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 cause 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 slat 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 enterrococcus, 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. [3]

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.[4]

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.[5]

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] County of Barnstable, Coastal Resource Protection Update, 2002, p. 10-11.
[4] County of Barnstable, p. 12.
[5] County of Barnstable, pp. 12-13.

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.)

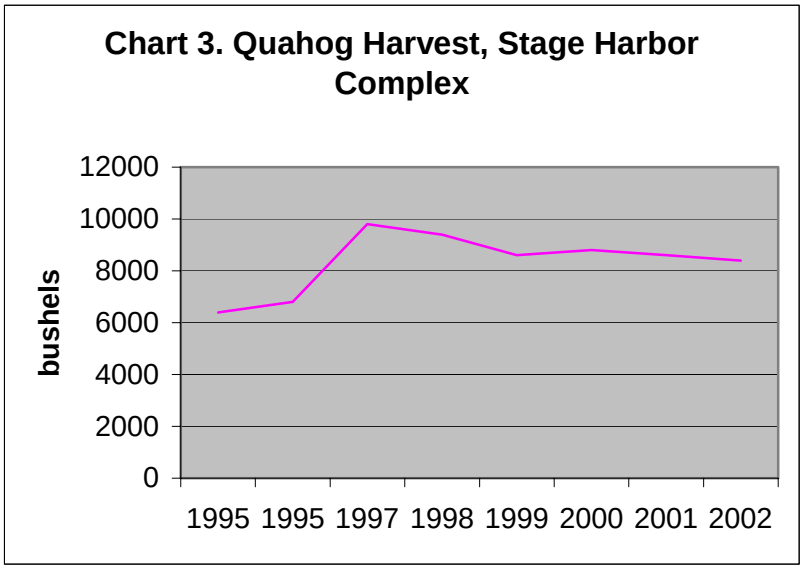
4. The Town should continue to monitor research and policy develop regarding Harmful Algal Blooms (HABs). Based on information generated from regional and national institutions, and based on local conditions, the town should develop a plan to address the prevention, mitigation, and control of HABs.

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 million[6]. 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).



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 loosing 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 embyaments 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 expected given nitrogen levels, but may decline further.[7]

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

[6] *Comprehensive Plan*, Town of Chatham, 2003.

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

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 stonewalls 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 give to the current definition of water dependent uses to ensure that it encompasses all uses that support desirable water dependent activities and public access.