalling 90.1% of all respondents. Thus, residents perceived Save The Bay as exhibiting some degree of effectiveness in managing Narragansett Bay's resources. Of the residents surveyed, 9.9% believed the organization was not very effective.

The top two responses by shellfishermen were effective and moderately effective, respectively, totalling 82.2% of the responses. However, more shellfishermen rated EPA as not very effective than rated the agency as very effective and/or highly effective; in fact, only 2.2% of shellfishermen rated EPA as highly effective. These survey results indicate that shellfishermen believe that the
governance system is providing some level of effective Bay management.

The top three boaters' responses rated DEM as effective, very effective, and moderately effective, respectively, equalling 96.7% of all respondents. Only 3.3% of boaters surveyed rated DEM as not very effective. Of the three user groups, fewer boaters believed that the governance system was not very effective (compared to 9.9% of residents and 11.1% of shellfishermen). The survey results indicate that there is an agreement among boaters that the governance system is somewhat effective.

A chi square test could not be performed to test whether statistical differences in perception exist regarding the issues which user groups believe are least effectively managed by the governance system. The responses to this question were too varied, and the responses were too broad to categorize for purposes of statistical testing (see page 40 for range of responses).

However, sewage-related issues in Narragansett Bay were identified by all three user groups as least effectively managed: the majority of residents (52.0%), the majority of shellfishermen (45.7%), and 25.0% of boaters. Only shellfishermen differentiated between inadequate sewage treatment plants (the majority response) and sewage from individual sewage disposal systems (18.5%). A small
percentage of residents (4.0%) also identified sewage dumping from boats.

The majority of boaters (70.8%) identified chemical pollution as the issue not adequately addressed by the Bay's governance system. Shellfishermen also identified industrial effluent (18.5%) and urban runoff (14.1%) as issues which are not sufficiently managed.

Although this question could not be statistically tested, these survey results do suggest that there are either significant differences among the general public user groups' perceptions of government agency effectiveness, or that there is a general ignorance concerning the issues which are not adequately addressed by the governance system.

SPECIAL INTEREST GROUPS

WATER AND SHORELINE QUALITY

All special interest groups identified the two lower portions of the Bay as exhibiting the best water quality; RISA and RIMTA also identified the middle western portion of the Bay as possessing good water quality.

Similarly, all interest groups identified the two upper portions of the Bay with the poorest water quality. The Rhode Island Marine Trades Association indicated that water quality in Newport Harbor was degraded as well, which they attributed to the operation of an inadequate sewage treatment plant which discharges to the harbor.
All interest groups rated the Bay’s overall water quality as fair or good: STB and RISA characterized water quality as fair; RIMTA rated water quality as good. As RISA representatives pointed out during the interview, shellfishermen require pristine water in order to harvest commercially viable shellfish, while several recreational activities including boating can occur in marginal waters. Therefore, this difference in perception of overall water quality between RISA and RIMTA is likely influenced by the different water quality needs of the groups.

With respect to shoreline quality, all three interest groups perceive of the Bay’s overall shoreline quality as fair. Save the Bay representatives indicated that overall shoreline quality was better in 1991 than in both 1986 and 1981. The Rhode Island Shellfishermen’s Association indicated that several areas throughout the Bay and the provision of public access are better in 1991 than both five and ten years prior. However, this generally positive view was tempered by comments identifying several areas which were worse in 1991 due to overdevelopment. The Rhode Island Marine Trades Association perceives 1991 shoreline conditions as the same as both five and ten years prior, but, like RISA, indicated that several localized areas have been adversely impacted by non-water-dependent development.

The interviews indicate that while there is some agreement among the special interest groups, there is a
difference in perception as to the rating of overall water quality and the comparison of 1991 shoreline quality to 1986 and 1981 conditions.

Although STB and RISA’s responses were the same, RIMTA did not perceive of overall water quality and previous shoreline conditions in the same manner. Therefore, the sub-hypothesis that differences in environmental quality perception would exist among the special interest groups is supported.

PERCEPTIONS OF GOVERNMENT AGENCY EFFECTIVENESS

Representatives from both STB and RISA identified DEM as the primary agency with water quality responsibility and CRMC for responsibility for regulating upland and in-water development. In addition, both organizations also identified CRMC as having indirect water quality responsibility since both upland and in-water uses affect water quality. The Rhode Island Marine Trades Association identified DEM as having water quality responsibility.

Save the Bay and RISA identified both DEM and CRMC as the most effective government agencies, while RIMTA only rated DEM most effective. All three special interest groups rated their choices as only moderately effective with below-average ratings.

With respect to issues least effectively managed, the special interest groups’ responses varied. Both STB and
RIMTA identified the lack of coordination among the divisions within DEM, and between DEM and CRMC. In addition, STB indicated that DEM appears to focus on preventing additional water quality degradation rather than concentrating on improving water quality.

The Rhode Island Shellfishermen’s Association indicated that the abatement of CSOs has not been adequately addressed. The organization also stated that CRMC has controlled neither upland nor in-water development.

The Rhode Island Marine Trades Association identified the lack of an in-water disposal site for dredged spoils as the primary management issue which has not been addressed by the government agencies. They also criticized what they believe is an unnecessarily lengthy CRMC regulatory process.

The results of the special interest group interviews indicate that there is agreement among all special interest groups with respect to perceptions of government agency effectiveness. All three interest groups identified DEM both as the agency with primary responsibility and as the most effective agency. All three groups also identified DEM as moderately effective. In addition, there was agreement between STB and RISA as both identified CRMC as having governance responsibility and as being moderately effective. Therefore, differences in perception among the special interest groups with respect to perception of government effectiveness are not supported.
REGULATORY AGENCIES

WATER AND SHORELINE QUALITY

Staff of CRMC and all DEM divisions selected for purposes of this study rated the overall water quality of Narragansett Bay as good. All agencies identified the lower Bay as exhibiting the best water quality and the upper Bay as having the worst water quality. All agencies indicated that 1991 water quality was better than the water quality conditions which existed in 1986 and 1981.

All agencies also rated the Bay’s overall shoreline quality as good, and indicated that shoreline quality in 1991 was better than conditions which existed in both 1986 and 1981.

The sub-hypothesis that there will be differences in environmental quality perceptions among the government agencies is not supported, and the null hypothesis is accepted.

PERCEPTIONS OF GOVERNMENT AGENCY EFFECTIVENESS

The Water Quality unit of DEM rated itself as moderately effective--less than average--and acknowledged that some areas of the Bay exhibit better water quality than others. They also acknowledged that, while some areas had improved, the water quality in other isolated portions of the Bay had been degraded or adversely impacted.
The CSO unit of DEM rated itself as effective, but acknowledged that CSOs have not been eliminated and therefore much work remains to be done.

The Coastal Resources Management Council rated itself as very effective, and identified Rhode Island's coastal management program as one of the strongest in the nation. Staff believe that the CRMC has controlled shoreline development since its creation, and indicated that shoreline quality conditions would be much worse if not for the council's regulation of shoreline development.

However, this perception differed from the user groups' and special interest groups' assessments of CRMC's efforts. In fact, residents could not identify CRMC as an agency with management responsibility for Narragansett Bay, while those groups which did identify CRMC rated their efforts as moderately effective.

There was no agreement among the three government agencies as to which issues were being least effectively managed by the Bay's overall governance system. The DEM Water Quality Unit identified its prevention of water quality impacts rather than improvement of current conditions and the lack of an in-water disposal site for dredged materials as the issues least effectively managed. The CSO Unit identified its inability to completely and expeditiously eliminate CSOs. The CRMC identified nutrient inputs to Narragansett Bay from individual septic systems.
According to these interview results, differences in perception of governance system effectiveness exist among the three government agencies selected for inclusion in this study. Each agency identified only itself as having primary responsibility for managing Narragansett Bay's resources, and there was no agreement among the agencies as to the level of effectiveness of their respective agencies. Thus, the sub-hypothesis that there will be differences among the government agencies with respect to governance system effectiveness is supported.

**SUB-HYPOTHESIS: ENVIRONMENTAL QUALITY PERCEPTIONS AS INDICATORS OF GOVERNMENT EFFECTIVENESS**

An additional sub-hypothesis tests whether each group's perceptions of environmental quality will serve as indicators of governance system effectiveness. If a group's perception of overall Bay water quality and shoreline quality is favorable, their perception of government effectiveness should also be favorable. If a user group perceives of the Bay's overall environmental quality as poor, its perception should indicate a dissatisfaction with the governance system's effectiveness.

**USER GROUPS**

The majority of residents surveyed in 1985 believed that 1985 water quality was good overall, and that 1985
water quality conditions had improved since 1975. The majority of residents rated 1985 shoreline quality as fair overall, and believed that 1985 shoreline conditions were better than 1975 conditions, but had remained the same since 1980.

These survey results would indicate that the majority of residents should perceive of the governance system as somewhat successful in improving water and shoreline quality over the ten year period, but a lack of an excellent rating for either water quality or shoreline quality would indicate that government efforts remained inadequate.

The majority of residents rated the organization they identified as having primary management responsibility as moderately effective, a below average rating. This perception of governance system effectiveness is consistent with this user group's environmental quality perception, and therefore the sub-hypothesis for the residents is supported.

Conversely, the majority of shellfishermen rated overall water quality in 1985 as fair, and believed that 1985 water quality conditions were worse than the conditions existing in both 1975 and 1980. Shellfishermen also rated 1985 shoreline quality as fair, and believed that 1985 conditions were worse than 1975 conditions and had remained the same since 1980.

These survey results clearly indicate that the Bay's water and shoreline quality had degraded in the opinion of
the majority of shellfishermen, thus suggesting that this user group was dissatisfied with government efforts. Accordingly, shellfishermen should perceive of the governance system as ineffective in improving both water and shoreline quality over that ten year period.

However, the majority of shellfishermen rated its first choice of government agency as effective, an average rating which is inconsistent with the ineffective rating that their environmental quality perceptions would suggest. Thus, it does not appear that shellfishermen’s environmental quality perceptions serve as an indicator of government effectiveness, and the sub-hypothesis for this user group is not supported. This may be due to this group’s perception of the governance system as pertaining only to those agencies which specifically manage shellfish resources. For example, although water quality has not been managed to this group’s satisfaction, they may perceive of shellfish management efforts as better by comparison.

The majority of boaters rated the Bay’s overall 1985 water quality as good, and believed that 1985 water quality conditions were better than 1975 conditions. Boaters also rated 1985 shoreline quality as good, and believed there had been no change in shoreline quality, either improvement or degradation, over the ten year period between 1975 and 1985.

These results indicate that boaters should perceive of government efforts as successful in improving water quality,
but perceive that shoreline management efforts were only somewhat successful in maintaining the quality of resources, but not in improving conditions.

According to the 1985 surveys, the majority of boaters rated its first choice of effective government agency an average rating. Therefore, the sub-hypothesis that environmental quality perceptions serve as an indicator of government effectiveness is supported for boaters.

SPECIAL INTEREST GROUPS

During the 1991 interviews, members of STB and RISA rated overall water quality and shoreline quality as fair, but indicated that 1991 environmental conditions were improved over 1986 and 1981 conditions. This would indicate that these two special interest groups believe government efforts had been somewhat successful between 1981 and 1991, but the lack of an excellent rating for water or shoreline quality indicates that they are not fully satisfied with the governance system’s efforts at improving the quality of Narragansett Bay’s water and shoreline resources. Therefore, these two special interest groups would likely rate the governance system as exhibiting below average or average effectiveness.

Both STB and RISA rated their first choice of most effective government agency as being only moderately effective, a below average rating consistent with their
environmental quality perceptions. Thus, the sub-hypothesis that environmental quality perceptions serve as indicators of government effectiveness is supported for STB and RISA.

The Rhode Island Marine Trades Association rated Narragansett Bay’s overall 1991 water quality as good, and rated overall shoreline quality as fair. This group also believed that 1991 water quality had improved since both 1981 and 1986, while shoreline quality had remained the same during the same ten year period. This would indicate that RIMTA believes that government efforts had been somewhat effective in improving Narragansett Bay’s water resources, but had not been effective in improving shoreline quality.

According to the 1991 interview with RIMTA members, this special interest group rated their first choice for most effective government agency as only moderately effective, a below average effectiveness rating. Thus, the sub-hypothesis that environmental quality perceptions serve as an indicator of government effectiveness is supported for RIMTA.

GOVERNMENT AGENCIES

The government agency staff interviewed for this study all viewed 1991 water and shoreline quality as good overall, and believed that environmental conditions in Narragansett Bay had improved since 1981 and 1986. When used as indicators of government effectiveness, these perceptions of
environmental quality should reflect that government agencies perceive that their efforts have been effective in managing and improving the Bay's resources. However, since none of the agency staff rated water or shoreline quality as excellent, it would indicate that they acknowledge that all management goals have not yet been achieved.

However, the government agencies differed in their perceptions of government effectiveness. The Water Quality Unit of DEM rated themselves as only moderately effective, a below average rating which is consistent with the staff's perceptions of environmental quality. The CSO unit of DEM rated themselves as exhibiting average effectiveness, thus acknowledging that their agency's primary goal of eliminating CSOs had not been realized. This is also consistent with staff's perceptions of environmental quality. Therefore, the sub-hypothesis that environmental perceptions serve as an indicator of government effectiveness perceptions is accepted for these two government agencies.

Staff of CRMC viewed their efforts as very effective, which is somewhat inconsistent with the respective perceptions shared by the other two government agencies. The CRMC's rating of overall water and shoreline quality was good, not excellent, and although overall shoreline quality had improved in their opinion, agency staff acknowledged during the interviews that some areas along Narragansett Bay
had suffered from intense development. Therefore, CRMC’s perception of its effectiveness is not reflective of its perceptions of environmental quality, and the sub-hypothesis is not supported for this government agency.

PRIMARY RESEARCH HYPOTHESIS: COMPARISON OF PERCEPTIONS AMONG ALL GROUPS

Statistical testing of the 1985 general public user group survey results suggests that there is a statistically significant difference in perception among all three user groups with respect to Narragansett Bay’s water quality and governance system effectiveness. Six years later, three special interest groups and three government agencies were asked the same questions as those used in the user group surveys to obtain information regarding their respective perceptions of the same topics.

It is essential to compare the results of the 1985 user group surveys to the 1991 special interest group and government agency interview results in order to test this study’s primary hypothesis. The survey and interview results indicate that many of the same perceptions, issues, and criticisms identified by user groups in 1985 remain prevalent several years later.

More importantly, however, is that in spite of some general similarities in environmental quality perceptions over the six year period, there are differences in
perception of government agency effectiveness between the public user groups, the special interest groups, and the government agencies.

ENVIRONMENTAL QUALITY

There is some general agreement among and between the user groups, the special interest groups, and the government agencies regarding Narragansett Bay's overall water quality. All government agencies, STB, RIMTA, and the majority of residents and boaters perceive of Narragansett Bay's overall water quality as good. RISA and shellfishermen rated overall water quality as fair.

The Rhode Island Shellfishermen's Association identified the upper western portion of the Bay, and all government agencies, STB, RIMTA and the top two majority responses of all user groups identified both of the upper portions of the Bay as exhibiting the worst water quality.

However, perception of those areas of the Bay exhibiting the best water quality varied between the user groups, special interest groups, and government agencies. Save the Bay and the majority of residents and boaters identified the lower eastern portion of the Bay; the majority of shellfishermen identified the middle western portion of the Bay; RISA identified the middle western, lower eastern and western portions of the Bay; RIMTA identified the middle western and eastern and the lower
western portions of the Bay; and all government agencies were in agreement that the lower portions of the Bay exhibit the best water quality.

All government agencies and special interest groups believed water quality was better in 1991 than in 1986 and in 1981. With respect to 1986 conditions, user groups did not agree among themselves: residents believed water quality was better in 1985 than it was in 1975, but that no changes had taken place since 1980; shellfishermen believed 1985 water quality was worse than in both 1975 and 1980; boaters believed that 1985 water quality had improved since 1975.

All three special interest groups and the majority of residents and shellfishermen said overall shoreline quality was fair; all government agencies and the majority of boaters rated overall shoreline quality as good.

All government agencies and STB and RISA believed that 1991 shoreline conditions were better than those existing in both 1986 and 1981. RIMTA perceived of 1991 shoreline conditions as the same as those which had existed in 1986 and 1981. The majority of residents believed that 1985 shoreline conditions were better than in 1975 but had not improved since 1980; the majority of shellfishermen believed that 1986 shoreline conditions were worse than in 1975 and had remained stable between 1975 and 1980; and the majority of boaters believed that 1985 conditions had remained the same since 1975.
While there may be agreement between some groups with respect to specific questions, the survey and interview results indicate that, overall, differences do exist between the general public user groups, the special interest groups, and the government agencies in their respective perceptions of Narragansett Bay’s water and shoreline quality. No question elicited the same response from all nine groups surveyed or interviewed (see Tables 3 and 4).

Therefore, with respect to environmental quality perceptions, the null hypothesis is not supported, and the study’s primary hypothesis is supported.

THE PERCEIVED EFFECTIVENESS OF GOVERNMENT AGENCIES

All government agencies, special interest groups, and the majority of boaters identified at least one Rhode Island government agency--DEM--as having primary responsibility for managing and protecting Narragansett Bay’s resources. The majority of shellfishermen and residents did not agree with any of the study’s other respondents, and identified organizations or agencies other than Rhode Island state agencies. Two special interest groups and all government agencies also identified CRMC as having primary responsibility for managing Narragansett Bay.

However, the user groups, special interest groups, and government agencies did not fully agree on which agency or
<table>
<thead>
<tr>
<th></th>
<th>LOCATIONAL</th>
<th>TEMPORAL</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RESIDENTS (1985)</td>
<td>LOWER EAST</td>
<td>UPPER WEST</td>
<td>GOOD</td>
<td>SAME</td>
<td>BETTER</td>
<td>---</td>
</tr>
<tr>
<td>SHELLFISHER-MEN (1985)</td>
<td>MID. WEST</td>
<td>UPPER EAST</td>
<td>FAIR</td>
<td>WORSE</td>
<td>WORSE</td>
<td>---</td>
</tr>
<tr>
<td>BOATERS (1985)</td>
<td>LOWER EAST</td>
<td>UPPER EAST</td>
<td>GOOD</td>
<td>BETTER</td>
<td>BETTER</td>
<td>---</td>
</tr>
<tr>
<td>SAVE THE BAY</td>
<td>LOWER EAST</td>
<td>UPPER FAIR</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>BETTER</td>
</tr>
<tr>
<td>RHODE ISLAND SHELLFISH. ASSOCIATION</td>
<td>MID. WEST</td>
<td>UPPER WEST</td>
<td>FAIR</td>
<td>---</td>
<td>---</td>
<td>BETTER</td>
</tr>
<tr>
<td>RHODE ISLAND MARINE TRADES ASSOC.</td>
<td>MID. &amp; LOWER</td>
<td>UPPER GOOD</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>BETTER</td>
</tr>
<tr>
<td>DEM WATER QUALITY</td>
<td>LOWER LOWER</td>
<td>UPPER GOOD</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>BETTER</td>
</tr>
<tr>
<td>DEM CSOs</td>
<td>LOWER LOWER</td>
<td>UPPER GOOD</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>BETTER</td>
</tr>
<tr>
<td>CRMC</td>
<td>LOWER LOWER</td>
<td>UPPER GOOD</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>BETTER</td>
</tr>
</tbody>
</table>
### Table 4

**Comparison of Environmental Quality Perceptions**

**Shoreline Quality (SQ)**

<table>
<thead>
<tr>
<th>LOC.</th>
<th>TEMPORAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESIDENTS (1985)</td>
<td>FAIR</td>
</tr>
<tr>
<td>SHELLFISHERMEN (1985)</td>
<td>FAIR</td>
</tr>
<tr>
<td>BOATERS (1985)</td>
<td>GOOD</td>
</tr>
<tr>
<td>SAVE THE BAY</td>
<td>FAIR</td>
</tr>
<tr>
<td>RHODE ISLAND SHELLFISH ASSOCIATION</td>
<td>FAIR</td>
</tr>
<tr>
<td>RHODE ISLAND MARINE TRADES ASSOC.</td>
<td>FAIR</td>
</tr>
<tr>
<td>DEM WATER QUALITY</td>
<td>GOOD</td>
</tr>
<tr>
<td>DEM CSOs</td>
<td>GOOD</td>
</tr>
<tr>
<td>CRMC</td>
<td>GOOD</td>
</tr>
</tbody>
</table>
agencies is the most effective in managing the Bay's resources, nor did they fully agree on the level of effectiveness of their first choice: STB, EPA, DEM, and CRMC were the organization and government agencies identified by 1985 survey respondents and supported in the 1991 interviews, and the perception of agency effectiveness ranged among respondents from moderately effective (below average) to very effective.

Based on the 1985 user group survey results and 1991 special interest group and government agency interviews, differences do exist between the general public, special interest groups, and resource managers in their perception of the effectiveness of the Narragansett Bay governance system in managing and protecting the Bay and its resources (Table 5). Therefore, the null hypothesis not supported, and the second component of this study's primary hypothesis with respect to differences in perceptions of government effectiveness is supported.

As a final and perhaps most important note, there was no agreement among the public user groups, special interest groups, and government agencies when asked to identify the issue which is least effectively managed by the governance system. Several respondents identified sewage in general, and combined sewer overflows and inadequate sewage treatment plants more specifically. Other responses included the lack of an in-water dredged material disposal site, chemical
pollution, and the lack of coordination between DEM and CRMC as major problems facilitating the governance of the Bay.
### TABLE 5

**COMPARISON OF GOVERNANCE SYSTEM PERCEPTIONS**

<table>
<thead>
<tr>
<th>RESIDENTS (1985)</th>
<th>AGENCY WITH PRIMARY BAY MGMT.</th>
<th>MOST EFFECT</th>
<th>LEVEL OF EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAVE THE BAY</td>
<td>STB</td>
<td>MOD. EFFECT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHELLFISHER-MEN (1985)</th>
<th>U.S. EPA</th>
<th>EPA</th>
<th>EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>BOATERS (1985)</th>
<th>R.I. DEM</th>
<th>DEM</th>
<th>EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SAVE THE BAY</th>
<th>R.I. DEM</th>
<th>R.I. CRMC</th>
<th>DEM CRMC</th>
<th>MOD. EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>RHODE ISLAND SHELLFISH. ASSOCIATION</th>
<th>R.I. DEM</th>
<th>R.I. CRMC</th>
<th>DEM CRMC</th>
<th>MOD. EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>RHODE ISLAND MARINE TRADES ASSOC.</th>
<th>R.I. DEM</th>
<th>DEM</th>
<th>MOD. EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DEM WATER QUALITY</th>
<th>R.I. DEM</th>
<th>R.I. CRMC</th>
<th>DEM</th>
<th>MOD. EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DEM CSOs</th>
<th>R.I. DEM</th>
<th>R.I. CRMC</th>
<th>DEM</th>
<th>EFFECT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CRMC</th>
<th>R.I. CRMC</th>
<th>R.I. DEM</th>
<th>CRMC</th>
<th>VERY EFFECT</th>
</tr>
</thead>
</table>

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CHAPTER VII - PUBLIC PARTICIPATION

The environmental programs established to manage and protect Narragansett Bay are required by law to provide for public input, either for the development of long-range policy or for site-specific, case-by-case regulatory reviews. This public participation process affords the public the opportunity to shape and influence the management structure for Narragansett Bay and to ensure that existing policies, standards and regulations are properly implemented by the applicable management and regulatory agencies.

The public participation process also provides the public with an opportunity to lodge criticism, complaints, or appeals if they are aggrieved by government agency decisions or believe that management and/or regulatory efforts are inadequate.

The most important factor pertaining to public participation is that the public must actively be a part of the decision-making process in order to effectively shape management and regulatory decisions.

It was hypothesized that the direct users of Narragansett Bay--residents of municipalities which border the Bay, commercial shellfishermen, and boaters, and the special interest groups--would be more likely to participate in the government decision-making process since their direct
use of the Bay is so heavily impacted by management and regulatory decisions.

It was also hypothesized that groups which actively participate in the decision-making process would be more likely to have an increased awareness of the governance system, and therefore be better able to render informed opinions of government effectiveness.

**Public User Groups**

Residents, shellfishermen, and boaters were asked in 1985 to identify the number of times each respondent had participated in a public hearing pertaining to an environmental issue during the previous year. A chi square test performed on this data (Table 6) shows that there is a significant difference (at the 0.01 level) in the number of times respondents had participated in a public hearing.

The results of the 1985 user group surveys indicate that the majority of all user groups--92.3% of residents, 51.5% of shellfishermen, and 79.6% of boaters--had not participated in a public hearing during the 12 months prior to the survey:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Residents:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>92.3% none</td>
<td>(36)</td>
</tr>
<tr>
<td></td>
<td>7.7% 1-3</td>
<td>(3)</td>
</tr>
<tr>
<td>Shellfishermen:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>51.1% none</td>
<td>(24)</td>
</tr>
<tr>
<td></td>
<td>29.8% 1-3</td>
<td>(14)</td>
</tr>
<tr>
<td></td>
<td>14.9% 4-10</td>
<td>(7)</td>
</tr>
<tr>
<td></td>
<td>4.3% &gt;11</td>
<td>(2)</td>
</tr>
<tr>
<td>Boaters:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>79.6% none</td>
<td>(39)</td>
</tr>
<tr>
<td></td>
<td>16.3% 1-3</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td>2.0% 4-10</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>2.0% &gt;11</td>
<td>(1)</td>
</tr>
</tbody>
</table>
TABLE 6

CHI SQUARE RESULTS

DIFFERENCE IN THE NUMBER OF TIMES RESPONDENTS PARTICIPATED
IN A PUBLIC HEARING PERTAINING TO AN ENVIRONMENTAL ISSUE

<table>
<thead>
<tr>
<th>Number of times participated in a public hearing</th>
<th>Degrees of Freedom</th>
<th>0.01 Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERY SIGNIFICANT (0.01 level)</td>
<td>2</td>
<td>9.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.57</td>
</tr>
</tbody>
</table>

Special Interest Group Interviews

Unlike the public user groups, all three special interest groups actively participate in public hearings before regulatory agencies and in lobbying efforts before the state legislature, according to the interviews with interest group staff and members.

In fact, STB, RISA, and RIMTA were each organized as a direct result of specific projects or issues. More specifically, these groups were created to enable the general public and users to voice their concerns and/or opposition to development proposals in and around the Bay. All three groups regularly participate in public hearings and provide significant input to agencies as regulations, policies, and plans are developed and as individual projects are proposed for review.
Save the Bay

Save the Bay representatives perceive of this organization as being very effective in influencing the decisions and policies ultimately rendered by DEM and CRMC. However, they indicated that the agencies' decision-making process is probably not significantly affected by individuals.

Representatives contend that their organization is a public advocacy group, not a special interest group. They believe that they represent general public interests, especially since they are primarily concerned with water quality issues which directly affect the general public and living marine resources. In addition, the organization's attempts to improve the quality of the Bay's resources which are utilized by significant numbers of Rhode Island residents, provide a general public benefit.

While the CRMC and DEM provide public notice of proposals under their review, STB representatives indicated that the notices often arrive after the date of the hearing, thereby making it more difficult for STB to provide timely input. Staff must monitor newspaper legal notices in an effort to counteract the late receipt of public notices.

Rhode Island Shellfishermen's Association

Representatives of RISA perceive that the organization's lobbying and public participation efforts are
extremely successful. They also believe that the organization, which has a membership of approximately 200, also speaks for the general public since the health of the Bay’s shellfish resources is a surrogate of the overall health of the Bay. According to RISA representatives, the shellfish industry requires pristine water quality in order to harvest clean quahogs, scallops, and other shellfish. Therefore, RISA’s efforts toward improving water quality also benefit the general public as a whole.

Rhode Island Marine Trades Association

RIMTA representatives interviewed perceive of their organization’s overall public participation efforts as successful, especially with respect to boating safety initiatives. However, they have not yet been able to convince state officials to develop a state-approved in-water dredge disposal site in the Bay, which the organization perceives as a significant issue.

According to RIMTA representatives, the general public does not have the time or money to participate in the governmental decision-making process individually, and must join organized special interest groups to truly let their opinions be heard. Representatives acknowledge that RIMTA’s interests are specifically tied to boating and marine trades issues, so their organization may not directly represent general public concerns and interests. However, they do
claim that their efforts benefit the general public through a trickle-down effect; for example, the promotion of recreational boating activity positively affects merchants in boating communities.

**Government Agency Perspectives on Public Participation**

**DEM - Water Quality Standards/Combined Sewer Overflow Units**

Staff at DEM note that public input significantly shapes regulations and policies developed by their agency. For example, staff indicated that Save the Bay was instrumental in merging the Blackstone Valley District Commission and the Narragansett Bay Commission to facilitate CSO abatement.

However, staff point out that the effect of public participation is not always positive; often, the DEM is prevented from strengthening regulations because of input from development interests. In addition, the state’s inability to establish an in-water disposal site in the Bay is the result, in part, of public input from several interest groups representing conflicting uses and concerns, thereby hindering consensus.

**CRMC**

Staff of CRMC acknowledge that the public plays a significant role in shaping policy and regulatory decisions,
and indicate that several decisions rendered by the Council were heavily impacted by public input.

Similar to the concerns of DEM staff, CRMC staff also stated that the council’s decisions are occasionally hampered by public participation, especially in the case of unpopular projects which are otherwise consistent with council standards, or when environmental protection becomes a smokescreen for hidden agendas between conflicting interests.

ANALYSIS

Public User Groups

It had been hypothesized that direct users of the Bay and its resources would participate more in the government decision-making process. The 1985 user group survey results pertaining to public participation indicate that of the three user groups, a higher percentage of shellfishermen participated in environmentally-related public hearings than the other two user groups, followed by boaters.

The majority of residents had not participated in an environmentally related public hearing during the year prior to the survey, and the small percentage of respondents which had participated had done so in only three or less hearings.

Therefore, the sub-hypothesis that direct users of Narragansett Bay and its resources participate more in the government decision-making process is not supported for the
three public user groups. This lack of participation, or unwillingness to participate, might be attributed to a belief that, as individuals, respondents would not significantly impact the decision-making process.

It had also been hypothesized that user participation in environmentally-related public hearings would increase the users’ awareness of the governance system, thereby enabling the user groups to render informed opinions of government effectiveness.

However, this was not necessarily the case. When asked to identify the government agency with primary responsibility for managing Narragansett Bay and its resources, the majority of shellfishermen—the group which participates the most of the three user groups in environmentally-related public hearings—identified the U.S. EPA.

Conversely, only 20.3% of boaters had participated in a public hearing, yet the majority of boaters surveyed identified DEM as the agency with primary management responsibility.

Finally, a significant percentage of residents had not participated in a public hearing pertaining to an environmental issue during the previous year. This lack of participation in the decision-making process was clearly reflected in the residents’ majority response when asked to identify the agency which they perceived as having primary
management responsibility for Narragansett Bay: The majority of residents did not name a government agency, but identified Save the Bay, a non-profit special interest group.

Therefore, based on the 1985 survey results, the sub-hypothesis that participation in the government decision-making process increases users' awareness of the government system is also not supported for the three user groups.

Special Interest Groups

Unlike the user groups, all three special interest groups routinely participate in public hearings and lobbying efforts, and consider themselves an integral component of the government decision-making process. The special interest groups' interview responses reflected this active participation in the government decision-making process. All special interest groups interviewed for this study had been created in response to specific events which, in the respective group's opinions, necessitated unified participation in the governmental process.

These three special interest organizations continue to participate in regulatory reviews and policy formulation, and have an increased awareness and knowledge of Narragansett Bay's governance system. This is evidenced by the groups' identification of the government agencies which have primary management responsibility for Narragansett Bay:

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RIMTA identified DEM, and STB and RISA identified both DEM and CRMC.

Accordingly, the sub-hypotheses that direct users of Narragansett Bay and its resources would participate more in the government decision-making process, and that special interest group participation in environmentally-related public hearings would increase their awareness of the governance system is supported for all special interest groups.
CHAPTER VIII - DISCUSSION AND CONCLUSION

HYPOTHESIS AND SUB-HYPOTHESES

The results of the 1985 surveys and the 1991 interviews have supported the primary hypothesis of this study: Differences do appear to exist among all public user groups, special interest groups, and government agencies in their perception of (1) the environmental quality of Narragansett Bay and (2) the effectiveness of the governance system in managing and protecting Narragansett Bay and its resources.

The following sub-hypotheses of this study have also been supported:

- Differences exist among the general public user groups with respect to perceptions of both environmental quality and government effectiveness;

- Differences exist among the special interest groups with respect to perceptions of environmental quality; and

- Differences exist among the government agencies with respect to perceptions of government effectiveness.

However, the study found that there are no differences among the special interest groups’ perceptions of government effectiveness--all rated the government as only moderately effective--nor are there differences among government agencies’ perceptions of environmental quality--all rated 1991 water and shoreline quality as good and perceived of conditions as better than those which existed in both 1986 and 1981.
This study also investigated whether environmental quality perceptions would serve as indicators of government effectiveness. This sub-hypothesis was supported for residents, boaters, all three special interest groups, and the Water Quality and CSO units of DEM. However, the research hypothesis was not supported for shellfishermen and CRMC, as their perceptions of government effectiveness were not necessarily reflected by their perceptions of the Bay's environmental quality.

Finally, the study determined that the public user groups generally did not participate in public hearings pertaining to environmental issues, even though it was hypothesized that as direct users of the Bay they would do so. None of the user groups' majority responses indicated that they had participated in one environmentally related public hearing during the year prior to the survey.

Furthermore, participation in the government decision-making process did not necessarily increase user groups' awareness of the governance system, nor did a lack of participation necessarily equate to a decreased awareness of management responsibility. While the lack of residents' participation in the government decision-making process was clearly reflected in their low awareness of the agencies responsible for managing Narragansett Bay, this sub-hypothesis could not be supported for all public user groups. In fact, a total of 48.9% of shellfishermen had
participated in at least one public hearing during the previous year, yet the group identified EPA as the government agency which has primary responsibility for managing Narragansett Bay. Conversely, the majority of boaters had not participated in a public hearing during the prior twelve months, yet the group’s top two responses correctly identified DEM and CRMC as the agencies with primary management authority.

As direct users of and advocates for Narragansett Bay and its resources, all three special interest groups participated in the government decision-making process, and their awareness of the Narragansett Bay government system is likely a result of their active participation. Accordingly, both of these sub-hypotheses were accepted for all three special interest groups.

DIFFERENCES IN ENVIRONMENTAL QUALITY PERCEPTIONS

It is clear from this study that, while most groups believe Narragansett Bay’s resources have improved, these improvements have been incremental. Accordingly, much more work is necessary both in terms of improving the quality of the Bay environment and, just as importantly, communicating accomplishments to users and the public.

However, government agencies have apparently based their resource management efforts on their perception that the quality of water and shoreline resources is good overall
and had improved over the past decade, while several user groups and special interest groups perceive of overall resource conditions as fair. This difference in perception of environmental quality among all groups will likely be perpetuated unless government agencies become aware of and address those instances in which public perceptions of environmental quality differ from their own.

WATER QUALITY

There was agreement among all groups and government agencies that, generally, the lower Bay exhibits the best water quality and the upper Bay exhibits the poorest water quality. However, shellfishermen and RISA identified the middle western portion of the Bay as exhibiting the best water quality, based presumably on the presence of a substantial shellfish area in West Greenwich Bay which is utilized year-round for commercial harvesting. As Burton, Kates, and White's research indicated, the difference in perceptions of the user groups with respect to water quality is not incorrect, but is likely influenced by each group's particular needs and their use of the resource. These two shellfish-related groups' perceptions of water quality also stress how important it is for the government to be aware of differences in perception in order to maintain acceptable water quality in the western Bay to ensure continued year-
'round viability of the resource and, therefore, the shellfish industry.

Shellfishermen, RISA, and STB also differed from all other groups in their perception of overall water quality. Their rating of fair compared to other groups' ratings of good may be attributed, in part, to continued closures of shellfish beds which directly affect shellfishermen and environmental advocacy groups like RISA and STB.

Shellfishermen also differed from all other groups in their perception of 1985 water quality conditions when compared to 1980 and 1975 conditions. This user group believed that water quality had actually worsened during that 10-year period in spite of government agency management efforts. This difference may be attributed to the fact that none of the other user groups' direct use of Narragansett Bay or economic livelihood is as directly dependent upon acceptable water quality conditions as that of the shellfishermen.

Boaters' and RIMTA's favorable perceptions of overall water quality are likely attributed to their ability to cruise open areas of the Bay where adverse water quality impacts may not be as evident as in nearshore areas. Boaters are able to travel to other areas in the Bay if water quality is not acceptable for their recreational pursuits. Likewise, residents, who rated overall water quality as good, can travel elsewhere within the Bay area to
utilize other areas for recreational purposes. Conversely, shellfishermen must harvest shellfish from immovable, established beds, often located in nearshore waters which may be more susceptible to adverse water quality impacts.

SHORELINE QUALITY

According to the 1985 survey results, boaters were the only user group or special interest group that perceived of overall shoreline quality as good; all other groups believed shoreline quality was only fair. This difference may be based on the fact that boaters are able to view the shoreline from a vantage point within Narragansett Bay which provides a different perspective of the Bay. A boater’s vantage point from within the Bay is more expansive than that of a resident, who views the Bay from the shoreline.

In addition, shellfishermen’s differing perceptions of shoreline quality may be due, in part, to the development pressure to which many shoreline areas along the Bay were subjected during the 1980s. From the shellfishermen’s perspective, increases in development of Narragansett Bay’s shoreline resulted in several adverse impacts, including diminished water quality from on-site septic systems, increased sewage treatment plant effluent, and urban runoff, as well as a decrease in access to the Bay, and the inability to harvest shellfish from beds which were physically obstructed by in-water development.
Boaters also believed that 1985 shoreline conditions were good overall, and had not changed during the 10 years between 1975 and 1985. Residents believed that 1985 conditions were better than 10 years prior to the survey, while shellfishermen believed conditions were worse during that same 10 year period. These differences in perception over time could be attributed to the effects of shoreline development on each group’s particular use of the Bay’s resources. During the 1980s at the height of shoreline development pressure, residents were not as directly impacted as shellfishermen by the adverse impacts associated with shoreline development, such as urban runoff and sewage impacts from upland sources.

These perceptions of environmental quality also served as indicators of each group’s perception of government effectiveness, except for the shellfishermen and the CRMC. Based on their environmental quality perceptions, shellfishermen should have considered government efforts as ineffective, yet the governance system was rated average. This could be attributed to how well government agencies address those aspects of the environment which are most important to shellfishermen, not necessarily how the government deals with the Bay’s resources overall. Thus, shellfishermen’s perceptions of government effectiveness may be limited to how well shellfish resources are managed.
DIFFERENCES IN GOVERNMENT EFFECTIVENESS PERCEPTIONS

With respect to the Narragansett Bay governance system, the majority of residents selected Save the Bay as the agency with primary responsibility for managing the Bay's resources. STB was chosen by resident respondents from a list of agencies and organizations provided in the questionnaire which also identified CRMC and DEM. Of the three general public user groups, only one--boaters--identified a state government agency as having primary responsibility for managing Narragansett Bay.

It is not clear why residents selected STB as the agency with primary responsibility for managing Narragansett Bay's resources. However, their choice could be attributed to the advocacy group's high visibility in the media. Because STB appears to be directly involved in the decision-making process, they may appear to residents to be successful in making management decisions.

Based on a comparison of the 1985 survey results to the 1991 interviews, it is clear that the special interest groups are more aware of the overall Narragansett Bay governance system than are the user groups. The special interest groups and government agencies each identified DEM and CRMC as the two government agencies with primary responsibility for managing Narragansett Bay's resources. But these groups did not entirely agree on which was the most effective agency or its level of effectiveness.
Regardless of their individual choice as the most effective agency, all user groups, special interest groups, and two government agencies indicated that the governance system was only average to moderately effective. The staff from the CSO and WQ units recognized the need for improving their effectiveness. However, CRMC staff rated their own efforts as very effective, which reflects a belief that their own efforts are adequate.

The area which appears to reflect the greatest divergence among user groups, special interest groups, and government agencies concerns the issues perceived as least effectively managed by the governance system. Although the issues identified in 1985 by the public user groups and by the special interest groups in 1991 ranged too broadly to test statistically, several of the issues raised by the 1985 user group survey results reappeared in the responses by the special interest group interviews six years later. Further, surveys of public user groups conducted in 1987 for the Narragansett Bay Project also identified many of the same issues raised by both the 1985 user group surveys and the 1991 special interest group interviews.

For example, all three user groups, albeit to varying degrees, identified sewage in 1985 as one of the issues which had been least effectively managed by the Narragansett Bay governance system. In 1991, two of the three special interest groups also identified sewage as an issue not
adequately addressed. "Pollution" was also chosen by 1987 Narragansett Bay Project respondents as the most significant problem facing the Bay, encompassing several types of pollution including trash, sewage, odors, silt, toxic metals, and industrial chemicals. In addition, the 1987 NBP surveys identified the lack of an approved dredged material disposal site as an issue, as did the 1991 Rhode Island Marine Trades Association interviews.

The issues identified as inadequately addressed appear to be tied to each group's specific use of the Bay, and how that use is impacted by the various agencies with jurisdiction over the Bay. For example, pollution-related issues were deemed very important by shellfishermen, Save the Bay, and the Rhode Island Shellfishermen's Association, yet pollution issues appeared secondary to the Rhode Island Marine Trades Association's primary concern that an approved dredged material disposal site had not yet been established.

The special interest groups were much more specific in identifying the issues which they believed were not adequately addressed by the governance system in 1991. Their identification of sewage as an issue was further detailed as discharges from combined sewer overflows, individual septic systems, and marine sanitation devices. In a parallel to Burton, Kates, and White's research, the environmental quality perceptions of the general public are likely based on personal, emotional responses to pollution,
while the perceptions of the special interest groups are more likely based on an actual knowledge of the scientific principles and data utilized by government agencies in their decision-making processes.36

Both the 1987 NBP survey results and the 1991 special interest group interviews also criticized what they perceived of as the governance system's fragmented decision-making process. There was general agreement among 1991 special interest groups and the 1987 NBP survey respondents that the state should establish a comprehensive policy governing the use of the Bay to ensure a unified direction and better coordination between DEM and CRMC.37

According to the 1987 NBP surveys, DEM and CRMC have been aware, at least since the start of the NBP, of the public's and special interest groups' dissatisfaction with the governance system established to manage and regulate Narragansett Bay. The results of this study highlight the public's continuing overall dissatisfaction. In fact, government agency staff acknowledged during the 1991 interviews that the public would likely perceive of government efforts as ineffective.

The continual criticism of CRMC expressed by public user groups in 1985, the 1987 NBP surveys, and the special interest groups in 1991 is especially noteworthy in light of CRMC rating themselves as very effective during the 1991 interviews for this study. The 1987 NBP surveys and the
1991 special interest group interviews accused the Council of rendering decisions which were politically motivated and favored economic development over resource protection. The 1991 special interest group interviews and 1987 NBP surveys also blamed CRMC for not controlling cumulative impacts to water and shoreline resources from in-water development, inadequate sewage treatment by municipal plants and individual septic systems, and the decrease in upland open space from the overdevelopment of vacant acreage.38

The 1991 special interest group interviews revealed several criticisms of CRMC. Interest groups identified poor inter-agency coordination with DEM, and accused the Council of ignoring staff recommendations on applications, approving projects which were recommended for denial by CRMC staff. Representatives from RIMTA also complained of what they perceive of as the lengthy CRMC permit application process.

PUBLIC PARTICIPATION

Government agencies are required to provide an opportunity for public participation in the decision-making process for all project reviews and development of regulations and management plans. However, the 1985 user group surveys indicate that a very small percentage of the residents, shellfishermen, and boaters actively participated in the process. There was a statistically significant difference in the number of times user groups had
participated in an environmentally related public hearing during the year prior to the survey. Shellfishermen were the only group of the three which participated the most, presumably because their livelihood depends on clean water and therefore they have more at stake economically.

Accordingly, the general public is more likely to involve itself in the political decision-making process for only those issues which directly affect them on a personal level. Thus, it is conceivable that during the year prior to the 1985 surveys, the public user groups' general lack of participation could be due to a lack of projects or management decisions which directly affected individual respondents within that year prior to the survey.

Although the majority of public user group respondents rarely, if ever, participated in the government decision-making process during that year and could not correctly identify the government agencies with primary management responsibility for Narragansett Bay, the same groups did not hesitate to rate government management efforts as average or below average. Thus, the public was critical of the governance system even though it had not participated in the public decision-making process in an attempt to shape decisions or formally express its concerns and criticisms.

Conversely, the special interest groups actively participated in the government decision-making process on an on-going basis. They believed that they represent the
public interest in clean water, improved habitat, safe seafood, or enhanced public access to the Bay for recreational activities and therefore were obligated to participate to protect the public' interest in the Bay and its resources. Accordingly, because of their continual participation in the decision-making process and strong influence over the decisions ultimately rendered by government agencies, it is essential that public interests are truly represented by the special interest groups.

CONCLUSION

Several conclusions may be drawn from this study's hypotheses:

(1) Differences exist among the user groups, the special interest groups, and the government agencies with respect to perceptions of environmental quality and governance system effectiveness;

(2) Perceptions of environmental quality, for the most part, serve as indicators of government effectiveness;

(3) The general public user groups do not necessarily participate in the government decision-making process pertaining to Narragansett Bay, yet all special interest groups do; and

(4) The general public user groups' participation in the government decision-making process does not necessarily increase their awareness of the governance system, nor does a lack of participation necessarily reflect a lack of awareness, yet the special interest groups consistently participate in the decision-making process which is clearly reflected in their knowledge of the governance system and the issues.
These conclusions are important to government agencies as they continue their planning and management efforts for Narragansett Bay.

The public is likely to believe that improper management decisions are being rendered if it believes that its concerns are not being adequately addressed. However, if government agencies do not share or, more importantly, are unaware of where the public's perceived concerns differ from their own, then management and regulatory programs cannot, in the public's opinion, be properly and adequately implemented.

Further, if government agencies are unaware of the management programs or policies which, in the public's view, need improvement, they are not likely to strive for programmatic improvements. Therefore, identification of those instances where government perceptions diverge from those of the general public is a first step toward improving resource management efforts.

Differences in perception among user groups and special interest groups increase the difficulty of managing the Bay, since management decisions which benefit one group might adversely affect the needs of another. This, in turn, will undoubtedly affect perceptions of government effectiveness.

The differences which exist among the public user groups, the special interest groups, and the government agencies make it difficult to establish a comprehensive plan
which serves all needs and concerns. But the study results make it clear that no plan currently exists which fully satisfies any of the respondents.

Thus, programmatic changes perceived as necessary by the public are unlikely to result if the government believes its management efforts are already effective and, therefore, changes are unnecessary.

The 1985 user group surveys coupled with the 1991 interviews indicate that government agencies are only moderately effective or average in managing and protecting Narragansett Bay. The 1987 NBP surveys indicate that the public does not believe that DEM or CRMC has carried out the proper management of Narragansett Bay and its resources or adequately resolved Bay use conflicts, and fears that the Bay has suffered from a lack of management.39

Staff of the DEM’s Water Quality and CSO Units and the CRMC disagree with these characterizations, and believe that water and shoreline quality conditions would be worse if not for their efforts.

Staff of both DEM and CRMC have been aware for several years at least of the public’s dissatisfaction with their overall performance. Both the 1985 and 1987 data suggest that problems existed at that time. Six years later, the 1991 special interest group interviews further supported this view. Accordingly, it is unclear why the governance
system has done little to address the public’s overwhelming
dissatisfaction with their management efforts.

It is very difficult to overcome adverse public
perceptions and criticisms, particularly if they are deeply
entrenched or are based on environmental harm of an
unpopular management decision which may have occurred
several years prior. A parallel may be drawn to Burton,
Kates, and White’s findings that natural hazard events of
long duration or which occurred in the recent past are
likely to influence public perceptions.40

Similarly, combined sewer overflows were constructed
many years ago in some of the most densely populated
municipalities surrounding the Bay, and a solution to these
chronic dischargers untreated of sewage will not occur
overnight. However, the fact that CSOs have adversely
impacted Narragansett Bay for several decades and have
caused the chronic closure of shellfish beds in the upper
Bay, a problem which occurs after every major storm,
perpetuates the perception that the government has been
ineffective in addressing the CSO problem.

Regardless, the governance system has an obligation to
rectify the apparent rift between the public’s perceptions
and its own, and should begin by recognizing that the public
does not necessarily share their perceptions of the Bay’s
environmental quality. Government agencies must also
realize that management of Narragansett Bay is an on-going,
dynamic process which requires constant fine-tuning of programs and policies in response to changing environmental conditions and public attitudes and needs.

Further, government agencies must abandon their attitude that they, as experts in a given field, are more knowledgeable than the general public and better able to grasp complex technical information and which is incorporated into regulatory decisions and management efforts. It is essential that government agency experts consider public input in the decision-making process, even if the input is based on lay knowledge. Government management efforts must incorporate public interests and needs in order to be perceived by the public as successful and effective.

A continuing review of the performance of states’ federally approved coastal zone management programs is required pursuant to Section 312 of the Coastal Zone Management Act of 1972, as amended. The performance of CRMC in implementing Rhode Island’s coastal resource management program has been reviewed by the Office of Ocean and Coastal Resource Management (OCRM) since the program was federally approved.

During the review period of May 1987 through May 1989, OCRM found that, overall, CRMC was properly implementing and adhering to the provisions of its approved program, and that satisfactory progress and achievements in resource
management were occurring. This appears to be in direct conflict with the opinions of the general public user groups in 1985 and the NBP 1987 public surveys.

The review went on to identify several significant accomplishments that CRMC had achieved during that time period, including:

expeditious administrative review of category "A" assents;

better coordination between CRMC and DEM reviews, including a water quality certificate checklist is supplied to CRMC applicants by DEM which identifies DEM's informational needs to process water quality certificates; and

buffer requirements as a condition of CRMC permit assents to protect water quality.

It would appear that the public user groups surveyed in 1985 and 1987 and the special interest groups interviewed in 1991 were not aware of these accomplishments, since the same issues were raised as criticisms against CRMC by these groups.

Further, a July 29, 1992 letter from Yvonne Bolton of the Connecticut Department of Environmental Protection to OCRM which reported on her findings for CRMC's 312 review for June 1989 through June 1992 indicated that in spite of complaints, approximately 93% of all applications are administratively reviewed, and a relatively small number of CRMC decisions actually contradicted staff reports and recommendations. This again is in direct conflict with
the complaints voiced by the special interest groups during the 1991 interviews.

Accordingly, it appears that the Rhode Island state government agencies are not necessarily ineffective in carrying out the proper management of Narragansett Bay, but rather may suffer from a lack of: (1) an awareness of the public's perception of the Bay's environmental quality; and (2) public relations efforts to disseminate information to the public to overcome negative public perceptions.

Therefore, CRMC and DEM must embark on a public education and information program to improve and enhance their respective images. Their individual and joint management and regulatory victories should be clearly publicized to combat the public's negative criticism of their efforts. In fact, the CRMC's 312 review for May 1987 to May 1989 identified a specific recommendation that CRMC commit itself to a broader public information program to summarize its various accomplishments. 44

The public education program could include the wide distribution of publications, newsletters, and progress reports which highlight DEM's and CRMC's victories and successful efforts toward improving Narragansett Bay's resources.

More importantly, however, the publications should also specifically identify the impediments encountered by DEM and CRMC to implementing specific programs encountered, such as
strong lobbying efforts from development interests, legislative requirements, the lack of money and/or staffing resources, or insufficient authority for enforcement. The publications must also continually remind the public, for example, that the Clean Water Act allows industrial and municipal discharges into Narragansett Bay, but that the governance system controls point discharges through the Rhode Island Pollutant Discharge Elimination System (RIPDES) regulatory program. The public must also be made aware that government agencies do not render decisions on projects or develop management plans arbitrarily. Rather, DEM and CRMC follow specific policies and standards which were developed based, in part, on federal and state legislative mandates and scientific data. Therefore, the DEM and CRMC are bound by law to render decisions consistent with those policies and standards.

The management and regulation of Narragansett Bay and its resources does not occur in a vacuum. Therefore, the public outreach programs should also strongly encourage public participation, and should challenge the public to become more involved in the management of the Bay.

The fact that only one of the three public user groups identified a state agency as having direct management responsibility for Narragansett Bay should cause great concern to DEM and CRMC. Therefore, the public outreach programs should also specifically identify those government
agencies which are responsible for managing and protecting Narragansett Bay, identify how to contact agency staff, and highlight their goals and objectives in addition to their victories.

Both DEM and CRMC must also acknowledge their inadequacies, and therefore a government agency education programs directed toward staff may also be necessary. Issues which should be addressed and/or improved include:

- the proper treatment of the public by DEM officials and CRMC members at hearings and meetings and by staff on a daily basis;
- proper public notification procedures;
- improved coordination with Bay-area municipalities; and
- ways to overcome the public perception that decisions are politically motivated.

Finally, it is essential to develop a comprehensive management approach to managing Narragansett Bay and its resources and strengthen coordination efforts between DEM and CRMC. The first step to coordinated Bay management is agreement among government agencies and the general public on identification and prioritization of the issues which must be addressed.

Once the issues are identified and prioritized, the government agencies should provide a rationale supporting their prioritization of management issues. The findings of the Comprehensive Conservation and Management Plan (CCMP) for Narragansett Bay should provide the basis for a coordinated approach to management of the Bay and its
resources, since the CCMP is the first concerted effort toward coordinated Bay management and will attempt to address the fragmented nature of current government efforts.

However, implementation of the CCMP is not guaranteed since none of the recommendations is legally binding. Thus, the public may continue to perceive that, after spending millions of taxpayers' dollars over several years of planning for a coordinated effort to improve the quality of the Bay, there is still no requirement for agencies to work together to cooperatively manage Narragansett Bay.

The results of this study highlight that regardless of DEM's and CRMC's perceptions of environmental quality and government effectiveness, the public has long been dissatisfied with their apparently fragmented efforts toward managing Narragansett Bay. It does not appear likely that the public will tolerate continued fragmentation in management efforts, especially in light of the significant cost of the Narragansett Bay Project. Thus, tremendous public pressure to ensure that DEM and CRMC quickly and properly incorporate the CCMP's enforceable policies into their respective water quality and coastal resources management programs and implement the plan's recommendations may foster the necessary willingness on the part of DEM and CRMC to undertake the plan's initiatives for better management of Narragansett Bay and its resources.
CHAPTER I


2Ibid., p. 1245.


6Coastal Zone Management Act of 1972, as amended. U.S. Public Law 92-583, Section 303(a).

7Ibid., Section 303(d).


11Ibid., Section 102.

12Ibid., Section 303.


15Ibid., p. 34.

16Ibid., p. 98.
17 Ibid., p. 23.

18 Thomas F. Saarinen, Environmental Planning, p. 155.


21 Ibid., p. 656.


23 Ibid., p. 410.


CHAPTER II


27 Ibid., p. 806.

28 Harold Ward et al., "Narragansett Bay Issue Assessment: Public Perceptions."


CHAPTER III


CHAPTER V


CHAPTER VIII

33Burton et al., The Environment as Hazard, p. 98.


35Ibid., p. 50.

36Burton et al., The Environment as hazard, p. 130.


38Ibid., p. 40.

39Ibid., p. 39.

40Burton et al., The Environment as Hazard, p. 21.


42Ibid., pp. 1-2.


Residents were asked to identify their town of residence (1985 user group surveys).

**Environmental Quality**

Which area of Narragansett Bay exhibits the best water quality, overall?

- Upper west bay
- Upper east bay
- Mid west bay
- Mid east bay
- Lower west bay
- Lower east bay

Which area of Narragansett Bay exhibits the poorest water quality, overall?

- Upper west bay
- Upper east bay
- Mid west bay
- Mid east bay
- Lower west bay
- Lower east bay

How would you rate the overall water quality of Narragansett Bay?

- Excellent
- Good
- Fair
- Poor
- Very Poor

How do current Narragansett Bay water quality conditions compare with conditions which existed five years ago?

- Better
- About the same
- Worse
- Don’t know
- Haven’t been here that long
How do current Narragansett Bay water quality conditions compare with conditions which existed ten years ago?

Better
About the same
Worse
Don’t know
Haven’t been here that long

How would you rate Narragansett Bay’s overall shoreline quality?

Excellent
Good
Fair
Poor
Very Poor

How do current Narragansett Bay shoreline conditions compare with conditions which existed five years ago?

Better
About the same
Worse
Don’t know
Haven’t been here that long

How do current Narragansett Bay shoreline conditions compare with conditions which existed ten years ago?

Better
About the same
Worse
Don’t know
Haven’t been here that long

Narragansett Bay Governance and Management

Please identify the agencies which have primary responsibility for managing and improving Narragansett Bay’s resources (the agencies and organizations listed below were provided for user group survey respondents only, and were not provided during interviews with special interest groups and government officials).

Rhode Island Shellfishermen’s Association
Rhode Island DEM
Rhode Island CRMC
Coastal Resources Center, URI
Narragansett Bay Commission
Save the Bay
Rhode Island Coalition of Coastal Communities
Rhode Island Office of Statewide Planning
Ecology Action of Rhode Island
League of Women Voters
Rhode Island Water Resources Board
Rhode Island Sea Grant Program
U.S. FDA/Shellfish Sanitation
Rhode Island Port Authority
U.S. Environmental Protection Agency
National Oceanic and Atmospheric Administration
Other

Please identify the agency which you believe is most effective in managing Narragansett Bay’s resources.

How effective is this agency?

Highly effective
Very effective
Moderately effective
Effective
Not very effective

Please identify the issues which you believe are least effectively addressed by the governance system (the issues listed below were provided for user group survey respondents only, and were not provided during interviews with special interest groups and government officials).

Public use
Providence water quality
Shellfish issues
Sewage/pollution control
Industrial discharges
Urban runoff
Education
Overall planning
Coastal management
Overboard discharge by boaters
Other
Public Participation

How many times during the past year have you participated in a meeting that dealt with an environmental issue?

- None
- Between 1 and 3 times
- Between 4 and 10 times
- 11 or more times
APPENDIX B

CHI SQUARE TABLES

H₀: There is no difference in perception of areas in Narragansett Bay exhibiting the best water quality.

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\[ x^2 = 12.59 \] No Statistical Significance (0.05 level)
\[ x^2 = 15.03 \] Significant Statistical Difference (0.02 level)
\[ x^2 = 16.81 \] Very Significant Statistical Difference (0.01 level)
\[ x^2 = 22.46 \] Extremely Significant Statistical Difference (0.001 level)
\[ x^2 = 17.25 \] Very Significant Difference (0.01 level)

Therefore, reject H₀.
H₀: There is no difference in perception of the areas of Narragansett Bay exhibiting the worst water quality.

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\[x^2 = 12.59\] No Statistical Significance (0.05 level)
\[x^2 = 15.03\] Significant Statistical Difference (0.02 level)
\[x^2 = 16.81\] Very Significant Statistical Difference (0.01 level)
\[x^2 = 22.46\] Extremely Significant Statistical Difference (0.001 level)
\[x^2 = 15.08\] Significant Difference (0.02 level)

Therefore, reject H₀.
H₀: There is no difference in perception of Narragansett Bay's overall water quality.

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\[ x^2 = 9.49 \] No Statistical Significance (0.05 level)
\[ x^2 = 11.67 \] Significant Statistical Difference (0.02 level)
\[ x^2 = 13.28 \] Very Significant Statistical Difference (0.01 level)
\[ x^2 = 18.46 \] Extremely Significant Statistical Difference (0.001 level)
\[ x^2 = 13.373 \] Very Significant Difference (0.01 level)

Therefore, reject H₀.
H₀: There is no difference in perception of 1985 water quality when compared to conditions which existed 5 years prior to the survey.

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\[ x^2 = 12.59 \text{ No Statistical Significance (0.05 level)} \]

\[ x^2 = 15.03 \text{ Significant Statistical Difference (0.02 level)} \]

\[ x^2 = 16.81 \text{ Very Significant Statistical Difference (0.01 level)} \]

\[ x^2 = 22.46 \text{ Extremely Significant Statistical Difference (0.001 level)} \]

\[ x^2 = 6.012 \text{ No Significant Difference (0.05 level)} \]

Therefore, accept H₀.
H₀: There is no difference in perception of 1985 water quality when compared to conditions which existed 10 years prior to the survey.

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\[ x^2 = 12.59 \text{ No Statistical Significance (0.05 level)} \]
\[ x^2 = 15.03 \text{ Significant Statistical Difference (0.02 level)} \]
\[ x^2 = 16.81 \text{ Very Significant Statistical Difference (0.01 level)} \]
\[ x^2 = 22.46 \text{ Extremely Significant Statistical Difference (0.001 level)} \]
\[ x^2 = 17.374 \text{ Very Significant Difference (0.01 level)} \]

Therefore, reject H₀.
$H_0$: There is no difference in perception of Narragansett Bay's overall shoreline quality.

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$x^2 = 9.49$ No Statistical Significance (0.05 level)
$x^2 = 11.67$ Significant Statistical Difference (0.02 level)
$x^2 = 13.28$ Very Significant Statistical Difference (0.01 level)
$x^2 = 18.46$ Extremely Significant Statistical Difference (0.001 level)
$x^2 = 13.6$ Very Significant Difference (0.01 level)

Therefore, reject $H_0$. 
H₀: There is no difference in perception of 1985 shoreline quality when compared to conditions which existed 5 years prior to the survey.

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\[ x^2 = 12.59 \] No Statistical Significance (0.05 level)
\[ x^2 = 15.03 \] Significant Statistical Difference (0.02 level)
\[ x^2 = 16.81 \] Very Significant Statistical Difference (0.01 level)
\[ x^2 = 22.46 \] Extremely Significant Statistical Difference (0.001 level)
\[ x^2 = 15.469 \] Significant Difference (0.02 level)

Therefore, reject H₀.
H₀: There is no difference in perception of 1985 shoreline quality when compared to conditions which existed 10 years prior to the survey.

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\[ x^2 = 12.59 \] No Statistical Significance (0.05 level)
\[ x^2 = 15.03 \] Significant Statistical Difference (0.02 level)
\[ x^2 = 16.81 \] Very Significant Statistical Difference (0.01 level)
\[ x^2 = 22.46 \] Extremely Significant Statistical Difference (0.001 level)

\[ x^2 = 22.111 \] Very Significant Difference (0.01 level)

Therefore, reject H₀.
$H_0$: There is no difference in perception of the agencies with primary responsibility for the management of Narragansett Bay.

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$\chi^2 = 9.49$  No Statistical Significance (0.05 level)

$\chi^2 = 11.67$  Significant Statistical Difference (0.02 level)

$\chi^2 = 13.28$  Very Significant Statistical Difference (0.01 level)

$\chi^2 = 18.46$  Extremely Significant Statistical Difference (0.001 level)

$\chi^2 = 30.2547$  Extremely Significant Difference (0.001 level)

Therefore, reject $H_0$. 

140
**H₀**: There is no difference in perception of the effectiveness of respondents’ first choice as the most effective agency.

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\[ x^2 = 12.59 \text{ No Statistical Significance (0.05 level)} \]
\[ x^2 = 15.03 \text{ Significant Statistical Difference (0.02 level)} \]
\[ x^2 = 16.81 \text{ Very Significant Statistical Difference (0.01 level)} \]
\[ x^2 = 22.46 \text{ Extremely Significant Statistical Difference (0.001 level)} \]
\[ x^2 = 21.335 \text{ Very Significant Difference (0.01 level)} \]

Therefore, reject \( H₀ \).
$H_0$: There is no difference in perception of the most effective agency (residents and shellfishermen only).

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$x^2 = 5.99$ No Statistical Significance (0.05 level)

$x^2 = 7.82$ Significant Statistical Difference (0.02 level)

$x^2 = 9.21$ Very Significant Statistical Difference (0.01 level)

$x^2 = 13.82$ Extremely Significant Statistical Difference (0.001 level)

$x^2 = 2.316$ No Statistical Significant Difference (0.05 level)

Therefore, accept $H_0$. 

142
H₀: There is no difference in the frequency of user groups’ participation in public hearings during the year prior to the 1985 surveys.

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\( \chi^2 = 5.99 \) No Statistical Significance (0.05 level)
\( \chi^2 = 7.82 \) Significant Statistical Difference (0.02 level)
\( \chi^2 = 9.21 \) Very Significant Statistical Difference (0.01 level)
\( \chi^2 = 13.82 \) Extremely Significant Statistical Difference (0.001 level)
\( \chi^2 = 10.569 \) Very Significant Difference (0.01 level)

Therefore, reject H₀.


Knecht, Robert W. "Coastal Zone Management: The First Five Years and Beyond," Coastal Zone Management Journal Volume 6 Number 4, 1980.


