

CHAPTER 2.A.

HARBOR FACILITIES AND ACTIVITIES:

MANAGEMENT ISSUES AND RECOMMENDATIONS

FOR THE STAGE HARBOR COMPLEX

2.A.0 INTRODUCTION

The Stage Harbor Complex encompasses one of the Town's premier recreational boating areas, critical offloading capacity for the Town's commercial fishing fleet, and significant shellfishing areas. The major management challenge facing the Town is how to sustain and balance competing uses of these limited resources. The current harbor infrastructure – including town access points, public and private offloading areas, and moorings – is under stress from a consistent high level of demand.

The original Stage Harbor plan identified important physical distinctions among the water bodies that make up the Stage Harbor Complex, and the appropriate uses for these areas. Specifically the plan proposes that:

- Stage Harbor, and the Mitchell River south of Bridge Street should be considered a multi-use harbor with emphasis on commercial fishing, shellfishing and recreational boating. New facilities for these uses could be accommodated within these areas provided they are consistent with the policies of the approved harbor plan.
- The Oyster River, Oyster Pond, Mill Pond, and the Mitchell River north of Bridge Street provide valuable shellfisheries and prime shellfish habitat. These protected areas have more restricted tidal flushing and should be considered environmentally sensitive areas. Appropriate activities in these areas include low intensity uses such as shellfishing and recreation. New facilities to support boating and recreational uses should only be allowed if they can be demonstrated to have no significant impact on the natural systems of these areas.

The original plan recommended that the Town implement these guidelines through the designation of harbor zoning districts allowing for uses. Although the Town chose not to designate harbor use districts in this manner, the distinction between areas noted above has been integrated in waterways policies and is carried forward in the recommendations of the South Coastal plan.

Within the context of these two types of waterways in the Complex, the balance of this chapter looks at the current conditions and management issues, and provides management recommendations for the following facilities and activities within the Stage Harbor Complex:

- Town Landings and Access Points;
- Commercial Fishing Infrastructure;
- Marina and Recreational Boating Facilities;
- Moorings;
- Private Piers and Other Shoreline Structures;
- Dredging;
- Boating and Navigation; and
- Commercial and Recreational Shellfishing

2.A.1 TOWN LANDINGS AND ACCESS POINTS

OVERVIEW

There are sixteen town-owned locations where the public can directly access the Stage Harbor system. According to the Chatham Comprehensive Plan (Draft-March 2001), five of the Town's eight key facilities for providing saltwater access are located within the Stage Harbor Complex. These five are the Old Mill Boatyard, Barn Hill Landing, Oyster Pond Furlong, Morris Island Road, and Bridge Street boat ramp.

Town landings and access points are part of the infrastructure of the local fishing and shellfishing industries. Landings enable fishermen to access the fishing waters, shellfishing flats, or their boats for maintenance. Landings are also areas where sales of fishing catch may be transacted. Of equal importance is the function landings and access points serve for recreational boaters and others who wish to access a mooring, launch a boat, or enjoy nature viewing. Unless one lives within walking distance, the ability to use a landing depends on the availability of parking. According to town regulation, parking is available on a first come first served basis. Only at Old Mill Boat Yard is parking restricted to town residents. However, parking is not clearly delineated at most landings. At certain levels of the tide fishermen or shellfishermen can utilize all available parking at some landings.

Since the original plan was written, the Town has embarked on an aggressive effort to upgrade and maintain many of the landings. These efforts include improvements to Old Mill Boat Yard to allow launching of larger vessels, and the addition of public floats and dinghy docks at Old Mill Boat Yard. At Barn Hill landing the boat ramp, one of the two bulkheads, and the float system all have been replaced or upgraded. The Town is planning to continue a high level of maintenance and investment at town landings in the coming years. Planned projects include:

- § Scour protection apron for the Old Mill Boat Yard ramp (completed spring 2003);
- § Improvements to parking area surface and drainage at several landings;
- § Shifting the roadbed and widening the roadway for better traffic flow and trailer parking at Barn Hill landing;
- § Longer term, upgrades to wharf/pier system at Old Mill Boat Yard; and
- § Addition of public restrooms at Old Mill Boat Yard.

Table 1. Public Access Points, Stage Harbor Complex

Location	Waterway	Acres	Ramp	Parking	Features
Vineyard Avenue	Oyster River	2.07	No	5	Small boat launching possible
Oyster Pond Furlong	Oyster Pond	.42	Partial*	22	Small boat access
Oyster Pond Beach	Oyster Pond	2.0	No	82	Beach with mooring access
Barn Hill	Oyster River	.41	Paved	20	2 bulkheads; dock and float
Sears Road	Oyster River	.10	No	0	Small boat access
Battlefield Road	Stage Harbor	.13	No	6	Mooring access; shellfish offloading
Port Fortune	Stage Harbor	.13	No	0	Mooring access
Champlain Road	Stage Harbor	<0.1	No	0	Pedestrian access only
Bridge Street	Stage Harbor	.10	Paved*	6	Town leases land
Bridge Street East	Stage Harbor	<0.1	N/A	6	Pedestrian access only
Old Mill Boat Yard	Stage Harbor	3.5	Paved	30	Deep draft vessel access
Stage Harbor Point	Stage Harbor	1.93	N/A	6	Pedestrian paths

Morris Island Dike	Stage Harbor	18	N/A	65	Pedestrian paths
Eliphamet's Lane	Mill Pond	<0.1	Unpaved	4	Mooring & small boat access
Little Mill Pond	Little Mill Pond	<0.1	N/A	3	Public dock
Water Street	Mill Pond	<0.1	N/A	N/A	Pedestrian access

Source: Chatham Coastal Resources Department *Functionally limited to use at mid to high tide

MANAGEMENT ISSUES: TOWN LANDINGS AND ACCESS POINTS

Capacity and Use-related Issues

Stage Harbor functions as a critical alternate finfish off-loading location for Chatham's commercial fishing fleet. At the time the original plan was written, the importance of this function was emphasized due to the perceived threat to the Fish Pier posed by the newly formed inlet. While the functional loss of the Fish Pier is not a present threat, the importance of Stage Harbor as a secondary homeport for the Chatham fleet is every bit as important today.

Barn Hill and Battlefield landings are heavily used shellfish offloading facilities. They are also popular locations for recreational boat launching and for mooring access. Due to very limited parking there are, from time to time, conflicts between different user groups at the landings.

Bridge Street landing is a popular access point in the Stage Harbor Complex. However, the landing is located on private property leased by the town. Although the lease arrangement has persisted for several years, there is no guarantee that the Town will have the use of the property in perpetuity.

The wharf building at Old Mill Boat Yard houses the Harbormaster's office and the Town's shellfish propagation upwelling facility. Currently, the building is in poor condition and is undergoing renovation to maintain its functional use and arrest deterioration.

Several of the most popular access points within the Stage Harbor Complex are not designated as landings, but function as landings by providing pedestrian access to moorings, shellfishing areas, and for nature viewing. These access points include Morris Island Dike, Water Street, and Stage Harbor Point. Activities at these access points may not be governed by the Town's regulations for landings and other municipally owned and water dependent properties.

Lack of public facilities (e.g. restrooms) at coastal access points has been identified as a major concern in the Town's wastewater management plan. Presently, port-a-potties are used in most locations, and the concern is that more permanent facilities may be needed in some locations.

Parking and Land-side Impacts

Parking is limited at all access points. As a result, cars and trailers are often parked on adjacent roadways. Overflow parking on narrow streets can obstruct traffic flow and cause public safety concerns, and may also result in erosion or damage to resources.

Drainage problems exist at most landings, resulting in storm water run-off containing nitrogen, petrochemicals, and bacteria directly into sensitive coastal waters. The Town has an aggressive

program of improving drainage at landings. However present funding limits the program to addressing one or two landings per year.

The traditional practice of storing dinghies at landings has grown with the number of moorings and increased boating activity. At some landings, overcrowding of dinghies is encroaching on areas of salt marsh. In some instances, adjacent property owners, many of whom have recently purchased their property, have expressed concern about encroachment of dinghies.

Signs indicating the limits of the town landings, facilities regulations, allowed parking areas, and the locations of other public water access areas are inadequate.

RECOMMENDED ACTIONS: TOWN LANDINGS AND ACCESS POINTS

As described above, town landings and access points in the Stage Harbor Complex are heavily used for a variety of purposes, resulting in landside and waterside congestion and impacts. The town's management of town landings and access points will continue to be guided by the following policies:

- Landings will continue to be accessible to all legal uses to the maximum extent possible in balance with resource protection. The use of landings by one user group should not preclude fair and equal use by another user group.
- Town landings function as gateways to the Town's waterways. Managing the capacity of landside access points is one of the Town's most effective ways of controlling the amount of activity on Chatham's waterways. The finite amount of parking available at town access points serves to limit the number of boats that can safely access the waterways from these locations at any one time.
- Town policies and practices for issuing permits for moorings that are accessed from town landings must consider the landside impacts of overburdened parking, public safety, congestion at town landings, and spill-over parking onto local streets.
- Recognizing the continuing importance of town access points for commercial and recreational uses the Town will identify and evaluate new opportunities for facilitating access to the Stage Harbor Complex.

The following actions are recommended to implement these policies and address the management issue outlined above.

1. Continue a high level of municipal investment in the acquisition, improvement, maintenance, and management of town landings, access points and associated facilities.
2. Develop a public education program to inform resident and transient boaters about the opportunities, facilities, and regulations associated with various landings and access points. The campaign may include outreach to local media, printed materials and improved and coordinated signs at access points.
3. Develop a parking plan that addresses the vehicular access issues unique to each landing. Specific recommendations include:
 - Use adjacent town land to widen the road at Battlefield and Barn Hill landings;

- Prohibit trailer parking at Bridge Street, east of the Mitchell River Bridge;
 - Evaluate offsite parking and a shuttle to selected landings;
 - Work with the Chatham Highway Department to continue drainage improvements at town landings and coordinate projects with needed parking improvements
1. Secure permanent public use and access to Bridge Street landing, if possible.
 2. Develop and implement a plan to locate permanent or seasonal public restrooms at heavily used landings and access points, as needed.
 3. Identify all access points that may not be governed by the Town’s existing regulations for landings and water dependent properties and address the need to clarify regulatory oversight at these locations. Evaluate the potential for seeking town landing designation for commonly used access points that are not currently so designated, including Stage Harbor Point, Morris Island Road, and Water Street.
 4. Develop a dinghy storage plan appropriate to conditions at each town landing or access. Approaches to dinghy storage that should be considered include dinghy registration, racks, and use of town-owned “courtesy” dinghies.
 5. Identify and evaluate opportunities to create or acquire new public access points as they may become available. The criteria used to evaluate the need for and appropriateness of new access opportunities should include:
 - Type and amount of public access provided;
 - Amount of stress relieved at other access points;
 - Impact on waterways congestion;
 - Landside impacts from parking and traffic; and
 - Impacts to marine and landside natural resources.

2.A.2 COMMERCIAL FISHING INFRASTRUCTURE

OVERVIEW

The commercial fishing fleet in Stage Harbor includes full time and seasonal or transient boats. Full time boats include ground fish boats (long line, gill net, and jig fishermen), lobster boats and charter boats. Offshore scallop boats, primarily from other ports, have recently begun to arrive in late April and remain until the end of summer. The arrival of boats fishing for tuna, striped bass, summer flounder (fluke) and bluefish follows the respective seasons of their catch. Three weir companies focus on catching squid, mackerel and scup. With the exception of the weir fishermen and a few recreational fishermen, most of the fishing occurs roughly fifteen miles off shore. Proportionately little fishing occurs within the Stage Harbor Complex. The Town has issued approximately twenty-four permits for commercial weirs in Nantucket Sound, with roughly one-third of those being operational at any one time.

Recreational fishing within near shore waters focuses on summer flounder (fluke), striped bass and bluefish. The commercial fleet includes charter operations for recreational fishing, although many recreational fishermen use their own boats or fish from land.

Two privately-owned piers are currently serve as the primary facilities available to local and transient commercial fishermen in Stage Harbor for the offloading and packing of fish. These piers are also the offloading facilities for the weir fishing companies. A half dozen or so private docks are also used by a limited number of fishermen on a permission-only basis, but are not available for regular use by local or transient boats. Transient boats and Chatham boats that are not moored in Stage Harbor can request use of one of the public moorings reserved by the Harbormaster for temporary use by transient fishermen, Chatham fishermen not moored in Stage Harbor and transient recreational boats.

Chatham zoning also allows for gear storage in residential areas, although neighborhood concerns about this practice are increasing. Storage areas for lobster traps and other fishing gear is provided under a municipal lease at the Chatham Airport. Alternate or additional gear storage areas have been explored, including the town transfer station. However there is no effective control or monitoring of access to the site and subsequent misuse of the storage site has resulted in the expenditure of town resources to remove hazardous and inappropriate materials and refuse.

MANAGEMENT ISSUES: COMMERCIAL FISHING INFRASTRUCTURE

Continued Use of Shoreline Facilities

Continued dock access in Stage Harbor for offloading, packing and equipment storage is essential to the viability of several commercial fishing companies. Existing town facilities would not be able to absorb commercial activity if one or more of the private facilities became unavailable. Presently the two privately owned piers service the demand generated by the current number of boats. However, several factors raise concerns about the long-term adequacy of these facilities. Although the pier owners believe they could accommodate a greater number of boats, demand for access to these limited facilities is at times heavy. Some of the facilities require extensive repairs, and could be permanently removed from this use if sold to non-fishing interests. Long-term access to these facilities is not assured and could change based on owners' desires. High shorefront real estate values, and limited available locations, suggest that the expansion or addition of facilities would be difficult and costly.

Pollution Control

The private commercial offloading piers provide important services to the commercial fishing vessels that utilize these facilities. However, trash, waste oil or other byproducts of the commercial vessels are often not properly disposed of and are left unsecured at dockside or on adjacent properties posing a potential environmental threat. Not all of the facilities have receptacles and procedures in place for the proper storage and removal of the waste material.

Access for Transient Boats

Another access issue concerns the use of public moorings by transient commercial boats needing to offload at one of the private docks. To date the dock owners have worked with the Harbormaster to coordinate the use of the public and private moorings by transient commercial

boats. Continued access to public moorings by transient boats is important because fees paid to the private offloading facilities by transient boats help offset the cost of operating the facilities. The economic viability of the piers is important to the viability of this important part of the commercial fishing infrastructure in Stage Harbor. However, non-compliance with Chatham's waterways and zoning bylaws and regulations on the part of transient vessels compromises the Town's ability to continue to provide access to its harbor facilities.

Haul Out Facilities

Another issue for commercial fishermen is the need for haul out areas for annual painting and maintenance. Private marinas and boat yards have been providing some areas for haul out activities. However these areas are limited, and many do not have adequate environmental controls to protect against contaminants entering sensitive coastal waters. The Town's proposal for a haul out facility at Ryder's Cove on Pleasant Bay is indefinitely postponed.

RECOMMENDATIONS: COMMERCIAL FISHING INFRASTRUCTURE

Commercial fishing and shellfishing are important to the local economy and are fundamental to Chatham's heritage. A continuing objective of the Town's management of the Stage Harbor Complex is to ensure that landside and waterside facilities are adequate to, at a minimum, safely and efficiently handle the current level of commercial fishing and shellfishing activity. The following actions are recommended to accomplish this objective.

1. Evaluate options for ensuring adequate offloading, packaging and storage facilities for the commercial fleet in perpetuity, through repair and maintenance of existing facilities and potential addition of new public or private facilities. Among the options to be explored should be the potential for town purchase and operation of commercial offloading facilities, and incentives for private or cooperative purchase and operation of facilities for these uses. Whenever private waterfront property comes onto the market, the Town should seek a right of first refusal and evaluate the potential benefits and feasibility of purchasing the parcel.
2. Operators of commercial offloading facilities should provide adequate waste (trash, waste oil, etc.) management procedures and equipment, commensurate with the operation and services provided by the facility, in order to prevent degradation of water quality or surrounding resources
3. Foster cooperation among the Town, commercial fishermen and local marinas and boat yards to ensure that adequate haul out facilities are available to the commercial fleet, and that they meet the most stringent applicable environmental requirements for protection of sensitive coastal resources.
4. Provide a reasonable number of moorings to be made available to transient commercial boats needing to offload in Stage Harbor, provided the boat operators adhere to strict management protocols and all applicable bylaws and regulations.

5. Continue to acquire public moorings at a reasonable rate in balance with the demand for private moorings. Public moorings could relieve demand for private moorings by commercial fishermen and seasonal boaters who only need to use a mooring for a limited period of time.
6. Protect provisions within the zoning bylaw that allow for gear storage in residential areas. Gear storage is currently provided at an area of the Chatham Airport. However misuse of the storage site has resulted in the expenditure of town resources to remove hazardous and inappropriate material from the site. Guidelines and access restrictions should be developed and enforced to prevent future incidences of misuse. The Town should evaluate the potential for alternate or additional gear storage areas as needed. Areas that have been under consideration include the town transfer station.

2.A.3 MARINAS AND RECREATIONAL BOATING FACILITIES

OVERVIEW

The four private marinas located within the Stage Harbor Complex provide a variety of services to recreational boaters and the commercial fleet. Services provided by these businesses include boat launching, hauling, repairs, maintenance, storage and parking. Three of the four facilities provide fueling.

Table 2. Marinas in the Stage Harbor Complex

Marina	Slips 1989	Slips 2002	Moorings 1989	Moorings 2002
Stage Harbor Marine	26	30	38	57
Chatham Yacht Basin	75	76	24	37
Oyster River Boat Yard	23	28	23*	50
Pease Boatworks & Marine Railway (Formerly Mill Pond Boat Yard)	0	0 (1 dock)	10	13
Totals	124	134	95	157**

Source 1989 Data: Stage Harbor Management Plan/*some of these are T-floats that handle two boats

Source 2002 data: Chatham Harbormaster, 2002 /**represents total number of boats including T-floats

MANAGEMENT ISSUES: MARINA AND RECREATIONAL BOATING FACILITIES

Marinas can serve an important function of coordinating boating access in an efficient and environmentally sound manner. While this is largely the case in the Stage Harbor Complex, the issues listed below require on-going attention:

Pollution Controls

Due to space constraints and the high costs of shorefront property, many marina and boatyard operators have begun to relocate certain repair, maintenance and storage activities in upland locations. However, some haul out activities such as power washing and painting, and other forms of maintenance, continue to occur at waterfront locations, often with little or no protection against pollutants and debris entering the water. Most such operations occur without a National Pollutant Discharge Elimination Service (NPDES) permit from the US Environmental Protection Agency (EPA).

Pump-out Capacity

The Stage Harbor Complex was designated a No Discharge Area in 1997. Pump out capacity in the Stage Harbor Complex is met entirely by the town pump-out station at the Old Mill Boat Yard and currently satisfies demand.

Growth

Since the original plan was prepared, the number of slips provided by private marinas and boatyards has increased from 124 to 134, or 8%. The number of commercial rental moorings has increased 65%, from 95 to 157. The role of marinas and boatyards continues to be important given strict controls on permits for private piers, and the long waiting lists for town moorings. However, by their very nature, marinas and boatyards operate in extremely sensitive coastal areas. Also, overflow parking is a problem at some marinas during the peak season. Some accommodation should be made for careful expansion of marina activities provided operators comply with stringent environmental and land use controls.

RECOMMENDATIONS: MARINA AND RECREATIONAL BOATING FACILITIES

1. Marinas and boatyards should be brought into compliance with all existing federal, state and local water quality protection regulations and measures. Operators should be encouraged to:
 - Voluntarily adopt the most protective best management practices for their operations, as outlined in the Massachusetts Clean Marina Guide;
 - Obtain a NPDES permit from US EPA if necessary;
 - Develop a long-term plan for containing effluent from power washing;
 - Relocate activities which pose potential environmental hazards to upland locations outside of sensitive resource areas
2. Marinas and boatyards should be allowed to expand activities provided:
 - Stringent environmental regulations and standards are met;
 - Demand for services accommodated by the expansion is demonstrated to help relieve pressure on public facilities;
 - Expansion does not negatively impact on public access or navigation;
 - Land use impacts, specifically parking, are adequately addressed; and
 - The use of upland locations can be demonstrated to be infeasible.

2.A.4 MOORING MANAGEMENT

OVERVIEW

The number of mooring permits in the Stage Harbor Complex has increased by approximately one-third since the adoption of the original management plan. In viewing the increase it is important to note that record keeping for mooring permits was not effective at the time the original plan was prepared. Therefore it is impossible to know with accuracy how many permitted or unpermitted moorings were in the Complex at that time. It is likely that some portion of the measured increase in permits is the result of better record keeping. However it is plausible that the number of moorings in the Stage Harbor Complex has increased by a significant number over the past twelve years. The largest increases in numbers seem to have occurred in Oyster Pond, followed by Oyster River and Stage Harbor. Currently, it is the policy of the Harbormaster that the number of permits for each mooring field location in the Complex is stable, and there are waiting lists for permits in each location.

Table 3. Private Mooring Permits in the Stage Harbor Complex

Location	Permits 1989	Permits 2002
Oyster Pond	95	219
Oyster River	259	310
Little Mill Pond	54	62
Mill Pond	64	97
Stage Harbor	341	416
Mitchell River	49	41
Snake River	0	6
Total	862	1,151

Source 2002 data: Chatham Harbormaster, 2002; Source 1989 Data: Stage Harbor Management Plan

Table 4. Total Mooring Permits in the Stage Harbor Complex, 2002

Type	Number	% Total
Private	1,151	86
Marina/Boatyard	157	12
Public	25	2
Total	1,333	100

Source: Chatham Harbormaster, 2002

Mooring Administration

Since the approval of the original management plan, administration of mooring permits has moved from the Permit Office to the Harbormaster's Department. This transfer of responsibility has helped to streamline the mooring permitting process and facilitate the exchange of information with permit holders. It also enables the Harbormaster to keep a more accurate watch on the vessels assigned to each permit. The Harbormaster has also instituted changes in mooring administration:

- A permit applicant is now required to submit proof of ownership of the vessel to be moored, in the form of (1) vessel registration (if required), (2) title, or (3) other vessel documentation. The Harbormaster provides assistance to vessel owners interested in obtaining a title if one does not exist.
- A mooring officer has been hired to enforce mooring regulations. The mooring officer inspects moorings, ensures that moorings are located where they are assigned, and monitors other use by third parties.
- The Harbormaster intends to include a picture of each vessel on every permit to further the goal of mooring compliance.

Currently, the Harbormaster administers a waiting list for mooring locations throughout Town. The assignment of a mooring can only be made by the Harbormaster to a person on an existing mooring waiting list.

Mooring Configuration

The original plan set forth *Stage Harbor System Use Guidelines* that include specifications for a grid-style mooring layout proposal to be implemented throughout the Stage Harbor Complex. The general parameters of the guidelines were to:

- Group vessels according to type and length;
- Set mooring areas outside of navigational fairways to reduce conflicts;
- Concentrate moorings in smaller areas within harbors and ponds, thereby creating wider navigational fairways;
- Limit the number of moorings in the Stage Harbor Complex to approximate 1990 numbers;
- Designate Stage Harbor as the main mooring area in the Complex, with less intense mooring space in the other areas of the Complex.

The mooring layout proposal for Stage Harbor was to be implemented over a period of years. However, the mooring layout did not gain broad support and was never implemented. Reasons for the lack of support for the proposal include the rigidity of the proposed grid formation, the aesthetic implications of grouping similar types of boats together (as was proposed), and the emphasis on boat length, rather than draft and water depth, in determining the location of vessels in the grid.

Although the specific mooring layout proposal was never implemented, some of the underlying guidelines provided a basis for the following actions that were undertaken by the Harbormaster and the Coastal Resources Department:

- Development of mooring polices, with stated mooring management goals and objectives;
- Revision of mooring regulations in support of mooring management goals and objectives;
- Revision of tackle specifications to include use of alternative mooring systems which are more environmentally compatible;
- Development of ecological guidelines for specification of required tackle type and the location of moorings;

- Identification of environmentally sensitive resources areas within which it will be required to remove of all permanent concrete block moorings to reduce impacts to shellfish habitat;
- Acquisition of additional public moorings to increase flexibility in temporary mooring assignments, particularly with regard to the commercial fishing fleet; and
- Establishment of mooring waiting lists for all areas throughout the Stage Harbor Complex.

Special Anchoring and Mooring Area Designations

Mooring policies and regulations include special designation of areas to allow or prohibit certain types of mooring and anchoring (Chatham Waterways Bylaws Chapter 35). The purpose of these special designations is to enhance public safety and minimize impacts on shellfish and other natural resources:

- A mooring free area is designated in Stage Harbor (Figure 4). Part of the rationale for this designation is the poor anchoring conditions in this area, which posed a safety hazard for vessels attempting to anchor there. In light of the mooring free area, the Harbormaster does make available six public moorings for transient use.
- Inner and Outer Stage Harbor are considered “exposed areas” where, due to wave energy, use of concrete blocks may be allowed with permission of the Harbormaster.
- The Mill Ponds, Mitchell River, Oyster River and Oyster Pond are considered “protected areas” where wave energy is more limited and use of concrete blocks for new or replacement moorings is neither necessary nor allowed.
- The Town may designate environmentally sensitive resource areas where use of concrete block moorings is prohibited and existing concrete moorings would have to be removed within five years of the designation. To date, no such areas have been designated.
- Temporary anchoring is allowed on the south side of the dredged channel east of Stage Harbor buoy 8, and on the north side of the channel west of Stage Harbor buoy 8, and in other areas of the Complex with permission of the Harbormaster. Live-aboard vessels are not allowed in Chatham in accordance with the Town’s zoning bylaw.

MANAGEMENT ISSUES: MOORING MANAGEMENT

Numbers and Congestion

Congestion related to moorings and boating activity was an issue identified in the original plan. As a result of the plan, the Town amended waterways regulations to prohibit the placement of additional moorings in a portion of outer Stage Harbor east of the navigational channel. (Chatham Waterways Bylaws §35041) (Figure 4).

The even greater number of moored vessels in the Complex today continues to cause congestion, particularly in Oyster River. Depending on tides and wind conditions, navigating a narrow channel can be much more difficult due to the number of moorings in the waterway. This issue is compounded by the placement of illegal (un-permitted) moorings, and the practice of some permit holders to “relocate” a mooring to an unauthorized area.

In response, the Harbormaster is working with the Waterways Advisory Committee to develop a mooring plan to help ease congestion. The issues of illegal moorings and poorly located moorings are being addressed by the Mooring Enforcement Officer.

Non-use Policy

The Town’s mooring policy allows a permit holder to maintain a mooring permit for two years while a mooring is not in use. The regulation is intended to allow permit holders adequate time to change vessels without losing a permit. A permit not in use may not be leased or rented under the policy. However, the Harbormaster may issue a third party use form to enable another vessel to temporarily use the permit while it is not in use by the permit holder. (Chatham Waterways Bylaws §35035) However, some participants in the public meetings conducted to solicit public input for the updated management plan expressed concern that there are abuses of the non-use policy. The abuses stem from unauthorized use of moorings by persons other than permit holders (perhaps rented or leased), and non-use of some permits for longer than two years. In addition, there are concerns about the liability of the permit holder if damage occurs to a vessel temporarily assigned by the Harbormaster to use the mooring tackle.

Demand for Permits for Commercial Boats

The Harbormaster maintains a policy of equal access to moorings, provided a person is listed on a mooring waiting list. The existence of waiting lists at all town mooring areas is evidence of the limits on moorings for all users. Commercial fishermen and shellfishermen have expressed the need to identify creative means to expand access to moorings by commercial shellfishermen and fishermen who derive their livelihoods from the water. The Harbormaster maintains a number of public moorings in Stage Harbor for temporary use by commercial and recreational users who may want to offload in or have access to Stage Harbor but do not have a mooring there. The actual number of public moorings is on record in the Harbormaster’s office.

Environmental Impacts

Other concerns about moorings stem from the impacts to surrounding resources caused by chain scouring, and the secondary impacts from moored vessels. Most moorings throughout Town are the mushroom anchor type. New concrete block moorings are allowed on a limited basis by permission of the Harbormaster, and only for vessels of a size or in a location that warrants added anchor weight. The Harbormaster is reviewing new mooring technologies and methods to minimize impacts on natural resources.

RECOMMENDATIONS: MOORINGS

A comprehensive mooring program for the Stage Harbor Complex, and ultimately all of Chatham's waterways, that addresses a range of community access and environmental impact concerns and is consistent with state and federal laws is needed. The following actions are recommended to ensure that such a program is developed through an open public process and put into effect.

1. The Harbormaster in consultation with the Waterways Advisory Committee should develop a comprehensive mooring program for the Stage Harbor Complex, and subsequently other Chatham waterways. The program should include input from appropriate user groups and Town Boards, and should complement existing mooring regulations in addressing the issues outlined above. The number of mooring permits in the Stage Harbor Complex should remain at approximately the current (2003) level until such time as the program has been developed, adopted by the appropriate local authorities, and put into effect.

The program should balance the demand for mooring permits with the need to protect sensitive resource areas from degradation caused by direct and indirect impacts from moorings and mooring access; an appreciation for public access to shellfish resources and the waterways by non-permit holders; and navigational safety. The program should accomplish the following objectives:

- Include use of alternative technologies that can improve mooring layout efficiency and reduce negative impacts on natural resources. New technologies should not be used solely as a means of expanding mooring capacity in the Complex. However, it is recognized that changes in technology and improvements in layout could achieve efficiencies that result in no net negative impacts on congestion or natural resources from the addition or relocation of moorings throughout the system, and without compromising vessel safety;
- Correlate vessel draft to water depth at mean low water;
- Consider the aesthetic implications of vessel configurations;
- Evaluate the efficiencies of clustering some types of vessels, such as commercial vessels, in selected areas;
- Evaluate the feasibility of acquiring more public moorings for use by commercial fishermen and transient boaters;
- Provide for reasonable use of moorings by transient vessels;
- Eliminate obstruction of the navigable channels;
- Identify creative means of accommodating mooring needs of the commercial fleet;
- Minimize impacts on resources, such as shellfish, eelgrass and salt marsh; and
- Maintain a policy of fair, open and equal access to all mooring sites.

The mooring program proposal should also set forth the annual appropriations necessary to implement the plan within a reasonable time frame.

2. The Harbormaster and Waterways Advisory Committee should continue to evaluate the utilization of environmentally compatible mooring technologies and techniques as a means of limiting impacts on the environment and achieving the mooring layout plan. The use of alternate technologies or methods should not be used solely as a means of increasing the number of moorings in Stage Harbor. However, as noted above, changes in technology and improvements in layout could achieve efficiencies that result in no net negative impacts on congestion or natural resources from the addition or relocation of moorings throughout the system.

3. The Town should move forward with a proposal to designate environmentally sensitive areas and enforce the removal of concrete block moorings from those areas within five years of the designation. Specific criteria and evaluation methods for the designation of such areas should be developed.
4. Issues of insurance liability and compliance with applicable town bylaws and regulations need to be evaluated and addressed regarding instances when the Harbormaster authorizes temporary use of a mooring by a vessel other than the permit holder's.

2.A.5 REGULATION OF PRIVATE PIERS AND OTHER SHORELINE STRUCTURES

Municipal harbor plans approved by the EOEa secretary under the terms of state governing regulation (301 CMR 23.00) provide a guide for future actions undertaken by state environmental agencies concerning state permitting of structures under M.G.L. Chapter 91. An applicant for a Chapter 91 license within the Stage Harbor Complex must obtain a consistency determination from the SHMPIC regarding the consistency of the application with the plan. The original plan discouraged the proliferation of private piers that interfere with use of the harbor system. In its reviews of applications for consistency, the SHMPIC looks carefully at impacts to shellfishing habitat, on encroachment on the public tidelands and waterways, and dangers to navigation. Reviews based on these issues have, in practice, resulted in few determinations of consistency.

Table 5. Private Piers and Erosion Control Structures, Stage Harbor Complex

Location	Docks, 1990	Docks, 2003	Erosion Control Structures, 2003
Oyster Pond	11	14	3
Oyster River	22	20	15
Little Mill Pond		5	1
Mill Pond & Mitchell River	17	21	12
Stage Harbor	17	1	1
Total	67	61	32

MANAGEMENT ISSUES: REGULATION OF PRIVATE PIERS AND OTHER SHORELINE STRUCTURES

Transfer and redevelopment of shorefront property within the Complex continues to fuel demand for private piers. The development and use of new piers can have impacts on public access, navigation and on natural resources. These impacts are well documented and continue to be of concern within the Stage Harbor Complex.

Restrictions on Public Access and Navigation

Private docks have the effect of privatizing an area of public tideland. Usually, the amount of functional area that is removed from public use as a result of a private dock is considerably larger than the dimension of the structure. The location of structures can potentially eliminate access to shellfish beds, and can reduce areas available for shellfish seeding. Private piers can also impinge on public mooring fields, and intrude into navigable waters. Private piers that deteriorate and are left in disrepair, such as the Davis Dock in Stage Harbor, can create a public safety hazard.

Resource Impacts

Resource impacts from docks are well documented¹ and include:

- *Blocking Wind and Tidal Flow.* In enclosed areas, wind action on surface waters can become a primary mechanism of circulation. Docks and piers create friction that restricts the wind's ability to circulate water.
- *Shading.* Docks and piers can decrease the amount of light that reaches the bottom. Shading can diminish the vitality of many forms of aquatic vegetation that are vital to the marine food chain, as well as eelgrass.
- *Chemical Leaching.* Wood used in the construction of most docks and piers is treated with an anti-fouling ingredient such as chromated-copper-arsenate (CCA). Although scientific studies are not conclusive, there is evidence that these chemicals have toxic impacts on marine organisms.
- *Construction Impacts From Seasonal Piers.* Most docks and piers in the Stage Harbor complex are seasonal structures that must be removed during cold weather months to protect them from storm and ice damage. However, the process of re-installation in early spring may disturb the plants and animals embedded in the substrate, and cause turbidity. Stub piles – which remain in the ground year-round – are used in some instances to support seasonal piers.

Old Coast Guard Dock (Davis Dock)

The Davis dock (also known as the old Coast Guard dock) is a remnant of a former U.S. Coast Guard Station on Stage Island in inner Stage Harbor. No longer in use, the decrepit pier is unlicensed and has been cited under the Refuse Act for contribution of flotsam to the estuary. The deteriorated structure is much larger than would be permitted under current regulations. It limits the harbor shellfishery, poses a danger to navigation, and restricts area for placement of moorings.

The Town of Chatham, state environmental officials and the Army Corp of Engineers have called for removal of the pier. However removal was delayed when the owner sued the Chatham Zoning Board of Appeals in land court (1996) and again when the owner went to Appeals Court (2000). The owner lost both cases.

RECOMMENDATIONS: REGULATION OF PRIVATE PIERS AND OTHER SHORELINE STRUCTURES

As outlined above, private docks can have a variety of impacts on public access, navigation, and natural resources values addressed in this plan. Each of these impacts needs to be considered in the consistency review of specific private dock proposals. At the same time, clear permitting guidelines are needed to inform prospective dock permit applicants of the issues inherent in the consistency review and subsequent local and state reviews, and to assist them in assessing the potential for obtaining necessary local and state approvals prior to investment in application. The following actions are recommended to clearly define the purpose and process of the consistency review.

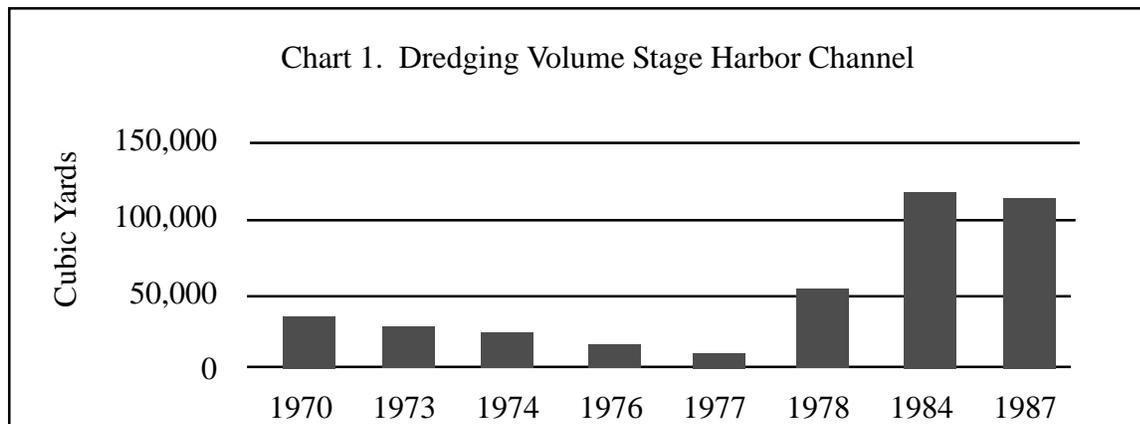
1. Undertake an assessment of the entire Stage Harbor Complex shoreline, focusing on the public access, navigation, and natural resource values addressed by the management plan. The assessment is necessary to determine where along the shoreline of the Complex piers may be found in compliance with the plan, and any areas where piers are not in compliance with the plan. The assessment should evaluate primary and secondary impacts on natural resources, public access, water quality, and navigation. A similar assessment conducted as part of the Pleasant Bay Resource Management Plan provides a useful model.
2. The assessment should be used to designate areas where the location of private piers may or may not be consistent with the management plan. The assessment should also be used to develop performance standards and design criteria for private docks in areas where they may be consistent with the goals of the management plan. Recommendations for the designation of areas off limits to new docks based on a resource assessment, or for performance standards and design criteria for new docks where they may be allowable should be adopted into the local zoning bylaw governing docks, as well as the Town's wetland protection regulations. A document called *Guidelines and Performance Standards for Docks and Piers in Pleasant Bay* provides a useful model for providing a basis for regulatory changes.
3. The plan does not address the impacts of other types of structures such as erosion control structures, stairways or walkways. The potential impacts or benefits of these types of structures must also be evaluated, and guidelines for permitting should be developed. Recommendations 1 and 2 above should also be applied to the permitting of:
 - Catwalks as allowed under the Chatham Zoning Bylaw. Currently a catwalk may extend below mean high water and require a Chapter 91 permit and consistency review. However the performance and design standards for these structures are not the same as for private docks, even though catwalks function as docks in some cases.
 - New erosion control structures, or Chapter 91 licensing of existing erosion control structures.
4. The Town should take action to ensure that the Davis dock is removed expeditiously. The Town should act similarly in all other instances that may arise where a private property owner fails to maintain a dock or other structure within the tidelands, resulting in harm to the public and surrounding resources.
5. The Town should work with the Department of Environmental Protection which administers Chapter 91, to monitor all structures within tidelands, including docks, piers, bulkheads and stairways, and ensure they have a valid Chapter 91 license and that the provisions of the license are being enforced.

2.A.6 DREDGING

OVERVIEW

Safe and navigable passage is important to the array of commercial and recreational vessels that utilize the Stage Harbor Complex. Shoaling conditions in the approach channel to Stage Harbor create navigational hazards and, if not addressed, could interfere with Coast Guard assistance to boaters.

Construction of the Stage Harbor Channel was completed in 1967. Maintenance dredging has been required since 1970. Because Stage Harbor is a Federally authorized channel, the Army Corps of Engineers is responsible for maintaining navigable depths through the channel. The authorized dimensions of the channel are 150 feet wide and 10 feet deep at Mean Low Water (MLW).



Source: Comprehensive Harbor Management Plan, 1992, Horsley Witten Hegemann, Inc.

MANAGEMENT ISSUES: DREDGING

Other than the entrance channel to Stage Harbor, where active maintenance dredging occurs, most areas within the Complex are fairly stable. Notably, improvement dredging was proposed in Oyster River in 1995, but was not pursued due to concerns about impacts on eelgrass and shellfish habitat.

Dredging removes sediments from a specified width and depth of bottom, and disposes of them in a predetermined location. This dramatic alteration in the substrate caused by dredging can have significant impacts on water quality and hydrology, aquatic vegetation, shellfish and finfish, and other forms of wildlife. Another set of impacts can be caused by the disposal of dredged materials.²

It is the Town's policy to dredge only where it is necessary to maintain safe navigation, and to a depth no greater than is necessary for that purpose. Dredging new areas, or maintenance dredging in greater dimensions should not be considered solely as a means of accommodating access for larger boats.

RECOMMENDATIONS: DREDGING

1. Continue maintenance dredging (dredging of previously licensed dredge sites) of the Federal Channel and other previously licensed dredged areas to continue safe access into the Stage Harbor Complex, and for the use of facilities there.
 - Allow dredging to maintain navigable depths at all town landings and access points. Accordingly, the Town should develop an inventory of proposed dredge activities and sites for disposal of dredged material, particularly if there is no prior record of licensed dredging.
 - Allow dredging to maintain navigable depths at private facilities such as marinas, boatyards and offloading facilities that provide part of the boating infrastructure and have a license for maintenance dredging

2. Allow improvement (new) dredging in areas where shoaling is limiting access through traditionally important publicly navigable waterways. Traditionally open waterways including Buck's Creek, Mill Creek, and Little Mill Pond should be evaluated to determine if dredging would improve access, water quality, and wildlife habitat.
3. In the design or review of dredging projects, the Town should ensure that dredging should only occur to the depth required to maintain navigation or improve water quality, and only if a project meets all local, state and federal environmental reviews and is consistent with the approved harbor management plan.
4. The Town should ensure that funds are available to undertake regular bathymetric surveys of all navigable channels throughout the Complex to be able to track changes in depth over time.

2.A.7 BOATING SAFETY AND NAVIGATION

It is noted above that Stage Harbor is an important location for deep draft vessels, and commercial fleet activity. Stage Harbor is also a popular location for youth sailing, swimming, water-skiing, windsurfing, kayaking and operation of personal watercraft (PWC). The Stage Harbor Yacht Club operates one of the most heavily used youth sailing programs in town from a pier located near the Old Mill Boatyard. Since the development of the original plan, kayaking has grown as a common use of waterways throughout the Stage Harbor Complex.

The only area in the Stage Harbor Complex where water-skiing is allowed is in the center of Oyster Pond, where there is no five-mile per hour speed control in effect. Operators of PWC are allowed to traverse the Complex adhering to "no wake" speed limits. In 2001 the Town adopted a bylaw prohibiting the operation of PWC in Pleasant Bay and the Southway, leaving the open waters of Nantucket Sound available to PWC operators.

MANAGEMENT ISSUES: BOATING SAFETY AND NAVIGATION

Congestion

The waterways in the Stage Harbor Complex operate at a very high capacity during any reasonably temperate summer weekend. Boaters wishing to reach Nantucket Sound or the Southway access these waters through the Complex. Anecdotally, it is believed that each year, a larger number of boats from other Cape towns are visiting the Stage Harbor Complex, as other Cape waterways become more congested.

Most of the Stage Harbor Complex is subject to seasonal vessel speed controls. Stage Harbor, Oyster River, Mitchell River and the Mill Ponds from Stage Harbor Buoy 4 to the head of Little Mill Pond, and to the entrance of the Oyster Pond are posted as "No Wake" zones from June 15th to September 15th. In addition, Stage Harbor from Buoy 4 to Buoy 6 is designated as a safety zone from June 15th to September 15th, in which swimming, or anchoring in the channel, use of sailboards and scuba diving are prohibited. (Chatham Waterways Bylaws §35005)

Since the original plan was approved, the number and variety of vessels using the Complex have grown. Kayaks are now a frequently used vessel, along with windsurfers, and kite sailors. Another issue not addressed in the original plan is the merging concern about the number of lobster pots being placed in or too near marked channels.

For the most part, a variety of boaters co-exist with surprisingly few incidents. However, as traffic and activity increases, that condition cannot be assumed in perpetuity. The Town must take what steps it can to manage boat traffic and ensure safe access to the Complex for a variety of marine users.

RECOMMENDATIONS: BOATING SAFETY AND NAVIGATION

The Town should continue a policy of supporting a broad range of recreational and commercial activities in the Stage Harbor Complex while ensuring environmental protection and public safety. The following actions are recommended:

1. Continue to use all means available to manage the number and size of boats that access the Stage Harbor Complex through town landings and access points. These means include:
 - Town policies and procedures governing the issuance of mooring permits should balance access demands with the need to protect sensitive resource areas from degradation caused by direct and indirect impacts from moorings and mooring access; an appreciation for public access to shellfish resources and waterways; and navigational safety.
 - The amount of parking available at town landings and access points;
 - Managing the growth of dockside facilities;
 - Managing the growth of private marinas and boatyards; and
 - Maintaining channels at depths traditionally required for navigation.
2. The Harbormaster is encouraged to continue active, highly visible patrol presence during the prime boating season (Memorial Day through Labor Day), especially on weekends.
3. Relocation of lobster pots should be undertaken by appropriate town officials as necessary when the location of pots poses a hazard to navigation. If such measures are not sufficient to address the problem, then regulatory steps should be considered.
4. Public education and changes in waterways regulation should be evaluated to promote safe and appropriate use of recreational equipment and activities, including but not limited to kayaks and canoes, para-sails, kite-boards, towed tubes and water skis, and swimming. Specifically such activities should be prohibited from operating in marked navigational channels unless crossing at a safe location.

2.A.8 COMMERCIAL AND RECREATIONAL SHELLFISHING

OVERVIEW

Despite threats and limitations on shellfishing resources, there has been an upsurge in the number of shellfishing permits issued in the Town in recent years. Part of the increase in commercial

permits may be due to the economic viability of the industry. In 2001, the cash value of shellfish total harvests in Chatham waters was approximately \$5 million.

Another trend has been the increase in non-resident permits. Non-resident permits grew 174% from 1990 to 2000, and have grown at a rate of 17% a year since then. Growth in non-resident permits may reflect the shrinking number of productive shellfishing areas in other Cape communities as residents of those towns seek access to Chatham’s shellfish beds.

Private shellfish aquaculture activity consists of one grant holder who cultivates quahogs and oysters on three acres located at the east end of the Oyster river, near Oyster Pond.

MANAGEMENT ISSUES: COMMERCIAL AND RECREATIONAL SHELLFISHING

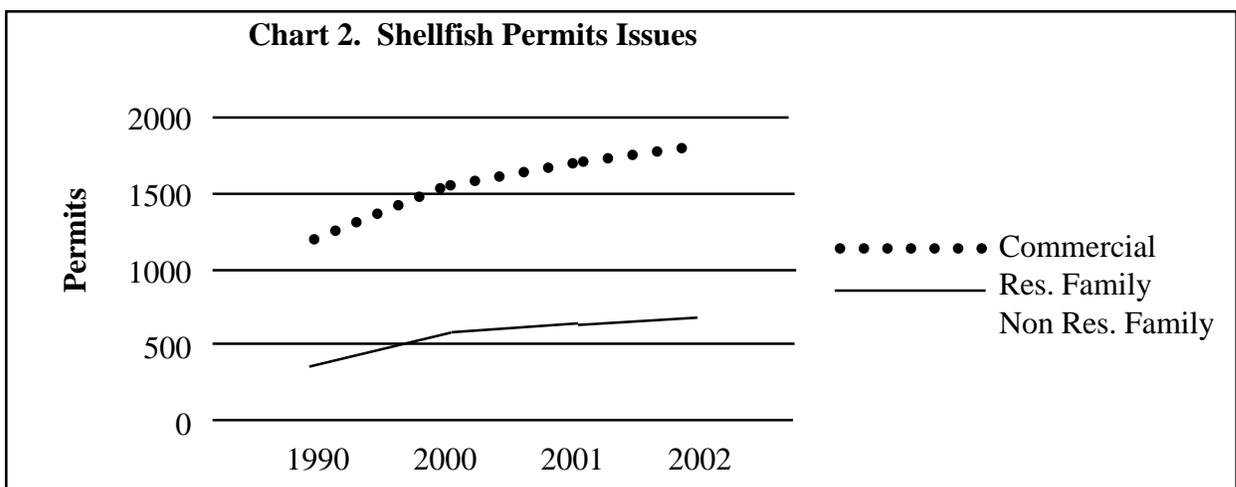
Access Issues

Shellfishermen depend on access to the shoreline and intertidal areas during low tide. Typically, a fisherman requires about six hours from dock to dock to take full advantage of harvesting the tides. Increasingly, access to and along the shore is being limited: piers, floats and other shoreline structures can limit a shellfisherman’s access to an area greater than the dimensions of the structure. In areas where shellfishing is done by long rake, the fisherman requires a circumference of ten feet around his vessel to harvest. A private dock will therefore preclude access not only under the structure but a portion of the intertidal areas surrounding it.

Offloading occurs primarily at Barn Hill and Battlefield landings. Parking is extremely limited, especially during the summer months. Congestion is not so much a problem during early morning tides, but can be extremely difficult during mid day tides.

Enforcement

As the number of permits rises, so does the need for capacity to enforce local shellfish regulations. Enforcement is important to limit violations of catch limitations and area or seasonal closures.



**SOURCES: 1990 DATA: CHATHAM SHELLFISH DEPARTMENT;
2000, 2001, 2002 DATA: TOWN OF CHATHAM ANNUAL REPORTS**

RECOMMENDATIONS: COMMERCIAL AND RECREATIONAL SHELLFISHING

1. Continue the Town's commitment to propagation of the wild shellfishery. Chatham has one of the most innovative and far reaching propagation programs among Cape Cod towns. The many years of successful propagation are no doubt largely responsible for the sustainability of the commercial quahog fishery in the community. The Town should explore the benefits of expanding the propagation program to encompass other species and increase production of seed. The adequacy of the existing upwelling facility to meet the Town's long-term propagation needs should be evaluated.
2. The number of commercial and recreational permits has increased over the past several years. The Town should ensure that increases in the number of permit holders is matched by a commensurate increase in the amount of resources spent on enforcement.
3. The ability to offload shellfish at town landings is an important part of the local shellfishing industry and is among the charter uses of those facilities. The demand for space for offloading may vary from year to year depending on harvests, and may also vary in location depending on the productivity of different species. The on-going importance of this activity at town landings is acknowledged by the plan. The on-going management of town landings should ensure that offloading activity is undertaken in compliance with all applicable bylaws and regulations.
4. Through the development of the comprehensive mooring program proposal the Town should evaluate creative methods for addressing demand for increased access to moorings for commercial shellfishermen.
5. In evaluating proposals for waterways projects, the Town should require applicants to provide documented assessment of impacts on shellfish or shellfish habitat and access to shellfish beds, from projects including: dredging, private and public docks, moorings and mooring fields, erosions control structures, catwalks. Preservation of shellfish, shellfish habitat, and public access to shellfish habitat should be given special consideration, in balance with broader public access needs.

¹ Poole, Bruce M.. *Diagnostic/Feasibility Study for Lagoon Pond Oakbluffs/Tisbury, MA*. SP Engineering, Inc. Salem, Massachusetts. 1987.

²Normandeau Associates. *Draft Environmental Impact Report Oyster Pond River Dredging Project Town of Chatham, Massachusetts*. Plymouth, Massachusetts. June, 1995.

CHAPTER 2.B.

NATURAL AND CULTURAL RESOURCE CONDITIONS: MANAGEMENT ISSUES AND RECOMMENDATIONS FOR THE STAGE HARBOR COMPLEX

2.B.0 INTRODUCTION

As noted in the previous chapter, the Stage Harbor Complex contains some of the most heavily used harbor infrastructure in the Town. It is also home to some of Chatham's most prolific shellfishing areas. It is the contrast between the busy multi-use harbor and the estuarine ponds and associated habitats that contributes to the character, vibrancy and significance of the area.

Two management objectives of the South Coastal plan are

- Protecting water quality, and the quality and quantity of shellfish, finfish and wildlife species and habitat, and
- Preserving the character and scenic quality of the harbor areas.

In consideration of those objectives, this chapter provides an overview and analysis of natural resource conditions in the Stage Harbor Complex -- including water quality, eelgrass, wetlands and shellfish. It also takes into account the cultural values associated with views and vistas of the waterways. Management recommendations for natural and cultural resources set forth in the chapter are intended to help achieve balance between the various commercial and recreational uses of the harbor system and the quality and quantity of natural resources.

2.B.1 WETLANDS AND EELGRASS

OVERVIEW

Coastal wetlands serve many important environmental functions. They provide habitat to a wide variety of terrestrial, avian and aquatic species, they moderate flooding caused by storm events, and they absorb pollutants from ground water and surface waters before reaching coastal waters.

The Stage Harbor Complex includes a wide variety of wetland resources (Figure 13). The variety of wetland resources in the Stage Harbor Complex is one reason for its high habitat value and shellfish productivity. Species such as quahog (*Mercenaria mercenaria*) and soft-shell clams (*Mya arenaria*) seek a variety of bottom types, while oysters (*Crassostrea*) and mussels (*Mytilus*) prefer hard bottom substrate.

Scallops tend to thrive where eelgrass (*Zostera marina*) is abundant. When the plan was developed in the late 1980's, the Town had experienced two prolific scallop harvests. However, since that time scallop harvests have fallen off dramatically. Oyster River, once a scallop haven, is now nearly devoid of the species. There are many potential factors for this trend. One may be the

reduction in eelgrass coverage due to water quality conditions and possibly excessive scallop dragging. Whatever the cause, a recent survey conducted by the Massachusetts Department of Environmental Protection shows that eelgrass coverage in the Stage Harbor System dropped 21.2% from 1994 to 2000.

Table 6. Change in Eelgrass Coverage, 1994 and 2000

Location	1994 Coverage (ft ²)	2000 Coverage (ft ²)	% Change
Outer Stage Harbor	6,402,000	4,787,000	- 25.2
Inner Stage Harbor	1,439,000	1,388,000	- 3.5
Oyster Pond River	2,110,000	2,159,000	2.3
Oyster Pond	675,000	0	-100.0
Mill Pond	277,000	0	-100.0
System-wide	10,903,000	8,334,000	- 21.2

Source: *Water Quality Analyses of Coastal Embayments in Chatham ,MA, 2001, Applied Coastal Research and Engineering, Inc., et al*

MANAGEMENT ISSUES: WETLANDS AND EELGRASS

Loss of Salt Marsh

As with many heavily developed coastal areas, wetland resources within the Stage Harbor Complex face many threats. As sea level rises, wetlands will tend to migrate inland. Build out of the shoreline, including development of piers and erosion protection structures, can preclude opportunities for inland migration to occur, and can result in a loss of salt marsh. Persistent waking caused by boats, foot traffic, and dinghy storage can also damage salt marsh.

Eelgrass Decline

The loss of eelgrass in the Stage Harbor system has been documented. However, specific causes are not known. Eelgrass is often considered as an indicator species whose vitality or decline are signals of larger problems within the ecosystem. Thus the loss of eelgrass in the Stage Harbor system could be part of a natural cycle or the result of changes in water quality or use related impacts.

RECOMMENDED ACTIONS: WETLANDS AND EELGRASS

1. Protection of salt marsh should be a priority consideration in the review of projects for private docks, marina or boatyard expansion, erosion control structures, walkways and dredging.
2. Opportunities for the restoration of damaged salt marsh, and for identifying land to provide inland migration should be identified and explored.
3. The Town, through its water quality monitoring program and wastewater planning efforts, should continue to monitor changes in eelgrass throughout the complex and develop an understanding of the causes of eelgrass variability.

2.B.2 WATER QUALITY

The original plan contained extensive analysis of nutrient loading from surrounding land uses, and the effects of excess nutrients on water quality throughout the Stage Harbor Complex. Several of the recommendations of the plan involved the design of a water quality monitoring program and efforts to better understand and manage wastewater from homes, businesses, and storm run-off.

In 1999, five years after the adoption of the plan, the Town launched an extensive citizen water quality monitoring program in the Stage Harbor Complex. With the help of the Chatham Water Watchers, volunteers involved in the program collect samples and records field measurements at seven stations throughout the Stage Harbor Complex. The samples are analyzed for nutrient content at the School of Marine Science and Technology (SMAST) laboratory at the University of Massachusetts - Dartmouth.

Also since the adoption of the plan, the Town has undertaken two comprehensive planning efforts that address land use and wastewater issues cited extensively in the original plan: the *Chatham Comprehensive Nutrient Management Plan* and the *Chatham Comprehensive Plan* (the latter approved by Town Meeting in May 2003). A product of the nutrient management planning process is a report entitled *Water Quality Analyses of Coastal Embayments in Chatham, MA*. The water quality issues identified in the report are briefly touched on below.

MANAGEMENT ISSUES: WATER QUALITY

Nitrogen Loading

Analysis conducted for the development of the wastewater management plan has found that the watershed draining into the Stage Harbor system contains approximately 1,700 acres dominated by single-family residences. Nitrogen loading from the more densely populated areas within the watershed is focused on the northern reaches of the system. Approximately 80% of the nitrogen from single-family homes is entering the system along the shorelines of Oyster Pond, the northern portion of Oyster Pond River and the Mill Ponds. The on-going study is utilizing water quality data from the citizen monitoring program, and is conducting extensive modeling of nitrogen loading, hydrodynamics and water quality. The results of the study will be incorporated into wastewater management decisions proposed for Stage Harbor and throughout the town.

Bacterial Contamination

Bacterial contamination poses a constant threat to swimming areas and shellfish beds throughout the Town's south coastal waters. Bacterial testing of public shellfishing areas has been conducted since the 1940's. Monitored areas are either *approved*, *conditionally approved*, *restricted*, *conditionally restricted*, or *prohibited* based on fifteen sets of water quality samples taken under conditions prescribed for the particular area. In 2001, the Massachusetts Legislature passed the Beaches Act, which tightened protocols for bacterial monitoring of public swimming areas. Since the new protocols were put in place, Cockle Cove Creek has been periodically closed to swimming due to high bacteria readings. The form of bacteria most often associated with beach closings is

enterococcus, commonly found in the bowels of warm-blooded mammals. Most enterococcus is believed to be from storm runoff rather than septic systems, which have the ability to filter pathogens. However, the exact sources of bacteria are unknown and may vary for different water bodies. Some communities have begun using DNA testing or other methods to try to track sources of bacteria.¹

Toxic Pollution

Like bacterial contamination, toxic pollution is not a major concern currently in Stage Harbor, Nantucket Sound or the Southway. However, the incidence of toxic pollution is a real threat and must be prepared for. A primary source of toxic pollution in coastal waters is from oil or fuel spills. A recent spill of oil or fuel of unknown origin in Nantucket Sound resulted in the closure of the Town's Nantucket Sound beaches. Fortunately, the Town's quick response averted any major damage from occurring. However, a larger spill could pose a more serious challenge for the town's emergency response capabilities.²

A naturally occurring source of toxic pollution is called Harmful Algal Blooms (HABs). These rare species produce harmful neurotoxins that can be transferred to shellfish, birds or other animals. Some species develop dense patches that become visible, while others can be harmful without reaching visible densities. The National Oceanic and Atmospheric Administration has begun to develop a research plan to better understand HABs and develop strategies for prevention, mitigation and control of HABs.³

MANAGEMENT RECOMMENDATIONS: WATER QUALITY

1. The Town should continue a high level of commitment to water quality monitoring throughout the Stage Harbor system. Implementation of the recommendations of the nutrient management plan should be a priority.
2. The Town should carefully consider employing DNA testing, or other feasible method of determining bacteria sources, in areas where sustained high bacteria counts have been recorded on a frequent basis. If in those areas a bacteria source is identifiable, the Town should undertake or require responsible parties to undertake remediation efforts.
3. The Town should review the Coast Guard Area Committee Oil Spill Contingency Plan for Southern Massachusetts and Rhode Island and to evaluate whether it adequately addresses local emergency response needs. Recognizing that the Harbormaster must notify the Coast Guard of any fuel spill, the Town should develop a locally tailored emergency response plan to address spills that, while harmful to the area, may not trigger intervention by the Coast Guard. (This recommendation applies for the Southway and Nantucket Sound complexes also.)
4. The Town should continue to monitor research and policy develop regarding Harmful Algal Blooms (HABs). Based on information generated from regional and national institutions, and based on local conditions, the town should develop a plan to address the prevention, mitigation, and control of HABs.

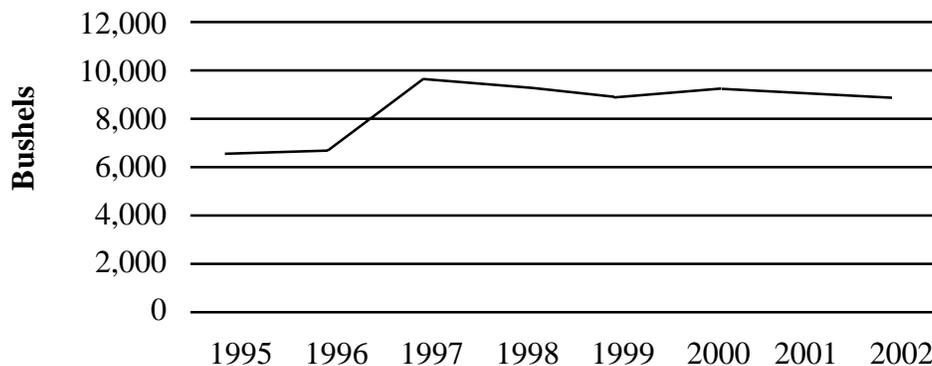
2.B.3 SHELLFISH RESOURCES

OVERVIEW

Chatham's shellfishing industry is an important part of the local economy. The wholesale value of shellfish harvested annually in Chatham is estimated at \$5 million⁴. Shellfish resources within the Stage Harbor Complex are often referred to as the "bread and butter" of the Town's shellfishing industry. Commercial and recreational harvesting of bay scallops, quahogs, soft-shell clams, and mussels occurs throughout Stage Harbor, the Mitchell River, Mill Pond, Oyster River and Oyster Pond. Oysters, once abundant throughout the system, are harvested sporadically and are primarily a recreational resource since they are off limits to commercial harvesting.

Quahogs are the predominant species throughout the system, and account for the vast majority of the reported catch. Quahog habitat, which is characterized by interrupted sediment, is pervasive throughout the system (Figure 9).

Chart 3. Quahog Harvest, Stage Harbor Complex



Scallops have a variable presence throughout the Stage Harbor Complex from year to year. In the mid to late 1980's, scallop yields were at peak levels, accounting for 20,000 to 25,000 bushels per year in the Stage Harbor Complex alone. Scalloping hot spots have included the Oyster River, Mitchell River, the Sears' Point side of Stage Harbor, and the edge of island flat. The loss of eelgrass throughout the Stage Harbor Complex, as noted above, has diminished scallop habitat. The loss of eelgrass may help to explain the dramatically lower scallop harvests reported in the last ten years (Figures 10, 11).

Soft shell clams, oysters and mussels are interspersed along the hard-bottomed shore areas (Figures 8,10). Soft shell clams occur in virtually all the intertidal areas of the Stage Harbor system, and occur in commercially viable quantities in Oyster Pond, Stage Harbor and Mitchell River. Oysters occur sporadically throughout the system. Oysters cannot be harvested commercially, and only by family permit holders during all but the summer months of the year (May 1 – August 31).

MANAGEMENT ISSUES: SHELLFISH RESOURCES

Nitrogen Loading and Loss of Habitat

The report *Water Quality Analyses of Coastal Embayments in Chatham, Massachusetts* indicates that some water bodies within the Stage Harbor Complex are losing habitat value due to nitrogen overloading. According to the report, Mill Pond and Little Mill Pond have lost eelgrass and have infaunal populations dominated by oligochaete worms and nematodes, indicative of eutrophic conditions. Oyster Pond, which maintains a relatively high habitat quality, is experiencing high nitrogen levels relative to other embayments with similar habitat characteristics. The larger subembayments within the system (Stage Harbor, Mitchell River, Oyster River) support moderate habitat quality. However habitat quality in these areas appears to be declining in light of trends in eelgrass loss. The level of habitat quality is above what might be expected given nitrogen levels, but may decline further.⁵

Area Closures

The upper portion of Oyster Pond is permanently closed to shellfishing (one of five permanently closed areas in town.) Seasonally closed areas include: lower portions of Oyster Pond, Taylor's Pond, Mill Creek, and Buck's Creek.

Propagation

The Town has an extensive shellfish propagation program aimed at increasing the natural productivity of the wild shellfishery. One reason why the Town has such an active and successful program is that, since 1983, the Town has had a commercial shellfish propagation revolving fund supported by 75% of all proceeds from the sale of commercial shellfishing permits. Quahogs, oysters and soft shell clams are all propagated town-wide. However the greatest propagation effort is directed toward the cultivation of quahogs due to the commercial importance of the species.

Propagation activities in the Stage Harbor Complex center on the municipal upwelling facility located at the Old Mill Boatyard. On an annual basis the facility handles four million animals. The upwelling facility enables the Town to purchase smaller seed at a lower price, and through a growing process at the upwelling facility, results in a greater survival rate. Once they have reached a certain size, the seed quahogs are transplanted to a grow-out facility in either Stage Harbor or Nantucket Sound, where they are nurtured until they are of a size that can be transplanted in the wild. The grow-out areas are off limits for shellfish harvesting. The town upwelling facility is at its maximum capacity. If there is a need or desire to expand propagation efforts, the town will need to identify an alternate location for the upwelling facility.

MANAGEMENT RECOMMENDATIONS: SHELLFISH RESOURCES

1. The Town's shellfish propagation program should continue to be supported. The existing upwelling facility should be evaluated to determine if it is adequate to meet the Town's long-term propagation needs. To the extent that there is a desire to increase the volume or variety of species addressed by the program, increases in funding for the propagation program and a larger or additional upwelling facility may be necessary.

2. Impacts to shellfish habitat resulting from excessive nitrogen in coastal waters is being documented through the Town's wastewater planning project. Continued loss of habitat will have a dire impact on the local shellfishing industry. Implementation of wastewater management measures aimed at reducing the flow of nitrogen into coastal waters should be expedited. The potential for reclamation of degraded habitat areas also should be considered.

2.B.4 LAND USE AND VISUAL CHARACTER

OVERVIEW

The historical features, scenic qualities and water views surrounding the Stage Harbor Complex contribute to the public's enjoyment of the resource. Public views and vistas from both land and water throughout the Stage Harbor Complex help to define the area's unique character. These are important elements of the local citizen's experience of the area, and also contribute to the community character that attracts seasonal residents and visitors to the town who in turn help support the local economy.

MANAGEMENT ISSUES: LAND USE AND VISUAL CHARACTER

Protection of Water Dependent Uses

Nearly all of the shorefront property in the Stage Harbor Complex is residentially zoned, and most of that land is now developed. Town-owned landings and access points account for a small portion of shoreline parcel area, and a smaller percentage of the shoreline. As a result, pedestrian access to and along the shorefront is very limited. Land uses that are currently classified as water dependent uses – such as marinas and boat yards – account for only a minor share of shoreline parcel area.

Water dependent uses are part of the infrastructure for the town's fishing industry and recreational boating. At this time, many water dependent land uses, such as offloading areas and town landings, are located adjacent to residences. Over time the possibility for conflicts arising from noise, traffic, or encroachment, increases. Management efforts are needed to ensure the sustainability of these limited water dependent uses while ensuring that the opportunities for conflicts are minimized.

Water dependent properties are access points to the people who utilize the services provided on those parcels. Another possible commercial activity not currently on the Stage Harbor waterfront is a restaurant that affords another type of access to compliment marinas and public landings.

Protection of Historic and Scenic Views and Vistas

The area around the Stage Harbor Complex includes many scenic and historic sites and vistas. The Chatham Comprehensive Plan provides a detailed inventory of many of these resources. Some examples are:

Scenic Roads: Sears Road, Champlain Road, Stage Harbor Road, Mill Creek Road, Bridge Street, and Eliphamet's Lane. (This designation prohibits road repair that involves removal of trees or stone walls without a public hearing held by the Planning Board. The board must issue its consent for the work to commence.)

Historic sites and structures: Mitchell River Bridge (Bridge Street), Atwood Museum, U.S.C.G. Boat House and Garage (Morris Island), Doc Keane Scout Hall (Stage Harbor Road), and Brandeis House (Sears Road).

Historical areas and streetscapes: Bridge Street, encompassing approximately 20 historic houses, as well as the Mitchell River Bridge, with views of Stage Harbor; The entire length of Cedar Street including lanes leading to Oyster Pond where shoreline buildings reflect 19th century maritime heritage; and Champlain Road running east-west between Stage Harbor Road and the sharp turn, with magnificent views of the harbor.

MANAGEMENT RECOMMENDATIONS: LAND USE AND VISUAL CHARACTER

1. Support the recommendation in the Comprehensive Plan to maintain and reopen views on town properties where unmanaged vegetation has or threatens to obscure views. Work with private property owners to promote similar efforts.
2. Explore mechanisms for preserving and restoring water views from public roads in residential areas.
3. The Town should develop management guidelines to address issues related to encroachment at town landings and access points.
4. In the process of revising Chatham's zoning bylaws, consideration should be given to the current definition of water dependent uses to ensure that it encompasses all uses that support desirable water dependent activities and public access.

¹ County of Barnstable, Coastal Resource Protection Update, 2002, p. 10-11.

² County of Barnstable, p. 12.

³ County of Barnstable, pp. 12-13.

⁴ *Comprehensive Plan*, Town of Chatham, 2003.

⁵ Applied Coastal Research and Engineering, Inc., et al., *Water Quality Analyses of Coastal Embayments in Chatham, MA*, 2001, p 83.