

Action Plan 6 Managing Impacts from Boating, Marinas, and Moorings

Problem⁹⁷

One of the significant accomplishments of the Buzzards Bay Action Committee, on behalf of the watershed municipalities, and with technical assistance from the Buzzards Bay NEP, was the designation of Buzzards Bay as a No Discharge Area for boat sewage in 2000, the first large area to be designated in Massachusetts. However, boats, boat moorings, and marinas can still adversely affect water quality and habitats of Buzzards Bay. These impacts are most pronounced where boat density is greatest or where there are sensitive resources. Boat use and maintenance, and the infrastructure to support those activities, all have potential impacts associated with the release of contaminants, and through physical alterations like propeller wash and anchor chain scour, and through shading of the bottom. Some harbors in Buzzards Bay have more than 1000 moorings. Mooring chains scour the bottom, remove eelgrass, and destroy habitat for benthic fauna. These chains, bouncing on the bottom with waves, resuspend bottom sediments greatly reducing water clarity that can shade out eelgrass beds over large areas and elevate bacteria levels. Some marinas have illicit discharges associated with boat cleaning operations, and 95% of the marinas in Buzzards Bay have not complied with EPA's Multi-Sector General Permit for managing stormwater discharges. Education is needed about the broader impacts associated with boats, moorings and marinas and how they can be minimized.

Goals

Goal 6.1. Eliminate the discharge of wastewater from all boats in Buzzards Bay.

Goal 6.2. Eliminate or minimize impacts of discharges from marina operations.

Goal 6.3. Eliminate adverse environmental impacts associated with mooring fields.

Objectives

Objective 6.1. To ensure there is an adequate number of pumpout facilities in Buzzards Bay.

Objective 6.2. To promote the use of pumpout facilities by educating boaters, making facilities more accessible, and enforcing the regulations.

⁹⁷ This action plan differs considerably from the boat sewage action plan in the 1991 CCMP. It only addresses physical impacts and pollutant discharges associated with boats, marinas, and mooring fields. Broader impacts associated with managing development of the waterfront, managing usages of the watersheet, and watersheet zoning are addressed in Action Plan 6 Managing Impacts from Boating, Marinas, and Moorings. Some boating impacts are also addressed in Action Plan 17 Preventing Oil Pollution.

Objective 6.3. Achieve full compliance of marinas with the Phase II stormwater and MSGP discharge permits.

Objective 6.4. Ensure compliance of marina power washing activities with applicable state and federal laws.

Objective 6.5. Deploy mooring systems that minimize environmental impacts to habitat and water quality.

Approaches

Goals can be achieved through education efforts, such as the distribution of newsletters, factsheets, and posting of notices or signs. Improved compliance by marinas with the MSGP stormwater permit program will require notification and enforcement by the U.S. EPA, with supporting technical assistance from DEP and CZM. Marina operators must also cease discharges associated with bottom cleaning operations on their properties that result in direct discharges.

Eventually most conventional mooring anchors should be replaced with helical anchors and elastic rodes. Requirements for mooring gear replacement to environmentally friendly types can be mandated through regulations or policies and could be phased in over time to minimize hardships. For example, the Town of Marion now requires helical anchor systems only on vessels over 25 feet (but elastic rodes are not yet required). Environmental moorings have an added benefit of increased boat densities, the same number of boats can be confined to a smaller area of the estuary. Municipalities can lead by example by replacing all municipal owned moorings with these environmentally beneficial mooring systems.

Costs and Financing

Many elements of this action plan require modest or negligible expenditures of public funds, as most relate to education, adoption of regulations, or better enforcement of existing regulations. Most of the necessary flyers and notices can be produced in-house by towns, and disseminated with mooring permits and through marinas.

The most expensive element of this action plan is born by boat owners, and that is the cost of the new mooring system. While these environmentally friendly mooring systems are somewhat higher in price to a conventional mooring system (\$4-7,000), unless the mooring is new, this is an added cost. Mooring upgrades can be phased in over a period of years. Municipalities should pursue funding for municipal owned mooring replacements from habitat restoration programs.

Measuring Success

The success of this action plan will be documented principally with programmatic actions, the volume of boat waste collected, regulatory compliance, and the extent of use of environmentally friendly moorings.

Background⁹⁸

During the summer, Buzzards Bay is home to more than 12,000 docked or moored boats⁹⁹. During a peak summer holiday or boat event, with the addition of day launches, more than 15,000 vessels are in the bay. Based on boat registration data, perhaps 1,850 of these are commercial or government operated vessels (principally coastal or nearshore fishing boats, ferries and municipal craft), with the remainder being recreation vessels. More than 33 public and private marinas, 58 public boat ramps, 6,340 moorings, and more than 1,000 docks serve these vessels. The number of docks, moorings, and boats in Buzzards Bay continues to grow. In some harbors, mooring fields cover large areas and may exceed 1,000 anchorages (Figure 65).

While boating is an important part of the recreational and commercial use of Buzzards Bay, the cumulative impacts of these activities together with impacts from the construction and maintenance of the supporting infrastructure, and other recreational activities like jet and water skiing, can affect the water quality, habitat, and living resources of Buzzards Bay. The illicit discharge of sanitary wastes was a concern identified in the 1991 Buzzards Bay CCMP. This concern led to the designation of Buzzards Bay as a No Discharge Area for boat sewage in 2000, the first large area to be designated in Massachusetts¹⁰⁰. One of the most conspicuous boating impacts is the effects of propeller wash from the operation of boats at too high a speed in shallow areas. Certainly direct impacts occur when navigational channels are dredged or maintained. However, the cumulative impacts of less conspicuous activities have an important, if not greater, impact on water quality. These cumulative impacts result from varied boating activities including boat cleaning operations, illegal discharge of sanitary waste or contaminated bilge water, fueling spills and engine discharges, and general maintenance activities at public and private marinas. Shading by boats and docks

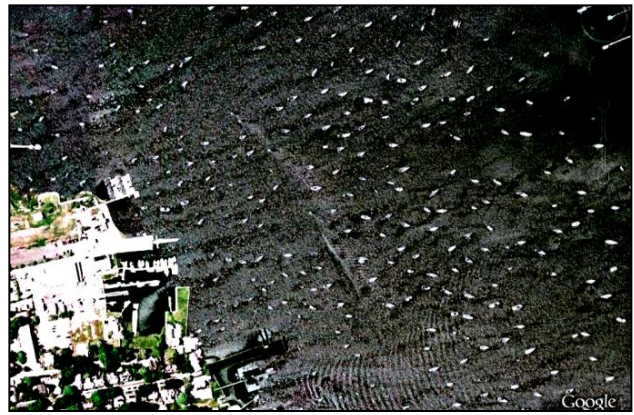


Figure 65. Oblique aerial photograph of a portion of a mooring field in Sippican Harbor, Marion, MA.

As illustrated by this aerial photograph, this harbor has one of the largest and densest mooring fields in Buzzards Bay can block sunlight from eelgrass and algae, changing bottom communities.

Besides these effects, more important are impacts from chain scour and sediment resuspension that are caused by traditional mooring systems. Traditional moorings systems consist of a large weight or anchor connected to a chain that drags on the bottom as the boat shifts with changing tide and wind direction and bounces up and down on the bottom with each wave. The chains scour the bottom destroying eelgrass and animal communities. They also suspend sediments causing increased turbidity, which causes eelgrass loss beyond the footprint of the mooring. Chain scour impacts can often be discerned from aerial photographs (Figure 66 middle).

This goal of this action plan is to minimize these impacts. Those impacts associated with fueling and hydrocarbon discharges are included in the *Reducing Oil Pollution* action plan.

Major Issues

There are several issues associated with pollution discharges and the operations of marinas¹⁰¹. Most marinas include impervious surfaces or town conveyance systems that discharge stormwater to surface waters. These marinas require a stormwater NPDES permit under the multi-sector general permit (MSGP) required for all “industrial” classified facilities with stormwater permits. Through this permit program, marina operators are required to implement best management practices to minimize stormwater volume and contaminants in the stormwater.

¹⁰¹ EPA defines a marina as any facility that contains 10 or more slips, piers where 10 or more boats may tie up, or any facility where a boat for hire is docked; boat maintenance or repair yards that are adjacent to the water; any federal, state, or local facility that involves recreational boat maintenance or repair that is on or adjacent to the water; public or commercial boat ramps; any residential or planned community marina with 10 or more slips; and any mooring field where 10 or more boats are moored.

⁹⁸ Text from the *Massachusetts Clean Marina Guide* prepared by Steve McKenna and Robin Lacey of Massachusetts Coastal Zone Management provided the basis of large portions of this new action plan.

⁹⁹ This information is based on mooring and slip numbers provided by the towns. In 2006, the Massachusetts Division of Marine Fisheries reported that there were 23,231 boats registered to residents of Buzzards Bay watershed municipalities. Many owners trailer these boats to coastal waters. Owners of many larger recreational vessels register their boats in other states (like Delaware) for tax purposes, but moor them in Buzzards Bay. For these reasons boat registration data, while useful for capturing the public’s interest in boating is less useful for defining actual boat activity in Buzzards Bay. However, 1,769 of these registered vessels are registered as commercial vessels that are most likely used on Buzzards Bay a large amount of time each year.

¹⁰⁰ The application was submitted by the Buzzards Bay Action Committee on behalf of Buzzards Bay municipalities. The Buzzards Bay NEP 2000 press release is retrieved from: buzzardsbay.org/ndapress.htm.

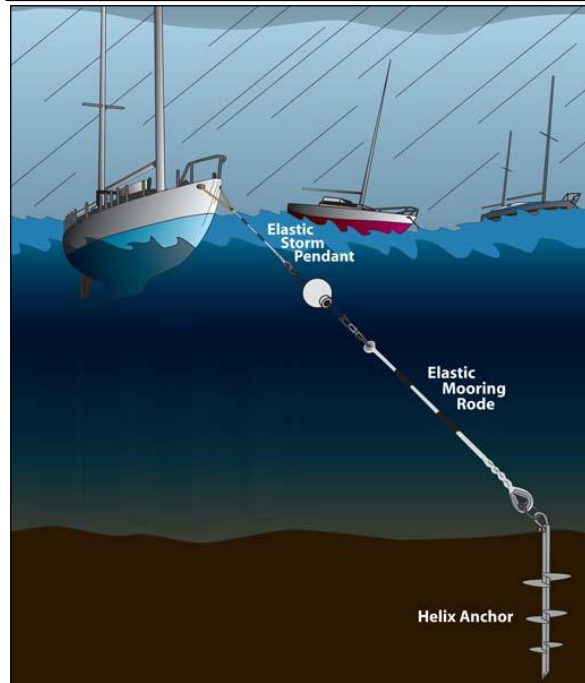
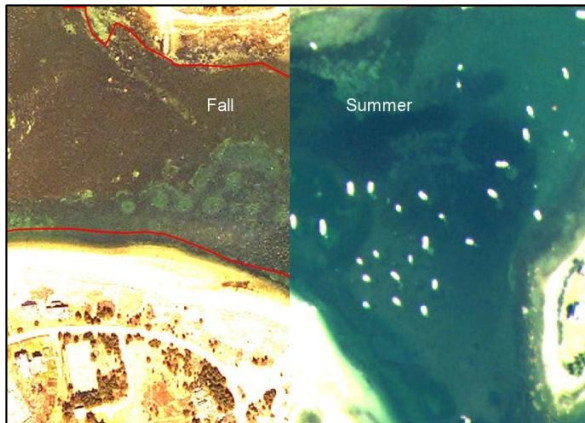
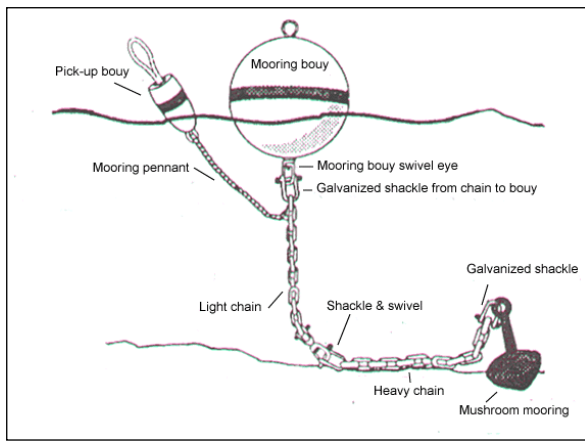


Figure 66. Impacts of traditional anchor systems and benefits of alternative systems.

Traditional moorings (top) have chains that scour the bottom destroying eelgrass beds (middle, mooring scars in West Falmouth Harbor) and suspending bottom sediments that make the water turbid, and shade out eelgrass beds and release nutrients. New anchoring systems consisting of elastic rodes and helical anchors (bottom) eliminate these problems, have only slightly higher costs, and have the additional benefit of allowing denser mooring fields. Graphic courtesy of boatmoorings.com.



Figure 67. Pressure washing at a marina with a water collection and treatment system.

It is believed that less than 5% of marinas in Massachusetts have complied with this EPA permit program.

Separate from the stormwater issues are discharges from power washing boats to remove debris and fouling organisms. Most boat bottoms have anti-fouling paints to prevent biological growth that can reduce boat speed and fuel economy. This bottom paint typically contains high concentrations of copper as its active ingredient.

Copper is a very effective deterrent to bottom fouling, however it is harmful to marine organisms. Even with a coat of bottom paint, most vessels need to have their hulls cleaned once a year to remove any biological growth. The most popular and efficient method is to power or pressure-wash the hull once the boat is hauled from the water using a high-pressure stream of water over the boat bottom while the boat is situated over a travel-lift well or on a boat ramp (Figure 67). The resulting wash water contains fouling organisms and paint chips, and is usually discharged directly into the surface waters or allowed to soak into the ground.

This wastewater, if not properly managed, may contaminate surface water and groundwater. It is also considered a contaminated discharge and requires either a EPA NPDES permit for a stormwater discharge to surface waters, or a DEP groundwater discharge permit from the state. Marina operators cannot discharge this flow to a septic system. These discharges require a wastewater recycling system, or a system to remove contaminants to permit authorized levels. As of 2005, only one marina in Massachusetts has obtained the necessary permits to discharge its power washing operation to a municipal sewer system. Most marinas have chosen to install a closed loop systems that does not require operational permits. Massachusetts CZM and the Buzzards Bay NEP have programs underway to educate marina operators about the need to comply with these permit programs.

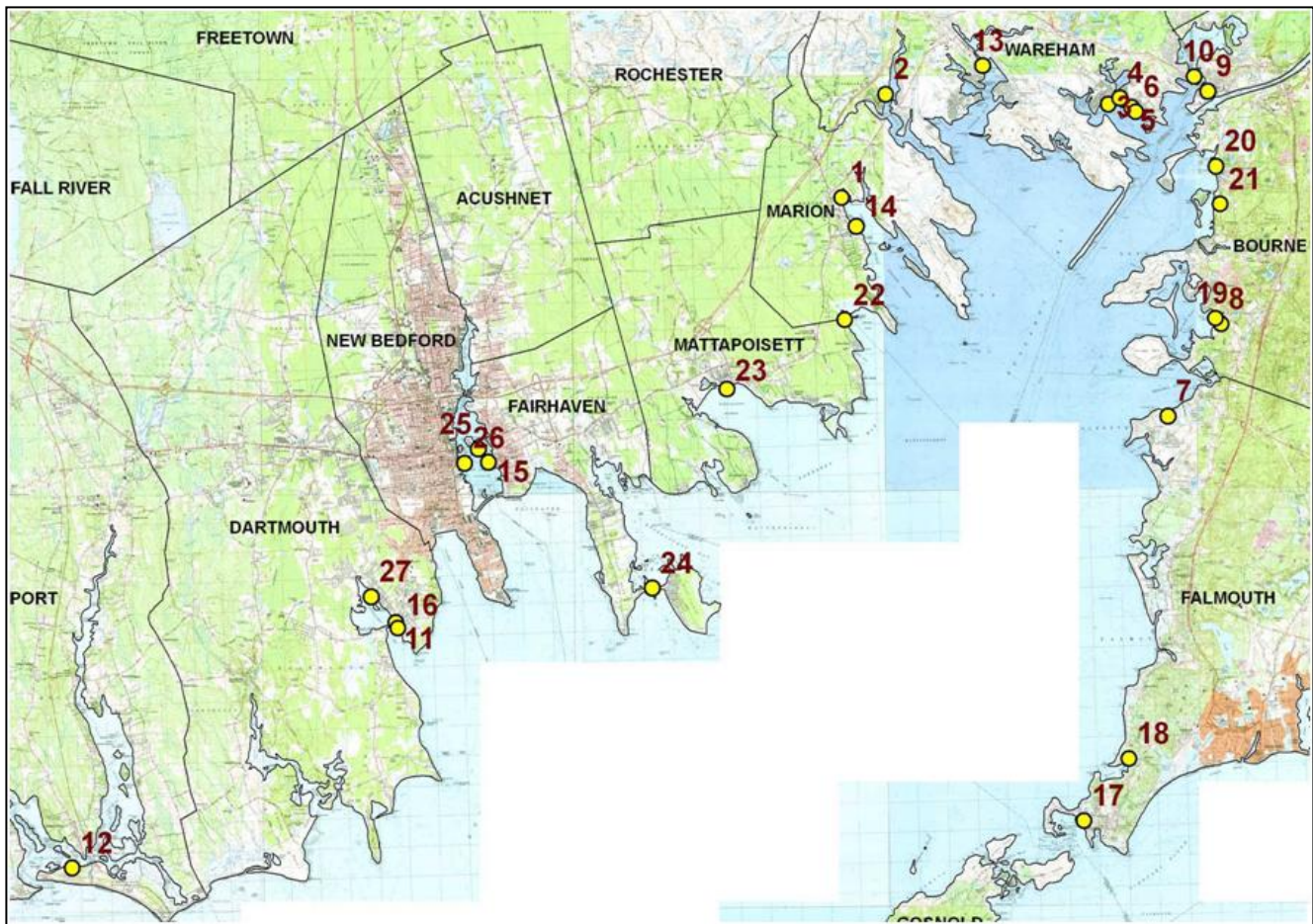


Figure 68. Location of boat pumpouts in Buzzards Bay.

Key: 1: Burr Brothers, 2: Wareham Boat Yard, 3: Onset Town Pier, 4: Stonebridge Marina, 5: Pt. Independence Yacht Club, 6: Onset Bay Marina, 7: Brewer's Fiddler Cove, 8: Parker's Boat Yard, 9: Taylors Point Marina, 10: Continental Marina, 11: North Side Bridge Town Dock, 12: Westport Point-Town Dock, 13: Town Facility at Warr's, 14: Island Wharf, 15: Fairhaven Pumpout, 16: Davis and Tripps, 17: Woods Hole Marine, 18: Quisset Harbor Boatyard, 19: Kingman Marine, 20: Wareham Boat Yard, 21: Pocasset River - town op, 22: Monument Beach Marina, 23: Mattapoisett Boat Yard, 24: Mattapoisett Town Dock, 25: Earl's Marina, 26: Popes Island Marina, 27: State Pier Facility, 27: Padanaram Harbor Boat. Not shown: Coalition Bay Keeper serves Cuttyhunk Harbor on Gosnold.

Fueling spills at marinas remain a problematic issue, but these problems are addressed in Action Plan 17 Preventing Oil Pollution.

Sanitary Waste Issues

Perhaps 1,000 or more of the moored boats in Buzzards Bay have installed marine heads (toilets)¹⁰². Some

¹⁰² Boats of 65 feet or less must be serviced by one of three types of marine sanitation devices (MSDs). Type I and Type II MSDs macerate and disinfect waste with chlorine, formaldehyde or other disinfectants. The Type I MSD treats the waste to a level not to exceed 1000 fecal coliform/100 ml and the Type II MSD treats to a level not to exceed 200 fecal coliform/100 ml and 150 mg/l suspended solids. Type III MSDs are holding tanks to prevent discharge of sewage near shore. These systems typically use formaldehyde, alcohol, or both, primarily to deodorize waste while it is stored in the holding tank. Boats larger than 65 feet must use Type II or Type III MSDs. Types I and II MSDs are permitted under the FWPCAA to discharge into all coastal waters. Type III MSDs are fitted with piping to enable sewage discharge, but this discharge is

smaller vessels use portable heads. Discharges from these marine sanitary devices were an area of concern in the 1991 Buzzards Bay CCMP and were the focus of recommendations in the Boat Sewage action plan. Most of the recommendations in this action plan were fulfilled, including the 1994 designation of Buzzards Bay as a boat no sanitary wastewater discharge area (NDA). Although this action plan was a success, some additional recommendations have been developed to help improve compliance with the boat no discharge area designation.

When traveling in NDA waters, boaters with Type I or Type II MSDs must do one of the following: 1) close the seacock and remove the handle 2) fix the seacock in the closed position with a padlock or non-releasable wire-tie 3) lock the door to the space enclosing the toilet with a padlock or door handle key lock. Those with Type

prohibited in marine waters within 3 miles of shore or within the territorial sea, which includes all of Buzzards Bay.

III MSDs (holding tanks) must secure these in one of the following ways: 1) close each valve leading to an overboard discharge 2) padlock each valve in the closed position 3) use a non-releasable wire-tie to hold each valve leading to an overboard discharge in the closed position. The U.S. Coast Guard must approve the approach of securing MSDs within NDA waters.

Boater compliance and government enforcement of boat no discharge area designations remains problematic. As required in the NDA discharge designation, adequate pumpout facilities are found in Buzzards Bay (Figure 68), but certainly additional ones are needed for at least two harbors: Cuttyhunk, and West Falmouth. The Federal Water Pollution Control Act Amendments of 1972 (FWPCAA) authorized the Coast Guard to regulate marine head discharges from vessels with installed heads, and has the authority to enforce the no-discharge designations. However, the Coast Guard never had adequate personnel to achieve a high level of compliance with the law. Changes in laws and regulations now enable the Commonwealth of Massachusetts with enforcing the restrictions of NDAs. In the 2008, the Massachusetts legislature amended Chapters 21A and 90B of the General Laws to allow for fines of up to \$2,000 for discharge violations in NDAs.¹⁰³ These amendments now give the authority to issue the fine to the Director of the Massachusetts Environmental Police and all that serve under him, which includes environmental police officers, harbormasters, fish and game wardens and police officers.

Marine heads installed on boats of 65 feet or less must be serviced by one of three types of marine sanitation devices (MSDs). Type I and Type II MSDs macerate and disinfect waste with chlorine, formaldehyde or other disinfectants. The Type I MSD treats the waste to a level not to exceed 1000 fecal coliform/100 ml and the Type II MSD treats to a level not to exceed 200 fecal coliform/100 ml and 150 mg/l suspended solids. Type III MSDs are holding tanks to prevent discharge of sewage near shore. These systems typically use formaldehyde, alcohol, or both, primarily to deodorize waste while it is stored in the holding tank. Boats larger than 65 feet must use Type II or Type III MSDs. Types I and II MSDs are permitted under the FWPCAA to discharge into all coastal waters. Type III MSDs are fitted with piping to enable sewage discharge, but this discharge is prohibited in marine waters within 3 miles of shore or within the territorial sea, which includes all of Buzzards Bay. Nonetheless, it is widely believed that discharge nearshore and in harbors does occur. Several harbormasters and boat dealers believe that Type I and Type II systems are not widely sold today and that most new boats are installed with Type III MSDs.

Mooring Field Issues

As noted above, dense and expansive mooring fields degrade water quality and bottom habitat of Buzzards Bay. Some harbors, like Apponagansett Bay and Sippican Harbor have more than 1,500 boats on moorings and slips. Conventional mooring blocks may have a bottom area of 16 square feet or more. Chains attached to mooring weights scour eelgrass from the bottom. These chains also bounce up and down off the bottom resuspending bottom sediments, greatly reducing water clarity that in turn can shade out eelgrass beds and elevate bacterial levels.

One solution to this problem is to install alternative mooring systems that have less environmental impacts, and where possible divert demand for new moorings to more compact marina facilities. Alternative mooring systems include helical anchors twisted into the bottom connected to boats by elastic cords. This mooring system is pragmatic for Buzzards Bay because the tidal range is less than 4 feet and the generally dense layer of fine sediments found in our embayments. Some Massachusetts communities, like the Town of Marion already require helical anchors.¹⁰⁴ Similar systems have already been installed in major U.S. harbors including Santa Monica.

Other Management Issues

Problems associated with houseboats and other waterfront management issues, as well as issues associated with dredging, and the beneficial use of dredged materials, are discussed in Action Plan 15 Managing Coastal Watersheds, Tidelands, and the Waterfront. Some boating impacts are also addressed in Action Plan 17 Preventing Oil Pollution.

Management Approaches

Each town should determine whether it has sufficient pumpout facilities. For example, the Town of Gosnold, which is potentially served by the Coalition's Baykeeper vessel, has sought funding to build a facility at its docks. Other towns should maintain and review sewage pumpout records of boats, and query boat owners to ascertain whether they have an adequate number of pumpout facilities to serve recreational boaters. Such tracking can also be used to evaluate the effectiveness of NDA designations and evaluate outreach efforts. Funds remain available from various state and federal sources to meet municipal needs, and local record keeping and boating activity can help direct state and federal funds to where there is the greatest need.

If local officials do not believe that compliance with the Buzzards Bay NDA is adequate, harbormasters could

¹⁰³ See Chapter 495 of the Acts of 2008.

¹⁰⁴ Owners of vessels longer than 25 feet must meet the 2002-approved requirement to install helical anchors. As of 2011 there were 1570 moorings in the Town of Marion of which approximately 1200 had helical moorings. Elastic rodes are not required by the Marion regulations.

implement programs such as seal heads of tank valves while in harbor, or place dye tablets in the heads, and where appropriate, issue non-criminal citations for failure to secure the MSD, and criminal fines for actual discharges.

With respect to mooring upgrades, towns should consider adopting regulations or implement programs to replace conventional mooring systems with those that are less injurious to the environment, such as those with a helical anchor and elastic cord systems. In most cases, such a program would need to be phased in. The use of these innovative mooring systems is needed most in shallow and sensitive environmental areas, such as bays with eelgrass or fine mud bottoms. Municipalities could lead by example by using these anchor systems for their own moorings.

With respect to discharges associated with marinas, municipalities, the U.S. EPA and the Buzzards Bay NEP should provide informational materials, and guidance to improve compliance of marinas with their MSGP NPDES stormwater permit program. Current compliance rates of marinas with the MSGP stormwater NPDES permit program are low. DEP and CZM should also work with marina operators to ensure that pressure washing and boat-cleaning operations do not discharge to surface waters. The Buzzards Bay NEP could offer marinas free planning and technical assistance for stormwater management. The EPA has also previously expressed an interest in conducting a joint educational mailing with the Buzzards Bay NEP to address these issues. Even with a robust technical assistance program, compliance with certain regulatory programs may take years without some enforcement action by state and federal agencies. In some cases, businesses might require private or public

(SRF) loans to meet pollution discharge limits.

Financial Approaches

Many elements of this action plan require modest or negligible expenditures of public funds, as most relate to education, adoption of regulations, or better enforcement of existing regulations. Most of the necessary flyers and notices can be produced in-house by towns, and disseminated with mooring permits and through marinas. There will be a more substantial cost for private entities to comply with state and federal pollution discharge regulations, and this will need to be met by private or public (SRF) loans.

The most cumulatively expensive element of this action plan is born by boat owners, and that is the cost of the new mooring system. While these environmentally friendly mooring systems are somewhat higher in price (\$4-7,000) to a conventional mooring system (\$2-4,000 for comparable vessels), unless the mooring is new, this is an appreciable added cost for replacements. Such mooring upgrades, however, can be phased in over a period of years as moorings ownerships are transferred. Municipalities should pursue funding for municipal owned mooring replacements from habitat restoration programs.

Monitoring Progress

The success of this action plan will be documented principally with programmatic actions, the volume of boat waste collected, regulatory compliance, and the extent of use of environmentally friendly moorings. Long-term benefits can be documented by recovery of eelgrass beds in those areas where eelgrass is adversely affected by conventional moorings.

Table 23. Boats registered in Buzzards Bay municipalities. Data from Massachusetts Environmental Police as of 2008.

Municipality/Boat Size:	<16'	16'-25'	26'-39'	40'-65'	Over 65'	all Boats	est. MSDs²
Westport	659	789	109	6	0	1,563	218
Dartmouth	496	603	116	3	0	1,218	182
New Bedford	726	571	66	10	0	1,373	157
Acushnet	196	106	9	0	0	311	26
Fairhaven	409	511	184	11	0	1,115	205
Mattapoisett	371	341	127		0	839	132
Marion	479	353	119	12	1	964	143
Wareham	809	1,112	194	6	0	2,121	325
Bourne	922	1,290	307	12	1	2,532	425
Falmouth ¹ (BB only)	369	533	119	5	0	1,026	171
Gosnold	30	61	10	0	0	101	17
Totals	5,466	6,270	1,360	65	2	13,163	2,001

¹ For this table, 25% of boats registered in Falmouth were assumed to be on Buzzards Bay.

² The actual number is not known. For this table, the numbers of MSDs were estimated based on these assumptions: 20% of boats in the 16-25' range, 50% in the 26-39 foot range, and 100% for boats 40 feet and over.

Table 24. Moorings and slips in Buzzards Bay embayments and towns data collected from various source circa 2004-2006.

Town	Bay	Moorings	Slips	Combined
Bourne	Buttermilk Bay	162	299	461
	Canal: Gray Gables	29	3	32
	Hen Cove	232	6	238
	Phinneys Harbor	327	70	397
	Pocasset Harbor	201	8	209
	Pocasset River	88	63	151
	Red Brook Harbor	546	278	824
	Squeteague Harbor	70	11	81
	Wings Cove	23	1	24
Bourne Summary		1678	739	2417
Dartmouth	Apponagansett Bay	810	270	1080
	Clarks Cove	30	30	60
	Little River	10	0	10
	Slocums River	30	0	30
Dartmouth Summary		880	300	1180
Fairhaven	East Cove, West Island	22	0	22
	Little Bay	10	0	10
	Nasketucket Bay	60	85	145
	Nasketucket Bay-Seaview Ave	13	0	13
	New Bedford Inner Harbor	213	409	622
Fairhaven Summary		318	494	812
Falmouth	Fiddlers Cove	0	120	120
	Megansett	138	0	138
	Quissett Harbor	240	0	240
	Rands Canal	15	0	15
	West Falmouth Harbor	348	0	348
	Wild Harbor	109	0	109
Falmouth Summary		850	120	970
Gosnold	Cuttyhunk Harbor	135	46	181
	Cuttyhunk Pond	61	0	61
	Hadley Harbor	18	0	18
	Robinson's Hole/Nash. Harbor	4	0	4
	Gosnold Summary		218	46
Marion	Aucoot Cove	17	0	17
	Blankenship Cove	48	0	48
	Hammets Cove	85	0	85
	Planting Island Cove	90	0	90
	Sippican Harbor	260	56	316
	Sippican Harbor- Old Landing	0	100	100
	Sippican Harbor-Inner Harbor	732	0	732
	Sippican Harbor-Jobs Cove	24	0	24
	Weweantic River	71	0	71
	Wings Cove	90	0	90
	Marion Summary		1417	156
Mattapoisett	Aucoot Cove	100	0	100
	Brandt Island Cove	12	75	87
	Mattapoisett Harbor	694	9	703
	Pt. Connett	45	0	45
	Mattapoisett Summary		851	84
New Bedford	Clarks Cove	90	30	120
	New Bedford Inner Harbor	105	995	1100
	New Bedford Outer Harbor	90	10	100
New Bedford Summary		285	1035	1320
Wareham	Butlers Cove	35	0	35
	Buttermilk	0	86	86
	Buttermilk Bay	30	0	30
	Onset Bay	370	350	720
	Onset Bay-Broad Cove	35	0	35
	Onset Bay-Stonebridge	0	60	60
	Onset Bay-Sunset Cove	40	0	40
	Wareham River	376	116	492
	Weweantic River	30	28	58
Wareham Summary		916	640	1556
Westport	East Branch	100	130	230
	West Branch	30	30	60
	Westport Harbor	500	440	940
Westport Summary		630	600	1230
Total Bay Summary		8043	4214	12257