

Executive Summary

Introduction

Pleasant Bay is an area of extraordinary natural resources and beauty. From tributary and marsh, to embayment, Pleasant Bay represents one of the most biologically diverse and productive marine habitats on the east coast of the United States.

Pleasant Bay's significance also stems from the many diverse ways people use its resources. Generations of residents and visitors have enjoyed the Bay's breathtaking views, harvested its shellfish, navigated its shoal waters, and appreciated its abundant wildlife. Over the years the Bay has also supported a variety of commercial activities and, today, people continue to rely on the Bay for their livelihoods.

The residents of the towns of Orleans, Chatham, Harwich, and Brewster recognize the delicate and priceless resource entrusted to their care. At present, Pleasant Bay's natural resources remain healthy and productive despite decades of development and change. And while most of the historic uses of the Bay have been preserved, there is increasing competition for use of the Bay's resources among a variety of recreational and commercial activities. These factors have led the four Bay towns to understand that the long-term health of the Bay cannot be assumed and must be safe-guarded. Accordingly, the towns have agreed to develop this plan for the on-going management of Pleasant Bay's resources.

An estuary left alone will nurture and care for itself with no help of human hands. It is only when human activities interfere with natural processes that the Bay responds by showing signs of stress, damage and disease. This stewardship plan for Pleasant Bay is intended to provide a practical framework for the towns of Orleans, Chatham, Harwich, and Brewster to work together to sustain the Bay's natural resources, and to promote a degree of use and enjoyment of those resources consistent with long-term sustainability. Accomplishing this will require residents, visitors, and businesses alike to place the long-term health of the Bay above individual interests. It will require change and sacrifice, and an on-going commitment to preserving the health, beauty, and tranquillity of Pleasant Bay for future generations.

Goals of the Resource Management Plan

Management of the Bay for the long-term is a challenge not only for the towns, but for all who use and enjoy Pleasant Bay. The process of developing the resource management plan has required many diverse constituencies to come together to develop a shared vision, and then to translate that vision into management strategies and actions. This process has been guided by our common aspirations for the future of Pleasant Bay, which can be expressed as the over-arching goals of the resource management plan:

to sustain and, wherever practicable, regenerate the health and productivity of the Bay's eco-system, including its water quality, diverse animal and plant life, tidal marshes, ponds, rivers, bays, islands, and beaches;

to encourage levels of recreational, residential, and commercial activity in the Bay and its watershed, including physical structures, that are consistent with resource sustainability and that promote a high degree of public safety and enjoyment;

to enhance opportunities for public access to, and enjoyment of the Bay, in balance with resource sustainability and private property rights; and

to preserve the features that contribute to the Bay's unique character, including its natural beauty, tranquillity, history, and accessibility.

The inherent tensions between these goals is readily apparent. The public process the towns have undertaken to develop the plan has provided numerous opportunities for expressing diverse perspectives, and for exploring management strategies and actions that serve our mutual interests. More than 1,000 residents responded to a survey of issues concerning the Bay, and hundreds more participated in numerous public meetings and workshops. The successful implementation of the plan will clearly require the on-going involvement and commitment of residents of the Bay communities. It is an opportunity to exercise regional cooperation of an impressive scale to preserve a valuable and cherished resource for generations to come.

Scope and Organization of the Resource Management Plan

To achieve its purpose, the resource management plan must present a thorough understanding of conditions and trends in the Bay, an assessment of key problems and threats, and workable strategies to address those problems and threats. Finally, it must illustrate how local residents, businesses and officials must all play a role in the success of those strategies.

The executive summary and sixteen chapters of the plan are organized in five sections. Each section, and each chapter within a section, begins with a brief summary of its contents.

Section One, Framework for the Plan, provides an overview of the planning process. This overview includes the history and organization of the planning process, and the extensive activities undertaken to involve local residents in the development of the plan.

The information found in *Sections Two and Three* provide the foundation for subsequent discussions of resource management issues and recommendations. *Section Two, Resource Conditions and Trends*, provides a detailed inventory of the Bay's natural resources, including its water bodies, wetlands, wildlife, and fisheries. The inventories are

based on a review of technical studies, and assessments of current conditions and trends for each resource type.

Section Three, Human Uses and Trends, looks at trends in the various human uses of the Bay and of the land surrounding the Bay. These chapters illustrate how uses have contributed to present resource conditions, and how trends in land and marine uses could continue to affect natural resource conditions.

The five chapters in *Section Four, Resource Management Issues and Recommendations*, present the analysis and recommendations for five key management issues:

Sustaining the Bay's Biodiversity,
Managing the Bay's Fisheries Resources,
A Regulatory Framework for Shoreline Structures,
Managing Environmental and Safety Impacts from Boating , and
Enhancing Public Access Opportunities.

These chapters provide recommendations for policies, regulations, management activities, public education, and enforcement practices to address or pre-empt issues, resolve areas of conflict, and seize opportunities for restoring or enhancing resources.

The resource management plan is intended to be a blueprint for action, requiring on-going steps to implement recommendations, monitor progress, and provide for adjustments as needed. Accordingly, *Section Five, Implementation Plan*, provides the framework for implementing the plan. The framework sets forth the relative priority of various recommendations, and identifies the organizational structure by which the four towns can work together to implement the plan's recommendations. The structure addresses sequencing and time frames for actions, resources needed for implementation, and the process for on-going monitoring, evaluation, and modification of the plan.

Key Findings Concerning Resource Conditions and Trends

- *Chapter 2. Salt Water Resources.* Water quality in the Bay is high. The few instances of problems with water quality are not characteristic of the Bay as a whole. However, water quality conditions could be worsened if steps are not taken to control the flow of nutrients generated by land uses in the watershed. Further study is needed to assess the water quality impacts from boating and other Bay activities. The Bay's ability to disperse nutrients and other pollutants from land and marine uses will continue to be influenced by its flushing rate. The 1987 Chatham breakthrough increased the Bay's flushing rate and, therefore, its ability to disperse pollutants. However, the continued southward migration of the breakthrough would diminish the Bay's flushing rate, and exacerbate the polluting effects from nutrients and other sources.

- *Chapter 3. Wetland Resources and Aquatic Vegetation.* The Bay's extensive wetland resources are generally quite healthy, but signs of strain are showing. The study area has lost a substantial amount of salt marsh over the past three decades. This translates into associated losses of animal habitat, of buffers from erosion forces, and of filters of pollutants flowing into the Bay. The Bay's marshes and other wetland resources face threats from erosion, encroaching land development and, in some cases, inadequately-sized culverts which restrict flushing.
- *Chapter 4. Shellfish, Finfish, and Wildlife.* Trends in shellfish, finfish, and wildlife resources point out additional management concerns. The three primary shellfish species have experienced more than a decade's decline in reported harvests. Several species of finfish, particularly flounder, have all but disappeared from the Bay. Nine animal and plant species in the study area are listed as endangered or of special concern to state regulators. And several habitats important to resident and migratory birds are threatened by competing uses and activities.

Key Findings Concerning Human Uses of the Bay

- *Chapter 5. Cultural and Visual Resources.* The Bay's history, scenic quality and sense of tranquillity are central to how we enjoy its resources. Yet these attributes are rarely recognized for their ecological and cultural significance. Scenic views, a primary source of public access and enjoyment of the Bay, are shrouded by shoreline development, and over-grown vegetation. Increased noise levels on the Bay rank high among community concerns, and threaten wildlife habitats. Physical and cultural reminders of the region's rich history, which may foretell its future, are ignored to the point of nearly being forgotten.
- *Chapter 6. Land and Shoreline Use and Development.* Regulations governing land use within the Bay's watershed allow for continued residential development, with little provision for the long-term protection of open space. As discussed in Chapter 2, nutrient loading from septic systems poses a threat to the Bay's water quality. At the shoreline, a licensing moratorium has halted the growth of structures for boating, water access, and erosion control. However there is pent-up demand for these structures that, if not managed, could impose stresses on natural resources.
- *Chapter 7. Boating.* Sailing and power boating are among the most readily identifiable Bay activities. Boating activity is on the rise, leading to congestion on the waterways during the peak season. More boating activity, coupled with increased demand for boating access and facilities, poses a threat to the Bay's natural resources.
- *Chapter 8. Shellfishing and Finfishing.* Shellfishing and finfishing are popular and traditional uses of the Bay. Management of shellfish and finfish resources has heretofore focused on controlling access through permits. Continued interest in shellfishing and finfishing, coupled with declining harvests of several species, is

prompting managers to expand public propagation efforts, and explore regional strategies for long-term sustainability of these resources.

Assessment of Resource Management Issues

Overall the Bay's resources are healthy and productive despite decades of land development and growth in use of the Bay. However, indications of stress on resource conditions, and of on-going resource degradation, are emerging. The five chapters in Section Four look in detail at the following issues, and recommend management actions to address them:

- The extent of current bacteriological testing indicates that water quality in the Bay is high, with isolated areas of concern. However, there is insufficient baseline data on the full range of water quality indicators, and no system is in place for monitoring long-term trends in water quality. Moreover, water quality is threatened by intensifying land uses within the watershed, and boating activity in the Bay .
(Chapter 9)
- Some wetland resources within the ACEC have been lost over the past three decades, with associated losses in the critical environmental functions they serve. Existing wetland resources could be degraded by inadequately-sized culverts, encroaching land uses, and a potential proliferation of docks and erosion control structures. (Chapter 9)
- The Bay's primary shellfish and finfish species are experiencing sustained declines in productivity. Pollution from land run-off, leachate, fertilizers and pesticides threaten the food supplies needed for species productivity. In addition, several terrestrial species of animals and plants are threatened to the point of displacement from the eco-system. There is no program in place to inventory or monitor trends in these resources, or the impacts of sustained human activity on their vitality and productivity. (Chapter 9)

These resource trends are compounded by intensifying human uses and activities which contribute to resource conditions in many ways:

- Land development in the Bay's watershed continues at a fast pace. Under current zoning, half of the land in the Bay's watershed could be developed for residential use. Yet septic systems, fertilizers, and storm run-off generated from land uses in the watershed contribute nutrients into the Bay. Only four percent of land in the watershed is protected as open space, and there is little regulatory provision for increasing the amount of protected land. (Chapter 9)
- Recreational and commercial shellfishing activity continues to be high despite declines in species productivity, and encompasses a broader number of species. Resources devoted to shellfish research, management and propagation are inadequate to respond to productivity declines. Also, there is a lack of scientific data available to

assist towns in making decisions concerning private aquaculture in the Bay. (*Chapter 10*)

- Along the shoreline of the Bay, there is potential for growth in the development of docks and erosion control structures. These structures can pose manifold threats to shellfish resources, beach vitality, wetlands, vegetation, and water quality. (*Chapter 11*)
- Boating activity in the Bay is on the rise, resulting in more frequent conflicts among vessels, and between boaters and other users of the Bay. Impacts on natural resources caused by boating or boating facilities include discharge of sewage, petroleum emissions and discharges from motors, and bottom scouring from propellers and moorings. (*Chapter 12*)
- Demand for access to the Bay's shoreline by residents and visitors is increasing. The limited number of existing public access points are being stressed by overuse during the peak season. Additional conflicts are arising between shoreline property owners and the public over lateral shoreline access and the use of shoreline structures. (*Chapter 13*)

The awareness of these conflicts confirms the need for strategies and actions to manage the Bay's resources, and the uses and activities that influence resource conditions. In developing the plan, it was necessary to focus on the conflicts which pose the greatest threats to resources, and which involve the most intensive uses of the Bay and surrounding land. The process of identifying management issues was based on technical research and analysis, as well as extensive community input. Through this process a series of management questions arose, each of which is addressed in the plan:

Chapter 9: What steps are necessary to sustaining the Bay's biodiversity?

Chapter 10: How should the Bay's fisheries resources be managed?

Chapter 11: What is an appropriate framework for regulating shoreline structures in the Bay?

Chapter 12: How should the environmental and safety impacts from boating be addressed?

Chapter 13: How can opportunities for the public's use and enjoyment of the Bay's resources be enhanced?

Each chapter of *Section Four* provides a description of management issues, and a series of recommendations to address each issue. Management recommendations are presented in a format that identifies the parties involved in and accountable for implementation, as well as the implementation time frame and funding needs. The complete list of recommendations found in *Section Four* is provided on the

Implementation Summary Matrix found in Chapter 15. Given the number and complexity of management recommendations, it was necessary to develop an action plan that specified the sequence of actions and also prioritized actions to ensure that the most pressing resource management issues were addressed in the earliest phases of implementation. The following section describes the priority recommendations and actions for the first year of the plan's implementation.

Priority Recommendations

The following recommendations are priorities for implementation within twelve months of adoption of the plan by the towns and the state. Some of the recommendations call for immediate actions, and others provide the foundation for future phases of action or further research.

#1 Form the Implementing Structure for the Plan

A. The plan recommends that the towns establish a permanent Pleasant Bay Management Alliance to implement resource management recommendations. A Steering Committee would be appointed to oversee the Alliance's management activities, and a Technical Resource Committee would be appointed to provide scientific and technical support to the Steering Committee. A Coordinator would be hired to assist the Steering and Technical Resources Committees with implementation activities. The following actions are proposed to be undertaken within one year of the plan's adoption.

- The Boards of Selectmen of the Pleasant Bay towns are recommended to enter into a memorandum of agreement to form a Pleasant Bay Management Alliance to implement the Pleasant Bay Resource Management Plan. The Steering Committee for the Alliance would consist of one member appointed by the Selectmen of each of the four towns.
- The Steering Committee would appoint a Technical Resource Committee consisting of resource management professionals from the four towns, county, state or federal agencies, regional scientific institutions, and citizens.
- The Steering Committee would hire a Coordinator for the implementation of the Pleasant Bay Resource Management Plan.
- The Alliance would establish a committee structure to enable on-going and substantive community participation in the implementation of the resource management plan. Among the committees to be appointed in the first year would be a Pleasant Bay Fisheries Oversight Committee.

B. In accordance with state-issued guidelines for the development of resource management plans for state-designated ACECs, the adequacy of the Pleasant Bay ACEC boundary was evaluated as part of the resource management plan. The evaluation indicated that the sustainability of resources within the ACEC is influenced significantly

by the Chatham breakthrough which is outside the existing boundary. Based on this recognition, an amendment to the ACEC designation to extend the ACEC boundary is recommended as part of the resource management plan. The state Executive Office of Environmental Affairs will review the resource management plan and proposed amendment simultaneously, and will issue a decision on the amendment along with a decision on the resource management plan.

- The amendment calls for extending the ACEC boundary southerly from Minister's Point to the Chatham Light, and from there easterly to the eastern boundary of the Cape Cod National Seashore.
- The amendment further specifies that improvement dredging, and the disposal of spoils from improvement dredging projects, be allowed in the area south of Minister's Point provided such projects are consistent with the resource management plan and meet all local, state, and federal environmental permitting requirements.

#2 Provide a New Regulatory Framework for Docks, Piers, Marsh Walkways, and Erosion Control Structures in the Bay

A. The plan proposes a new regulatory framework for private docks and piers, to replace the current moratorium on such structures. The framework proposes a permanent moratorium on new licenses for docks and piers in areas identified in the plan as "resource sensitive". In all remaining areas of the Bay, the existing moratorium would be continued until new performance standards and design criteria are adopted into regulation by the respective towns and approved by the state. A similar process should be undertaken for freshwater ponds within the ACEC, based on the outcome of a freshwater resource assessment. In year one, the following actions would be undertaken to implement this recommendation:

- Establish a permanent moratorium on new licenses for docks and piers in areas identified in the plan as "resource sensitive."
- Undertake an assessment of freshwater resources within the ACEC, and determine whether any freshwater areas now under moratorium are "resource sensitive."
- Begin developing performance standards and design criteria for docks and piers within saltwater and freshwater areas allowed by the plan. The current moratorium on docks and piers in those areas would remain in effect until the new performance standards and design criteria, as developed by the Pleasant Bay Management Alliance, are adopted into regulation by the respective towns and approved by the state. Performance standards and design criteria should address any impacts from structures on marine resources and public access. Design criteria should address required water depth, dimensional requirements, design, materials, and maintenance requirements. The new performance standards and design criteria for saltwater and freshwater areas should be prepared by the Fall, 1999.

B. Performance standards and design criteria should be developed for allowing marsh walkways and related structures where such structures are deemed necessary to preserve marsh resources. In year one, the following actions would be undertaken to implement this recommendation:

- Begin developing performance standards and design criteria for marsh walkways and related structures. The standards and criteria would address impacts on wetlands and marine resources, public access, and dimensional and aesthetic requirements.

C. The plan proposes a resource-based framework for evaluating shoreline wetland resources, and the impacts of erosion control structures on those resources. The assessment would provide a basis for developing consistent performance standards and design criteria for erosion control structures; identifying the relative sensitivity of specific portions of the shoreline to the impacts of erosion control structures; and developing a system to monitor erosion rates and the impacts of erosion control structures over time. In year one, the following actions would be undertaken:

- Begin developing the parameters for a shoreline resource assessment. The assessment should encompass a variety of physical features that affect the value and functioning of shoreline wetland resources. The assessment would be used to measure impacts on shoreline wetland resources from erosion control structures.
- Begin developing performance standards and design criteria for erosion control structures. The standards and criteria should address use of hard versus soft technologies, vegetation, maintenance and mitigation requirements, protections for lateral shoreline public access, and design and orientation features that minimize adverse impacts on natural resources.
- Continue the existing moratorium on erosion control structures requiring Chapter 91 licenses until new performance standards and design criteria, as developed by the Pleasant Bay Management Alliance, are adopted into regulation by the respective towns and approved by the state.

#3 Increase Boating Regulations and Enforcement

The plan calls for increased enforcement of boating regulations, regulatory changes, and new navigational markings to reduce environmental impacts and improve safety. The following actions would be in effect for the 1998 boating season:

- Establish a Bay-wide patrol whereby the harbor masters of Orleans, Chatham, and Harwich will work together to ensure that there is a patrol dedicated to the entire Bay at all times during the peak boating season. Patrol personnel from each town will be “cross deputized” to enable them to pursue transgressors across town lines.

- Implement improvements to navigational aids in areas identified in the plan as “navigational trouble spots” including the area from Namequoit Point to Meeting House Pond, the northeast corner of Strong Island, the channel from Dogfish Bar to the Chatham Light, and the channel in the vicinity of Fox Hill, Ryder’s Cove and Strong Island. The harbormasters should also coordinate the numbering of markers to be consecutive from one end of the Bay to the other.
- Increase enforcement of existing local and state waterways regulations, with emphasis on No Wake Zones and five-mile- per-hour zones, including those requiring that vessels not exceed a speed of five miles per hour when operating within one hundred fifty feet of the shoreline. Local waterways regulations should be reviewed to ensure they are consistent with the most recent state waterways regulations.
- Establish a permanent 587-acre mooring free area in Big Bay that would remain open for transient recreational and commercial access.

#4 Reduce Environmental Impacts from Boating

The plan recommends steps to reduce boating impacts on sensitive natural resources. These include the designation of the Pleasant Bay estuary as a *No Discharge Area*, and setting restrictions on moorings in environmentally sensitive areas. Toward this end, the following actions would be undertaken in year one:

- Prepare the application materials necessary to request the U.S. Environmental Protection Agency to designate the Pleasant Bay estuary a “No Discharge Area”. The NDA designation prohibits overboard dumping of treated or untreated marine sewerage anywhere in the Bay.
- Develop a Bay-wide mooring program that specifies mooring locations, technologies, and capacities that are consistent with resource sustainability. The program is targeted to be in effect in the 1999 boating season. Pending the completion of the mooring program, harbormasters are requested to maintain the number of mooring permits at the 1997 level; prohibit placement of new moorings in “resource sensitive” areas; prohibit the use of concrete block moorings in most areas of the Bay; and encourage use of alternative mooring technologies that are likely to reduce impacts on natural resources.

#5 Minimize Safety and Environmental Impacts from Personal Watercraft (PWC)

The improper operation of PWC in the Bay is widely perceived to be a threat to public safety and natural resources. “Operating a PWC” was rated the least popular and least important activity on the Bay in the survey of residents, and regulating the use of PWC was supported by eighty-eight per cent of residents surveyed. Participants in the Boating Safety and Navigation work group urged strong controls, even prohibition, on the

operation of PWC in Pleasant Bay. Accordingly, the plan includes the following recommendations:

- Business concessions offering use of PWC on a rental basis would be prohibited from operating within the Pleasant Bay ACEC (extended as proposed). Regulations to implement this recommendation, as needed, would be developed in year one.
- A PWC Management Program should be developed and implemented to eliminate threats to natural resources and public safety posed by the improper operation of PWC. The Program should encompass development of Best Operating Practices, greater enforcement of existing regulations, and possible changes in regulations. Cooperation of PWC owners and operators is anticipated to ensure the Program's success. If Program goals are not met within a specified timeframe, the plan recommends exploration of further restrictive measures including prohibitions on PWC operations, subject to Town Meeting approvals.

#6 *Inventory and Monitor the Bay's Ecology, Water Quality, and Fisheries:*

A. The plan recommends undertaking research in three major areas to provide baseline and on-going data concerning resource conditions and trends. Data generated by the research would be applied in addressing a number of critical resource management issues, including the development of regulations for shoreline structures, developing a Bay-wide mooring program, and local decisions concerning private aquaculture grants. A detailed work plan for undertaking research in the following areas would be developed within one year of the plan's adoption. Research in the three areas would be integrated to the extent practicable:

- *The Ecological Inventory and Monitoring Program* would assess the status of natural resources and habitats within the Bay. The program would encompass: water quality, physical characteristics, vegetation, salt marsh, macroalgae, shellfish, finfish, and birds.
- *The Shellfish and Finfish Assessment* would provide detailed information on the status and productivity of the Bay's shellfish and finfish resources, and would identify and monitor influences on the health and productivity of these resources.
- *The Water Quality Monitoring Program* would be designed to generate data on a range of critical indicators of water quality throughout the Bay on a sustained basis. The program would also identify and monitor the factors influencing water quality.

B. *Areas of Critical Marine Habitat* are intertidal areas that would be protected from adverse impacts pending the studies of the Bay's ecology, water quality and fisheries. The areas encompass sandy tidal flats, muddy tidal flats, eelgrass beds, fringe marsh, and areas of freshwater up-welling, among other areas. Areas of Critical Marine Habitat serve as habitats, feeding areas, nesting areas, spawning areas and nursery

areas for hundreds of species of marine invertebrates as well as amphibians, shellfish, finfish, migratory shorebirds, and some species of upland fauna. It is recommended that Areas of Critical Marine Habitat be established in year one, while the inventory and monitoring program is being designed and implemented. This is to ensure that areas now known to be sensitive are protected from adverse impacts while further scientific data is collected and assessed. Based on the results of the inventory and monitoring program, the designation of such areas could be amended. Placing a shoreline structure, placing a mooring, and aquaculture would be prohibited within the intertidal *Areas of Critical Marine Habitat*. Existing structures, moorings, and aquaculture grants within the designated areas would be exempt from the restrictions.

#7 Refine and Coordinate Fisheries Management Policies and Regulations

- A. The plan calls for a strong, regional approach to managing shellfish and finfish resources in light of decades of sustained declines in harvests of traditional species, and growing fishing of alternative species. A Pleasant Bay Fisheries Oversight Committee would be formed within twelve months of the plan's adoption. The Committee would seek to coordinate regulations and policies in the towns of Orleans, Chatham, and Harwich dealing with fishing controls, enforcement, and propagation. Committee membership would include fisheries management officials from the towns and the state, technical experts from regional institutions, commercial and recreational fishermen, and aquaculturists. In the first year of implementation the Committee would prioritize fisheries management issues. Following the evaluation of each issue, the Committee would recommend actions, policies or regulatory changes.
- B. The plan recommends that a study of issues relevant to the future potential for aquaculture in the Bay be included in the comprehensive fisheries assessment. The assessment would provide scientific information for the towns to use in making decisions concerning private aquaculture grants. Pending the completion of the assessment, the towns are recommended to institute a moratorium on new grants, and to allow existing grantholders in the Bay to expand or relocate within the designated Aquaculture Grant Area.

#8 Identify Changes Needed to Strengthen Local Wetlands Regulations:

To ensure consistency among the towns, specific language should be developed for adoption into wetlands protection regulations in each town. In the first year of implementation, a detailed scope of the following issues would be developed, as well as a work plan to address each issue:

- Establishing a goal of *no loss of wetlands* within the study area;
- Ensuring that replication of wetlands is not an allowed mitigation action;
- Developing specific criteria for applying the ACEC standard of “no adverse impact”;
- Reviewing and assessing the status of *Coastal and Inland Wetlands Restrictions*;
- Developing uniform procedures for the delineation of wetland resource boundaries;

- Allowing for periodic review and revisions to boundaries as needed;
- Strengthening buffer zone requirements to adequately protect salt and fresh water fringe marsh areas and allow for their upland migration due to sea level rise;
- Requiring that all projects within the watershed be subject to an assessment of impacts on wetlands resources; and
- Ensuring that Conservation Commissions have adequate professional staff and resources for regulatory reviews and enforcement.

#9 Develop and Implement a Watershed Management Program

The results of a nitrogen loading study conducted for the plan would provide a basis for defining the parameters of a watershed management program to limit the flow of nitrogen in the Bay, now considered to be a threat to marine water quality. The detailed parameters for the watershed management program would be developed within twelve months of the plan's adoption, and would include:

- *Nitrogen Management Program.* Nitrogen management options would be evaluated for areas identified in the nitrogen loading study as having or potentially having excessive nitrogen loading (Muddy Creek, Pah Wah Pond, Arey's Pond, Ryder's Cove and Round Cove). The management options evaluated would encompass waste water disposal practices (the role of on-site denitrifying septic systems, cluster systems, centralized technology, etc.) open space acquisition, and the impact of land-care practices.
- *Fertilizer and pesticide use.* The program would work to ensure that homeowners, and commercial land-care operations including agriculture, cranberry bogs, lawncare/landscaping, and golf courses, operate according to Best Management Practices, Integrated Pest Management (IPM), and other management techniques appropriate to their activity.
- *Storm water management.* The program would coordinate local and state inventories of storm water management conditions, and develop comprehensive and coordinated storm water management policies and practices for areas within the watershed.
- *Public education.* The program would include public education to explain how activities within the watershed affect the Bay's water quality.

#10 Enhance Public Access Opportunities:

- A. Public access to and along the Bay's shoreline is impeded by many factors: presence of shoreline structures, resistance by private property owners, and lack of publicly-owned shoreline and access points. The plan recommends measures to remove obstructions to human lateral access along the shoreline, and to increase the number of public shoreline access points. Actions that would be undertaken within one year of the plan's adoption include:

- Begin developing regulatory language for local conservation commissions and state Division of Wetlands and Waterways to ensure that human lateral access is a requirement for obtaining permits under state wetlands regulations and local by-laws, and to require mitigation of the loss of lateral passage at any stage of the tide and at any future date.
- Begin developing a prioritized list of endangered public access points that require special protection, and of potential new public access points that could be established.
- Begin developing a public access information program concerning public access points, support facilities and services, use guidelines, and public access rules and responsibilities. The program would encompass a *uniform style and format for signs* used to identify public access points in all towns around the Bay; *guidelines on the use and accessibility of public access points*; *interpretative education exhibits* concerning environmental and historical information; and information on *public access rights and responsibilities in the intertidal zone*.

B. Town landings, which afford the public's primary access to the Bay, are experiencing many stresses: loss of shoreline from erosion, excessive or inappropriate use, lack of space to accommodate demand, inadequate maintenance, and encroachment by private abutters. Actions to address these concerns that would be undertaken within one year of the plan's adoption include:

- Drafting Town Landing Management Guidelines, to encompass a *town landing category system* to ensure that uses of landings match the landings' respective capacities and facilities; *parking and trailer management strategies*; *dinghy storage*; and a *licensing system for commercial uses of town landings*.
- Begin developing a Town Landing Improvements Plan to encompass *property surveys* undertaken and recorded with the Registry of Deeds; an *improvements plan* identifying and prioritizing repairs and upgrades needed at all landings within the Bay study area; and an *improvements budget* requesting each town to establish a dedicated source of funds for completing the town landing improvements plan.

Implementation and Monitoring

The resource management recommendations set forth a plan for cooperative action to preserve the Bay's highly valued resources. Implementing the recommendations would be a long-term process, and one that would require careful oversight. The Pleasant Bay Management Alliance would provide the leadership, accountability, and coordination among the towns needed to implement the recommendations. The prioritizing of recommendations and the sequencing of actions would ensure that scarce technical and financial resources are directed first to the actions that offer the greatest protection or benefit to resource conditions.

The priority recommendations and actions for the first year of implementation consolidate the gains made during the plan's development. They accomplish this by evolving the discussion of key management issues raised in the plan to the level of regulatory and policy application and, through this process, setting forth the work plan for creating new regulations and polices more responsive to resource conditions. Subsequently, years two through four of implementation involve more intensive activity as studies are conducted and regulatory language is developed and enacted. Year five and beyond would, in large measure, be focused on monitoring and updating activities.

In addition to an organizational structure and a plan of action, implementation would require a considerable commitment of resources. Preparation of the plan has been funded through a variety of public and private contributions: the towns of Orleans, Chatham, Harwich, and Brewster contributed thirty percent of the cost, state and Cape Cod Commission provided fifty percent, and the Friends of Pleasant Bay, Inc. provided twenty percent. The implementation budget specifies \$95,000 in FY 1999 to undertake activities outlined for the first twelve months of implementation. The towns would be requested to provide the bulk of funds needed in year one. The budget also shows that the towns' requested contributions remain at the year one level for the first five years of implementation. However, the towns' combined contributions, as a percentage of the total implementation budget, decrease to roughly one-half following year one. In those subsequent years, public and private grants would be sought to implement many priority actions. Additional non-town sources of funds of roughly \$100,000 per year would be sought to augment the towns' contributions in subsequent years, depending on the intensity of program activity.

The implementation plan emphasizes on-going community involvement in and support of the plan. Regular reports on the status of recommendations and resource conditions would be provided to the towns. The plan recognizes that resource conditions, and our understanding of those conditions, are likely to change over time. Accordingly, the plan would be updated every five years to ensure that it continues to respond both to resource conditions and community concerns.