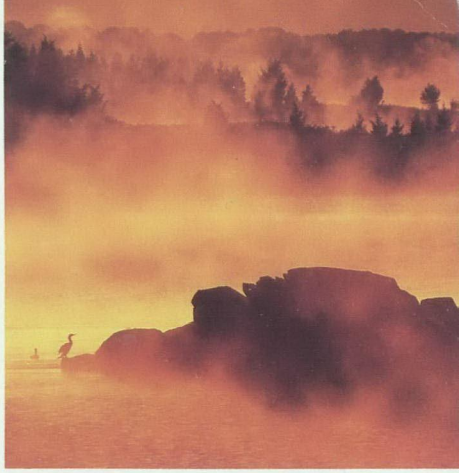
Status Report on the Narragansett Bay Project



The Narragansett Bay Project's

recent designation to the National Estuary Program (NEP) represents a renewed commitment to improve and protect the environmental quality of Narragansett Bay. Although the Narragansett Bay Project began in 1985, changes in the NEP with passage of the Water Quality Act of 1987 impelled the Narragansett Bay Project to review its progress and plans. The resulting agreements reflect a formal partnership among the State of Rhode Island, the U.S. Environmental Protection Agency (EPA), and the Narragansett Bay Project. Designation is the partnership's contract to meet the requirements of the Act, to provide funding, and to take action on a well-defined schedule.

The National Estuary Program began in 1985 when Congress and the Environmental Protection Agency acted on the need for focused attention to estuaries. Four estuaries — Narragansett Bay, Long Island Sound, Buzzards Bay, and Puget Sound — received appropriations to initiate comprehensive management programs. Albemarle-Pamlico Sounds and San Francisco Bay were added to the NEP in 1986.

The Water Quality Act of 1987 provides new authority for the NEP. The Act officially recognizes the Program, authorizes the EPA Administrator to convene Management Conferences in estuaries of national significance, and defines seven purposes of a Management Conference. Each of the existing estuary programs, including Narragansett Bay, worked with EPA to review its program and ensure consistency with the new Act. They negotiated goals, schedules and commitments to meet the requirements of the Act. Based on these commitments EPA Administrator Lee Thomas officially designated each program to continue as part of the National Estuary Program.

But schedules and goals are only the beginning. The Bay and its resources need you — who live on the Bay, who live upstream away from the Bay, and who visit — to help protect the Bay from pollution.

Designation of the Narragansett Bay Project (NBP) to the National Estuary Program comes at the midpoint of the five year project. This provides an opportunity to reexamine the purpose of the NBP and to renew our commitment to the Project goals.

The purpose of the NBP is to evaluate the water pollution problems in Narragansett Bay through an intensive research program, and to develop a comprehensive management plan to protect and improve the water quality and living resources of the Bay. To accomplish this, a Five Year Plan was developed early in the project which outlined the research needed to answer certain management questions regarding the Bay. The scientific information generated by the research will be used by the NBP as the basis for developing recommendations for managing the Bay. The end result of the NBP in December, 1990, will be a Comprehensive Conservation and Management Plan (CCMP) that will outline a holistic approach to protecting and managing Narragansett Bay.

Priority problems and goals for the Bay were established through a problem and priority assessment process involving a series of meetings and goal-setting workshops. These workshops involved a full spectrum of public and user groups, including resource managers, academics, environmental groups, industry people, fishermen, and other Bay users.

The assessment process included development of a five year plan and a public opinion survey. The Project Management Committee also recently held an Issues Workshop to further refine the list of priority issues regarding Narragansett Bay. The seven priority problems, identified below, were distilled from a larger set of perceived problems in order to focus the Project's resources more effectively. The Project will reevaluate its priorities from time to time as more information about the condition of Narragansett Bay becomes available.

In addition, the Project realizes that the current list of priority issues should include problems that may arise in the future. One goal of the Project's analysis of historical characterization studies, water column models and monitoring data is to develop the capability of predicting potential future problems. If problems can be identified before they become severe, the impacts can be minimized by preventive management actions.

The following seven priority problems (not listed in order of priority) have been identified by the Narragansett Bay Project:

- Management of fisheries
- Nutrients
- Impacts of toxic contaminants
- Health and abundance of living marine resources
- Health risk to consumers of contaminated seafood
- Land use
- Recreational uses

Because of the Bay-wide and interrelated nature of these problems, the Narragansett Bay Project is taking a Bay ecosystem approach to the study of problems and development of action plans to address these problems.

The Project also is working to expand and coordinate existing programs to be more effective in protecting the Bay and its resources. Rhode Island's Department of Environmental Management (DEM) has primary responsibility for water quality management programs. DEM's approach toward water quality management recently shifted to water quality-based pollution limitations because Best Available Treatment requirements for industrial dischargers and secondary treatment for sewage treatment plants have failed to produce compliance with water quality standards. The agency also has a Phase II Basin Plan process underway under Clean Water Act Section 205(j). This process is being coordinated with the Narragansett Bay Project. DEM also conducts biweekly monitoring of shellfish growing areas for total and fecal coliforms in the upper Narragansett Bay, and weekly bathing-area monitoring, sanitary surveys of shellfish growing areas, and monitoring for paralytic shellfish poisoning.

Other State agencies, such as the Coastal Resources Management Council, the Office of State Planning, and the Department of Health have important data collection and/or management responsibilities. The Bay Project is serving a valuable role in coordinating these programs with the activities of other agencies and groups and research by academic and governmental institutions. The Project's coordination helps to apply the results of research to the practical needs of managing and improving the environmental quality of the Bay.

Management of Fisheries

The value of Narragansett Bay to Rhode Island is reflected in the importance of commercial fisheries. The quahog (hard clam) fishery, estimated to generate $15 million per year, is the State's largest, with winter flounder being the most important finfishery. Several problems face these fisheries, including overexploitation and effects of adverse water quality. Management and protection of these fisheries to ensure future fishery stock is a high priority.

In order to assess the status of these two fisheries and the health of the resources, the Narragansett Bay Project has funded a number of studies designed to identify specific problems.

Several research projects have been conducted on the quahog, including studies on population size, incidence of disease in the clams, historical trends of the fishery, levels of toxic metals and organics in the tissue, and bacterial levels in the clams. Preliminary evidence indicates that the clams are quite hardy and appear to be mostly unaffected by poor water quality. However, polluted water does pose a threat to human consumers due to high levels of bacteria and, possibly, toxic contaminants. The quahog takes up microbial pathogens from the water close to the sediment, resulting in the closure of shellfish beds. The loss of shellfishing grounds because of unacceptable water quality affects both recreational and economic uses. Currently, approximately one third of the Bay is closed to shellfishing on a permanent or conditional basis.

The Project funded the Food and Drug Administration (FDA) to conduct a sanitary survey of Mount Hope Bay to evaluate the feasibility of reopening portions of the Bay to shellfishing as a result of the recent improvements in the Fall River, Massachusetts, sewage treatment plant. The FDA determined that the treatment plant is working well, but discovered significant illegal dry weather discharges in the Quequechan River, an underground river flowing through Fall River. The FDA characterized it as "a river of sewage". As a result of this study, the EPA has taken enforcement action against Fall River to eliminate these discharges.

Winter flounder studies currently underway include investigations of disease incidence, toxic contaminant levels in edible tissue, historical fishery trends, and larval survival viability.

Results of these and additional studies will be used to evaluate the status of the fisheries and to make recommendations on how to manage them better.

Nutrients

Significant increases in the concentration of nutrients in the Bay have led to concern about eutrophication problems. Higher levels of nitrogen, and associated changes in the plankton populations, have been measured in the upper Bay and may be linked to effluent from sewage treatment plants. Effects of these changes on the living resources within the Bay in terms of lowered dissolved oxygen and food web dynamics are of concern to the Project. The changes in nutrient levels and the ecosystem of the Bay are being evaluated by scientists from the University of Rhode Island who are conducting studies of plankton dynamics and relating changes to nutrient levels in the Bay. The Project is also funding development of a eutrophication model which will be used in predicting effects of changes in nutrient levels in the Bay on the ecosystem.

Impacts of Toxic Contaminants

Narragansett Bay receives significant quantities of toxic pollutants from point and nonpoint sources, with pollution entering the Bay directly or via its tributaries. Industries and municipalities within the drainage basin are prime contributors.

Projects funded by the Narragansett Bay Project have been assessing the levels of contaminants in living resources, the water column and sediments, as well as the effects of these toxics on the ecosystem. University of Rhode Island investigators conducted a series of Bay-wide cruises in 1986 to look at water quality throughout the Bay. An additional series of cruises, concentrated in the upper Bay and Providence River, were conducted in 1986 and 1987. Both cruises measured a whole suite of parameters including heavy metals, organics, and nutrients. These data provide a good picture of the current condition of the Bay water quality. Concentrations of toxic chemicals decrease along a down-Bay gradient, with highest levels found in the Providence River and upper Bay. Copper concentrations in the upper Bay were found to exceed the EPA water quality criteria for protecting sensitive species. A series of cruises in the upper Bay to examine impacts of storm events on water quality are scheduled for this year. The effects of nonpoint sources such as runoff, and combined sewer overflows (CSOs) on the Bay will be measured to determine pollutant loadings resulting from wet weather events.

Development of a series of hydrodynamic and transport models has been funded by the Narragansett Bay Project. These models will be linked and used to predict fate, transport, and effects of contaminants throughout the Bay. Abatement alternatives will be evaluated by running simulations of various scenarios with the models to determine the most effective actions to recommend for implementation.

Levels of toxics have also been measured in both quahogs and winter flounder, and are currently being measured in sediments as part of an intensive survey of Narragansett Bay sediments being performed by University of Rhode Island scientists. In addition, historical trends in water and sediment quality in the Bay are being evaluated. Concentrations of toxics in the water, sediment, and organisms, and sources of the pollutants will be examined to determine the extent, causes, and possible solutions to toxic contamination of the Bay.

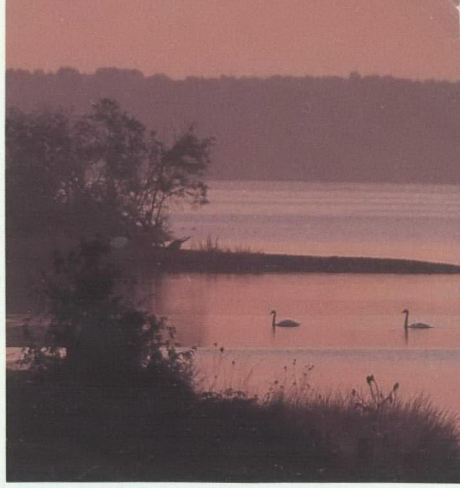
Health and Abundance of Living Marine Resources

In the last several decades, the living marine resources of Narragansett Bay have changed dramatically. While hard clam populations have begun to rebound in areas closed to shellfishing, scallops and soft clam populations have declined throughout the Bay. In addition, benthic populations in the Upper Bay have become dominated by opportunistic species, and the dominant fish species have declined and display an increased incidence of disease along a down-Bay gradient which may be related to pollution. Phytoplankton abundance, species composition, and seasonal dynamics have deviated from the 5-year cycle they followed since 1959 such that diatom abundances now have declined in winter and increased in summer. The Project is currently investigating whether observed fluctuations in indigenous marine species are attributable to natural biological or geophysical cycles, climatic changes, or human-induced changes such as pollutant loadings, overfishing, or habitat destruction. Most of the projects discussed under management of fisheries also address this priority problem.

Health Risk to Consumers of Contaminated Seafood

The concentrations of human pathogenic bacteria and viruses in the waters of Narragansett Bay are of concern because shellfish can accumulate bacteria and viruses, presenting a risk of diseases ranging from mild cases of gastroenteritis to hepatitis. Systematic records of the incidence of diseases related to the consumption of the contaminated seafood have never been kept in Rhode Island, but recent illnesses in neighboring States, which have been linked to the consumption of Rhode Island clams, have caused State officials to rank this problem among the State's top priorities. Whether the cause of these outbreaks is directly related to the quality of the shellfish, poor preparation procedures, or illegal harvest, it casts doubt on the quality of an important Rhode Island economic resource and raises concerns about potential public health risks. The Project has funded several studies to evaluate the microbial pathogen levels in the Bay and its living resources, as well as comparisons of the effectiveness of various indicator organisms in protecting human health.

An additional concern is the risk to human consumers of seafood contaminated with toxic chemicals. Contamination of seafood has



recently received widespread public and media attention and has been an important issue for the Narragansett Bay Project. The Project has funded development of a methodology for assessing the risk of human consumption of seafood harvested in Rhode Island. A preliminary application of this methodology indicates that heavy metal concentrations in quahogs from open shellfishing areas poses no threat to human health. Further risk assessment analyses for organic chemicals are being conducted this year.

Land Use

The impact of land use practices that affect Bay shorelines and water quality, especially shoreline development, is an important issue for Rhode Island. Development along the shore and within the Bay basin has increased substantially, with accompanying increases in runoff and loading which impact water quality. An additional result has been a reduction in the aesthetic value of and public access to the Bay.

The Project is initiating an intensive effort this year to evaluate the effects of current land use practices in Rhode Island. A complete set of aerial photos of Rhode Island will be analyzed to evaluate current land use in the State. Three cities with different land use development patterns will be chosen as case studies. Land use patterns over a fifty year period will be evaluated and an attempt will be made to link land use to changes in water quality. This project will be a cooperative effort between the

Narragansett Bay Project, the Department of Environmental Management, the Office of Statewide Planning, and the Coastal Resources Planning Council. Results will then be used to develop recommendations for controlling harmful land use practices such as model zoning ordinances. The Project plans on establishing a mechanism for working with local governments to assist them in developing protective land use strategies.

The Project is also funding a study of nonpoint source governance in Rhode Island. This effort is being coordinated with the nonpoint source assessment and management plan being developed by the Office of Environmental Coordination as required by the Water Quality Act of 1987.

Recreational Uses

Narragansett Bay is used extensively for recreational purposes including fishing, boating, and swimming. Limitation of these uses due to poor water quality is a problem, especially in the upper Bay. Improvement in water quality could allow expansion of recreational activities into currently restricted areas. An assessment of the type and extent of recreational uses of the upper Bay by University of Rhode Island researchers is currently being funded by the Narragansett Bay Project. This will be used in benefit/cost evaluations of pollution abatement alternatives. Other issues of concern to the Project include public access to the Bay, the impact of marinas on water quality and dredging of marinas.

Management Recommendations

The ultimate goal of the Narragansett Bay Project is the development of management recommendations and plans for their implementation — the Comprehensive Conservation and Management Plan. This Plan will provide for systematic, technically sound, region-wide protection of the water quality and marine resources of Narragansett Bay. The Plan will include recommendations for control of point and nonpoint pollution sources, better resource management, and long-term monitoring to assess the success of actions taken.

In addition to program commitments at the State and Federal levels, much of the implementation activity in Narragansett Bay will involve local action and commitment. The Public Education Committee of the Narragansett Bay Project is involved in efforts to publicize the activities and findings of the Project, and to develop support by citizens, user groups, and political leaders for implementation recommendations. The Committee is also planning a series of governance workshops to educate the public on who in government makes decisions affecting Bay management and how to contact those people.

There is much to be done to develop a Comprehensive Conservation and Management Plan by December of 1990, but the Narragansett Bay Project is well on its way!

The Narragansett Bay Project thanks Mr. Barry Kaplan, Director of the Light Works Gallery, Wickford, Rhode Island, for the donation of all photography used in this report.