

I. Introduction

Vision of Sustainable Harbor Management in Wareham/Onset Bay

T

his declaration of character and purpose for Wareham's Harbor Management Plan and the future of its waterways continues the paramount principle protecting promoting the exercise of the Harbor Plan's six priority goals.

The primary "vision" of the Harbor Management Plan is the recognition that the long-term environmental health of Wareham must take

as
and
ement



In this first decade of the 21st century, the keystone of the economic vitality of Wareham/Onset is, more than ever, the quality of the Town's water recreational resources and the natural beauty of its harbors. Offering residents and visitors alike the attraction of visual beauty, while allowing multiple, productive and safe use

of its waters. If development in Wareham is allowed to increase without planned control, it is essential that diminished open space on land be relieved by maintaining spaces on the Town's water bodies. This Harbor Management Plan is to work in conjunction with the municipal master plan, not to impose new restrictions on land and shoreline development in Wareham. This plan is intended to offer the necessary guidance for inclusion of the management of multiple activities upon the navigable waterways and along the shoreline within the existing land use/resource management, zoning and development, and law enforcement programs of the town.

The Harbor Management Plan recognizes that maintaining its lead priority, multi-use waters, will require the continuing dedication of all citizens. The Town of Wareham, located at the junction of several major highways, provides the most accessible water resource for a number of burgeoning communities in southeastern Massachusetts and already supplies more public access to its waters than any other town on the western shore of Buzzards Bay. Local areas experiencing already concentrated human activities, such as Onset Bay, could conceivably lose the benefits of multi-use if its shores are impacted by extensive additional development and if particular water-related activities gain unchecked precedence over others. The Town of Wareham must value and preserve its recreational assets and natural beauty while

promoting the six goals which are presented in priority order in this Harbor Management Plan.

B. Purpose of the Plan

The Primary goal of the Harbor Management Plan [continues to be](#), to develop [workable](#) policies and to implement strategies that will satisfy the diverse water- dependent interests and needs of the Town of Wareham. The plan will enable the town to encourage future water-dependent uses of the waterfront and harbor while simultaneously protecting natural and recreational resources and resolving user conflicts. The Wareham Marine Resources Commission and Massachusetts Coastal Zone Management [first](#) administered this program [in 1996](#) to provide a comprehensive plan which has the support of the community. [Further implementation is essential.](#)

Section II, Inventory of Baseline Conditions, is intended as a foundation upon which the remainder of the plan can be built. The Inventory is designed as a working paper from which meaningful conclusions about the issues facing Wareham Harbor may be drawn.

Section III presents a summary of harbor management issues as they evolved during the public participation program. The public participation program included two public workshops, mail-in comment sheets which were distributed at the second public workshop and made available at local marinas and the conservation commission. [The Marine Resources Commission periodically holds public meetings to obtain public input.](#)

Through the public participation program a range of community goals was developed. These goals include issues relating to safety, water quality, preservation of natural resources and community values, multiple uses of Onset Bay and Wareham River, shell fishing, and dredging. One goal which received the most vocal support was the desire of the community to see Wareham waters and especially Onset Bay is allowed to develop for multiple use and not just boating (Section IV). Actions relating to these goals are presented in Section V. In this latter section, guidance is also provided on strategies that may be implemented to make the plan a workable tool for the Town of Wareham.

C. Study Area Description

Located in Plymouth County, on the southeastern coast of Massachusetts, at the mouth of the Cape Cod Canal, the Town of Wareham shares coastline on Buzzards Bay. Situated within the network of Routes 6 and 28 and 1-195 and I495/25, Wareham receives heavy volumes of traffic en route to and from Cape Cod. The Wareham Harbor study area (Figure 1) is composed of Wareham River and Onset Bay in addition to smaller coves, inlets, and bays. It is around these two major inlets which the villages of Wareham and Onset have grown. The Weweantic, Agawam and Wankinco (extended from the Wareham River) rivers flow into Wareham Harbor and Buzzards Bay.

Wareham has 54 miles of waterfront (Wareham Town Report) including 37.16 miles of coastal frontage (DEM, 1990) which is used for a multitude of commercial and recreational pursuits. Buzzards Bay has historically been rich in shellfish beds and shell fishing continues to be a livelihood in the Town of Wareham, [however, it should be noted that the number of shell fishermen in town has been declining](#). Recreational pursuits focus around an active boating and sailing community which uses the private marinas, numerous private piers, and the town pier and launches. The Wareham Harbormaster has issued 1,200 Harbor Services Permits in 1992 (down from approximately 1,400 before Hurricane Bob and the current drop in the economy), an indication of the number of boats moored or launched in town. Much of the coastline is beach which is accessed for public and private use. According to the Massachusetts Coastal Land Inventory, publicly owned coastal frontage totals 8.82 miles or 23.7% of Wareham's coastal frontage. Wareham has 17.5% of the Buzzards Bay Coastal Region's coastal frontage (Westport to Wareham) and 26.9% of the region's publicly owned frontage (DEM, 1990).

II. Inventory of Baseline Conditions

Baseline conditions in the project area have been inventoried to form a basis for informed decision making. Information on water resources, manmade resources, and natural resources has been compiled using secondary data from the Town of Wareham, state agencies, and personal interviews with town staff, the Wareham Marine Resources Commission, and representatives from private marina facilities.

A. Water Resources

1. Water Quality

Water quality data were obtained from the U.S. Geological Survey, U.S. Army Corps of Engineers, Massachusetts Department of Environmental Protection, Massachusetts Coastal Zone Management, Massachusetts Division of Marine Fisheries, Massachusetts Division of Water Pollution Control, and Wareham Shellfish Commission; the Buzzards Bay Project, Wareham Board of Health, and Wareham Marine Resources Commission.

Information on drainage and discharge points and facilities was acquired through interviews with municipal officials and marina proprietors. The inventory of storm drains was compiled from the data presented in the *Onset Harbor Study* (Soderstrom, 1988) and the *Wareham Harbor Study* (Clayton, 1988). The Massachusetts Division of Marine Fisheries (DMF) Sanitary Survey Reports (1989) for Onset Harbor and Wareham Harbor provided additional storm drain information. Mapping was developed from these DMF reports.

The available quantitative and qualitative information was analyzed to evaluate the water quality in the study area.

a. Water bodies

The surface water bodies in the study area comprise four major systems: Wareham River, Onset Bay, Weweantic River, and a small area of Buzzards Bay. In addition, there are smaller embayments, including Bourne Cove, Little Harbor, Widows Cove, and Butler Cove.

The Wareham River system consists of Agawam River, Wankinco River, Wareham River, Broad Marsh River, Crooked River, and Marks Cove. Both the Agawam and Wankinco rivers originate in the Myles Standish State Forest and flow south through ponds, swamps, and cranberry bogs. The drainage area for these systems is approximately 39 square miles (Clayton, 1988).

The Onset Bay system includes Gibbs Brook, Muddy Cove, Broad Cove, East River, Shell Point Bay, Onset Bay, and Pleasant Harbor. The freshwater input into the Onset Bay system is minor compared to the other systems in the study area. Water bodies that drain into Onset Bay consist of Dicks Pond, Beaver Dam Pond, Union Pond, Cedar Pond, Sandy Pond, and the pond at the end of Cutler Drive (Soderstrom, 1988).

The Weweantic River system consists of the Weweantic River with Horseshoe Pond and the smaller Sippican River. The river system drains an area of approximately 60 square miles. There are numerous cranberry bogs in the drainage area (Clayton, 1988).

b. Bathymetry

The Wareham River bed has a central channel that extends from its confluence with the Agawam River to Buzzards Bay. The maximum water depth in the 100-foot-wide channel is 16 feet (NOAA, 1990; U.S. ACOE, 1986).

Onset Bay consists of a deeper central basin which is separated from the Hog Island Channel and Buzzards Bay by a shoal area in the vicinity of Onset Island. Maximum water depth of the deeper turning basin at Onset Pier is 16 feet; water depth of the shoal is 10 feet (NOAH, 1990; U.S. ACOE, 1990). Two 8-foot-deep anchorages are located near Wickets Island. Onset Bay has been dredged to 15 feet in the shallower areas to connect the village of Onset with Buzzards Bay.

The Weweantic River has a channel depth of up to 10 feet. In the vicinity of Briarwood Beach, the water depth reaches a maximum of 19 feet. The water depth of Buzzards Bay west of Stony Point Dike is less than 15 feet.

c. Natural and Manmade Impediments and Flushing of the Harbor

Flushing rates of the Wareham River, Weweantic River, and Onset Bay were recently determined by the Buzzards Bay Project (Table 1). The residence times of pollutants in these water bodies ranged from 2.3 to 5.9 days. The longest residence times were calculated for the upper Wareham River and the Weweantic River. Residence times for smaller embayment's close to Buzzards Bay, such as Little Harbor, Bourne Cove, Widows Cove, and Butler Cove, are estimated at less than 2 days.

There are a number of natural impediments to flushing. [The continuing elongation of Shell Point sand bar is threatening the usability of the 1972 State dredged channel.](#) At the entrance to Onset Bay from Buzzards Bay in the vicinity of Onset Island is a shoal. In addition, several smaller water bodies including Broad Cove, Shell Point Bay, Little Harbor, Bourne Cove, and Broad Marsh River are constricted by a narrow entrance and sand bars.

Along the shore there are small manmade structures such as jetties, ripraps, and groins to stabilize the shoreline. These structures, as well as marinas, possibly reduce the flushing rate to some extent. The effect of these structures, however, is included in the flushing rates in Table 1.

Table 1
Flushing Rates

<u>Residence Time</u>	
Upper third of Onset Bay	2.8 - 4.3 days
Upper Wareham River	5.75 days
Lower Wareham River	3.6 days
Broad Marsh River	3.3 days
Upper Weweantic River	2.3 - 5.9 days
Source: Buzzards Bay Project, 1991	

d. Sediment Types, Transport, and Distribution Patterns Throughout the Harbor

Quantitative sediment data, collected by the Massachusetts Division of Water Pollution Control (Gil and Beaudoin, 1987), were available from three stations in the study area. These stations were located in Wareham River (Station 24), Onset Bay (Station 11), and in Buzzards Bay (Station 42). Sampling stations are identified in Figure 2. Coarsest sediments were collected in Buzzards Bay with mostly sand (Table 2). The sediment at the Wareham River station consisted of 50% sand and 50% silt and clay. The sediment of the Onset Bay station consisted of mostly silt and clay. The finer grain size in Onset Bay is possibly caused by low flow velocities.

Quantitative information on the sediment transport and distribution in the water bodies in the study area was not available. Pinehurst Beach and Swifts Beach have been losing sand due to erosion,

although some of the loss at Swifts Beach may be related to mechanical raking and cleaning (town maintenance). Swifts Beach and Swifts Neck were the areas of Wareham which were the hardest hit during Hurricane Bob in August 1991.

e. Sediment Chemistry

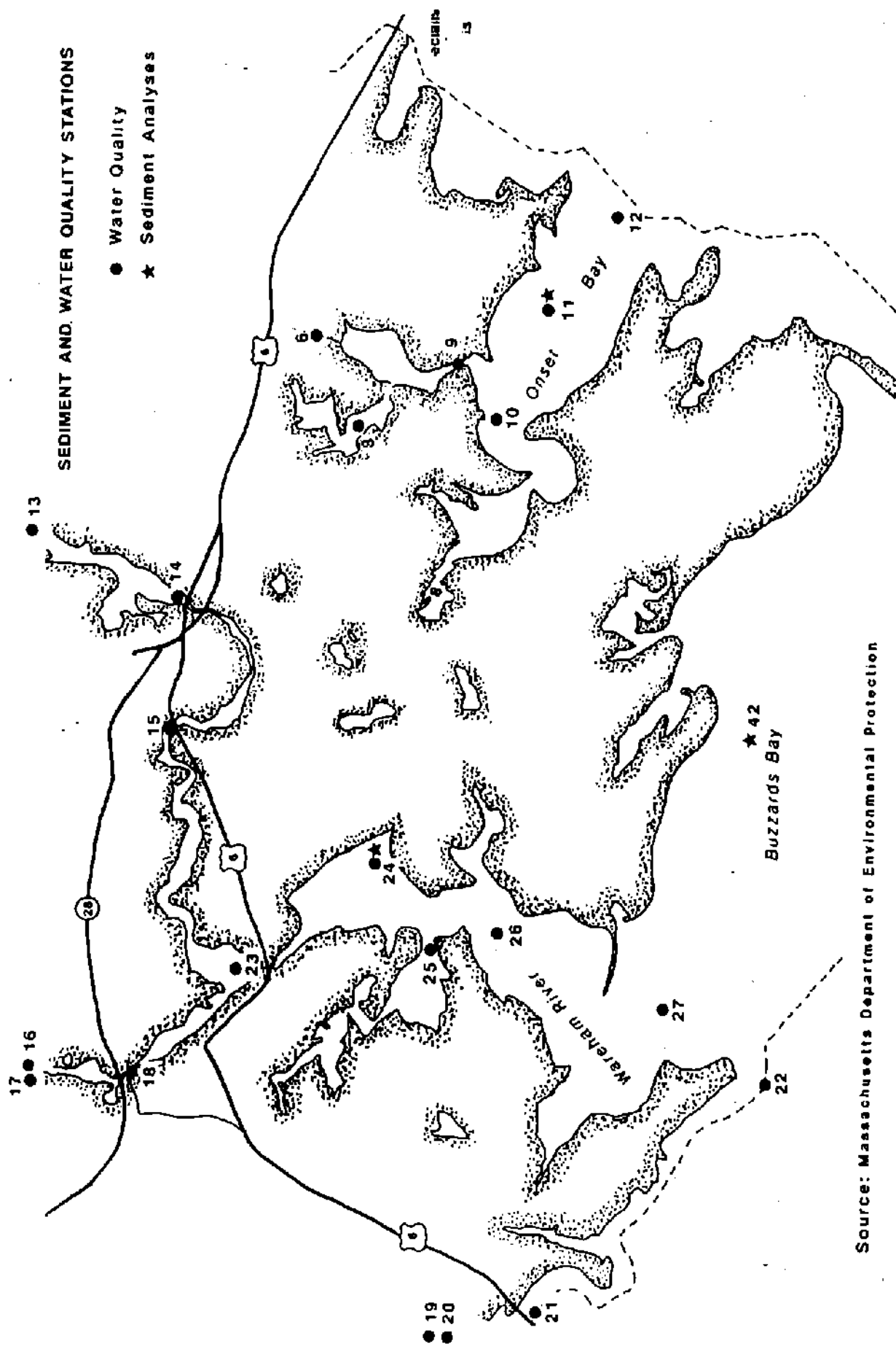
Pollutants in coastal sediments typically include metals, pesticides, herbicides, fungicides, PCBs, and polycyclic aromatic hydrocarbons (PAHs), among others. Potential sources of these pollutants include urban runoff, sewerage discharges, fertilizers and herbicides, anti-fouling paints from boats, oil spills, and industrial discharges.

In the study area, chemical analyses were carried out at three stations for selected chemical compounds by the Massachusetts Division of Water Pollution Control (Gil and Beaudoin, 1987). These compounds consisted of heavy metals, PCBs, and PAHs. Metal concentrations were lowest at the Buzzards Bay site probably due to the coarser grain size which reduces absorption (Table 2). PCBs and P s were not detected, with the exception of a low concentration of PCBs in the Onset Bay sample. These concentrations, obtained in the scientific study, cannot be directly compared to regulatory standards which require different analytical procedures.

f. Dredging

The federal regulatory agency for dredging issues is the U.S. Army Corps of Engineers (U.S. ACOE). Onset Bay is connected to Buzzards Bay by a dredged channel measuring 15 feet deep by 150 feet wide which was last dredged over 35 years ago. The channel usually requires maintenance every 5-10 years. According to the *Onset Harbor Study*, the Commonwealth of Massachusetts and the Town of Wareham dredged the basin and channel 10 feet deep in 1914. In 1935 the basin was enlarged and the channel basin was deepened to 15 feet. In 1945 the turning basin was enlarged and a 16-acre anchorage basin was dredged to 8 feet. Improvement dredging took place in 1957.

A 1991 U.S. ACOE proposal to dredge the East River channel from Onset Bay to Broad Cove has been dropped from further consideration at this time due to economic considerations derived through a cost benefit analysis. As the East River is used primarily for recreational boating, an activity with minimal economic benefit, the cost could not be justified. U.S. ACOE participation is typically directed toward dredging projects which benefit commercial vessels.



Source: Massachusetts Department of Environmental Protection

Table 2
Grain Size Distribution and Sediment Chemistry

Grain size (1)			
Sand	50	25	81
Silt	37	57	19
Clay	13	18	0
Chemistry (Total Concentration in mg/kg dry weight) (1)			
Cadmium			<1
Chromium	13	23	9
Copper	19	24	5
Lead	32	36	8
Mercury	0.59	0.17	0.05
Nickel	4	11	5
PCB/Aroclor			
1016/1242	ND	ND	ND
1248	ND	ND	ND
1254	ND	0.89 (2)	ND
1260	ND	ND	ND
PAHs	ND	ND	ND

ND = Not detected

* See Figure 2 for station locations.

Notes:	(1)	The concentration listed for stations #24 and #11 represent the mean of two replicate samples.
	a)	The concentration of one of the two samples was ND; the concentration of the replicate sample was very low at 0.89 mg/kg, just barely above the detection limit.

Source: Massachusetts Department of Environmental Protection, Division of Water Pollution Control (Gil and Beaudoin, 1987).

The Massachusetts Department of Environmental Management, Division of Waterways has proposed a maintenance dredge project which extends from the federal channel in Onset Bay to the second bridge over the East River. This channel has previously been dredged but has not been maintained in many years. This project is similar to one proposed by the U.S. ACOE for the East River, Broad Cove area which was dropped from further consideration because of a lack of economic justification (this area is used for recreational and not commercial use).

As proposed in 1993 the East River dredge project **consisted of two** phases:

Phase I: maintenance dredging of a 100-foot-wide channel to a depth of 6 feet from the existing 8-foot-deep anchorage in Onset Bay to the stone bridge on Onset Avenue. Dredged material would be used for beach nourishment.

Phase II: new dredging of an 80-foot-wide channel to a depth of 6 feet at mean low water in the East River, extending only 400 L.F. into Broad Cove from the stone bridge to the Main Avenue bridge at Muddy Cove, including widening and deepening the channel to the 12th Street boat ramp. Dredged material would be considered for beach nourishment.

The history of dredging in Wareham River is summarized in the *Wareham Harbor Study (1988)*. Wareham River has been dredged twice in the past 100 years. In 1896 the U.S. ACOE dredged the channel from Buzzards Bay to Wareham 9 feet deep, over ^{3A} of the width in the upper harbor and 'h of the width in the lower portion of the river. In 1917 the Commonwealth of Massachusetts dredged a 12-foot-deep channel 90 feet wide. The Harbormaster noted that Wareham River is in need of dredging and is likely to be dredged in the future. Neither Buzzards Bay between Stony Point Dike and Cromeset Neck nor the Weweantic River has ever been dredged, and there are currently no plans for dredging.

In the event of dredging, a study of the rocks, bottom sediment, debris, refuse, and plant or animal matter of the proposed area would be conducted to determine physical and chemical constituents. U.S. ACOE and Massachusetts Department of Environmental Protection, Division of Wetlands and Waterways (310 CMR 9.00) standards for dredging and dredged material disposal would be followed.

g. Water Quality Classification

The Massachusetts Department of Environmental Protection (DEP) regulates the water resources within the state under the federal Water Pollution Control Act (Clean Water Act). As required by the act, DEP Division of Water Pollution Control (DWPC) developed the Massachusetts Water Quality Standards "which designate the uses for *which* the various waters of the commonwealth shall be enhanced, maintained and protected; which prescribe the water quality criteria required to sustain the designated uses; and which contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges." These regulations are promulgated in 314 CMR 4.00 Surface Water Quality Standards, 1990.

The classes adopted for inland waters and coastal and marine waters establish the target water quality criteria and the associated uses of the water bodies. Surface waters are classified according to the most sensitive beneficial uses of this resource and by minimum criteria for water quality. Classified water bodies have to meet the water quality standards specified by the regulations (314 CMR 4.00). The classes are as follows:

Classes for Inland Waters

Class A: Designation for use as a source of public water supply.

Class B: Designation for the uses of protection and propagation of fish, other aquatic

life and wildlife; and for primary and secondary contact recreation.

Class C: Designation for the uses of protection and propagation of fish, other aquatic life and wildlife; and for secondary contact recreation.

Classes for Coastal and Marine Waters

Class SA: Designation for the uses of protection and propagation of fish, other aquatic life and wildlife; for primary and secondary contact recreation; and for shellfish harvesting without depuration in approved areas.

Class SB: Designation for the uses of protection and propagation of fish, other aquatic life and wildlife; for primary and secondary contact recreation; and for shellfish harvesting with depuration (Restricted Shellfish Areas).

Class SC: Designation for the uses of protection and propagation of fish, other aquatic life and wildlife; and for secondary contact recreation.

Water quality classifications for the surface water bodies in the Wareham study area are listed in Table 3 and on the Water Quality Classification Map, Figure 3.

Table 3

Surface Water Quality Classification

Weweantic River - Source to Outlet at Horseshoe Pond	B
Weweantic River - Outlet of Horseshoe Pond to mouth Agawam	SA
River - Source to Wareham Sewerage Treatment Plant Agawam	B
River - Wareham Sewerage Treatment Plant to confluence with Wareham River	SB
Wareham River	SA SA
Onset Bay	

Source: Massachusetts Department of Water Pollution Control (314 CMR 4.06), 1990

Potential pollution sources of the water quality in the study area consist of urban runoff, leachate from septic systems, boat discharges, leachate from landfills, industrial discharges, and sewerage treatment plant effluent). The pollutants either enter the water bodies as point sources or as nonpoint sources, such as leaking septic tanks and storm drains.

The coliform concentrations in the coastal and estuarine waters in the study area are monitored regularly by the Wareham Board of Health and the Massachusetts Division of Marine Fisheries (e.g., Sawyer, 1989a; 1989b). Fecal coliform concentrations are determined as an indicator of the amount of the bacterial species *Escherichia coli* (*E. coli*) in fecal material. *E. coli* is normally found in warm-blooded animals' intestines and wastes and is not harmful to humans by itself. Certain other coliform bacteria which are harmful (pathogens) exist in the natural environment and frequently live in similar conditions as *E. coli*. Fecal coliform is therefore used as an indicator of such pathogens.

Water quality data were also collected by the DEP, Division of Water Pollution Control and by other scientific organizations in connection with the Buzzards Bay Project (e.g., Battelle Ocean Sciences, 1988; DEP-DWPC, 1989), as discussed in detail below.

A detailed analysis of the water quality of Onset Bay and Wareham Harbor is presented in *Onset Harbor Study* (1988) and *Wareham Harbor Study* (1988).

Fecal Coliform

Fecal coliform data from the Wareham Board of Health is not necessarily compatible with the data from the DMF since different analytical techniques were used. The method used to determine the coliform concentration by the Board of Health may have underrepresented the actual amount of bacteria present. This issue is discussed in more detail in the *Wareham Harbor Study* (1988).

The **Wareham Board of Health** analyzes fecal coliform concentrations at the town beaches on an average of twice per month during the swimming season (see Table 4). Fecal coliform concentrations are typically below the Board of Health beach closure limit of 200 *E. coli*/100ml; yet, occasionally, a concentration exceeds the median concentration. The only time the beach was closed was during the aftermath of Hurricane Bob. The sporadic nature of unusually high concentrations suggests a nearby source of fecal coliform, which irregularly creates "patches" of elevated concentrations in the water. A Buzzards Bay Project study indicates boat discharges could be the source of such patches (DEP-DWPC, 1989; Beskems, 1990). Other sources such as septic systems or storm drains probably do not cause these patches since these sources typically release coliform into the water gradually, which results in a gradual increase in the coliform concentration in the water column and a more uniform regional distribution.

The **Massachusetts Division of Marine Fisheries** (DMF) collects water samples and analyzes them for fecal coliform to determine water quality in shellfishing areas. Prior to January 1988, this responsibility was performed by the DEP. There are over 100 DMF monitoring stations in the study area. Typically, areas with open shellfish beds are tested five times per year. The following coastal regions are tested: Weweantic River, Wareham River, Agawam River, Little Harbor/Bourne Cove, Widows Cove, Onset Bay, Shell Point Bay, Broad/Muddy Coves, and Butler Cove. Fecal coliform data for the years 1985 through 1991 are presented in Appendix 1. These data provide the baseline for the closure of shellfishing beds. The lower detection limit applied by the DMF is 1.7 *E. coli*/100ml; the upper detection limit is 64 *E. coli*/100ml. Closure occurs when the levels exceed 14 *E. coli*/100ml. No inferences can be made from these data on the swimability of the coastal waters near the sampling locations since the beach closure limit is 200 *E. coli*/100ml.

Between 1985 and 1991, fecal coliform levels exceeded the closure limit in all coastal regions in most years. Consistently high fecal coliform concentrations were observed in the Weweantic River, Wareham River, Broad/Muddy Coves, and Shell Point Bay. Fecal coliform concentrations were particularly high in the Agawam River. The fecal coliform concentrations in Butler Cove and Onset Bay are cyclical; shellfish closure limits are generally exceeded only in the summer and early fall. Widows Cove and the Little Harbor Bourne Cove region had the lowest fecal coliform concentrations. However, the trend of the fecal coliform concentration in the Little Harbor Bourne Cove region as well as for the Wareham River showed an increase. The trend in the other coastal regions remained steady over the seven years of monitoring.

The main sources of the fecal coliform are possibly urban runoff and septic systems. Clayton (1988) stated that rainfall levels (and thus urban runoff) seem to be strongly correlated with fecal coliform levels. Summer activities near the waterbodies (summer residences, boating, etc.) may also affect the fecal coliform concentrations, as indicated in the seasonal increase in Butler Cove and Onset Bay during the drier summer and fall months. Boat discharges contribute in the summer (Beskenis, 1990), although the quantitative contribution to the coliform levels is not known (Sawyer, 1989a, 1989b).

A variety of water quality parameters were investigated by the **Massachusetts Division of Water Pollution Control** in 1985 at 21 stations in the study area (Gil, 1987). Fecal coliform levels exceeding the shellfish bed closure limit were observed in Gibbs River, Weweantic River, Agawam River, and Wankinco River in the vicinity and downstream of the tri-town Landfill in Carver (Table 5). The data suggests that the upper estuaries and rivers provide a considerable source of coliform to Wareham River and Onset Bay.

Nutrients

Nutrients are supplied by point and nonpoint sources that include failing septic systems, lawn and agricultural fertilizers, stormwater drainage pipes, waterfowl, marsh vegetation, and boat discharges. High nutrient levels could lead to eutrophication and ultimately to anoxic conditions at the bottom of the water column in areas of limited flushing. Such anoxic conditions in turn deplete the bottom-dwelling organisms such as shellfish. Furthermore, high nutrient levels lead to increased algal growth which in turn leads to increases in turbidity as these organisms decompose. This turbidity in turn reduces the decomposition rates of fecal coliform. Higher turbidity and thus lower water transparency can also have large-scale effects on eelgrass distribution (Costa, 1988).

Nitrogen loading has been identified by the Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) as an issue which is critical to the future health of our coastal waters.

Excessive nitrogen inputs from septic systems and lawn and agricultural runoff can cause algae blooms in coastal areas thereby depleting the water of oxygen and sunlight, hurting living resources, and causing an overall decline in water quality. The CCMP shows the Wareham and Weweantic river estuaries to be particularly susceptible to nitrogen loading. Onset Bay is also listed as an area requiring growth management to avert the damaging effects of eutrophication.

A large part of the nutrients most likely enters the waterbodies during stormwater runoff, as was

observed by Heufelder (1987) in Buttermilk Bay, outside of the study area.' Nutrient data from the waterbodies in the study area is limited. Nutrients levels are elevated in most waterbodies (Table 5), but particularly in the Agawam River as also indicated by the presence of algal mats (L. Gil, personal communication). No data was found for nonpoint sources for nutrient input into the waterbodies in the study area, such as septic systems, fertilizers, and waterfowl. Further discussion of the importance of these sources is found in Soderstrom (1988) and Clayton (1988).

Other Pollutants

Other pollutants such as trace metals, organics, polycyclic aromatic hydrocarbons (PAHs), may be introduced into the waterbodies by landfills, effluent from sewage treatment plants, marinas, and urban runoff. The landfill closest to the project area is the tri-town landfill in the Wankinco River watershed. The only sewerage treatment plant in the project area is the Wareham Sewage Treatment Plant adjacent to the Agawam River.

The availability of water quality data of other pollutants is limited. During the DWPC water quality study in 1985 (Gil, 1987), mean metal concentrations were found at or below the detection limit (Table 5). Dissolved oxygen concentrations in all samples were above 6.5 mg/l with the exception of the Gibbs River and Weweantic River samples near Route 25. The absence of PCBs, trace metals, and PAHs in the sediment column (Table 2) may indicate that the presence of these pollutants in the water column is small.

Marinas

Marinas may be one of the land uses that contribute to the decrease in water quality exhibited during summer months. Pollutants contributed from marinas to the overall water quality include most notably fecal coliform from illegal discharge of marine sanitation devices, and fuel and oil from the operation and refueling of motor boats (for more details see Soderstrom, 1988). The effect of marinas on the water quality depends on the number of boats, the frequency of boat usage, the policy for pump-out collection, and the placement of refueling stations. Studies indicate that the density and the number of boats strongly correspond to the poor water quality in areas of active boating and in the vicinity of marinas (e.g., Beskenis, 1990; Sawyer and Golding, 1990; Eldredge, 1989; Milliken and Lee, 1990; Gaines and Solow, 1990). Frequently, fecal coliform pollution corresponds with policies of waste collection. Evidence of a boat user discharging human waste into the water while in the marina slips is presented for example in Beskenis (1990).

Other pollutants related to marinas are solvents and painting agents used for boat maintenance which are toxic to aquatic life. This includes copper and tributyltin (TBT) bottom paints used to prevent fouling. No data was available to determine the contribution of such pollutants from boats to the waterbodies adjacent to the marinas in the Wareham study area. Due to strict regulatory requirements, no TBT is currently used by any of the Wareham marinas.

2. Drainage and Discharge

a. Drainage into the Harbor

In August 1989, the DMF, with assistance from Wareham Board of Health, issued sanitary survey reports for Wareham River and Onset Bay. As part of the survey, all known storm drains and discharge points were identified and mapped. It was confirmed by the Municipal Maintenance

Department that no new storm drains have been constructed since the time of the DMF survey. The DMF inventory is included in Appendix 2. [Stormwater remediation projects were completed in 2006 for Muddy Cove, East River and Broad Cove. Stormwater remediation projects have previously been completed on Town property at the Municipal Service Center, Town Hall, and in the Point Independence area of Onset. Currently Stormwater remediation is ongoing \(2007\) along Minot Avenue from the Narrows Bridge to Oak Street.](#)

a. Marine Pump-Out Facilities

In February 1992, the Town of Wareham was designated a "No Discharge Area" by the U.S. Environmental Protection Agency (U.S. EPA). Boaters are required to use one of the seven pump-outs in town or face fines. Furthermore, no discharges are allowed from vessels. The designated area encompasses Onset Bay and Wareham River to the Weweantic River along the border with Marion. Education is a major component of the designation, according to Jean Spaulding, Wareham Health Inspector.

The Wareham Board of Health prohibits all vessels from discharging any sewage, whether treated or untreated, into the coastal waters of Wareham as determined by U.S. EPA. As indicated in the town's No Discharge Area Regulation:

"The Wareham Board of Health prohibits the discharge from all vessels of any sewage, whether treated or untreated into the coastal waters of Wareham as determined by the state of Massachusetts and designated by the United States Environmental Protection Agency."

"Boat sewage shall be disposed of through available boat sewage pump-out facilities within the Town of Wareham, or through other approved means outside of the Town of Wareham boundaries."

"All vessels registering for mooring (harbor permits) within the Town of Wareham shall be inspected by the Harbormaster, or his designee, for compliance with the Marine Sanitation Device Coast Guard Regulation."

"Any violation of the NO DISCHARGE AREA regulation shall be punishable by a fine of \$50.00 and a warning for the first offense, a fine of \$200.00 for the second offense, and a fine of \$500.00 and a loss of mooring rights for one year upon conviction of a third offense."

"This Board of Health regulation may be enforced by the Wareham Board of Health, the Shellfish/Harbormaster's Department, and any applicable state and federal enforcement agencies." [The Marine Resources Commission recommends a program of random inspections of holding tank systems.](#)

Marine pump-out facilities for moored and transient vessels in Wareham are equipped to receive discharge from marine holding tanks. [Only holding tanks are permitted in Wareham.](#)

In many towns, boaters release their wastes directly into the water due to lack of on-shore pump-out facilities or improper toilets installed. As of summer 1991, towns on Buzzards Bay had a total

of 15 pump-out stations; Wareham has 7 of these facilities at the following locations: Warr's Marine, Onset Bay Marina, Point Independence Yacht Club, Stonebridge Marina, Continental (formerly Bevan's) Marina, Onset Town Pier, and Wareham Boat Yard. Table 6 summarizes Wareham's pump-out services. Warr's Marine, Onset Town Pier, Onset Bay Marina, Point Independence Yacht Club, and Stonebridge Marina are tied into the municipal sewer system. According to the Water Pollution Control Department, sewer tie-ins will be made once modifications in sludge-handling expansion to the Wareham Water Pollution Control Facility are completed. Continental Marina currently has a holding tank and an on-site septic system. Wareham Boat Yard has an on-site septic system which services primarily smaller vessels without MSDs. Facilities are most active in the fall when boats are hauled from the water for winter storage.

Although there is no estimate of total number of discharges made per year or the frequency of use of each station, the Harbormaster reports a general underutilization of the pump-out facilities. This was confirmed by the town's request to the U.S. EPA for the designation of a "No Discharge Area".

In the federal application for the "No Discharge Area" it was estimated that annual vessel usage of Wareham coastal waters consists of approximately 1,300 vessels, including 15 commercial and 200 transient recreational vessels (Federal Register, Nov. 14, 1991). The Harbormaster observed that most transient vessels stay in Onset Bay because of its proximity and convenience to the Cape Cod Canal, and its protected waters.

Table 6
Summary of Wareham Marine Pump-Out Facilities Services

name	Public/private	fee	Hours	Se wsrage
Zecco Marina	Private	FREE	Mon -Sat, 8AM-4PM Sunday, variable	Municipal Sewer
Stonebridge Marina	Private	Free	9AM-7PM	Municipal Sewer
Onset Bay Marina	Private	FREE	Sun-Fri, 7:30AM-6 PM Sat, 7 : 3 0 - 7 P M	Municipal Sewer
Point Independence Yacht Club	Private	FREE	Weekdays, 8AM-4PM Weekends, 8AM-8PM	Municipal Sewer
Continental Marina	Private		Daily, 8AM-5PM	Holding Tank & On-Site Septic (to be connected to municipal sewer in 1992)
Onset Town Pier	Public		Weekdays, 8AM-4PM Weekends, 8AM-6PM+	Municipal Sewer
Wareham Boat Yard	Private	-	Daily, 9AM-4PM	On-Site Septic System

* All Wareham pump-out facilities ities are free of charge since 1992, the first year of federal designation as a "No Discharge Area." SOURCE: Coalition for Buzzards Bay, Handbook for Mariners of Buzzards Bay, 1991; Marina Representatives.

c. Fuel Handling Facilities

The possibility of spills or leaks from underground storage tanks poses a threat to water quality. Most of the private marinas have fuel service, although there are two public access points for refueling trucks to service commercial vessels and other large vessels. Both Besse Park and Onset Town Pier allow diesel fuel truck service. No recreational boats are serviced at these fuel handling facilities. Each year the fuel companies must obtain a permit from the fire marshal to sell fuel and must provide a recent inspection of the service vehicles. The Harbormaster is in charge of refueling operations and state law requires that a town official authorize each refueling. Because of the location of bathing beaches on either side of Onset Town Pier, supervision at this site is critical. Similarly, Besse Park has a public park and offers public access; therefore, the refueling operations pose a threat to users of the park. The private marinas and boat yards which have fuel service all have underground storage tanks. Aboveground tanks are prohibited by the fire marshal.

Zecco Marine has one diesel fuel and two gas dispensers on the fuel pier at the bulkhead. Gas and diesel underground storage tanks were installed during the summer of 1991. They include one 10,000 gallon double-wall fiberglass gas tank and one, 6000 gallon double-wall fiberglass diesel tank. These tanks are 180 feet from the bulkhead (seawall). Both tanks are equipped with remote monitoring systems.

The one fuel pump at Stonebridge Marina is supplied from one 3,000-gallon gas underground storage tank. This tank was installed in the 1970s, according to the Onset Fire Department.

Fuel service at Onset Bay Marina is provided and there are three underground storage tanks. Two of these tanks are 6,000-gallon gas tanks and one is a 6,000-gallon diesel tank. These are all new double-wall tanks which have been installed within the last five years. Monitoring systems will be retrofitted into these tanks.

Wareham Boat Yard has one fuel pump that is supplied from an underground storage tank which is at least 15 years of age. This tank is tested annually and received a new annual permit in summer 1991.

[Point Independence Yacht Club sells both gas and diesel fuel.](#)

d. Wastewater

Portions of the Town of Wareham are connected to municipal sewer service which is treated at the Wareham Water Pollution Control Facility (WPCF) located off Sandwich Road. A map depicting the on-line sewers and new sewer projects (Figure 4) was provided by the Water Pollution Control Department.

The Wareham WPCF was constructed in 1971 and put on line in 1972. It has not experienced any operational problems. Discharge from the facility via four pipes is released into the Agawam River between the outlet of Mill Pond and the bridge at Route 6. Treatment design capacity is 1.8 million gallons per day. Average daily demand is approximately 650,000 gallons per day and peak

daily demand is approximately 4 million gallons per day. Currently the facility is undergoing an upgrade in its sludge-handling expansion. The WPCF treats septic sludge from the towns of Wareham, Carver, and Rochester. In the summer an average of 14,000 gallons per day of sludge is brought in by truck and in the winter, the volume decreases to an average of 8,000 gallons per day.

The Wareham Water Pollution Control Facility was reauthorized to discharge into the Agawam River under the National Pollution Discharge Elimination System (NPDES), September 20, 1991.

B. Manmade Resources

1. Land Use

Land uses were determined through Wareham Board of Assessors maps and records. The majority of the land along the Wareham waterfront is used for residential purposes as indicated in Figure 5. Residential activity is clustered around Onset and Wareham Village centers. The majority of commercial activity is located along Routes 6 and 28. The town owns coastal land which provides public access to the shore on beaches, public ways, launches, piers, and parks. Other waterfront vacant land, primarily marsh, is owned largely by the Massachusetts Audubon Society, for preservation and conservation purposes.

In 1916, the Massachusetts Supreme Judicial Court decreed that the "shore fronts and beaches lying between the water and North Boulevard, East Boulevard, South Boulevard and West Boulevard," as described in the "Plan of 1878," were "dedicated to and accepted by the public for public parks and squares, and that the enjoyment of the same for all purposes and uses of or appropriate to parks, squares, groves and shore fronts and beaches devoted to public use and enjoyment belong to the public...." It has been in the interest of many Wareham organizations, including the Committee to Save Onset's Beaches and the Onset Protective League, as well as local Onset residents, to maintain public access to beaches which have developed along the shoreline of Broad Cove and Shell Point in particular.

The 1916 Supreme Court decree has been cited to contest construction of a parking lot in a picnic grove at Shell Point and construction/repair of the 12th Street boat ramp on the East River/Broad Cove.

2. Zoning

The majority of waterfront zoning is residential, both single- and multiple-family as indicated on Figure 6. A small area on the Weweantic River along Route 6 is zoned for Strip Commercial activity. Other Strip Commercial zoning is found along Route 28. Marinas and boating facilities are the only areas zoned for marine use in the coastal area. In the eastern part of Wareham near Broad Cove, between Onset Avenue and the railroad, is an area zoned for Conference Recreation. The object of this area is to facilitate business enterprises and to promote economic development in the town as well as to provide for a year-round recreation and fitness facility, such as a golf course.

Onset Village is zoned as Onset Village Residential and Onset Village Center is zoned specifically as Onset Village Commercial to maintain a compact, pedestrian-scaled area, to encourage business and the distinctiveness of the area, and to promote a visual connection to the waterfront.

Similarly, Wareham Village zoning is designed to protect the historic buildings in the area and promote a visual connection to the waterfront, residential development, and a solid economic base.

3. Demographics and Build-Out Analysis

The 1990 U.S. Census lists the total year-round population of the Town of Wareham as 19,232 persons. This represents a 4.2 percent increase in population over the 1980 U.S. Census figure of 18,457 persons, and corresponds to a population density of 518 persons per square mile. The population density for Plymouth County is slightly higher at 633 persons per square mile (1990 U.S. Census of Population). According to U.S. Census statistics, Wareham's population increased by 61 percent from 1970 to 1980, representing an increase of 6,965 persons. Between 1960 and 1990 Wareham grew 103.3 percent from a 1960 population of 9,461 (SRPEDD). Much of this growth may be attributed to conversion of summer cottages to year-round residences.

The Southeast Regional Planning and Economic Development (SRPEDD) office has prepared revised demographic projections for the area in late 1994/early 1995. These are: year 2000 - 23,027; year 2010 - 24,099; and year 2020 - 25,222. These are based upon land availability and 1992 projections (made by a state agency) which did not take local situations into account.

Carver, which is also located in the Wareham drainage area, is the fastest growing Buzzards Bay community with a 52 percent increase in population from 1980 to 1990 (1990 population - 10,590). Regional growth rates and population are presented in Table 7.

Table 7
Population of Buzzards Bay Communities

Carver	6,988	10,590	51.5%	276
Plymouth	35,913	45,608	27.0%	467
Freetown	7,058	8,522	20.7%	247
Falmouth	23,640	27,960	18.3%	628
Bourne	13,874	16,064	15.8%	392
Marion	3,932	4,496	14.3%	315
Dartmouth	23,966	27,244	13.7%	447
Acushnet	8,704	9,554	9.8%	531
Middleborough	16,404	17,867	8.9%	255
Mattapoisett	5,597	5,850	4.5%	335
Wareham	18,457	19,232	4.2%	524
Rochester	3,205	3,291	2.7%	97
Fairhaven	15,759	16,132	2.4%	1,328
New Bedford	98,478	99,922	1.5%	5,262
Westport	13,763	13,852	0.6%	261
Gosnold	63	98		

The purpose of conducting a build-out analysis is to estimate the total of all development in a community, assuming that the community were to be entirely developed under the provisions of existing zoning. It helps describe the end result of existing regulations and policies towards land use. There are two primary reasons for conducting such an exercise. The first is to gain basic

knowledge regarding the ability of the land to accommodate additional development under present zoning. Second, the result of this analysis can help identify critical issues, such as the existence of land shortages or surpluses, which leads to the formulation of policies and implementation strategies designed to address them. It must be noted here that the build-out analysis presented herein does not recommend or endorse development of certain areas of the town which are relatively free of development constraints.

The build-out analysis was based on an inventory of waterfront parcels in the study area. The inventory was compiled using information from the Wareham Board of Assessors (Appendix 3). From this data the acreage of all vacant parcels which were determined to be developable based on the land use codes in the data was compiled and summed based upon the zoning of the parcels.

Table 8 shows a summary of the vacant, developable acreage by zoning district. (NOTE: Only zoning was used as a constraint once the parcels were extracted from the Assessor's data. Any water and sewer service limitations and environmental constraints such as poorly drained soils were not factored into the equation due to the limited scope of this analysis.) The total acreage per zoning district was then divided by the minimum square-footage necessary to construct a single-family home in each of the respective districts, based upon the current Wareham Zoning Ordinance. This yielded a total of 334 new potential dwelling units which may be built before all of the vacant, developable land is used up.

Table 8
Potential New Dwelling Units*

Zoning	Vacant Developable Acres	Minimum Lot Size Zoning Required ** (Acres)	Potential New Dwelling Units
	Col 2		Col 3
MR30	94.78	0.69	137
R30	49.32	0.69	71
R43	0.00		
R60	170.17	1.38	123
R130	5.54	2.98	2
TOTALS	319.81		334

Based upon vacant, developable land in Wareham Waterfront Parcel Inventory,
(See Appendix 3).

** Based upon minimum lot size required in the Wareham Zoning Ordinance for a single-family residence.

Source: Louis Berger & Associates, Inc.

The key question in the build-out analysis is when will the vacant, developable land be used up? The answer to this question is what will enable the Town of Wareham to plan for future development and to monitor and guide how fast it occurs in certain critical areas.

To calculate the year of build-out, the following formula is used (Collier, 1982):

$$I (\text{Future Year})$$
$$" \text{Baseline Year} = n I (1 .$$
$$\text{Growth Rate}) \text{ (formula's}$$
$$\text{need work)}$$

n = number of years to build-out.
n + Baseline Year = year of build-out.

Where:

In = natural logarithm.

Future Year = baseline year data (e.g. number of existing dwelling units) plus additional number of dwelling units that could be built given existing zoning.

Baseline Year = existing number, variable or measure at a given point in time. Growth Rate = average annual rate of change in a number or variable over time.

The equation variables used in this analysis are as follows:

Baseline Year (1990, based on U.S. Census) = 11,383 total dwelling units
Future Year = 11,717 total dwelling units (11,383 + 334 from Table 7)
Growth Rate = 0.42% per year from 1980 to 1990, based on both dwelling units and total population (4.2% for the decade 1980-1990)

Solving for n (number of years) = 7 (rounded). Therefore the projected year of residential build-out in the study area is 1997 (1990 + 7). Based on the potential increase in the number of households (334), and an average household size of 2.57 persons (1990 U.S. Census), it is possible that an additional 858 persons could live on waterfront parcels by the year 1997.

It is very important to keep in mind that this is a theoretical analysis and that several assumptions have been made as follows:

- The existing zoning map remains unchanged between 1990 and 1998.
- Maximum permitted development is assumed for all buildable land.
- Past trends in growth rates (population and dwelling units) remain constant and dictate future trends.
- The reuse, rehabilitation or enlargement of existing developed sites is not considered.
- Substandard lots have been included in this analysis.

As indicated in Table 8, 334 new dwelling units could be constructed on waterfront parcels. This estimate, however, does not address environmental constraints on these lots including steep slopes, wetlands, substandard lot size or frontage requirements. It also does not address situations such as one in Onset where a paper street (undeveloped) fronts the shoreline. This "street" is on the beach and could never be developed as waterfront homes although five lots, totalling a third of an acre, are listed by the assessor.

Ownership of many of Wareham's shorefront parcels predates town zoning bylaws and is therefore "grandfathered." As "grandfathered lots" the only control on development is based upon Title 5 of the State Environmental Code for Subsurface Disposal of Sanitary Waste (310 CMR 15.00) which establishes distances from waterways for septic systems. If the lot is not sewered there must be 100 feet from the leach system to the waterway. Parcels without sufficient distance would not be buildable. If municipal sewers are available in the street, however, the property would be developable regardless of current zoning restrictions. Development pressures, therefore, increase when sewers are extended along shorefront property. According to Henry Knight, Wareham building inspector, the number of "grandfathered" lots would be in the thousands in town. An accurate determination of the exact number is beyond the scope of this project (requiring several person-months of investigation).

According to 1995 discussions with the planner in the Wareham Community Development Office, only limited shorefront development is anticipated in the future. The Onset area is fully developed in his estimation, although it may be possible to see limited reconstruction (demolition with reconstruction according to current standards) which would not be reflected in an increase in

population. The planner indicated that there is more potential for shorefront development in the Cromeset Neck area on the west. Although a few lots may be potentially available in the Swifts

Neck area, due to the flood hazard these are not very attractive. The Marks Cove area (north of Cromeset) may Nye slow growth as well. One major area, the Indian Neck area (between Little Harbor and the Wareham River), is largely held in estates, is all privately held, and is unlikely to be parceled out within the near future. There is no public water in this area. Wickets Island has the potential for developing four house lots under current zoning. Development pressures on parcels with frontage on salt marshes may continue as construction opportunities on open waterfront parcels decrease.

Implications of the Build-Out Analysis

It should be recognized that this build-out analysis is a model for approximating the development potential of waterfront parcels. The analysis is a tax map-based approach and does not take into consideration the "buildability" of the parcels, in terms of environmental or engineering constraints.

The potential for another 334 developable parcels on the waterfront of Wareham and Onset Bay has implications in many ways for the Town of Wareham. These include, but are not limited to, the following:

- new demands for expanded infrastructure (water, sewers, electricity)
- additional potential impacts on water quality from septic systems
- new demands on town services (schools, emergency services)
- increased municipal tax revenue generated from development of shorefront property
- increased runoff of fertilizers and other lawn-care and home/car care chemicals
- loss of access to the waterfront/shoreline
- loss of views of the water due to a more heavily developed shoreline
- potential loss of opportunities to build parking areas, boat ramps, and other public ingress
- general loss of open space and natural areas
- possible increased demand for moorings, docks and other encumbrances on the waters
- increased motor-based uses of the water and potential increase in fuel/oil spill events
- increased non-motorized uses of the waters for recreation with potential conflicts with motor-based uses.
- continuous conflict between boating and shellfish

4. Marine Facilities and Uses

According to the Wareham Harbormaster, over 2,000 harbor services permits were issued for boats in excess of 10 feet in length operated on the fresh and salt waters of Wareham. This includes over 700 boats moored in Wareham River and over 600 moored in Onset Bay. Other boats would presumably be moored on freshwater ponds or trailered to Wareham waters. The number of harbor services permits issued has declined in recent years due to the economy and

the effects of Hurricane Bob in 1991. There is a waiting list for moorings at the current time (2007). If a mooring is unpaid at the end of the season it is typically removed or reassigned.

Harbormaster

According to February 6, 1989 correspondence from Kopelman and Paige, P.C., Wareham's town counsel, to the Board of Selectmen, the Harbormaster is empowered to enforce laws and regulations in accordance with the following General Laws of the Commonwealth of Massachusetts:

General Laws, Chapter 102, sections 17 through 28, provide the Harbormaster with certain powers related to controlling vessels in the harbor. Pursuant to these sections of Chapter 102, the Harbormaster may direct vessels in the harbor and promulgate harbor regulations, §21; remove vessels lying in the harbor, §24; remove vessels occupying a public wharf; regulate and station vessels in the streams and channels of the harbor, §26; and impose a fine for violations of his order, §28.

General Laws, Chapter 91, Section 10A, provide that the Harbormaster may issue temporary mooring permits "upon such terms, conditions and restrictions as he shall deem necessary." This section also empowers the Harbormaster to remove, after written notice to the owner, floats or rafts held by anchors or bottom mooring installed without his permission, G.L. c. 91, §10A.

The Harbormaster currently has an Assistant Harbormaster and additional staff for the summer months. of four, two patrol boats, and 56 miles of freshwater and marine coastline to patrol. According to the Harbormaster, limited assistance is available from the U.S. Coast Guard and the Massachusetts Department of Law Enforcement since staffing of these agencies is also limited. The Harbormaster has indicated that it is his policy to issue verbal warnings prior to issuing citations. (leave-"of four, two patrol boats " in?)

Marine Resources Commission

The Wareham Marine Resources Commission was created by annual town meeting. As indicated in the town meeting article:

"The purpose of the Marine Resources Commission is to advise the Board of Selectmen on all matters relating to inland and marine waters environment.... The Commission, at the direction of the Board of Selectmen, shall study and recommend programs and uses for coastal areas of Wareham in order that maximum coordinated benefits may be obtained from the Marine Resources of the town."

The Marine Resources Commission serves under the jurisdiction of the Board of Selectmen and is composed of five members and two associates appointed by the Board of Selectmen.

The Shellfish [Constable](#)/Harbormaster/Harbor Patrol Officer also serves as an associate non-voting member of the commission.

a. Private Recreational Marinas

The Town of Wareham has several private boating and marina facilities, the majority of which are located on Onset Bay. The accessibility of the Onset area from the Cape Cod Canal contributes to the activity in Onset. During July, which is the busiest month for transient boat traffic, Onset Bay receives more boats than Wareham River, according to the Wareham Harbormaster. Descriptions of the private recreational marinas are divided into two geographical areas: Wareham River and Onset Bay. Information on marinas was obtained from marina operators in 1991 and updated in 1993. Table 9 summarizes private and public slips and mooring spaces for recreational and commercial marina resources, as reported by the Wareham Harbormaster for 1992. Information on services available at Wareham marinas, yacht clubs, boat yards, and boat ramps is presented in Appendix 4.

b. Public Piers and Boating Areas

In addition to four public boat ramps, the Town of Wareham operates a town pier in Onset Bay and has a pier in Wareham, (Besse Park). There are also piers adjacent to Besse Park that are used for fishing.

c. Commercial Boatyards

Two boatyards in Wareham are in the business of servicing vessels. Cape Cod Shipbuilding also builds boats at its facility.

d. Public Ramps

There are four public boat ramps in Wareham. Parking is limited and often restricted to sticker parking.

Table 9
Private and Public Recreational and Commercial Marina Resources

Name	Total Slips	Total Moorings	Transient Slips	Valet Service	Transient Moorings	Commercial Boats	Recreational Boats	Pump-out
Continental Marina	42	0	(1)	64	0	0	54	Y
Onset Bay Marina	155	34	(1)	45°	8	0	189	Y

Wareham Boat Yard	30	15	0	0	0	--	--	Y
Cape Cod Shipbuilding	0	2	(3)	0	0	--	--	N
Onset Town Pier	0	0	7	0	3	(4)	--	Y
Point independence Yacht Club	57	56	(6)	0	(6)	0	113	Y
Atlantic Marina	69	0	0	0	0	0	73	Y
Maxi Marine	20	0	0	0	0	0	20	N
Zecco Marine	120	65	(1)	0	(2)	5	180	Y
British Landing	41	0	0	0	0	0	41	N
Besse Park	0	0	(8)	0	0	--	.-	N

not applicable

(1) If boats with slips are out of harbor for a length of time, transient slips may be available for lease.

(2) If boats with moorings are out of harbor for a length of time, transient moorings may be available for lease.

(3) Docking facilities **available** for repair.

(4) Head boats, 3 lease **dockage** from the Town and 1 is **moored**.

(5) Point Independence Yacht Club has a permit for 57 moorings.

(6) As a yacht club, reciprocal **slip/mooring** privileges are offered to boats from other yacht clubs.

(7) Does not include 4 slips which were **converted** to storage for **up to 10 skiffs**.

(8) Besse **Park has bulkhead pier space for 3 or 4 boats** in the 25 to 30 foot range of temporary use only

(9) 95 valet units advertised.

Source: William P. Ellis III, **Wareham Harbormaster**, Nov. 1992; marina operators, **July 1993**.

- In addition to a cement ramp at Oak Street/Tempest Knob Beach, there is a small dock connected to a pier Although a town sticker is now required, following rehabilitation access may be unlimited.

n The state ramp at the Weweantic River at I-195 has little water at low tide and at high tide there is no room to pass under the bridge, thus limiting the size of boats allowed. The parking here, which accommodates 50 cars and trailers, is the most provided at any of the public launches in Wareham

.The 12th Street boat ramp on the East River in Onset was recently repaired but there is no legal parking.

- Swifts Beach ramp is located at the end of Shore Avenue. Use is limited to small boats due to the low water depth. Sticker parking is available at Swifts Neck.

e. Mooring Build-Out

The following is from the mooring grid plan completed by Aneptek Corporation. This plan has been accepted by the Wareham Marine Resources Commission as a template for moorings.

Aneptek Corporation was commissioned in 1994 by the Town of Wareham to produce a mooring grid plan for the Wareham River and Onset Harbor areas. The grid plan can be used as a template to establish the capacity of each area, the density of moorings within each area, and the clustering of boats by size and type. In essence, it will allocate space more efficiently, provide more open space for conservation and recreation purposes, and improve the navigability of the waterways.

Generally, a mooring plan is developed as a segment of an overall harbor management plan. In this case, the mooring plan was completed before the entire management plan. Because of this, extensive use was made of interim reports prepared in 1988, for the Wareham River and Onset Harbor areas. It also required involvement by major recreational and commercial user groups, local neighborhood and municipal officials, as well as thoughtful consideration to the preservation of the historic character of the harbor. Other considerations included water depth, conservation of environmentally sensitive areas (wetlands, marshes, etc.), public accessibility, location of shellfishing beds, public beaches, and the rights of property owners to have access to their boats within a reasonable distance from their property (i.e., riparian rights).

The first step in developing the mooring plan was to compile an inventory of the boats that were currently anchored in each harbor. Extensive research was conducted to determine the number of boats and the specific location of each mooring (i.e., Onset Pier, Parkwood Beach, Tempest Knob, etc.) for all the boats that were registered with the Harbormaster's office. With few exceptions, these are the only boats that moorings were provided for. Appendix I (*of the Aneptek Plan*) contains a breakdown, by location, of the number of moorings allotted in the grid plan. Once the total number of moorings for each area was determined, boats were subdivided according to their characteristics (i.e., type, length, draft) and the minimum safe mooring spacing was calculated. Each area was then gridded, keeping in mind the minimum mooring spacing and the other factors mentioned above.

By limiting the number of moorings within the harbors, the quality of the water should be maintained. Many areas in New England, and throughout the country, have experienced damage to the shellfish population due to degradation of water quality caused by unchecked discharges from developed shorelines and development within shellfish habitat areas. Increasing the number of moorings in the harbor may further degrade water quality and cause further damage to shellfish areas which could hinder

the replenishment of various species of shellfish in areas throughout Wareham.

This report is available for review at the Wareham Harbormaster's office and from the Conservation Officer.

f. Other Recreational Uses

One of the town's most important assets is its beaches which are a source of many water recreational activities. Windsurfers frequent the waters off Little Harbor Beach. The primary town beaches have toilets and bathhouses for use by summer beachgoers. Other water sports actively pursued include, w a t e r s k i i n g , fishing, and shell fishing.

Much of the coastline is used for swimming, and residents in some areas have deeded rights to the beaches. The Wareham Recreation Commission has beaches under its jurisdiction: Onset, Little Harbor, Pinehurst, and Swifts Beach/Swifts Neck. Onset, Little Harbor, and Swifts Beach are owned by the Town of Wareham; Pinehurst is privately owned. (life guards) removed?

■ Onset Beach

Onset is the largest public beach and is patrolled by town lifeguards. The one building at the beach served as a bathhouse which has since closed. Restrooms, which are maintained by Municipal Maintenance, are available adjacent to the Harbormaster's office and across the street from the beach at on the bluffs. Remove lifeguards ?

Approximately 40-50 parking spaces are available at Onset Pier. Pay parking at a daily rate is available.

■ Little Harbor Beach

Little Harbor Beach has a very shallow beach, especially at low tide, which makes it a good beach for children. Windsurfers also frequent this beach. There are 217 parking spaces for which a resident sticker is required. Town lifeguards patrol Little Harbor Beach. A bathhouse with toilets is available to the public.. remove?

■ Swifts Beach and Swifts Neck

Swifts Beach and Swifts Neck are separated by a private stretch of beach. A public playground is located at this beach and town lifeguards are staffed here. There is a public boat ramp at the end of Shore Avenue directly on Swifts Beach. The Town of Wareham provides water for the two bathrooms and two bathhouses. A total of 83 parking spaces are provided in two paved locations. Paid parking is available at Swift's Beach at the end of Beach Z Road, and resident sticker parking is available at Swift's Neck. remove?

■ **Pinehurst Beach**

Pinehurst Beach is owned, cleaned and maintained by the Pinehurst Beach Association. It is open to town residents. There is no parking available. The Municipal Maintenance Department picks up seaweed and refuse from the beach.

■ **Other Beaches and Playgrounds**

Playgrounds located near Onset Beach and Swifts Beach are maintained and operated by the Recreation Commission and Municipal Maintenance Department. Onset Playground has a wooden play structure which was completed in 1987-88 through volunteer fund raising. This playground serves townspeople, although the Recreation Commission noted that the playground attracts people from out of town also. There are two basketball courts and the softball field is used by a women's league and by school leagues. At the Swifts Beach Playground, there is a smaller wooden play structure, also funded through volunteer fund raising and contributions. There are also picnic tables at this site.

The Town of Wareham owns other unguarded beaches which are not maintained or operated by the Municipal Maintenance Department. These include Point Independence Beach (1.05 acres) located between Point Independence Yacht Club and Admiral's Way, two smaller beaches on Riverside Drive (2.7 acres), a small beach on North Boulevard, Nemasket Beach (.25 acres), and Weweantic Shore beaches (1.0 acre total).

Tempest Knob terrace Beach is town owned but according to the Municipal Maintenance Department, it is not considered an official town beach. The beach is 1.17 acres in size and has 3,037 feet of water frontage. A public boat ramp with a small pier and dock is accessible off Oak Street.

Other waterfront beach property is owned by private beach associations. The Parkwood beaches, totaling 26 acres, are owned and maintained by the Parkwood Beach Association. In addition to maintaining Pinehurst Beach, the Pinehurst Beach Association owns various parcels of private beach. The Hamilton Beach Association owns 4.2 acres of beach property. The Nanumet Heights Beach Club is located on a beach of the same name.

C. Natural Resources

1. Coastal and Inland Resource Features

Coastal and inland wetland resources have been identified based on aerial photographs of Wareham; reports prepared for the town; and federal and state wetland mapping and inventories. Coastal and Wetland features are illustrated on the natural resources map located in the sleeve to the rear of the text. For mapping purposes and for the summary of approximate acreage presented in Table 10, shallow fresh marsh, shrub swamp, and wooded swamp inland wetland features have been combined in the wetland category. Deep marsh and pond categories have also been combined. A full inventory of coastal and inland wetland resources is presented in Appendix 5.

The inventory has been completed by drainage areas. Due to tidal fluctuation, beaches have been measured in linear feet of coastal frontage and not by acreage. Tidal flats have typically been estimated at a 100-foot width except where significant variation is indicated in the data. Sea cliffs

are listed in linear feet. All approximations of acreage are based upon mapping at a scale of 1" 400' and therefore will not correlate with property ownership data.

As a coastal community, Wareham exhibits characteristics of three habitats: saltwater, freshwater, and a dynamic interface between the two due to tidal influences, where the aquatic ecosystem is dependent upon brackish conditions.

Table 10
Coastal and Inland Wetland Resources Summary
Approximate acreage or linear feet

Coastal Resources							
Dunes		IA		IA		84A 107A	
Salt Marsh	83A	13A	16A 1A	82A 3A	25A		16A 175A
Salt Ponds			15A 1500'		IA	2500'	
Sea Cliffs					300'	122A	2650'
Tidal Flats	10A	IOA 3300' 2		600'	18A	20900'	122A
Beach	6600'				5700'	6	22300'
Harrier Beaches	4				4		15
Island	IA						2
Inland Resources							
Deep Marsh/Pond	31A		4A	16A	15A		42A
Wetland	MA			48A	53A	3A	26A
Bog				IA	IA		
Cranberry Bog	24A		5A	4A	10A	5A	86A
<p>A = acre</p> <p>= linear feet</p> <p>1 - Swifts Beach</p> <p>2 - Broad Marsh River</p> <p>3 - Agawam River</p> <p>4 - Wareham Route 6 to Long Beach Point</p> <p>Source: Louis Berger & Associates, Inc. 1991 based on CZM Coastal Barriers Resources System, 1982; DEM Wetland Restriction Program Plan for Wetlands, prepared 1978; NQAA Cape Cod Canal and Approaches map, 1990; U.S. Fish and Wildlife Service, National Wetlands Inventory; U.S. Department of the Interior Coastal Barrier Resources System, 1983.</p>							

For the natural resources inventory, the study area has been analyzed from west to east by the following watershed areas which are described in detail below:

- Weweantic River to Marks Cove

- Wareham River
 1. Swifts Beach to Hamilton Beach
 2. Broad Marsh River to Route 6 Bridge
- 3. Wankinco and Agawam Rivers
- 4. Wareham River (Route 6 to Long Beach Point)
- Buzzards Bay - Long Beach Point to Cedar Island Point
- Onset Bay

The **Weweantic River** is fairly protected from the currents and wave action of Buzzards Bay. Nobska Beach, located at the end of Cromeset Neck, is more exposed to the influences of Buzzards Bay. Barrier beaches are found on both the east and west shores of Cromeset Neck and at Marks Cove including one north of Nobska Point which is protected by the U.S. Department of the Interior. Marks Cove, with depths typically 2 to 5 feet at mean lower low water (the average height of the lower low water over a 19-year period, as presented in the Cape Cod Canal and Approaches NOAA map), is bounded by salt marsh and tidal flats. Two small islands are situated in Marks Cove. A cranberry bog and associated freshwater wetlands are located in the upland area to the north.

Wareham River between Swifts Beach and Hamilton Beach, is characterized by barrier beaches, tidal flats, and a small pocket of salt marsh at Swifts Neck.

Broad Marsh River is very shallow at mean **lowest** water with depths averaging less than one foot. Extensive salt marshes are found in the upper reaches. Tidal flats front the Pinehurst Beach neighborhood on the Wareham River. A barrier beach has developed on the north shore of the Hamilton Beach neighborhood at the Broad Marsh River. **mean lower low water is correct term**

North of the Route 6 bridge over the Wareham River, tidal waters mix with freshwater. This ecosystem is controlled by a fluctuating salinity level which is dependent on the height of the tides and on the freshwater inflow from rainfall in the Agawam and Wankinco drainage basin. Upland areas immediately south of Route 28 (Elm Street) and along both sides of Route 6 (Sandwich Road) are marked by shrub swamps, wooded swamps and wet meadows. A bog located north of the railroad tracks east of Oakdale further adds to the diversity of ecosystems in the area. Salt marshes and a salt pond are found in lowland areas adjacent to the Agawam River where tidal influences are greater. Freshwater influences, such as bog, shallow fresh marsh, and wet meadow, are more apparent on the upper reaches of the Agawam River between the water pollution control facility and the Route 6 bridge.

The **Agawam River** from Plymouth to Wareham (9.1 miles) has been classified as a scenic cultural river by the Massachusetts Scenic Rivers Program which has proposed the river for designation on the National Rivers Inventory and for eventual potential inclusion into the National Wild and Scenic Rivers System.

The **Wareham River** between Route 6 and Long Point Beach includes both coastal and inland wetland resources. Beaches and tidal flats front much of the shoreline with smaller pockets of salt marsh along the Crooked River. Upland resources on the Crooked River, the major freshwater inflow in this section, include shallow fresh marshes, shrub swamp, a cranberry bog and deep marsh. Barrier beaches, salt marsh, and tidal flat areas are located at the mouth of the Crooked River and along the Wareham River shore to Long Beach Point.

Coastal resources on Buzzards Bay are subject to the influences of open water, wave action, winds

from the south, and tidal action. Beaches are located at Long Beach Point, Warren Point, Bourne Point, Little Harbor Beach, Tempest Knob and Stony Point Dike. Barrier beaches have been identified at Bourne Cove, near Stony Point Dike, and south of Long Point Beach. A large barrier beach at Little Harbor is protected by both the Massachusetts Coastal Zone Management (CZM) and the U.S. Department of the Interior. Salt marshes are found in areas such as Bourne Cove and Little Harbor where there is a shallow gradient. Great Neck, the upland area, has one of the highest elevations in Wareham; Bourne Hill, which is fairly steep, has an elevation of 118 feet. Sea cliffs as inventoried by the Massachusetts Department of Environmental Management (now Department of Conservation and Recreation) in 1978 are found on Indian Neck, at Little Harbor Beach, and at Tempest Knob.

Hurricane Bob in August 1991 caused erosion on Indian Neck and Tempest Knob. Loose rock covering laid in the 1930s to 1950s was undercut during the storm. At Indian Neck the erosion extended 10 feet inland along several hundred linear feet.

The **Onset Bay** watershed area has several coastal and inland wetland resources. This area is generally more protected from wave action than the **Buzzards Bay** resource area due to its location on the approach to Cape Cod Canal. Despite the presence of extensive barrier beaches, tidal flats, and shallow areas east of Onset Island, most of Onset Bay has depths ranging from 5 to 15 feet at mean **lower low** water with a navigable channel and mooring **areas**. Islands in Onset Bay include Onset Island and Wickets Island. Barrier beaches are found at the mouth of the East River and at Pleasant Harbor. **Lowest?**

Sunset Cove at Shell Point Bay, Broad Marsh, Broad Cove, and Muddy Cove in Onset Bay, and Cedar Point on the Hog Island Channel (Cape Cod Canal approach) are all more shallow than Onset Bay. These areas are typified by freshwater tidal marshes similar to those on the Agawam River which exhibit fluctuations in salinity due to the mixture of freshwater and tidal water. Freshwater wetlands located upgradient of these salt marshes include shrub swamps, shallow fresh marshes, cranberry bogs, deep marshes and Beaver Dam Pond. **The majority of cranberry bogs in the project area are found in the Onset Bay watershed.** A coastal plain pond is found on Long Neck. This resource, also called a kettle hole, is known in the Cape Cod region, but is uncommon in the world. According to the Massachusetts Division of Fisheries and Wildlife, the integrity of these coastal plain ponds is constantly being threatened by development. **Weweantic watershed**

Floodplains

Flood Insurance Rate Maps (FIRM), prepared for the National Flood Insurance Program by the Federal Emergency Management Agency, were used to locate land subject to flooding and wave action. Figure 7 identifies the following special flood hazard areas inundated by 100-year flood:

- Zone AE - base flood elevation, typically ranging between 15 and 16 feet
- Zone VE - coastal flood with velocity hazard (wave action); base flood elevations typically ranging up to 21 feet

Seawalls have been constructed in several shoreline areas. These walls/bulkheads are identified on both the USGS base map and on Figure 7.

2. Natural Communities

The Massachusetts Division of Fisheries and Wildlife (DFW), through its Natural Heritage and

Endangered Species Program (NHESP), has identified important natural communities and rare and endangered plant and animal species, of which [many](#) are found along the coast of Wareham. Estimated habitat areas of state-listed rare wetlands wildlife have been identified in the Natural Resources Map. The NHESP list of endangered, threatened, special concern, watch list, historical and delisted species observed in Wareham is presented in Appendix 6.

Rare and Endangered Species

As defined in 321 CMR 8.00, Endangered Species are any reproductively viable native species which have been documented by biological research and inventory to be in danger of extirpation from the commonwealth. Threatened Species are those species which have been inventoried to be rare or declining within the state and which are likely to become endangered in the future. Species of Special Concern are suffering decline and could be threatened if this condition is left unchecked or these species occur in such small numbers, restricted distribution, or special habitat requirements that they could become threatened. [This information is listed in Appendix 6.](#)

Freshwater Tidal Marshes

reshwater tidal marshes are found along the Agawam River and in Onset Bay where the water level rises and falls with the tides and the water ranges from fresh to slightly brackish, These areas have diverse flora with a pronounced seasonal diversity of plants. As low tide draws water across the freshwater tidal marshes, the runoff carries rich nutrients and minerals from upland areas and deposits them in the muck and peat in the tidal marshes, creating an extremely productive environment for wildlife. Stream beds which cut through the marshes typically have mud and sand bottoms providing still further diversity in [the](#) habitat. Tidal marsh substrate is a slightly acidic muck and peat. Conditions in these marshes also vary with weather conditions; drought raises the salinity and high rainfall reduces the salinity. Vegetation in this area, therefore, is uniquely adapted to this function.

Freshwater tidal marsh communities include many state-listed rare plant species such as Parkers Pipewort, Long's Bitter-Cress, River Arrowhead, and Pygmyweed, all of which have been observed in Wareham since 1990. There is abundant bird life due to the [diversity in vegetation](#). Ducks and geese, freshwater snakes and turtles, and insects are more varied in freshwater tidal marshes than in saltwater tidal marshes although the fish, mollusks and zooplankton fauna is less diverse in freshwater tidal marshes for similar reasons. [Check pg.42](#)

According to the NHESP, freshwater tidal marshes are uncommon natural communities in Massachusetts. DFW has identified the Agawam and Weweantic rivers as having good, small areas of this resource we, but there is continual pressure to clear the edges for better access for boats or to put in docks. Some of the freshwater tidal marsh along the Agawam River is owned by the Town of Wareham.

Estuarine and Coastal Tidal Communities

This habitat, typically found along the coast where rivers and the ocean join, is marked by salt marshes and tidal flats where the water is saline to slightly salty. Variations in temperature, substrate stability and tidal action determine vegetation We and animal life. Vegetation includes eelgrass and marine algae in shallow, protected coves with arrowheads, bulrushes, wild rice, pickerelweed and

smartweeds along the stream sides. Saltmarsh cord-grass is found in salt marshes which are daily flooded by the tides. Greater diversity of vegetation is found in areas only flooded by the higher tides. Vegetation at higher elevations here includes salt marsh hay and spike grass with sea lavender and seaside goldenrod. In areas with only occasional salinity, reed grass, cattail, and sedges are found.

Coastal Plain Pond Communities

Coastal plain ponds or kettle ponds are depressions in glacial outwash plains that are directly linked to the underground aquifer. Due to a direct relationship with the groundwater elevation, water levels in the pond fluctuate with the seasons. Lower water levels during the growing season is one of the single most important factors in providing suitable habitat for the grasses and other herbaceous plants of the pond shore community. The substrate is typically sandy with poor nutrient value. Waters tend to be nutrient-poor and acidic.

Barrier Beaches

The Town of Wareham has over 30 federal and state designated barrier beaches (Figure 8 and Natural Resources Map, in plastic sleeve). The criteria used for identifying and delineating the barrier beaches are based on the [definitions](#) contained in the Coastal Regulations of the Wetlands Protection Act [Massachusetts Coastal Zone Management (CZM), 1982] and the Coastal Barrier Resources Act of 1982 (P.L. 97-348). MCZM defines a barrier beach as "a narrow low-lying strip of land that generally consists of coastal beaches and coastal dunes extending parallel to the trend of the coast, separated from the mainland by a narrow body of fresh, brackish, or saline (salt) water or marsh system." These fragile resource areas are important in preventing flood and storm damage and in providing wildlife habitat.

3. Shellfish Resources and Closures

Beds of soft-shell clam, quahog, and oyster grow in the Wareham River and Onset Bay (DMF, 1991) as indicated in Figure 9. Many of these resources are unavailable due to shellfish closures; availability is generally limited to areas in which transplanting has occurred. The southern shore of Onset Bay and the water around Onset Island and Pleasant Harbor contain beds of all three shellfish types which are open to harvesting. Large beds of oysters are found in Agawam River, Crooked River, and Wareham River north of Pinehurst Beach; however, these are unavailable because these are prohibited areas year-round. Most of Marks Cove, closed year-round to prohibit harvest of soft-shell clam, quahog and oyster in that area, has recently been reclassified to "Approved" by DMF. Broad Marsh River is closed for the taking of soft-shell clams and quahogs. Approximately 150 acres may reopen on a conditional basis in Broad Marsh River following completion of rainfall work in the area by the town.

Some shellfish areas are privately cultivated under license by the Town of Wareham shellfish grants. Wareham has a long history of grants which were established to encourage propagation of shellfish by privately protecting cultivation and harvest. Sets of spawn from these grants are used to replenish other less productive areas (Soderstrom, 1988). Grants also produce income for the town through the annual fee of \$25/acre. Currently 102.7 acres are designated in shellfish grants. Appendix 7 presents the private shellfish grants held in the Town of Wareham.

4. Eelgrass Beds

A definitive study entitled *Eelgrass in Buzzards Bay; Distribution, Production, and Historical Changes in Abundance* was conducted by Costa (1988). According to this study, eelgrass (*Zostera marina* L.) is a subtidal marine plant which forms extensive meadows and abundant beds in Buzzards Bay and Cape Cod. Eelgrass, unlike other marine plant species, is specifically discussed in the Harbor Management Plan because it is a very ecologically important species and is considered a special aquatic site by federal regulation and, as *such*, is considered in the U.S. Army Corps of Engineers' permit applications. Eelgrass beds serve as breeding grounds, refuge and feeding areas for *fish*, waterfowl and invertebrates. Eelgrass growing in shallow locations, such as intertidal flats, provide important forage sources for waterfowl such as Canada geese, while deeper rooted beds provide forage for fish such as striped bass, bluefish, tautog, flounder and cownosed rays (Costa, 1988).

Eelgrass beds and meadows also bind, stabilize and alter the chemistry of marine sediments, and are thus important in helping to prevent coastal erosion (Costa, 1988). The distribution of eelgrass in the coastal area is dependent upon a few key physical parameters. The depth at which eelgrass can grow is limited by the light intensity which can reach its leaves for photosynthesis. The limits on its habitat landward include factors such as wave action, ice scour in the winter months, and desiccation. Eelgrass beds will grow in a variety of substrates, including anoxic mud, sand and gravel (Costa, 1988).

Costa (1988) estimates that within the Town of Wareham there are approximately 564 hectares of eelgrass cover (equivalent to approximately 1,393 acres since one hectare = 2.47 acres). The Costa study contains detailed mapping of these beds which has been reproduced and shown in Appendix 8.

Without the necessary light needed to support eelgrass, nutrient loading contributes to eelgrass decline or death by increasing the concentration of algae and phytoplankton which absorb light, preventing it from reaching the eelgrass leaves.

According to the Wareham Conservation Officer, a proliferation of private docks and piers in the past several years has helped destroy valuable marine habitat in Wareham, including eelgrass beds. Many of these docks float at high tide but rest on the bottom at low tide, thus scouring the substrate and blocking light even when floating. While the town may take regulatory action in the future to prevent such destruction of habitat, management of water quality within the study area is a much more widespread problem since it deals with the management of several watersheds which all drain into Buzzards Bay.

The destruction of eelgrass is specifically regulated by the Commonwealth of Massachusetts under Section 10.25 of the Wetlands Protection Act (310 CMR 10.00, Part II, 1989). Section 10.25 deals with Land Under the Ocean and in reference to dredging projects subpart (6) attempts to minimize or prevent, through the use of the best available measures, adverse effects on marine fisheries habitat or wildlife habitat caused by:

- a) alterations in water circulation;
- b) destruction of eelgrass (*Zostera marina*) or widgeon grass (*Ruppia maritima*) beds;
- c) alterations in the distribution of sediment grain size;
- d) changes in water quality.

Other sections of the Wetlands Protection Act indirectly protect eelgrass by regulating the same or similar parameters in Land Under Salt Ponds (10.33), and Land Containing Shellfish Beds (10.34).

III. Harbor Management Issues

A. Community Participation Process Summary

This Harbor Management Plan was developed through a public participation process which actively sought to include the concerns of a wide range of users of the waters of Wareham. These included town officials, the Marine Resources Commission (MRC), full-time residents of the community and summer residents.

A draft set of community goals was circulated to all town offices through the MRC. Following a review period the revised set of goals was presented at two public workshops. These workshops were advertised to the community through articles in the *Wareham Courier*.

On July 9, 1992 the Onset Protective League (OPL) invited the MRC and Louis Berger & Associates, Inc. to present the preliminary Harbor Management Plan goals and receive public comment.

A second workshop was held to continue the discussion of the first meeting and to encourage full-time and summer residents from the Wareham River area to attend. On August 12, 1992 the MRC opened its regularly scheduled meeting for additional public comment.

Comment sheets were distributed at the second workshop. Many in attendance took these with them to comment privately or to give to neighbors. Warr's Marine and the MRC also had additional copies available. Written comments received are presented in Appendix 9. Louis Berger & Associates, Inc. announced a toll-free number which people could call to give additional input.

1. Preliminary Goals (as presented at public workshops)

1. The Town of Wareham recognizes the need to preserve, protect and enhance its natural resources for the current and future use of town residents and visitors. The appeal and attraction of the Town of Wareham as a shoreline community is based upon the preservation of these resources for multiple uses, including scenic vistas.
2. The Town of Wareham recognizes that the water quality of its many coves, bays, rivers and harbors is fundamental to the town's economic vitality, support of natural resources, and water-dependent recreational and commercial uses.
 - Recreational uses (including water-contact recreation, such as swimming, waterskiing, windsurfing, and SCUBA diving, and boating including sailing, canoeing, kayaking, and rowing);
 - Commercial and recreational shellfishing and fishing;
 - Industrial and commercial waterfront facilities (primarily marinas and other water-use related industries); and
 - Property values.

3. As a contribution to the degradation of water quality, numerous causes exist in the area. Point and nonpoint sources of nutrient loading occur in many forms and can be from the following sources;
- Streams entering the coastal waters of Wareham carry substances from a variety of sources including roadway runoff, land fill leachate, wastewater treatment plant effluent, cranberry bog fertilizers and pesticides, and agricultural activities which may degrade water quality.
 - Subsurface septic systems/cesspools are sources of nutrients. Failed systems can contribute bacteria, viruses and nutrients when they leach into the waterways.
 - Stormwater runoff can also add to water quality degradation by contributing nutrients, heavy metals, and polycyclic aromatic hydrocarbons (PAH) compounds to the loading.
 - Potential degradation from boating includes boat sewage, boat engine PHC, anti-fouling paints leachate, and trash disposal, including plastic debris.
 - Beach erosion leads to increased sediment loads in waterways. This erosion is caused by storms, heavy boat wakes, grading of adjacent upland areas, and unfilled shellfish beds. In addition, sediment transport can lead to increased turbidity impacting water quality.
4. The town recognizes the importance of protecting the integrity of the various coastal and inland wetlands which serve many important ecological and economic functions. Protection efforts should be directed toward estuaries, coastal salt ponds, tidal and freshwater marshes, bogs, wet meadow, aquatic beds, beaches and all other environmental resources in the project area defined by the Massachusetts Wetland Protection Act. The marine ecosystems complement the freshwater and landside environmental interests subject to protection under the act.
5. Due to the diversified wildlife habitat in this coastal community, the Town of Wareham supports threatened and endangered species (including birds, insects, vegetation, and turtles) and unique habitats such as freshwater tidal systems. The Town of Wareham recognizes the significance of maintaining these habitats and ecosystems for these species. Non-regulated development and incremental cumulative impacts (residential, commercial, industrial, and agricultural) may jeopardize natural habitat and adversely affect water quality due to nonpoint pollution sources such as subsurface disposal system failures, agricultural and domestic fertilizers and pesticides, and runoff
6. The Town of Wareham recognizes that waterfront development as simplistic as pier construction may adversely affect water quality and therefore the aquatic ecosystem (including shellfish beds). These adverse effects could be cause for cumulative potential for increased pollutant discharges resulting in a decrease in the water quality and potential closures of shellfish beds. This may result in continued degradation of water quality and increases in conflicts among recreational users in the harbor.
7. The Town of Wareham recognizes that public access by town residents and others to waters, beaches, boat ramps, coastal resources and other marine facilities is a significant

asset to the town and must be maintained. Maintenance of publicly and privately held open space on land and water is important for both current and future generations. It is also important to provide parking, sanitary facilities at beaches, pump-out facilities for boats, adequate life saving and boat patrols, and maintenance of beaches.

8. The Town of Wareham recognizes that adoption of a HMP with a mooring grid plan and dredging of navigational channels are important to harbor safety and navigation and to the orderly development and use of the waterways.
9. The Town of Wareham recognizes that the rights of private shorefront owners must be respected in any HMP.
10. The Town of Wareham recognizes that use of the harbor must be regulated to reduce conflicts between the various users. Mooring areas must be designated and regulated to reduce conflicts with other activities. There must be a balance between alternatives to provide the most while disenfranchising the fewest.
11. The Town of Wareham recognizes that the residential character of Onset Bay and Wareham River communities is a significant asset to the town and that dominant commercial land uses conflict with this character.

2. July 9, 1992 Public Workshop

Primary points discussed at the July 9th meeting included the following:

1. Summer residents feel disenfranchised since they are not registered voters in the Town of Wareham. They do have input via the hearing and HMP development process. Many expressed concern that the HMP would reflect elected officials' concerns and not necessarily those of the users of Onset Bay.
2. Many stressed the need for open space in Onset Bay. Much of the water surface is now dedicated to moorings in the mooring grid plan (not yet adopted) or is part of the federal navigational channel. Open space is needed for transient anchoring at night and might be used for waterskiing, sailing, fishing, etc, during the day.
3. Onset Bay is a "harbor of refuge" along the Cape Cod Canal. Water in the bay is very protected (especially from Buzzards Bay southwesterlies; according to *Soundings*, May 1992, it is considered the fourth or fifth safest harbor on the East Coast in case of hurricane). Those venturing out to Buzzards Bay must navigate the strong chop and tidal current in the canal (5 to 6 knot currents). Onset Bay therefore serves several functions for mariners:
 - Protected harbor area for youngsters and others learning to sail and not yet proficient enough to navigate the Hog Island Channel/Cape Cod Canal.
 - Home port for those boats which are moored in Onset Bay but generally cruise to Buzzards Bay
 - Refuge for mariners travelling the seacoast and using the Cape Cod Canal.
4. There is a need for stricter enforcement of existing bylaws and federal designations. A

primary use conflict appears to be between the yacht clubs/Harbormaster and those who enjoy open waters of the bay for recreation, including waterskiing. Many present felt that a federally designated open water area has been encroached upon by permanent moorings.

5. There is a conflict between swimmers at beaches and water skiers who are dropped off on shore. This reflects a lack of enforcement since waterskiing is prohibited within 150 feet of bathers. Until recently a few beaches were posted to give water skiers the right of way to disembark on shore.
6. All goals designating areas for separate use should stress the importance of SAFETY.

Other points relating to pollution and water quality were discussed, including the following:

1. The importance of education was a topic stressed by several regarding the cumulative effect of lawn fertilizers and hydrocarbons from street runoff at storm drain outfalls.
2. An Onset Island resident stressed that 10 weeks per year residents have a much smaller impact on the environment through septic tank discharge than full-time residents. Local building codes seem to encourage year-round use when structures are replaced or repaired.
3. When eelgrass is destroyed, slumping seems to occur along the shoreline. There appears to be a dichotomy: properties that are well-maintained may contribute to harbor degradation more than those that are not due to bulkhead construction, grading activities, eelgrass removal, fertilizer applications, etc.
4. According to some, oil is increasing at local beaches. Oil/grease traps may be useful in trapping oily sediments which are being discharged in storm sewers. Detention basins may also be used to trap sediments.
5. According to the Buzzards Bay CCMP, storm drains are a bigger contribution to pollution than septic failures. The speaker emphasized that sewer extensions may not lead to a significant water quality improvement.
6. General comment: goals dropped from consideration should be documented to expedite the town meeting process so that items are not discussed twice.
7. Marinas and the industrial waterfront get a lot of blame for degrading water quality. **Michael Besse, Deputy Harbormaster**, indicated that many have gas/oil traps on their storm drains.
8. The Deputy Harbormaster indicated that if the HMP identifies areas to be used for separate uses and these recommendations are incorporated into town bylaws, then under present regulation, implementation and enforcement are the Harbormaster's responsibility.
9. There is a perception that people with permanent moorings at the marinas generate more pollution than either transient (temporary anchorage) boaters or those local and/or summer residents who use private moorings. This is based upon the fact that those who live in the community do not have as great a need for pump-out facilities as those who live on their boats at the marinas.

10. As shellfish holes are closed due to pollution, consideration should be given to instituting "relay programs" which would remove shellfish from closed areas to clean water. Permits for this activity have been issued to the Town by DMF previously. Transplanting of eelgrass from closed shellfish beds to improve habitat of non-degraded areas should be discussed with the Department of Environmental Management.

3. August 12, 1992 Public Workshop

Primary points discussed included the following. Comments indicate the range of concerns of those in attendance at the workshop and do not necessarily reflect actual documented situations, accepted marine operations, town bylaws, or recommendations of this HMP. A discussion of comments raised at this workshop is presented in **Section B. Summary of Issues.**

Shellfishing

1. Shellfishing has historically been an important recreational and commercial undertaking. With the increase in shellfish closure areas, fewer areas are available for shellfishing. Although other sources of pollution are known to degrade harbor waters, increased usage of pump-out facilities on the many recreational boats using the harbor is needed to improve water quality so that shellfish areas are not closed on a seasonal basis.
2. Relaying shellfish from closed shellfish areas to clean areas for natural depuration was discussed. One citizen pointed out that this is a more cost-effective means of shellfish culturing than seeding, which takes four years for harvest. Others in attendance indicated that this is a short-term solution which does not clean up areas already closed.
3. Questions were raised about the procedures to close shellfish beds, including regulations relating to distances from marinas. It was explained that it is based upon water quality sampling (there are over 100 water quality sampling stations in open shellfish beds in Wareham, which are tested 5 times per year by the Division of Marine Fisheries). Many questioned whether water quality is an adequate indicator, since shellfish live in the sediment. It was explained that shellfish are filter feeders and that this is adequate.
4. One resident would like to see information on fecal coliform counts made publicly available (e.g. in the newspaper) so that people can make their own judgements about water quality.

Dredging

1. One resident presented information from a recent newspaper article which indicated that the state is considering a \$450,000 dredging project (\$60,000 for field survey and \$380,000 for dredging) in East River. The town is being asked to participate.
2. Plans to dredge Broad Cove were discussed. One resident indicated he is in favor of dredging this area to improve water quality and flushing but he is afraid that it will open up an already fragile area to more boating and anchorages. The cove is so shallow that eelgrass is cut up by boat motors. He is concerned about the impact on Broad Cove beaches which are protected by a 1916 Supreme Court decree. He is concerned about boats going too fast, too close to shore.

Onset Bay

1. One speaker outlined OPL's efforts over the past 12 years to improve water quality in Onset Harbor, primarily for swimming. He discussed OPL's 1988 efforts through Gerry Studds and the U.S. Coast Guard hydrocarbon expert who indicated that the only way to improve water quality would be to reduce the number of boats in Buzzards Bay harbors. Since that time the number of boats has increased.
2. Onset Harbor used to be beneficial for scallops but now there are too many hydrocarbons for growth. The speaker indicated that, according to the Harbormaster 10 years ago, "scallops come and go," and that this is just an ebb in the cycle. However, that was 10 years ago, and the scallops have not come back.
3. OPL is interested in preserving Onset Bay for boating, bathing, shellfishing and fishing but the town seems to be interested only in boating.
4. Although TBT has been a problem in marine waters, federal actions now prohibit its use. The sale and use of this anti-fouling ingredient have been identified as disrupting the marine ecosystem.
5. OPL is concerned that groves and bluffs along Shell Point Grove which had historically been protected have been taken by Selectmen and paved for a parking lot.
6. Land protected by the Onset Bay Grove Association has been developed as a marina.

Wareham River

1. The Wastewater Treatment Facility (WWTF) on the Wareham River does not provide tertiary treatment to remove nitrogen and other nutrients. This is blamed for increased algal growth in the Wareham River particularly during hot weather.
2. A resident of Parkwood Beach described the changes in water quality at Little Beach at Kingwood Street. This area used to have a nice beach but it now has become nothing but a boat anchorage. The area was once a desirable location for shellfishing. The resident described how conditions have deteriorated since construction of Standish Shores across the river.
3. There have been problems with fisheries enforcement. Residents had to get assistance from Massachusetts Division of Fish & Wildlife to remove an oversized shellfish trap. Regulation of activities relative to fisheries is the regulatory responsibility of the Division of Environmental Law Enforcement within the Department of Fisheries, Wildlife & Environmental Law Enforcement (DFWELE). There appears to be more concern for the safety of wildlife than of swimmers or boaters in the town.
4. The Parkwood Beach area has evolved from an area of summer homes to one of year-round residences.
5. Speakers discussed problems which resulted from dumping a garbage truck full of shellfish with maggots, debris, broken shells, and garbage at the Point, a 12-acre Town Conservation parcel at Briarwood Beach. A front-end loader was used to push oyster shells out over the

eelgrass. Local residents complain that the area resembles a town dump and have been frustrated by the lack of response by town officials. One speaker responded that there was a lack of adequate inspection and enforcement by the Shellfish Constable/Harbormaster when this was done. This area has become an informal boat launch. Briarwood Beach Association has constructed a gate to restrict launches between 7 pm and 7 am.

6. People securing prams have caused shoreline damage by driving in stakes and tying up on trees, sometimes in front of private property. Residents suggested that an unused beach area at Minot Beach could have a pipe with clips for the purpose of locking prams onto it. Another option could be a dinghy dock. One speaker suggested that these could be located in areas no longer used for swimming due to the growth of grass along the shore, such as at Tempest Knob.
7. The formation of beach/neighborhood groups was recommended to increase community education, foster neighborhood pride, and create a group with more clout when dealing with local and state officials.

Storm Drains

1. Based on recent findings of the Buzzards Bay Project, storm drains are a major contributor to water pollution. The speaker was concerned with the status of 18 storm drains in the Point Independence area. Questions arose as to the applicability of a project similar to that recently completed in Buttermilk Bay, as well as to the availability of funding for such a project.
2. One speaker reinforced that the town must be committed not only to construction of storm drain alternatives (including leach fields, sedimentation basins, or gas/oil traps), but also to routine maintenance of these facilities.
3. Enforcement of the Clean Water Act is important to improve water quality. Federal grants must be actively pursued.

Navigational Safety

1. According to one speaker, the area around #21 concrete pylon at the entrance to the Onset Channel from the Hog Island Channel is very hazardous. Many boaters cut the corner too close and at too high a speed. Prevailing southwesterlies "whistle down Buzzards Bay after about 1 pm in the afternoon, plowing smack into the strong ebb tide" (Soundings, August 1992). As quoted by Ellis, Harbormaster, "it will pound you to pieces."
2. Wareham River has had a problem with the disappearance of floats marked "NO WAKE." These regulations must be enforced. A 5 mph limit does nothing to reduce wake and may in fact increase it. Wakes cause erosion on the shoreline and cause dangerous situations in boatyards and along shore.
3. The restriction on boating within 150 feet of shore should be enforced to protect swimmers, and to reduce erosion on shore and disturbance to moorings.
4. Channels must be kept clear of moorings and traps. Informal votes were taken on several issues at the August 12th workshop:

■ There was a majority votes that an open space area at Onset Bay should be designated and enforced.

■ It was almost unanimous that enforcement of existing laws and regulations be carried out by the Harbormaster's office. There was much discussion about the lack of responsiveness and consistent enforcement. There should be more education as to who is responsible for enforcement and what alternatives there are through other state or federal agencies. Strict fines and not just written warnings are needed to make enforcement work. Could signs be posted indicating the fines for speeding?

4. Written and Telephone Comments

Written comments are presented in Appendix 9. The following is a summary of written and telephone comments received by October 13, 1992:

1. Develop good mooring system. Eliminate illegal moorings.
2. Dredge Crooked River (Wareham River). Consider dredging Shell Point for purpose of safe boating, protection against hurricanes, etc.
3. Protect barrier beaches (30+ in Wareham).
4. Do away with poor septic systems on coastline.
5. Goose population needs to be reduced. Post signs: "Do Not Feed the Ducks."
6. Harbormaster needs to be required to attend MRC meetings regularly and to supply information as requested by the MRC.
7. Harbormaster office should be restructured to report to the MRC or some other citizen-appointed town board.
8. Open space must be maintained as designated on existing marine charts prior to recent expansion of some mooring fields into them. In no place is this as important as Onset Bay, where a major shipping channel and strong currents keep many recreational water uses confined to the harbor.
9. Preserve and improve the quality of swimming areas and beaches.
10. Renew the cleanliness of the water in order to reopen shellfishing beds year-round.
11. As important as it is to gain a general consensus to establish a harbor management plan, it is equally as important to select those to positions of power whose philosophy embodies the spirit of the plan, otherwise the impact of this plan will be undermined. Many regulations already on the books have been ignored and therefore rendered ineffective.
12. Enforce the law prohibiting dumping sewage from boats; enforce laws prohibiting the release of petroleum products into the water. Curtail illegal dumping by limiting the number of anchorages.

13. Put fewer restrictions on floating docks and/or piers.
14. New waterway regulations may be needed, as suggested by the Harbormaster. These regulations must be enforced.
15. A harbor line should be drawn to prevent piers from extending further into the bay. Prohibit or at least limit the construction of new public or private docks, piers, etc. and the expansion of marinas.
16. All competing interests, swimming, boating, fishing, recreational shellfishing, commercial shellfishing, sailing, waterskiing, windsurfing, and marinas, must be considered to retain Wareham harbors as multi-purpose harbors.
17. Enforce speed and safety rules including those north of canal and Hog Island Channel.
18. Resolve the matter of storm drains contaminating swimming and clamming areas.
19. Adopt a feasible plan that would permit water scooters and waterskiers to enjoy their activity without interfering with bathers and swimmers.
20. Decide once and for all the matter of whether hydraulic dredging for shellfish is detrimental and, if so, take the necessary steps to prevent same.
21. Limit moorings; restrict future expansion of marina and yacht club.
22. Inspect and enforce regulations at industrial or commercial facilities to prevent sanding, painting, fuel transfer, and parking lot runoff from entering the water.
23. Monitor streams entering coastal water for contaminants.
24. Sewer pump stations should have back up propane generator systems in case of a power failure on South Boulevard, Onset Avenue, and East Boulevard to keep raw sewage out of the bay.
25. Onset Bay may become a parking lot for boats; the bay should be multi-purpose, the way it used to be.
26. Maintain public access along the shores of Broad Cove and other Onset shores in the area identified in the 1916 Supreme Judicial Court decree (Onset Bay Grove Association).
27. **Mr. William Ellis, Wareham Harbormaster**, presented a draft set of Waterways Rules and Regulations (see Appendix 10).
28. The Board of Selectmen should establish an appointed or elected citizen board to develop marine regulations for multiple use of Wareham waters and to direct activities of the Harbormaster.
29. Comments received from a citizen: Requests maintenance of multi-use harbor (not a boat "parking lot"); recommends approval of boating regulations written by the Harbormaster; identifies disagreement between many citizens and the Harbormaster; recommends formation of a town-

appointed or elected board to which the Harbormaster would report; recommends adoption of the mooring grid plan; indicates that other Buzzards Bay towns restrict boat ramp access to town citizens, charge to use ramps, or charge for parking; and indicates that enlargement of the East River boat ramp would unwisely damage the quality of life in this densely residential area.

30. A citizen committee is recommended to oversee Harbormaster and develop regulations which emphasize multi-use of the harbor and deemphasize boating. This would reduce the power of the Harbormaster, who currently has too much power in harbor planning.

31. October 6, 1992 memo from William E. Ellis, III, Harbormaster/Shellfish Constable, Town of Wareham is presented in Appendix 9. Issues raised are summarized as follows:

- *Restructuring of the Harbormaster's Office:* Suggestions that the Harbormaster's office be restructured to report to a citizen's board would result in a political quagmire and constant turmoil. Politics should have no role in this position.

- *Shellfish Area Closure:* Discussion of shellfish area closures including relaying of shellfish from areas closed because of pollution to open waters.

- *Water Quality:* Expansion of municipal sewers cannot be overemphasized for improving water quality (however, this could result in degradation of the estuary on the Wareham River downstream of the WWTF). Mentions possibility of piping WWTF effluent to SEMASS for cooling water.

- *Dredging:* There is a definite need for dredging projects throughout the town for navigation and to improve water quality.

- Failure of the town to recognize demographic trends has resulted in the town diminishing as a haven for tourists.

- *Navigational Safety and Law Enforcement:* The adoption of a comprehensive set of waterway rules and regulations has been thwarted by the MRC.

- *Mooring Fields:* The mooring grid system commissioned by the Town of Wareham was not adequately designed for optimal use of specific areas and is therefore unacceptable to the Harbormaster.

- *Public Access:* Boat ramps with parking are necessary to accommodate those who prefer to trailer their boats. As boating is a major source of recreation, the Harbormaster believes the courts would agree that this facility is an acceptable use of the land as identified in the 1916 decree.

B. Summary of Issues

The following is a compilation of important issues raised through the public participation process. Comments received at the public workshops, on comments sheets, by letter, and by phone have been organized and summarized according to topic to reduce duplication and to present the breadth of community concerns (i.e., some are in favor of dredging to improve water quality but some are against it, since it would increase boating which could jeopardize swimming safety). Issues include enforcement of existing regulations, multiple use of Wareham waters, shellfishing, dredging, water

quality, navigational safety, and political realities. As a compendium of issues, no effort has been made to weigh the merit of each issue. See Sections IV and V for a discussion of goals, policies, and actions of the Harbor Management Plan.

1. Enforcement of Existing Regulations

1. Permanent moorings and anchorages must be prohibited from federally designated open waters and navigational channels.
2. A mooring grid plan must be adopted to restrict areas for moorings. This will help keep space open for waterskiing, sailing, and fishing, among others.
3. Federal, state, and town marine regulations and bylaws must be fully and equally enforced.
4. Industrial and commercial facilities must be inspected to prevent sanding, painting, and fuel transfer spills from entering the water through storm drains.

2. Multiple Use of Wareham Waters

1. When the economy is good there is a great demand for permanent moorings. Some residents are concerned that Onset Harbor has become a parking lot for boats.
2. Open space is needed for waterskiing, sailing, jet skiing, and windsurfing. These activities are allowed in the federally designated area in Onset Bay. This area must be kept free of permanent moorings.
3. Windsurfers need a large area and are dependent upon the wind. There is increasing demand for this water-dependent recreation, although only a small percentage of marine users are involved.
4. Public access to the marine waters of Wareham must be assured for all. The Oak Street public boat ramp facility is scheduled for renovation. Access from the existing ramp at Onset is limited by low water at low tide and limited clearance under bridges during high tide.
5. High-quality swimming beaches depend upon good water quality. Beaches must be well-maintained and clean. Waterskiers and boats must not jeopardize the safety of bathers.
6. Piers and floats which extend into the bay limit the area for multiple use.

3. Shellfishing

1. Shellfishing has historically been an important recreational and commercial undertaking. With the increase in shellfish closure areas, fewer areas are available for shellfishing.

Increased usage of pump-out facilities on recreational boats is needed to improve water quality so that shellfish areas are not closed on a seasonal basis.

In addition, since shellfishing area closures are in fact administrative under current requirements, marinas would remain closed during operation (boating season) regardless of pump-outs and no discharge. Improvements to pump-outs would affect the size of closed buffer zones around marinas.

2. Efforts should be made to improve water quality and not to rely upon relaying shellfish from closed shellfish areas to open (clean) areas for natural depuration. This would entail the hydraulic removal of shellfish along with established eelgrass (as approved by DEM) and relocating to open shellfish areas. Not only would this destroy established eelgrass beds which are important for shellfish habitat and for natural control of sedimentation and water quality purification, but it would require that the bed to which shellfish are relocated be closed to all shellfishing through one spawning season, in accordance with state regulations. The net result would be that fewer shellfish holes would be open and the one from which the shellfish were taken would be degraded environmentally.
3. Residents would like to see seasonally closed shellfish areas remain open. Seasonal closure is a federal regulation which requires that shellfishing areas be closed when the density of boats that could potentially discharge waste into the water exceeds an established point. Closure is from May 1st to November 1st. Half of Onset Bay is closed based upon the number of boats. A goal of the federal no pump-out area is to improve water quality so that seasonally closed shellfish areas may remain open.
4. Many shorefront areas have been sewerred in recent years but adjacent shoreline areas remain closed to shellfishing. Residents would like to see these shellfish areas reopened. Adequate water quality testing is required to determine when and if shellfish areas may be reopened. Testing for water quality must be a continuous process.
5. There have been problems with irregular shellfish enforcement. Residents have to resort to state agencies to get enforcement.

4. Dredging

1. Some residents favor dredging to improve water quality by improving flushing action. Others are concerned that by making the area more accessible for boats there will be more boat-related degradation of water quality (illegal marine discharge of pump-out facilities and hydrocarbons). Some feel there would be more pressure to extend the mooring field in Broad Cove. As boating increases, eelgrass is destroyed in the shallow waters and the area becomes a poor shellfish habitat. Others feel that the safety of bathers on shore will be jeopardized by speeding boats.
2. In early 1995, the Massachusetts Division of Waterways let a contract for a \$450,000 dredging project in East River. The town is participating in the project. This area was previously dredged. According to the Division of Waterways, this area has great value for recreation. According to the Harbormaster, this river will become impassable for boats in three to five years.
3. Residents recommended dredging the Crooked River (Wareham) and Shell Point Bay

(Onset) for boating safety and hurricane protection.

5. Water Quality (Marine Pump-Out Facilities, Sewers and Storm Drains, and Shoreline Erosion)

1. The "No Discharge Area" established by the U.S. EPA must be enforced. The use of marine pump-out facilities at one of the seven approved facilities in Wareham must be enforced to improve water quality in all waters of Wareham.
2. Canada geese populations have contributed to deteriorated water quality.
3. People perceive that oil is increasing on local beaches, especially Onset Beach.
4. The cumulative effect of lawn fertilizers and illegal disposal of motor oils and antifreeze must be recognized as degrading harbor water quality through storm drain outflows. Based on recent findings of the Buzzards Bay Project, storm drains are a major contributor to water pollution. There are 18 storm drains in the Point Independence area alone.
5. The WWTF on the Wareham River does not remove nitrogen and other nutrients. This has resulted in increased algae growth in the Wareham River especially during hot weather.
6. Residents from both the Onset Harbor area and Wareham River area spoke about how areas which previously had clean beaches and shellfish areas now have become nothing but boat parking lots as water quality has deteriorated.
7. Adequate inspection and response to hazardous conditions by the Shellfish Constable/ Harbormaster is needed to prohibit actions such as the recent dumping of shellfish debris at the Point, a 12-acre Town Conservation parcel at Briarwood Beach.
8. Enforcement of the Clean Water Act is important to improve water quality. Federal grants must be actively pursued.
9. Sewer pumping stations in the South Boulevard, Onset Avenue, and East Boulevard areas should have backup generator systems in case of a power failure to prevent discharge of raw sewage into the bay.
10. People securing prams have caused shoreline damage by driving in stakes and tying up on trees, sometimes in front of private property.

6. Navigational Safety

1. The area around #21 concrete pylon at the entrance to the Onset Channel from the Hog Island Channel is very hazardous. Many boaters cut the corner too closely and at an excessive speed.
2. Wareham River has had a problem with the disappearance of floats marked "NO WAKE." These regulations must be enforced. A 5 mph limit does nothing to reduce wakes and may in fact increase it. Wakes cause erosion on the shoreline and cause dangerous situations in boatyards and along shore.

3. The restriction on boating within 150 feet of shore should be enforced to protect swimmers, and to reduce erosion on shore and disturbance to moorings.
4. Channels must be kept clear of moorings and traps.

7. Political Realities

1. Many of the users of Onset Bay are summer residents. As such they are not registered to vote in Wareham. They feel disenfranchised since the HMP must be adopted by the Board of Selectmen and approved by town meeting, of which they are not a part.
2. As important as it is to gain a general consensus to establish a HMP, it is equally important to select those to positions of power whose philosophy embodies the spirit of the plan, otherwise the impact of this plan will be undermined. Many regulations already on the books have been ignored and therefore rendered ineffective through selective enforcement.
3. Seasonal dwellings will continue to be converted to year-round homes. This will place continued stress on the natural environment.

IV. Goals and Objectives

Goals reflect Wareham's vision for the harbor area. They are the general statements about what the community would like to achieve in the harbor. The relationship between natural coastal resources, facilities and improvements, and the community's fiscal and management capabilities are all integral in establishing harbor goals.

Objectives are specific, measurable milestones that, as achieved, incrementally approach long-range goals. Specific objectives have been outlined for all of the stated goals. Goals and objectives address the issues previously identified in Section III.

Wareham Now and Then

Wareham residents have a very personalized sense of ownership of their local harbor, whether it be Marks Cove, Wareham River, Sunset Cove, Broad Cove, Widows Cove, or Onset Bay. This individualization of neighborhoods is enhanced by the geography of Wareham which is driven by the shoreline configuration of the Wareham River and Onset Bay. Some shorefront neighborhoods are separated by over fifty miles of shoreline. Resident identification with either Wareham River or Onset Bay is further defined by membership in local beach associations. These beach associations provide a sense of community, private swimming beaches and perhaps mooring areas and shellfish opportunities.

As a popular summer community, Wareham has attracted generations of vacationers. Ownership of summer cottages may have remained in the family for ten, twenty or more years. Summer residents may therefore have fond memories of special places in Wareham and favorite activities which reinforce their attachment to the community. It is this "collective memory" and the sense of responsibility to preserve the coves, bays and rivers of Wareham for their children's children which has led to the urgency for creation of this harbor plan. Too many residents have seen conditions deteriorate for swimming, shellfish, waterskiing, and small-boat sailing as the demand for boating increases and water quality declines. Summer residents, however, feel a lack of power to implement change as they are not registered voters in town.

Over the years shorefront access has been available through neighborhood beach associations and a series of public beaches owned and operated by the town. Those summer and full-time residents who are fortunate enough to have access to beaches and moorings do not have to compete with out-of-towners for use of town beaches and boat ramps. As recreational demand increases in southeastern Massachusetts, this places increasing burdens on local residents and town facilities. The current increase in boat ownership as a popular alternative to owning a summer cottage also increases conflicts in the community. This increases the demand for marina and mooring facility expansion in areas of the harbor which historically have been "open space" traditionally used for multiple purposes, and places greater demands on parking.

Many of the issues relating to increased harbor usage are the direct result of population growth in Wareham. As southeastern Massachusetts communities continue to grow, increased demand will be placed on recreational services, including those which are water-related. Some of this growth is attributable to the conversion of property which was previously used in the summer only to year-round use. This population growth places a higher burden on water quality as septic

systems become subject to year-round use, lawns are maintained for a longer season, and additional contaminants are introduced by motor-driven boats, sport vehicles and waste discharges from boats. The town has made considerable progress in eliminating septic systems by installing sewer systems. In addition Wareham was the first town on the eastern seaboard to be declared a "NO DISCHARGE" harbor in accordance with the U.S. Clean Waters Act. (added))

Wareham in the Future

In order to formulate goals and objectives for the Harbor Management Plan, the following types of questions have been addressed:

- What does the community want the harbor area to look like in the future?
- What services and opportunities do we want the waterfront to provide?
- What is the maximum level of use that should be allowed in the harbor waters?
- Whom does the community want to encourage to use harbor waters and waterfront facilities?
- What do people want on their waterfront that they do not now have? What do people want to keep that they do have?

Priorities

The Harbor Management Plan has identified six goals which have been prioritized below according to the consensus generated through public meetings and conversations with and correspondence from residents and town officials:

- Goal 1 - Multiple-Use Waters
- Goal 2 - Clean Waters
- Goal 3 - Productive Waters
- Goal 4 - Community Values and Natural Resources
- Goal 5 - Safe Waters
- Goal 6 - Dredging

Many of these goals are interrelated. *Dredging*, for example, is integral to several goals, including *Clean Waters*, *Productive Waters*, and *Safe Waters*. *Multiple-Use Waters* is related to *Clean Waters*, *Productive Waters* and, especially, *Safe Waters*. The goal of *Community Values and Natural Resources* is interdependent upon *all* harbor management goals.

It should be noted that the following six prioritized goals of this Harbor Management Plan do not, to the best of the author's knowledge, conflict with existing Town Regulations.

Goal 1 - Multiple-Use Waters

Both Onset Bay and Wareham River are used by diverse groups ranging from recreational boaters, swimmers, and waterskiers to those with commercial ventures who depend upon these same waters for shellfishing, fishing boats, sightseeing cruises, and marinas. Maintaining diversity of uses and minimally organized uses in a crowded harbor is the primary goal resulting from user surveys and feedback from the public participation process. Harbor users include permanent year-round residents, summer residents, seasonal marina users including "live-aboards," and transient boaters. In order to maintain a multiple-use harbor, access must be maintained for the general public to the shoreline and to Wareham waters via boat ramps, anchorages and the town piers. Additionally,

mechanisms must be studied and employed to finance operation and maintenance of the harbor facilities upon which the public places great demand. It is recognized, however, that by encouraging multiple use of inner harbors, conflicts between users may arise that will require thoughtful regulations and enforcement to maintain safety (see *Goal 5 - Safe Waters*).

Objectives

1. Promote the preservation of open space by establishing “harbor lines” in Wareham waters for public enjoyment now and in the future. Expand open space within inner harbors protects scenic vistas, which are an important attraction of the town.
2. Recognize the demand for waterskiing, kayaking, windsurfing, and small sailboating, uses which require open water away from moorings, beaches, and designated channels, with adequate water depth. The need for designated areas must be determined by actual use as well as by demand.
3. Reduce conflicts between moorings and waterskiing inside and outside the designated federal anchorage area.
4. Enhance public beaches; enhance public boat ramps for access by filtered boats. Reduce encroachment by private individuals on public land and rights-of-way. Assure that on-street parking at or near public boat ramps does not block residential driveways.
5. Acknowledge the public demand for pier construction as well as the potential environmental degradation which may result.
6. Recognize the need for great caution by the Town in allowing significant increased development and activities in both waterfront and non-waterfront areas which will impact and stress the multiple use of Wareham waters, as well as have impact on goals 2,3, 4 and 5.

Goal 2 - Clean Waters

The goal of protecting and improving the water quality of both freshwater and marine waters including Onset Bay and Wareham River is one of the priority goals of the Wareham Harbor Management Plan. The use, enjoyment, and productivity of these waters are dependent upon the quality of water. Both permanent and seasonal residents are keenly aware of the deterioration of water quality over the past decades and are concerned with how changes in water quality now limit swimming and shellfishing. Education is an important means of informing the public of the implications of their actions on water quality.

Objectives

1. Promote proper, safe disposal of sewage from boats in Wareham waters.
2. Promote proper disposal of solid waste along shoreline and from boats.
3. Relocate/redistribute Canada goose population which contributes to deteriorated water

quality through fecal waste.

4. Encourage education in the form of a marine environment or marine biology type of class at Wareham schools, to include co-curricular environmental studies, after school and/or summer vacations, to promote clean and productive waters.
5. Institute a program to plan and implement treatment of stormwater discharge prior to point discharge. Promote proper handling and disposal of petroleum products to reduce or eliminate adverse impacts on the environment.
6. Promote extension of the municipal sewer systems in currently developed areas and encourage individual hookups to the existing sewer system.
7. Promote adequate maintenance of individual wastewater systems including septic systems and cesspools.
8. Reduce shoreline erosion resulting from boat wakes.
9. Promote appropriate agricultural practices to minimize nutrient effluent in tributaries to the Wareham River.

Goal 3 - Productive Waters

Shellfishing has historically been an important recreational and commercial asset to the Town of Wareham; its continuation is an important community priority. Improved water quality is crucial to reopening areas of town previously closed to shellfishing. There is a need to find a balance for all competing water-dependent uses of the waterways.

Objectives

1. Protect habitat from degradation in areas currently open to shellfishing.
2. Encourage actions which lead to water quality and habitat improvement in areas currently closed to shellfishing.
3. Encourage the strengthening of the town's participation in shellfish propagation.

Goal 4 - Community Values and Natural Resources

The Town of Wareham recognizes the need to preserve, protect, and enhance its natural resources for the current and future use of town residents and visitors. The appeal and attraction of the Town of Wareham as a shoreline community is based upon the preservation of these resources.

Due to the diversified wildlife habitat in this coastal community, the Town of Wareham supports threatened and endangered species (including birds, insects, vegetation and turtles) and unique habitats such as freshwater tidal systems.

The Town of Wareham recognizes that the residential character of Onset Bay and Wareham River communities is a significant asset to the town and that dominant commercial land uses, [that](#)

sometimes can conflict with this character. It is again recognized that multi-uses of waterways contribute to the seaside character of the community.

Objectives

1. Improve the quality of fresh and tidal water, maintain the integrity of natural coastal features including saltmarshes and barrier beaches, and protect upland areas from development that negatively impacts these resources.
2. Reinforce the maritime, residential character of the community through the zoning bylaws.
3. Maintain the habitats and ecosystems of threatened and endangered species.
4. Respect the rights of private shorefront owners.
5. Maintain public shorefront access.

Goal 5 - Safe Waters

As sheltered inlets along Buzzards Bay, both Onset Bay and Wareham River are recognized as harbors of refuge. In order to maintain safe operating conditions for all users of Wareham waters, comprehensive waterways rules and regulations must be enforced, and navigational aids must be clear and well-understood by the marine public. It is also important to minimize conflicts between various users, such as swimmers, divers, waterskiers, and boaters, including, for example, those on sailboats, motorboats, windsurfers, and jet skis. (See appendix ix-for current Wareham Rules and Regulations)

Objectives

1. Provide public participation in the formulation of harbor regulations.
2. Enforce existing regulations and provide harbor services equally, independent of resident status, swimmer or boating user group, or age.
3. Recognize the need for separate use areas to avoid conflicts between users.
4. Recognize the authority and jurisdiction of harbor-related boards and positions, including the Marine Resources Commission and the Harbormaster.

Goal 6 - Dredging

Dredging is in accordance with *Goal 1 - Multiple-Use Waters*, *Goal 2 - Clean Waters*, and *Goal 5 - Safe Waters*. Secondly it can enhance beaches, improve fisheries, and promote boating. By maintaining adequate depth in channels, navigation is not restricted by shoaling during low water. Dredging projects can help improve water quality by removing sediment which impedes the natural flushing action of tidal flows. Dredging has been used historically in Wareham and will probably be necessary in the future as continued deposition of sediments reduces navigation and leads to deteriorated water quality. It is recognized, however, that dredging results in short-term loss of shellfish habitat through removal of eelgrass, and may stimulate increased boating demand.

Objectives

1. Maintain adequate depths in navigational channels to accommodate the needs of the boating public.
2. Improve water quality through dredging which increases water movement.

V. Implementation Action Plan

The intent of this section is to outline a process through which the Town of Wareham may begin to implement the goals and objectives established in the preceding section. It is recognized that this Harbor Management Plan is a community plan, subject to the will of the people. The information presented in this section is consistent with the Massachusetts Coastal Zone Management Agency (MCZM) (June 2000), and will set the groundwork for the town to confront current challenges relating to use and development of the harbor, and provide a framework upon which the town can meet future challenges.

The prior Implementation Action Plan of April 19, 1996 was derived through an open public participation program, through meetings and conversations with the Wareham Marine Resources Commission, the Wareham Harbormaster, and the Wareham Town Administrator, and through research into other successful harbor management plans in Massachusetts, Rhode Island and Connecticut. Coordination with MCZM has been instrumental in producing the following plan. Not all recommendations to implement all items including the Harbor Management Council. Reviews and Approval of Municipal Harbor Plans (301 CMR 23.00) (Check with author)

Any process/program identified must have a means to empower seasonal residents who are not registered voters at Wareham town meeting.

Inherent in the development of the Harbor Management Plan is the need to determine and enforce the *accountability* of town staff and board members to harbor users, including the permanent and seasonal residential community.

It is important to *empower a* primary group of citizens concerned with harbor issues to manage the implementation of the Plan.

As discussed in detail below, the recommended concept for implementation includes the formation of a *Harbor Management Council* empowered as a policy-making board to advocate bylaw changes, coordination with municipal boards on the review of proposed development within a harbor overlay area, education of the public regarding land- and water-based water quality issues, and active pursuit of state and federal funding for harbor-related improvements.

This Implementation Action Plan specifies the creation of a *Harbor Management Council* to replace the existing Marine Resources Commission.

A. Action Plan for the Harbor Management Council

Town bylaw changes are required to enact recommended changes in the management and maintenance of the harbor. Such changes, however, must be formulated by an authority empowered to guide other additional bylaw modifications through the town meeting process. Regulatory changes are needed for management of both water-based and land-based resources, and the implementation of a Harbor Management Council will enable the Town of Wareham to begin the process of making necessary and immediate changes to improve the management of harbor resources and planning for future challenges to the activities in, surrounding, and affecting the harbor. Making consistent the many regulations, policies, and guidelines with the Harbor Management Plan, while assuring a mechanism for community participation, will be one of the Harbor Management Council's first important tasks.

1. Harbor Management Council Bylaw

A Harbor Management Council or similarly named authority must be created, by bylaw, upon the recommendation of the Wareham Board of Selectmen. This Harbor Management Council would be empowered as a policy-making entity, required to hold public hearings before presenting articles for town meeting. The Harbor Management Council would be designated the local "clearinghouse" for issues relating to the waterfront. The Harbor Management Council would have a dual role regarding the office of the harbormaster:

- Harbor Management Council would set policies which the harbormaster must implement and enforce; and
- Harbor Management Council would oversee the activities of the harbormaster.

Composition of the Harbor Management Council should be broad based in its structure, and include nine (9) members comprising both registered voters (permanent residents) and seasonal residents (would require a by-law change) who are willing to make the commitment of time and energy to protect and direct the use of harbor resources. By including, as advisors (Liaisons?), members or designated representatives of the Planning Board, Conservation Commission, and Board of Health, coordination of municipal groups on harbor issues will be ensured. Members would be appointed for staggered terms by the Board of Selectmen from a listing of interested citizens. One representative each from the following groups shall be appointed as voting members of the Harbor Management Council (ex-officio representation would include the harbormaster/harbor agent):

Members:

- 1. Beach associations (to be appointed on a rotating basis between Wareham River and
- 2. Onset Harbor associations to represent all such organizations in their respective areas)
- 3. Recreational boating community (boats 25 feet or less in length)
- 4. Commercial fishing/shellfishing industry
- 5. Marine-related industries
- 6. Marine Environmental Specialist
- 7. Three community members-at-large

Advisors:

- 1. Planning Board
- 2. Conservation Commission
- 3. Board of Health

To enable the Harbor Management Council to get off to a good start and so as not to rely fully on the potential part-time dedication to functions on the Harbor Management Council, it is recommended that a part-time staff position from the existing Harbormaster's office, be utilized to carry on administrative activities of the Harbor Management Council, including the action items identified below. The harbor agent would facilitate the continuous advance of research, investigation, and coordination required to commit fully to implementation of the Harbor Management Plan. The harbor agent would also coordinate the activities of Council members and provide staff continuity for rotating terms for Council members.

The harbor agent position could be combined with the harbormaster position in recognition of the harbormaster's knowledge of harbor issues and availability during the non-boating season. Based

upon budgetary realities in Wareham at the current time, it could be more realistic to consider combining the harbor agent and harbormaster positions. This recommendation is made based upon the harbormaster's knowledge of Wareham waters, harbor issues, and state and federal regulatory responsibilities and funding opportunities. Although the harbormaster and his staff are very busy during the peak boating season, Memorial Day through Labor Day, he/she would be available to perform harbor agent tasks related to implementation of the Harbor Management Plan during the off-season. It is anticipated that once municipal budgetary constraints are eased in Wareham it would be optimal to hire a part-time harbor agent. Training/education and dedication to harbor issues are paramount in the selection of personnel for this position.

Responsibilities and supervision of the shellfish constable must be consistent with Chapter 130, Section 98 of the Massachusetts General Laws, as well as Chapter 130, Section 52, which gives the Board of Selectmen ultimate control over the shellfish constable.

A sample bylaw for creation of a Harbor Management Council is presented in Appendix 11. 2.

Harbor Management Council Responsibilities

As recommended in MCZM's [301CMR 23.00 Review and Approval of Municipal Harbor Plans](#), the following duties and responsibilities should be assigned to the Harbor Management Council through the development of a town bylaw:

- Present appropriate bylaws, ordinances, rules, policies, guidelines and regulations for plan implementation. The body should also monitor compliance with any adopted law that affects any aspect of the plan or harbor.
- Require that any further sub plans such as mooring and anchorage plan updates would lead to further management plan implementation.
- Participate in the planning or decision-making activities of all public and private agencies, committees, commissions, boards, etc. and any private entities which have interest or jurisdiction in the harbor planning area.
- Review and make recommendations on proposals reviewed by other municipal authorities for land and water use activities within the harbor planning area. In particular, the Harbor Management Council should review and make recommendations, consistent with the adopted Harbor Management Plan, on any proposal affecting the real property on, in or contiguous to the harbor planning area submitted to any municipal authority with jurisdiction over the harbor planning area.
- Review for consistency with the Harbor Management Plan any public notice of an application for a local, state or federal permit for an activity taking place within the Harbor Management Council's jurisdiction.
- Conduct, or cause to be conducted, studies of the conditions and operations within the harbor planning area. Present proposals for the harbor's efficient operation to the Board of Selectmen.

- In collaboration with the Board of Selectmen, assist in obtaining funding for harbor improvements such as capital projects, property acquisitions, easements, facilities maintenance, or dredging.
- Monitor progress of Harbor Management Plan implementation and maintain a schedule for implementation of goals and objectives as cited in the Harbor Management Plan.
- Serve as liaison between all federal, state, county, regional and municipal entities that share jurisdiction over the harbor planning area following the completion of the Harbor Management Plan, and throughout the entire implementation process. Collaborate with The Board of Selectmen for harbor project approvals

3. Harbor Management Council Action Plan

The multiple use of harbor waters is the highest priority of the Harbor Management Plan. Both seasonal and permanent residents are concerned that Onset Bay in particular is becoming little more than a boat parking lot. This Harbor Management Plan acknowledges that Wareham offers disproportionately greater access to its waters than many other Buzzards Bay communities as a result of its acceptance of federal funds for harbor access improvements. The Harbor Management Plan heralds the community's desire to protect the multiple use of Onset Bay and Wareham River for current and future harbor users from inside and outside of the community. The Harbor Management Plan also recognizes that changes allowed throughout the Town, not only in waterfront areas, impact the multiple use of Wareham's waters, their cleanliness, productiveness, and safety.

In order to implement the Harbor Management Plan, specific Action Items have been identified for implementation by the Harbor Management Council:

A. Harbor Management Council to ensure safe, multiple use of harbor waters for recreation. Harbor Management Council is to work with existing community groups including the Onset Protective League, beach associations, and marina-users as well as the community-at-large to document the demand for waterskiing, [fin fishing](#), shell fishing, small boating, [kayaking](#), scuba diving, etc. Harbor Management Council is to convene separate task forces for each use (or group of similar uses) charged with the documentation of demand, the identification of use areas, the formulation of regulations to ensure safe use, and the enforcement of these regulations. ***Community participation is paramount to the success of all Harbor Management Plan Action Items.***

- i. Schedule community meeting. Advertise in local media, post signs at marinas and boatyards. At meeting formulate task forces for separate harbor uses. Task forces to comprise community-at-large and one member of the Harbor Management Council. In order to effect change, task forces may be charged with completing their mission within a 6-month period. Such schedule should result in holding public hearings during the peak harbor use period, May through October.
- ii. Task forces to document demand, identify harbor areas favorable to use, outline safety and use parameters (including such issues as depth of water, water quality, prevailing winds and sea surface conditions, and potential conflicts with boat traffic and other harbor uses), and draft preliminary specifications for regulations.

- iii. Task forces to meet with harbormaster to draft regulations for each use.
- iv. Task forces to develop a water-use activities map which would be based upon the Waterways Rules and Regulations, the mooring grid plan, shellfish resource areas, multi-use areas (exclusive of mooring areas), and designated-use areas for waterskiing, windsurfing and swimming beach exclusionary areas (State regulated). This map would serve as the basis for a harbor uses by-law.
- v. Harbor Management Council to hold public hearings (during peak harbor use period) on proposed regulations, integrate revisions and initiate Wareham Police Department and Department of Fisheries, Wildlife and Environmental Law Enforcement (DFWELE) review. Issues to be addressed include those concerns raised through the Harbor Management Plan community participation program, specified in Section III.
- vi. Harbor Management Council to submit proposed regulations for town meeting warrant. To expedite the approval process, regulations could be presented separately for mooring or other contended issues. When promulgated, Harbor Management Council to oversee the enforcement of regulations through the harbormaster and police department, and address community concerns regarding maintenance of multiple use of harbor areas.

B. Harbor Management Council to promote education on harbor issues. Knowledge is the key to garnering community support for many issues relating to water quality improvements, one of the priority goals for implementation of the Harbor Management Plan. The Harbor Management Council, through coordination with MCZM, the Buzzards Bay Project, Massachusetts Department of Environmental Protection, the SERPEDD, and state and federal agencies, has the means to disseminate information to the local community. The Harbor Management Plan recommends that Harbor Management Council staff develop a series of brochures/leaflets to be distributed to the community as specified below.

- i. Successful implementation of the No Sanitary Discharge Law is dependent upon knowledge of the law by the boating community as well as enforcement by the harbormaster, police department and Board of Public Health. Education is key to its success. The Harbor Management Council and Board of Health must provide continuous education through the local media. The Harbor Management Council must develop a pamphlet, to be issued with Harbor Services Permits, on the law and on the availability of pump-out facilities in town.
- ii. Harbor Management Council to develop and distribute to applicants for Harbor Services Permits a copy of an educational booklet which discusses the safe handling of fuel, oil, and grease for motor boats, including the implications of pumping contaminated bilge water. Massachusetts Maritime Academy could be consulted regarding development of this brochure. Harbor Management Council to develop a pamphlet discussing the pollution impact on the bays and rivers in Wareham resulting from illegal disposal of motor oil, antifreeze, and gasoline in storm drains in residential areas.

C. Harbor Management Council to ensure multiple use of harbor waters for shellfishing. Harbor Management Council is to oversee the efforts of the shellfish constable in the formulation and enforcement of regulations and policies for shellfishing in Wareham waters in accordance with *Goal 1 - Multiple-Use Waters*, *Goal 2 - Clean Waters*, and *Goal 3 - Productive Waters*. Action Items are directed toward protecting public health, shellfish resources, and opportunities for

recreational and commercial shellfishing now and in the future and include the following:

- i. Harbor Management Council to direct the shellfish constable to enforce local, state, and federal standards/policies regarding the harvest of shellfish.
- ii. To avoid resource depletion, Harbor Management Council and shellfish constable to work in conjunction with DMF to investigate means to limit shellfishing by instituting limits on catch, reducing shellfish hours, or reducing permit availability to permanent and seasonal residents of Wareham.

D. Harbor Management Council to coordinate review of proposed development affecting harbor. The Harbor Management Council is charged with preserving, protecting and enhancing the natural resources of the harbor in accordance with *Goal 4 - Community Values and Natural Resources*. The Harbor Management Council is charged with carrying out several tasks to ensure that future development is in accordance with this goal:

- i. Harbor Management Council to review any project for consistency with this harbor plan, *previous to any state-action if the proposed project is deemed by the Harbor Management Council to be inconsistent with the Harbor Plan then the Harbor Management Council shall reject such proposal project. The project Proponent has the right to revise and resubmit for review to ensure consistency with the Harbor Management Plan.*
- ii. Harbor Management Council to review all proposed development within the Harbor Overlay Zone (development on any property located within 100 feet of tidal waters), as described under *Wareham Planning Board Action Items*, below, for compliance with this Harbor Management Plan.

E. Harbor Management Council to coordinate with the Board of Health on documentation of sanitary pump-out usage. This Action Item is in accordance with *Goal 1 - Multiple-Use Waters*, *Goal 2 - Clean Waters*, and *Goal 3 - Productive Waters*. The Harbor Management Council and the Board of Health are to obtain the following information from the harbormaster:

- i. Harbor Management Council to request that the harbormaster submit information on the number of pump-outs performed on a monthly basis at all sanitary pump-outs in Wareham. This information will be submitted to the Harbor Management Council and the Board of Health on a monthly basis.
- ii. Harbor Management Council to request that the harbormaster obtain information on the Harbor Services Permit application on the type of holding tank on board each permitted boat. This information would be submitted to the Harbor Management Council and the Board of Health by July 31 for each boating season.

F. Harbor Management Council to support coastal access. Wareham continues to offer opportunities to the general public for access to harbor and river waters in accordance with state and federal mandates (Wareham provides more opportunity for free access to beaches, boat ramps, and parking areas than many other Buzzards Bay communities in southeastern Massachusetts). The Harbor Management Council must assess each opportunity for improved access on a case-by case basis to determine how this would impact the Harbor Management Plan *Goal 1 - Multiple-Use*

Waters. Improved access must also be viewed in a regional context to assure that Wareham does not bear a disproportionate share of the burden to provide improved public access to Buzzards Bay.

Harbor Management Council to initiate a paid parking system for all town-owned boat ramps, including the Oak Street/Tempest Knob boat ramp on the Wareham River. According to the Public Access Board, the state and town have negotiated a Land Use Agreement which allows the Town of Wareham to charge a fee for use at the Tempest Knob boat ramp covering the cost of routine maintenance. This fee must not discriminate between residents and non-residents. A special consideration enables the town to allow parking for those residents who have purchased a town beach parking pass. Pay by use is also allowed.

- ii. Harbor Management Council to [assist](#) the Onset Bay Association, [if requested](#), as they investigate development of remote parking with shuttle bus connections to the Onset Village business district, the 12th Street boat ramp, and Shell Point Beach.
- iii. Harbor Management Council to investigate funding mechanisms for coastal acquisitions through [DCR and the Wareham Community Preservation Committee, the Department of Fisheries, Wildlife and Environmental Law Enforcement and grants from organizations such as the Audubon Society, Ducks Unlimited etc....](#)
- iv. Harbor Management Council to pursue Public Access Board funding for boat ramp rehabilitation at Swifts Beach.
- v. Harbor Management Council to work with the harbormaster to [annually](#) prepare recommendations for mooring fees comparable with other Buzzards Bay towns for presentation at town meeting.
- v. Harbor Management Council to communicate to the Municipal Maintenance Department the need for any changes in any policies regarding beach wrack cleanup and restroom maintenance.

G. Harbor Management Council to review and amend the Harbor Management Plan [every](#) three years in accordance with MCZM Harbor Planning Guidelines. This will ensure that the document becomes a working tool and continues to meet evolving community and water-user needs. Public participation is key to the ongoing success of Harbor Management Plan implementation; existing neighborhood groups and associations are encouraged to work together on common issues by inviting them to hearings or meetings held to discuss harbor issues. This is especially important for summer residents who are not town voters.

H. Harbor Management Council to prepare dredging master plan. The Harbor Management Council, together with the harbormaster, must determine the need for dredging town waterways, based upon past dredging activities, rates of sedimentation, commercial and recreational need, resource areas (including eelgrass habitat and shellfish areas), impact upon multiple use of harbor waters, and availability of funding. The master plan for dredging must give consideration to the need for an environmental impact report for the action(s) and the federal or state agencies' concern for the disposal of dredged material and impact on the ecology or resources areas. Implementation of this Action Item is in accordance with *Goal 6 - Dredging*.

4. Harbormaster Action Plan

In order to implement Harbor Management Plan, the Harbormaster/Shellfish Constable will be responsible for the following:

A. Harbormaster to enforce Waterways Rules and Regulations. As a law enforcement authority the harbormaster is responsible for enforcing federal, state and local marine and freshwater regulations within his/her area of jurisdiction. As indicated during the public participation process, these regulations must be enforced equitably. This Action Item addresses *Goal 1 - Multiple-Use Waters* and *Goal 5 - Safe Waters* and is a priority objective of the Harbor Management Plan.

- i. Harbormaster to enforce existing Waterways Rules and Regulations equitably,
- ii. Harbormaster to work with the Harbor Management Council and the multi-use task forces in the designation of various use areas and in the revision of Waterways Rules and Regulations.
- iii. Harbormaster to enforce the prohibition of mooring expansion beyond the "special anchorage" area in Onset Bay, and any further enlargement of existing public mooring areas.
- iv. Harbormaster to enforce prohibition of waterski "drop off" on public beaches.
- v. Harbormaster to enforce "no wake" (6 mph or approximately 5 knots) speed limits in inner harbor areas to reduce shoreline erosion on a year round basis.
- vi. Harbormaster to enforce existing minimum wake restrictions (6 mph or approximately 5 knot speed limit) for motor boats within 150 feet of swimmers, fishermen, skin or scuba divers, floats or small craft.
- vii. Harbormaster to enforce state regulations prohibiting motor boats within 150 feet of public beaches. Where appropriate, harbormaster to work with the Municipal Maintenance Department to demarcate public swimming areas with buoys and floats.
- viii. Harbormaster to enforce the maintenance of separate areas for swimming, boat ramps, and waterski drop-off areas to avoid conflicts among users.

B. Harbormaster to upgrade navigational aides and public information. In order to achieve *Goal 5 - Safe Waters*, the harbormaster must undertake the following:

Harbormaster to mark the designated federal "special anchorage," channel and turning basin (as indicated on the NOAA navigational chart for Cape Cod Canal and Approaches, 13236, November 6, 1999) and the town-designated public multi-use area including waterskiing on Onset Bay with appropriate buoys and markers to make identification unmistakable in the harbor. (According to Wareham bylaws, this area is south of an imaginary line between Onset Island and Wickets Island, excluding the mooring areas and buoyed channels.)

- ii. The Harbormaster should develop a policy for the removal of hazards such as boats improperly moored in channels and dangerous congestion at entrance to Onset Bay from Cape Cod Canal as evidenced during the community participation program as allowed under the Massachusetts General Law, Chapter 102, Harbormaster legislation. Policy should

include time limits for vessels to be in a location prior to removal, a proper notification process and a proposed reimbursement program for all cost expended. If the Harbormaster's efforts fail to resolve a problem, then Harbormaster to request federal and state assistance, if necessary, to eliminate hazards.

- iii. Harbormaster to develop and distribute a brochure with the Harbor Services Permit which provides information on local boating bylaws (Waterways Rules and Regulations) and information from NOAA chart 13236 (1999), Cape Cod Canal and Approaches, relevant to Onset Bay and the Wareham River.

C. Harbormaster to accept and implement an overall mooring control plan. This Action
Item is crucial to *Goal 1 - Multiple-Use Waters* and *Goal 5 - Safe Waters*.

- i. Harbormaster, working in conjunction with the Harbor Management Council, to revise mooring control plan to make it workable. Harbormaster to begin gridding **existing public mooring areas without expansion**.
- ii. Harbormaster to work with the Harbor Management Council to prepare recommendations for mooring fees comparable with **other** area Buzzards Bay towns.
- iii. Harbormaster and Harbor Management Council to institute a written policy on Harbor Services Permit procedures. Harbor Management Council recommends that the Harbor Services Permit be computerized to provide information on the following:
 - Specific location of mooring, **using GPS coordinates**.
 - Information on marine sanitation device or holding tank on board.
- iv. Harbormaster and Harbor Management Council to develop written policy on mooring closure including dates at which moorings are either removed or sold/transferred to another. Policy to address reassignment of moorings based upon size and type of boat. Policy also to address waiting list procedures.
- v. Harbormaster to ensure that moorings are never abandoned and sunken in place, as they create obstacles for dredging, other water-based development projects, and navigation. The Harbormaster will identify moorings which have been abandoned and sunken in place in the past on the mooring plan. Reference to this information by proposers of other water-based projects within this area should be encouraged.
- vi. As many of the private docks and piers rest on the ocean floor at mean low tide (which scours the substrate and affects eelgrass habitat/distribution), the Harbormaster (in collaboration with the Harbor Management Council) should develop a registration program for these private structures to assist DEM in determining the number of structures that are in compliance with the Public Waterfront Act (M.G.L. Chapter 91). Any pier or dock needing to be licensed, even under the amnesty program, would be expected to meet minimum performance standards of not resting on the bottom and not preventing lateral public access for fishing and navigation. Since the amnesty program for existing unlicensed structures ends in October 1995, the Waterways Regulation Program will be available to assist in a public outreach effort to bring these structures into compliance with Chapter 91. The Waterways Regulation Program is coordinating (November 1994) with the Harbormaster to

schedule a workshop for the Town of Wareham.

D. Harbormaster to enforce the U.S. EPA "No Discharge Area." Enforcement of the no-discharge law is directed toward the improvement of Goal 2 - Clean Waters in Wareham waters.

- i. Harbormaster to enforce the maximum penalty (\$200 fine) for each pollution violation in accordance with town bylaws. Harbormaster to institute on-board inspections of vessels moored in Wareham, including so-called "live-aboards," to determine compliance.
- ii. Harbormaster to inventory the type of marine sanitation device on board through a question on the Harbor Services Permit application (this inventory could be used to help identify the quantity of effluent potentially discharged). Harbormaster to explore possibility of issuing color-coded stickers based upon type of device to aid law enforcement agents in identifying potential violators.
- iii. Harbormaster to provide the Harbor Management Council and the Board of Health with information on the number of citations issued for no-discharge violations on a monthly basis. Harbormaster also to provide general information on the number of verbal warnings issued.
- iv. Harbormaster to pursue available grants through the Clean Vessel Act, and the Department of Fisheries and Wildlife, and Environmental Law Enforcement for upgrade or replacement of outdated or malfunctioning pump-out facilities at Onset Pier and to purchase mobile pump-out or "honeywagon" for use in Onset Bay. The Town has recently received Clean Vessel Act (CVA) monies to upgrade Onset Pier pump-out and purchase a pump-out boat. Additionally, the Town has upgraded several private marina pump-outs with CVA funds.

E. Harbormaster to work with the Harbor Management Council to develop a dredging master plan.

- i. Harbormaster to pursue state and federal funding for maintenance dredging projects such as the recent contract let for dredging in the East River and Broad Cove. Project limits would be established through the availability of funding and through the full circuit of environmental review required for any dredging project. Issues to be addressed during dredging studies include what manmade and natural resources will be affected by dredging, whether there is a demand for more moorings which will result in the expansion of mooring fields, need for environmental documentation, and what the financial loss would be to the town if there is a resultant short- or long-term loss of shellfish habitat. Funding by federal and state agencies is contingent upon acceptance of their rules and regulations.
- ii. Harbormaster to work with the Harbor Management Council in development of a sequential dredging master plan. A complete dredging plan for Wareham waterways should include areas needing dredging over the next 50 years. A look at disposal options and development of a dredging fund could also be included.
- iii. Harbormaster to coordinate with several agencies in developing a dredging master plan, including MCZM's Dredging Coordinator, DEM's Waterways, and DEP's Water Pollution Control Division

iv. So that all water-based planning projects adequately consider the physical limits of other water development projects, the Harbormaster should reference the U.S. Army Corps of Engineers' Wareham Harbor Federal Navigation Project (see Appendix 13).

B. Action Plan for Town Boards, Commissions, Committees, and Agencies

Designation of the Harbor Management Council as the authority to implement the Harbor Management Plan has certain implications for the various agencies and departments within the Town of Wareham's administration. In order to maintain consistency with the goals and objectives for harbor management, the operations of these offices and the Harbor Management Council must be synchronized. Each must have a clear understanding of its individual responsibilities as well as the collective responsibilities of others in town to bring the Harbor Management Plan to fruition.

1. Wareham Board of Selectmen

The Wareham Board of Selectmen (and the Town Administrator) will be instrumental in the implementation of Harbor Management Plan tasks fulfilling *Goal 1 - Multiple-Use Waters*, *Goal 2 - Clean Waters*, *Goal 4 - Community Values and Natural Resources*, and *Goal 5 - Safe Waters* as identified in Section IV.

A. **Harbor Management Council Responsibilities:** as pertaining to the Harbormaster/Shellfish Constable. The proposed Harbor Management Council would provide policy direction and guidance to the harbormaster and shellfish constable. This Action Item would be instrumental in implementing *Goal 5 - Safe Waters* through the improvement of law enforcement services relating to harbor safety.

B. **Harbormaster Responsibilities.** The Harbor Management Council is to clarify the jurisdictional authority and responsibilities of the harbormaster. The harbormaster, and any assistants or deputies, should be empowered to act for the Town of Wareham. Education in the marine field should be established as an employment prerequisite. Specific powers and duties should be clearly stated. The responsibilities of the harbormaster would include those Action Items identified previously in A.4, **Harbormaster Action Plan** and include, at a minimum, the following:

- enforce any local, state or federal boating safety law, regulation or bylaw as applicable;
- act as a non-voting, ex-officio member of the Harbor Management Council;
- implement the Harbor Management Plan;
- administrate designated mooring areas;
- collect Harbor Services Permit fees annually;
- prepare and maintain records of the locations of all moorings, users and vessels within designated harbor areas and other town waters;

- prepare and make available [to the public](#) a current waiting list for mooring permits;
- collect data on usage of sanitary pump-out usage and provide information to the Harbor Management Council and the Board of Health;
- provide recommendations to the Harbor Management Council on amendments or revisions to water safety regulations; and
- continue harbormaster training and education on marine/recreation issues through seminars and courses, and participate in harbormaster associations to deal with common issues.
- [See page 81 #7ii for similar Harbormaster responsibility with Harbor Service Permits](#)

C. Wareham Board of Selectmen and Harbor Management Council Action Items. The Board of Selectmen has several responsibilities in the implementation of the Harbor Management Plan. The Board's support in adopting the plan and in forwarding policy changes through town meeting approval is crucial to project success. The Board of Selectmen is also important in establishing job descriptions and performance levels for town employees.

- i. Board of Selectmen [with assistance from the Harbor Management Council](#) to coordinate inspections and response to illegal dumping of solid waste, hazardous materials including petroleum products, and human waste through the harbormaster's office, Board of Health, conservation agent, oil spill coordinator, police and fire department, and other town offices, as necessary.
 - ii. To facilitate professional job performance, [the Harbor Management Council](#) to require training of staff (harbormaster/shellfish constable), elected officials (Board of Health) and appointees (Harbor Management Council, Planning Board, Conservation Commission) at seminars and courses sponsored by the Massachusetts Association of Conservation Commissions and other [related](#) federal/state agencies. [\(other corrections not clear,pg.76\)](#)
- in. Board of Selectmen [and the Harbor Management Council](#) to pursue funding to finance pollution prevention and remediation programs for stormwater control, toxic use reduction, land use regulations, and the establishment of additional boat pump-out programs, in accordance with implementation of the Comprehensive Conservation and Management Plan (CCMP) through federal and state agencies including the Division of Marine Fisheries, Division of Water Pollution Control (Coastal Water Pollution Program), Division of Wetlands and Waterways, Division of Fisheries and Wildlife Environmental Law Enforcement, among others.

2. **Wareham Planning Board**

The Wareham Planning Board is instrumental in the implementation of *Goal 4 - Community Values and Natural Resources* as identified in Section IV. The Wareham Planning Board is charged with implementation of M.G.L. Chapter 40A, the Zoning Enabling Act. Chapter 40A established standardized procedures for the administration and promulgation of municipal zoning laws including the empowerment by communities to enact their own zoning bylaws in accordance with Home Rule. The purposes and objectives of the 1975 act, commonly referred to as Chapter 808, include the following which are most relevant to the Wareham Harbor Management Plan:

- to conserve the value of land and building, including the conservation of natural resources and the prevention of blight and pollution of the environment;
- to encourage the most appropriate **long term, beneficial**, use of land throughout town, including consideration of the recommendations of the master plan, if any, adopted by the planning board and the comprehensive plan, if any, of the regional planning agency; and
- to preserve and increase amenities by the promulgation of regulations to fulfill said objectives.

The Wareham Planning Board will be charged with several Action Items in the implementation of the Harbor Management Plan:

A. **Representation on the Harbor Management Council.** A representative of the Planning Board shall serve as an **advisory (ex-officio)** member of the Harbor Management Council. This representative will improve communication among town boards, serve as a liaison between landside development and harbor management, and, through his/her participation, will increase community awareness of the important relationship between protection of the harbor as a valuable community resource and the current and future attractiveness of the town as a whole.

B. **Planning Board to initiate Zoning Bylaw Amendments.** Amendments to the existing zoning bylaw are needed to assure that future shoreline development is in accordance with the Harbor Management Plan. These recommendations will be presented to the Planning Board by the Harbor Management Council. The Planning Board will then be responsible for presenting articles to the town meeting warrant for zoning bylaw amendments. The Harbor Management Council will provide the planning board support to effectuate zoning amendments.

- i. Create a Harbor Overlay Zone which extends a minimum of 100 feet from mean high water and includes all shorefront lots. This would be similar in concept to the Floodplain Overlay and the Buzzards Bay Overlay District. The Harbor Overlay Zone would be added to SECTION VII. ADMINISTRATION AND EXCEPTIONS of **the current** Wareham Zoning By-law
- ii. Add the following to SECTION II. ZONING DISTRICTS - USE REGULATIONS of the Wareham Zoning Bylaw as a Design Suggestion under Onset Village Commercial District and as a Design Requirement under Wareham Village District :

Site plan should reflect the relationship with the harbor, maximizing the relationship with adjacent waterfront/marsh by incorporating pedestrian walkways and seating areas along the rear of the property.

Site plan should maintain visual corridors between the adjacent street and the shoreline to reinforce the marine character of the community.

The Town may want to consider instituting a formal "Section 18" review process within the zoning bylaw. According to M.G.L. Chapter 91, Section 18, the planning board receives each license application and can hold a public hearing and submit a written recommendation to the DEP on whether the proposed project would serve a public purpose and not be detrimental to the public's right in tidelands [ref: M.G.L. Chapter 91, Section 18 and 310 CMR 9.13(5)]. A zoning bylaw could more fully describe what factors the planning board

will consider when making this determination.

- iii. Under SECTION IV DENSITY AND DIMENSIONAL REGULATIONS of the Wareham Zoning Bylaw, amend the allowable building height for Wareham Village to 35 feet. This will maintain a scale consistent with current building heights and maximize the relationship with the adjacent marsh on the Wareham River. (Onset Village height restrictions are currently 35 feet.)
- iv. Under SECTION VIII, SITE PLAN REVIEW of the Wareham Zoning Bylaw, insert the following under A. PURPOSE: *... and that such development be in accordance with the Harbor Management Plan.*

Under B. OBJECTIVES (2) Relationship of Buildings to Environment, add the following: *...and, if located within the Harbor Overlay Zone, ensure that the site plan is compatible with the marine environment, minimizing environmental degradation through: sedimentation and erosion at the shoreline as well as the upland portion of the property resulting from site alterations; leaching of or disposition of lawn and/or agricultural fertilizers, pesticides and other chemicals and organics; other activities, including, but not limited to, use or handling of petrochemicals (fuels, oils, and so forth).*

Insert: (6) Harbor Planning - *Proposed development on parcels within the Harbor Overlay Zone must assure that said development supports the goals of the Harbor Management Plan by protecting and preserving water quality, maintaining **existing** shore access, and preserving visual connection between pedestrian paths and the waterfront.*

The Public Waterfront Act (M.G.L. Chapter 91) and associated waterway regulations (310 CMR 9.00) can assist the Town in achieving goals for preserving/enhancing physical and visual access to the waterfront and waters of Wareham.

License application review for placement of structure or fill on riparian lands (310 CMR 9.04 and 9.05) ensures that activities in tidelands maintain and/or enhance public rights to fish, navigate and access such tidelands.

In order to increase communication between municipal boards, under F. PROCEDURES indicate that: *The Harbor Management Council shall evaluate all site plans subject to Minor Site Plan Review and Major Site Plan Review - Special Permit located within the Harbor Overlay Zone. Such evaluation (advisory only) shall be forwarded to the Planning Board for consideration.*

- v. Planning Board to investigate measures to control buildability of "grandfathered" shorefront lots in areas to be sewered.
- vi. Planning Board to adopt subdivision bylaws that require best management practices for stormwater runoff .

3. Wareham Board of Health

The Wareham Board of Health will be instrumental in the implementation of Harbor Management Plan tasks fulfilling *Goal 2 - Clean Waters* and *Goal 4 - Community Values and Natural Resources* as identified in Section IV. These tasks relate to Board of Health representation on the proposed

Harbor Management Council, enforcement of the U.S. EPA No-Discharge Law and regulation of development in unsewered areas.

A. **Representation on the Harbor Management Council.** A representative of the Board of Health shall serve as an advisory/non-voting member of the Harbor Management Council. This representative will improve communication among town boards, serve as a liaison between landside development and harbor management, and, through his/her participation, will increase community awareness of the important relationship between protection of the harbor as a valuable community resource and the current and future attractiveness of the town as a whole.

B. **Action Plan - Review of Development.** Nonpoint discharge from septic tanks, the application of lawn fertilizers, and street runoff are major sources of nutrient loading (pollution) as identified by the Buzzards Bay Project. The following are consistent with Buzzards Bay Project recommendations:

- i. Board of Health to amend the local sanitary code to increase septic system setbacks from resources areas such as shorelines to 150 feet. Alan to check w/B o H and/or Con.Com.
- ii. Board of Health to pursue grants to comply with the Clean Water Act, including upgrading the Wareham Wastewater Treatment Facility (WWTF), extending sewer systems to unsewered coastal areas, eliminating existing storm drain outfalls (a major source of pollution), and retrofitting existing pump stations with auxiliary power systems to prevent discharge of raw sewage during power outages.
- iii. Board of Health to investigate use of Wareham WWTF effluent for cooling water at the local waste-to-energy plant.
- iv. Board of Health to work with the Conservation Commission and the Massachusetts Department of Environmental Protection (DEP) in the development of Geographic Information System (GIS) mapping of the most sensitive areas - including the extent of filled tidelands - in Wareham. This will serve as a base for state and local cooperation in enforcing any revisions to DEP's clean water rules (Title 5 of the State Environmental Code) which is aimed at better controlling pollution caused by on-site sewage disposal systems. These activities are directed toward addressing this important nonpoint source pollution problem. GIS mapping should incorporate the resource areas identified on the DEP Division of Wetlands and Waterways Wetlands Conservancy Program orthophoto mapping (scale 1:5,000, 1990 aerial photography). Resource areas include the following: deep marsh; shallow marsh, meadow or fen; shrub swamp; wooded swamp (deciduous, coniferous or mixed); bog; cranberry bog; tidal flat; salt marsh; coastal beach; barrier beach system; coastal dune; rocky intertidal shore; open water; and coastal bank, bluff or sea cliff. Alan, GIS in place ?
- v. Board of Health to consider new individual sewage disposal (septic) systems in coastal velocity areas (as mapped by FEMA), as the potential for water contamination is very great in these areas.

4. Wareham Conservation Commission

The Wareham Conservation Commission will be instrumental in the implementation of Harbor Management Plan tasks fulfilling *Goal 1 - Multiple-Use Waters* and *Goal 4 - Community Values*

and Natural Resources as identified in Section IV.

A. **Representation on the Harbor Management Council.** A representative of the Conservation Commission shall serve as an advisory/non-voting member of the Harbor Management Council. This representative will improve communication among town boards, serve as a liaison between landside development and harbor management, and, through his/her participation, will increase community awareness of the important relationship between protection of the harbor as a valuable community resource and the current and future attractiveness of the town as a whole.

B. **Action Plan - Review of Development.** Through the Wetlands Protection Act (M.G.L. Ch.131 Sec.40) and the local wetlands bylaw, the Conservation Commission is empowered to review development.

- i. Conservation Commission natural resources agent to continue investigation into the regulation of coastal engineered structures which may adversely affect water quality, shellfish habitat, and shoreline erosion.
- ii. Conservation Commission to utilize the Barrier Beach Management Guidelines produced by an MCZM Task Force and the Swift's Beach Study. The task force has drafted a range of possible best management practices that could be employed by a conservation commission or beach manager in order to manage a barrier beach most efficiently.
- iii. Conservation Commission to investigate measures to protect the saltwater/freshwater habitat found on the Agawam River. Designation within the Massachusetts Department of Environmental Protection Areas of Critical Environmental Concern (ACEC) could be a consideration.
- iv. Conservation Commission to work with the Board of Health and the Massachusetts Department of Environmental Protection in the expansion of GIS mapping of the most sensitive areas in Wareham.
- v. Conservation Commission to amend Division VI, Article I - Wetland Protective Bylaw to require that, for new construction, a 30-foot buffer area of native vegetation be maintained along tidal shorelines to reduce the possibility of fertilizer and pesticide use near the water and to intercept nutrients and contaminants before they reach tidal water.
- vi. Conservation Commission to utilize the Nonpoint source "Megamanual" received from the DEP's Office of Watershed Management which helps municipal officials understand, recognize, and manage local nonpoint source pollution that threatens important water resources. This manual may be used as guidance in preparing a nonpoint source management plan and writing bylaws to combat potential nonpoint sources of pollution.

5. Municipal Maintenance Department

The Wareham Municipal Maintenance Department will work hand-in-hand with the Harbor Management Council towards the implementation of Harbor Management Plan tasks fulfilling Goal 1 - Multiple-Use Waters and Goal 2 - Clean Waters as identified in Section IV.

- i. Municipal Maintenance Department to work with the Harbor Management Council and the harbormaster to demarcate all public swimming areas with buoys and floats.

- ii.. Municipal Maintenance Department to work with the Harbor Management Council and the harbormaster to construct pram-racks or pipes to which prams could be secured to reduce shoreline erosion at Tempest Knob Beach and Minot Beach.
- iii. Municipal Maintenance Department to post "Do Not Feed the Geese and Ducks" signs on beaches where their presence has been a problem. Police/ [Harbormaster](#) to enforce the existing bylaws regarding same.
- iv. The Department should use the Best Management Practices (BMPs) for stormwater control.

7. Town Collector/Treasurer

The Wareham Town [Treasurer](#) will be instrumental in the implementation of Harbor Management Plan tasks fulfilling *Goal 2 - Clean Waters* and *Goal 5 - Safe Waters* as identified in Section IV.

- a. Town Accountant to mail a pamphlet, developed by the Harbor Management Council, with all property tax bills outlining implications of disposal of toxic materials and nutrients through private septic systems and cesspools, and the town's sewer system and storm drain network with a discussion of how the application of fertilizers on residential lawns may contribute to algal blooms in area coves and marshes.
- b. Town [Treasurer](#) to mail a pamphlet, developed by the Harbor Management Council, with boat excise tax bills outlining information on channels, turning basins, swimming areas, and waterskiing areas in Onset Bay and Wareham River. Pamphlet to summarize water safety rules and regulations and to explain harbor buoys and markers.

C. Action Plan for Private Groups and Others

Numerous organizations in Wareham are concerned with the use and development of harbor resources in town. While some groups' sole focus is harbor use, this may be only one of many issues for other organizations. The grassroots support of these groups will be instrumental in Harbor Management Plan implementation. These organizations include the Onset Protective League, the Onset Bay Association, the Shell Point Association, the Nanumet Heights Beach Association, and other neighborhood and beach associations. As indicated in previous discussion, members of beach associations are to be appointed to the Harbor Management Council on a rotating basis between Wareham River and Onset Harbor associations. This is a way to empower these members on harbor issues.

1. Traffic and Parking Action Planning

[Various neighborhood and beach](#) associations will be instrumental in the implementation of Harbor Management Plan tasks fulfilling *Goal 1 - Multiple-Use Waters* as identified in Section IV.

These associations to investigate availability of convenient off-street parking for respective areas such as marinas, boat ramps and beaches, to improve safety on narrow village streets and minimize conflicts with local residents whose driveways are frequently blocked by on-street parking. Potential funding sources include Massachusetts Department of Transportation, [\(ask for Frank T.\)](#) Department of Housing and Economic Development for community-based economic development assistance to help retain, grow and attract business.

D. Conclusion

The key objective in Harbor Management Planning at Wareham is the accurate and concise identification of existing problems and probable future conflicts pertaining to the administration and management of municipal waters. Furthermore, this key objective includes the determination of specific actions to reduce those conflicts. To reach this objective, a Harbor Management Plan requires special attention to engineering, land use management, water resource management, and regulatory control.

Control and regulation within municipal waters are typically shared between federal, state and local governments, making it necessary for Wareham to have a clear statement of its goals and objectives, as well as an understanding of how these agencies interact in terms of harbor management. Each level of government has its own goals and objectives, and because the agencies are dissimilar, so are their objectives. This in turn creates uncertainty regarding authority and responsibility over the management of municipal navigable waters. In addition, federal, state and local governments routinely find themselves facing complex decisions with limited information to assist them in making site-specific decisions.

Traditional comprehensive land use planning fails to consider adequately the administrative changes required for implementation of land use plans beyond the shoreline. Land use controls may allow or disallow waterfront activities to continue with little regard for their impact on water surface availability, water quality, local maritime activities, or the carrying capacity of local, natural shoreline habitats.

It is the objective of this implementation component of the Wareham Harbor Management Plan to address the necessity of dealing promptly with the often uncoordinated regulatory programs at each level of government and create, through bylaw amendment, an integrated management framework designed to accomplish the stated goals and objectives for harbor management that have been developed through this public participatory planning process.

Implementation of the Harbor Management Plan requires the resolve and commitment of the entire Town of Wareham, from the citizen-based membership of the proposed Harbor Management Council to the town administrators who will be responsible for the modification of bylaws and the creation of the council. It requires continuous momentum of the council, whose membership is driven by the full-time activities of a qualified and resolute harbor agent who has a clearly defined mission. It requires a high level of coordination not only with state and federal agencies, but perhaps more importantly, with other departments and offices within the town organization to bring to fruition the objectives of sensible and sustainable management of land and shoreline resources. This coordination is particularly important for the new council in terms of building upon the broad base of knowledge possessed by the harbormaster (and, if his/her function is not expanded to serve also as the proposed harbor agent, include h h e r in a mentorship function to the harbor agent) so that the Harbor Management Plan can be enriched by the experience he/she has gained from monitoring activities along 56 miles of shoreline.

This Harbor Management Plan is to work in conjunction with the municipal master plan, not to impose new restrictions on land and shoreline development in Wareham. This plan is intended to offer the necessary guidance for inclusion of the management of multiple activities upon the navigable waterways and along the shoreline within the existing land use/resource management, zoning and development, and law enforcement programs of the town.

3.

-
11. Marinas and the industrial waterfront get a lot of blame for degrading water quality. Michael Besse, Deputy Harbormaster, indicated that many have gas/oil traps on their storm drains.
 12. The Deputy Harbormaster indicated that if the HMP identifies areas to be used for separate uses and these recommendations are incorporated into town bylaws, then under present regulation, implementation and enforcement are the Harbormaster's responsibility.
 13. There is a perception that people with permanent moorings at the marinas generate more pollution than either transient (temporary anchorage) boaters or those local and/or summer residents who use private moorings. This is based upon the fact that those who live in the community do not have as great a need for pump-out facilities as those who live on their boats at the marinas.
 14. As shellfish holes are closed due to pollution, consideration should be given to instituting "relay programs" which would remove shellfish from closed areas to clean water. Permits for this activity have been issued to the Town by DMF previously. Transplanting of eelgrass from closed shellfish beds to improve habitat of non-degraded areas should be discussed with the Department of Environmental Management.

3. August 12, 1992 Public Workshop

Primary points discussed included the following. Comments indicate the range of concerns of those in attendance at the workshop and do not necessarily reflect actual documented situations, accepted marine operations, town bylaws, or recommendations of this HMP. A discussion of comments raised at this workshop is presented in **Section B. Summary of Issues.**

Shellfishing

4. Shellfishing has historically been an important recreational and commercial undertaking. With the increase in shellfish closure areas, fewer areas are available for shellfishing. Although other sources of pollution are known to degrade harbor waters, increased usage of pump-out facilities on the many recreational boats using the harbor is needed to improve water quality so that shellfish areas are not closed on a seasonal basis.
 5. Relaying shellfish from closed shellfish areas to clean areas for natural depuration was discussed. One citizen pointed out that this is a more cost-effective means of shellfish culturing than seeding, which takes four years for harvest. Others in attendance indicated that this is a short-term solution which does not clean up areas already closed.
 6. Questions were raised about the procedures to close shellfish beds, including regulations relating to distances from marinas. It was explained that it is based upon water quality sampling (there are over 100 water quality sampling stations in open shellfish beds in Wareham, which are tested 5 times per year by the Division of Marine Fisheries). Many questioned whether water quality is an adequate indicator, since shellfish live in the sediment. It was explained that shellfish are filter feeders and that this is adequate.
-

