CHAPTER 8:
SHORELINE CHANGE & REGULATION OF SHORELINE STRUCTURES

IMPLEMENTATION SUMMARY

RECOMMENDATION	STATUS
11.2.1 Revise the moratorium on docks and piers 11.2.2 Develop performance standards for permitting new docks and piers 11.2.3 Develop design criteria for permitting new docks and piers	✓ Developed *Guidelines and Performance Standards for Docks and Piers in Pleasant Bay* that were then used by the Towns to change local bylaws and regulations. ✓ The State approved the guidelines and will rely on them in the evaluation of Chapter 91 licenses within the ACEC. ➢ The Alliance is evaluating the need for separate guidelines for the Muddy Creek shoreline.
11.2.4 Develop performance standards and design criteria for marsh walkways and related structures	✓ Developed *Guidelines for Private Walkways and Stairways in Fresh and Marine Resource Areas of Pleasant Bay* that are being used by Towns in revising local regulations
11.2.1 Conduct a resource assessment of the shoreline of freshwater ponds in the ACEC and develop guidelines for permitting structures in those areas.	✓ A freshwater resource assessment was completed (see Ch. 4). ➢ Use assessment to develop guidelines for permitting structures around freshwater bodies within the ACEC.
11.2.5 Monitor cumulative impacts of shoreline Structures 11.4.1 Develop resource-based framework for erosion control structures 11.4.2 Monitor shoreline erosion rates 11.4.3 Encourage alternatives to use of hard erosion control structures 11.4.4 Develop performance standards and design criteria for erosion control structures 9.6.3 Increase protections for barrier beach and marsh system	➢ Conducted an aerial fly-over in 2000; to be repeated in 2005 ➢ Develop best management practices for shoreline protection in high, moderate and low energy areas. ➢ Conduct a shoreline change study to establish a baseline measurement and assess loss of sediments due to natural and man made features. ➢ Identify & prioritize areas for accepting dredge material for shoreline stabilization, habitat restoration and protection of public access, consistent with Chapter 91 regulations.

➢ CONTINUED ✪ NEW RECOMMENDATION ✓ COMPLETED

OVERVIEW

Concern about a proliferation of shorelines structures – piers, revetments, walkways – was a major impetus to the designation of Pleasant Bay as an ACEC and the subsequent development of the resource management plan. From a regulatory standpoint, the ACEC designation had the effect of a categorical restriction on state issuance of Chapter 91 licenses for private structures within the ACEC, pending the adoption of a resource management plan.

The approved plan documented the direct and indirect environmental impacts of structures on the Bay's resources. The harmful effects of docks and piers cited in the plan include blocking wind and tidal flow, shading of vegetation, chemical leaching from materials, and impacts from construction and removal. Impacts from erosion control structures stemmed from the concern that hard structures interfere with the natural erosion and re-nourishment processes in the Bay. The need for clear guidelines to assist towns with reviewing applications for marsh walkways is also recommended.

Implementation actions related to shoreline structures have focused on putting in place the regulatory framework for permitting docks, piers and walkways laid out in the plan. In the coming years the Alliance will focus on deepening our understanding of the processes of shoreline change, and using that information to provide a basis for system-wide management of dredging, coastal armoring, and habitat protection.

NEW LOCAL REGULATIONS FOR DOCKS AND PIERS

The plan summarized a detailed resource assessment of the Bay's shoreline area that was used to identify areas where new piers would continue to be prohibited, and areas where piers could be permitted provided they met certain performance criteria and design standards. The plan also called for the categorical restriction to be extended until such time as the towns adopted new or revised policies and regulations consistent with the framework outlined in the plan.

The Alliance, with input from local conservation commissions and planning boards, as well as representatives of the DEP, the Massachusetts Coastal Zone Management Program, WHOI/SeaGrant and Cape Cod Cooperative Extension, and the Department of Environmental Management's ACEC Program, developed *Guidelines and Performance Standards for Docks and Piers in Pleasant Bay*. In developing the guidelines the Alliance looked at existing local regulations, state guidelines for docks and piers in ACECs, and regulations in place in other coastal communities. Draft guidelines were presented and discussed in more than thirty public meetings of Conservation Commissions, Planning Boards and Boards of Appeal in the Alliance communities. Through that review process many helpful comments were integrated into the guidelines. The Alliance adopted the guidelines in December 1999 and forwarded them to the local communities.

Local Conservation Commissions and Planning Boards relied upon the guidelines to develop specific regulatory or bylaw changes necessary to bring local regulations into compliance with the resource management plan. The guidelines allowed the towns to achieve consistency in their treatment of docks and piers while working within the existing structure of local regulations. Although the guidelines were developed for Pleasant Bay, each town opted to apply many of the performance standards town-wide, resulting in a significant increase in the protection of coastal resources beyond the ACEC boundary. The Guidelines were approved by the Secretary of the Executive Office of Environmental Affairs, and are now relied upon in determinations of Chapter 91 license applications within the ACEC.

UPDATE RECOMMENDATION

The Alliance will evaluate the unique resource characteristics of Muddy Creek and will develop guidelines for structures there. Muddy Creek is a tidal area within the ACEC that, because of its unique characteristics, was not included in the resource assessment for docks and piers. As a result, the categorical restriction on new Chapter 91 licenses for new private docks remains in effect.

Develop guidelines for docks and piers in freshwater areas. The categorical restriction on Chapter 91 licenses for private piers referred to above extends to freshwater great ponds (10 acres or more) within the ACEC boundary. Recognizing the differences in both the use of freshwater areas and the impacts structures can have on freshwater resources, the plan called for the development of separate guidelines to govern structures in those areas. As a first step, the Alliance obtained a grant from the Community Foundation to conduct a shoreline resource assessment of the eleven freshwater lakes and ponds within the ACEC boundary (although only five are great ponds). The project consists of an assessment of significant plant and animal species and related physical characteristics of the shoreline areas. The freshwater resource assessment, along with bathymetry for the ponds, will be used to develop guidelines for local permitting of freshwater docks. The guidelines will be coordinated with Chapter 91 regulations for areas where state permitting is also required. If the guidelines recommend changing Chapter 91 regulations restriction on private docks, state agency review and EOEA approval will be sought.

NEW GUIDELINES FOR WALKWAYS AND STAIRWAYS

The extraordinary system of marshes is perhaps the most unique and significant wetland resource within the Pleasant Bay study area. The plan notes the importance of marsh resources to the Pleasant Bay ecosystem and the need to manage human impacts to protect them. Among the human impact issues highlighted in the plan is the development of walkways to provide access over or through marshes and other marine resource areas. The plan recommends that performance standards and design criteria be developed for construction of marsh walkways and related structures to minimize impacts on tidal marshes

The Alliance, with input from the Orleans, Chatham and Harwich Conservation Commissions, the Chatham Planning and Coastal Resources Departments, the Massachusetts Department of Environmental Protection, Massachusetts Coastal Zone Management, WHOI/SeaGrant and Cape Cod Cooperative Extension, developed *Guidelines for Private Walkways and Stairways in Fresh and Marine Resource Areas of Pleasant Bay*. The Alliance worked more than a year to identify issues, review current regulations, and develop standards for application within the Pleasant Bay ACEC. Draft guidelines were submitted for public comment to local Conservation Commissions, Planning Boards, state environmental agencies, engineers and attorneys. Comments received during that process were incorporated in the guidelines.

The guidelines are intended for use by local Conservation Commissions, Boards of Appeal and Planning Boards in the review of permit applications for walkways or stairways over marine or freshwater wetland resources. Conservation Commissions in the Alliance towns are using the guidelines to revise their respective wetland regulations governing walkways and stairways. The guidelines also raise issues for consideration in the application of bylaws and regulations.

SHORELINE CHANGE AND EROSION CONTROL STRUCTURES

Little information exists that provides a measure of shoreline dynamics in the Bay. Comprehensive aerial photography of Pleasant Bay was lacking until 2000, when the Alliance, with the Town of Chatham, conducted an aerial flyover of Pleasant Bay in 2000. The resulting aerial photography has been a useful tool in managing structures, monitoring changes at some shoreline locations, and in undertaking the intertidal study.

The plan cited the negative impacts hard erosion control structures can have, including the prevention of naturally occurring beach nourishment. The loss of sandy beach areas, particularly along primary public access points located near the Head of the Bay, is noted in the plan and continues to be of concern. There is also recognition of the need for property owners to take appropriate steps to protect shorefront property from erosion. The plan calls for development of a resource based framework for evaluating when use of hard structures may be necessary, and development of standards and criteria for those situations. Elements to be considered in the resource assessment include:

- Soil type;
- Height of the bank;
- Relative slope;
- Vegetation;
- Orientation of bank;
- Distance from mean high water to toe of bank;
- Tidal action;
- Width of bordering fringe marsh;

- Distance of landward edge to the toe of the bank;
- Incidence of episodic storms;
- Value of the resource as a sediment source;
- Erosion rate;
- Cause of the erosion;
- Presence of building;
- Distance of building to bank; and
- Presence and dimensions of shoreline structures.

The shoreline assessment intended to be used to evaluate the effectiveness of local regulations in protecting resources, and to:

- Identify appropriate regulatory changes, including performance standards and design requirements for structures see (11.4.4);
- Identify the relative sensitivity of specific portions of the shoreline to the impacts of erosion control structures;
- Develop maintenance and mitigation requirements for structures; and
- Develop a system to monitor impacts of structures over time.

UPDATE RECOMMENDATIONS

Identify areas of high, moderate and low wave energy, and develop best management practices for shoreline stabilization in those areas. The designation of high, moderate or low wave energy areas would be re-evaluated at regular intervals. Best management practices would address selection of shoreline stabilization technology, provision of an alternatives analysis, re-nourishment guidelines, construction practices, erosion of adjacent properties and public access.

Conduct a shoreline change study to develop a baseline shoreline profile against which future erosion can be measured. The shoreline change study would establish a shoreline and coastal bank profile using current and historical aerial photography, and would calculate the sediment loss due to coastal armoring. The study results would be used to monitor shoreline and bank erosion, address the loss of sediments at public beaches and other public access points, and manage the preservation of shoreline, marsh and intertidal habitats.

Implement a shoreline-monitoring program. A volunteer-based program to monitor shoreline at selected locations will be implemented. The monitoring program will help to build a database on shoreline conditions that can be compared over time with the shoreline baseline established by the shoreline change study.

Identify and prioritize shoreline areas that could benefit from placement of dredged materials, consistent with Chapter 91 regulations. As a practical mater, maintenance dredging cannot occur without pre-determining a location for disposal of dredge material. The selection of appropriate sites to receive dredge material is influenced by regulatory requirements, cost considerations, and limitations of technology. For the most part, material dredged in one town will be placed at a location in the same

town. Even if other nearby sites in the Bay could yield greater benefit from the material. By identifying and prioritizing sites to receive material, the Alliance hopes to encourage towns to consider the system-wide benefits of locating dredge material and to consider high priority sites when seeking a permit to dredge in the Bay.

Repeat Aerial Flyover in 2005, and in subsequent five-year intervals. Aerial photography is a useful tool in managing structures, monitoring changes at some shoreline locations, and in intertidal areas. Aerial flyovers should be continued at five-year intervals.