

Buzzards Bay Project

National Estuary Program
Implementation Review

January 31, 2002

**Buzzards Bay Project
National Estuary Program
Implementation Review:**

Progress made during April 1999 to December 2001

*A summary of the successes of the Buzzards Bay Project and its partners
in our joint efforts to facilitate the implementation of the
Buzzards Bay Comprehensive Conservation and Management Plan*

Buzzards Bay Project National Estuary Program

January 31, 2002

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Chapter 1. Background and Organization

In 1985, Congress designated Buzzards Bay as an Estuary of National Significance, one of five estuaries so designated. The designation by Congress eventually led to the creation of the National Estuary Program in Section 320 of the reauthorized Clean Water Act of 1986. In 1987 the Buzzards Bay Project National Estuary Program formally became a U.S. EPA designated National Estuary Program.

Between 1985 and 1990, the Buzzards Bay Project funded water quality and living resource characterizations and assessments of Buzzards Bay. Based on these findings, the Buzzards Bay Project examined management options to address the identified problems and conducted financial assessments of these management solutions. These efforts culminated when the Buzzards Bay Project wrote the draft Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) in 1989, the first NEP to do so. This Management Plan was approved by the then Massachusetts Governor Weld in September 1990, and by the US EPA in April 1991.

The Buzzards Bay CCMP was one of the country's first watershed plans and one of the first to focus so strongly on non-point source pollution and the cumulative impacts of development on water quality and living resources. The Buzzards Bay CCMP broke much new ground including a nationally acclaimed nitrogen management strategy. Also unique is the fact that nearly three quarters of the recommendations contained in the Buzzards Bay CCMP are directed at local government. This fact is a reflection that under Massachusetts' environmental regulatory framework, and because of "home rule" laws empowering municipalities, it is local government that has the greatest authority for dealing with cumulative non-point impacts in Massachusetts.

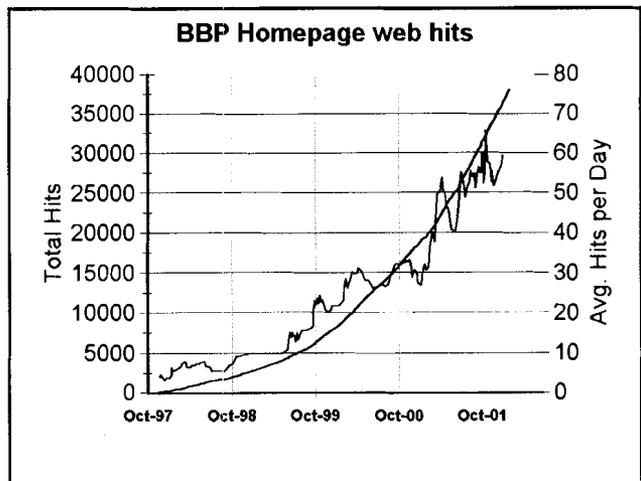
Since the Buzzards Bay Project completed the CCMP, it has transformed itself into a technical assistance and implementation program unparalleled in the National Estuary Program. Historically the Buzzards Bay Project has always been one of the smaller and less-well funded Estuary Programs. The Buzzards Bay Project adapted to its many unique features and transformed potential weaknesses into assets, and reformed itself into small, but highly effective program, with a remarkable track record at both getting things completed and in securing state and federal funding.

These accomplishments were achieved despite some unconventional approaches, such as the complete abandonment of the Project's Public Outreach program in 1994, including elimination of the Project's newsletter.

The one exception regarding public outreach is that the Buzzards Bay Project has aggressively maintained a website that is a repository of project activities and progress. This website has received considerable traffic. (note: web hits shown in the graphic below).

The Project made the strategic decision of relying on the outreach activities of two not-for-profit organizations – the Coalition for Buzzards Bay, a citizen's group, and the Buzzards Bay Action Committee, an association of municipal officials. Rather than focus on public outreach, the Buzzards Bay Project would instead seek to fulfill the environmental technical assistance needs of Buzzards Bay municipalities. This approach was feasible only because both nonprofits were also committed to the implementation of the Buzzards Bay CCMP, an unsurprising fact since both groups were created because of the dissolution of the Buzzards Bay Project's Citizen Advisory Committee in 1988. This triad partnership among the three Buzzards Bay organizations has helped ensure that the Buzzards Bay Project remains one of the most successful National Estuary Programs.

Because of the interaction and collaboration of the three Buzzards Bay organizations, and our mutual primary goal of implementing the CCMP, we present in this report progress made by all three organizations, toward that goal.



Chapter 2. CCMP Implementation Status, Analysis of the “Action Plans”

In the following chapters, we include all goals, objectives, and recommendations for each “Action Plan” and action oriented chapters contained in the CCMP. In these chapters, excerpts from the CCMP are quoted in *italicized text*. Below each goal, objective, and recommendation we have added comments on our approach and degree of implementation, particularly new actions since the last implementation review.

This verbal analysis complements the implementation tracking spreadsheet, initiated in 2000, and contained in Appendix A. This spreadsheet is available through the Buzzards Bay Project website (click the “Status and Trends” button).

This new implementation tracking strategy enables the Buzzards Bay Project to easily track the number of CCMP recommendation achieved, as well as to assign uncompleted action plans a “percent complete” rating.

It is worth noting that, of the 119 specific recommendations contained in the 1991 CCMP, 7 have been determined by the Project to be either no longer relevant or applicable. Of the 112 recommended actions, 57 were deemed to be completed by December 2001 as shown by the figure below.

Major new completed actions during the past two years include:

- designation of Buzzards Bay as a no discharge area in August 2000
- full support by the Massachusetts Department of

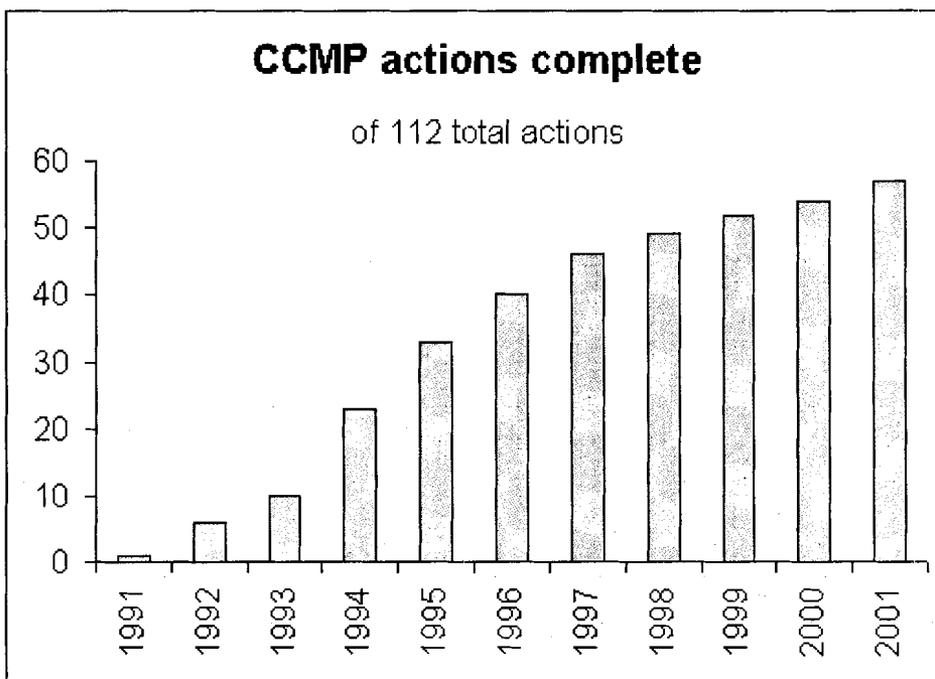
Environmental Protection for the alternative septic system program, including funding of the Septic System Test Center established by the Buzzards Bay Project, and full staffing of their program by 2001

- Completion in November 2001 by the Buzzards Bay Action Committee of the updated and revised municipal oil spill contingency plan for Buzzards bay and its acceptance by the US Coast Guard
- Completion in 2000 by the Executive Office of Environmental Affairs of a buildout analysis of all Buzzards Bay municipalities

It is worth noting that many of the easier to achieve recommended actions were completed in the early 1990s, with progress on the remaining more difficult to achieve recommendation coming slowly.

The adopted tracking system allows the overall completion of all CCMP actions, since each action plan is assigned a % completion value from 0% to 100% when an action is completed. This estimate was based on best professional judgment of BBP staff and others familiar with specific recommended actions. Currently all specific actions recommended in the CCMP are estimated to be 71% complete.

In the chapters on each CCMP Action Plan or chapter that follow, we include a brief analysis of progress with selected 1999-2001 accomplishments to illustrate the activities that are being made.



Chapter 3. Action Plan: Managing Nitrogen-Sensitive Embayments

CCMP Goals

1. Ensure that no beneficial water uses will be lost, nor will ecosystems be adversely affected by excessive contributions of nitrogen to any embayment within Buzzards Bay.
2. Restore any beneficial water uses and ecosystems lost or impacted by the excessive contribution of nitrogen to any embayment within Buzzards Bay.

Because of the overwhelming complexity and difficulty of the nitrogen issue, the BBP chose initially to focus on protecting relatively unimpacted valuable resource areas from future degradation. With time, however, the Buzzards Bay Project has begun to pursue efforts to restore degraded areas, especially those areas impacted by sewage treatment facilities through the establishment of TMAIs (Total Maximum Annual Loads) for nitrogen.

CCMP Objectives

1. To control the amount of nitrogen entering Buzzards Bay as a whole.
2. To limit new additions of nitrogen entering nitrogen-sensitive embayments.
3. To reduce the amount of nitrogen entering nitrogen-impacted embayments.

Because Buzzards Bay as a whole is not degraded; the method of achieving Objective 1 was always believed to be succeeding at Objectives 2 and 3. Municipalities bear the primary burden for managing nitrogen to embayments principally affected by non-point source pollution. Local response to the nitrogen problem was weak during the first part of the decade, but with the continuing efforts of the Coalition's Citizens Water Quality Monitoring Program, the adoption of the BBP's nitrogen Management Strategy by the Coalition, and the use of the BBP's management strategy by Massachusetts DEP and EPA New England to establish Sewage Treatment Facility TMDLs for nitrogen, the program is now generating tremendous advances in addressing several degraded areas.

4. To develop and support the use of alternative technologies that achieve denitrification of wastewater. With the construction of the Massachusetts Alternative Septic System Test Center by the Buzzards Bay Project in the fall of 1998, changes in the state's onsite wastewater regulations in 1995, and DEP's full commitment to alternative technologies and Test Center support in 2001, all five CCMP objectives under this Action Plan are now being met in appreciable ways.

5. To develop a monitoring program that can

assess the effectiveness of management actions taken and determine changes in water quality and health of coastal ecosystems.

In 1991, the BBP through funding and technical assistance, and with collaboration of the Coalition for Buzzards Bay established the necessary citizen based water quality monitoring program. After funding cutbacks by the Project in 1996, the Coalition secured enough money to continue the Citizen Monitoring Program. The Coalition has continued to obtain state, municipal, and private funds to keep this monitoring program an ongoing success.

CCMP Commitments:

Department of Environmental Protection:

1. DEP will adopt regulatory standards for nitrogen inputs to coastal embayments in its 1993 revision to State Water Quality Standards. (Target date: 6/93).

In 1995 DEP revised its strategy to instead put more emphasis on nitrogen management through the state's onsite wastewater regulations (Title 5), which in turn established a tougher nitrogen standard for well recharge areas and "nitrogen sensitive embayments" (a term created by the BBP) which were designated in the state's surface water quality standard regulations. Such a designation can be achieved either through designation by DEP, the Secretary of Environmental Affairs, or by local municipal nomination to the state. While such areas have not been officially designated, beginning in 1998, the DEP has de facto adopted a policy of considering certain embayments as "nitrogen sensitive" for the purposes of issuing surface water quality discharges for sewage treatment facility permit renewals. Although designations have yet to be fulfilled, with the process in place, DEP's commitment has been substantively advanced. DEP is now drafting nitrogen standards for TMDL development. In late 2001, EOE and UMass Dartmouth agreed to fund a \$13 million study to establish nitrogen TMDLs in all Massachusetts embayments including those in Buzzards Bay

2. DEP will actively promote the development and acceptance of cost-effective alternative technologies for wastewater denitrification by assigning additional personnel to overview pilot projects. (Target date: 12/91)

Status: In 1995, in part due to recommendation by the BBP, DEP adopted changes to Title 5 that made it easier for alternative technologies to be approved for use in Massachusetts. In addition, the BBP, in partnership with DEP and other organizations, sought funding from EPA in 1995 to build a facility to test and promote alternative technologies for onsite systems in Massachusetts. We succeeded in this endeavor and the **Massachusetts**

Alternative Septic System Test Center was built on Cape Cod in late 1998. In 2001, DEP agreed to assume financial responsibility for the Test Center and has dedicated four individuals to the alternative septic system program. For these reasons, this task is deemed complete

Environmental Protection Agency (EPA):

1. *EPA, through its Near Coastal Waters Program, will construct and evaluate approximately four experimental denitrifying onsite wastewater disposal systems in Buzzards Bay municipalities.*

About 1994, these systems were built, tested, and led to the eventual construction of the Massachusetts Alternative Septic System Test Center.

2. *EPA will contribute a water quality specialist's skills in working on nitrogen issues within the context of DEP's Anti-Degradation Task Force. (Target date: Beginning 1991).*

This initiative was never formally implemented by the EPA, but this action may no longer be needed in light of national EPA efforts to establish nitrogen Total Maximum Daily Loads for coastal waters.

Buzzards Bay Municipalities:

1. *Bourne, Plymouth and Wareham have adopted an intermunicipal overlay district around Buttermilk Bay. Completed in 1991*

2. *Dartmouth will pursue development of a nitrogen loading strategy for the Apponansett Bay Watershed.*

In 1993 the Town of Dartmouth began efforts to evaluate nitrogen reductions needed to restore Apponansett Bay, which is an impacted embayment. In 1996, as a result of the BBP's SepTrack software program implemented in Dartmouth, the Board of Health discovered that up to 300 homes near the edge of the bay that were supposedly sewered more than a decade ago, were never tied in to the sewer system. The Board of Health's efforts to tie these homes in will result in water quality improvements. A broader comprehensive strategy has not yet been achieved.

3. *Westport will pursue a nitrogen loading strategy for the Westport Rivers. (Target date: 9/91-9/92.)*

Because of funding and technical assistance from the BBP and increased public awareness through the Westport River Watershed Alliance and CBB efforts, the Town has initiated a nitrogen management evaluation for the Westport River. In 1999, the Buzzards Bay Project completed an open space plan for the Town of Westport and City of Fall River (which includes the upper Westport River watershed) that focused on protecting open space to prevent further degradations of water

quality. An overall remediation solution for the watershed, which is dominated by agricultural and dairy inputs has remained elusive.

Other Recommended CCMP Actions:

1. *Municipalities should adopt nitrogen-loading bylaws, subdivision regulations, or health regulations to implement nitrogen-management programs around appropriate embayments. Target dates: technical basis, 9/92; community action, as appropriate.*

Because of funding and technical assistance from the BBP and increased public awareness through the CBB water quality monitoring efforts, the municipalities have initiated nitrogen management actions for several watersheds including: West Falmouth Harbor, Little Bay (Fairhaven), and the Wareham River Estuary.

2. *The Cape Cod Cranberry Growers' Association (CCCGA) in cooperation with the Plymouth County Conservation District should be encouraged to continue implementation of its Water Quality Protection Initiative.*

The CCCGA has continued technical assistance for bog operators, but in 1996, the CCCGA argued to DEP against funding the BBP for implementation of a program to inventory flow-through bogs in the Buzzards Bay watershed because in its view the effort would be counter productive to their activities. As a result, DEP withdrew funding for this project.

Analysis

The Buzzards Bay Project identified the management of excessive nitrogen loading to small coastal embayments as a major component of its CCMP. Unlike other east coast estuaries such as Long Island Sound and Chesapeake Bay, central Buzzards Bay fortunately did not suffer from the impacts of excessive nitrogen loading. However, nitrogen inputs were identified in the CCMP as one of the greatest threats to the health of the Bay's more than 30 shallow, often poorly flushed, coastal embayments. Starting with a well-conceived strategy, the BBP has gone on to become a national leader in nitrogen management. Protocols developed by the BBP were transferred to other National Estuary Programs as well as to neighboring Cape Cod where the Cape Cod Commission has adopted and applied the BBP's nitrogen management methodology as part of its overall regulatory program. An earlier significant success was the Buttermilk Bay Tri-town Nitrogen Overlay District (the first of its kind in the country), which was approved by town meetings in Plymouth, Wareham and Bourne in 1991.

Selected 1999-2001 Accomplishments

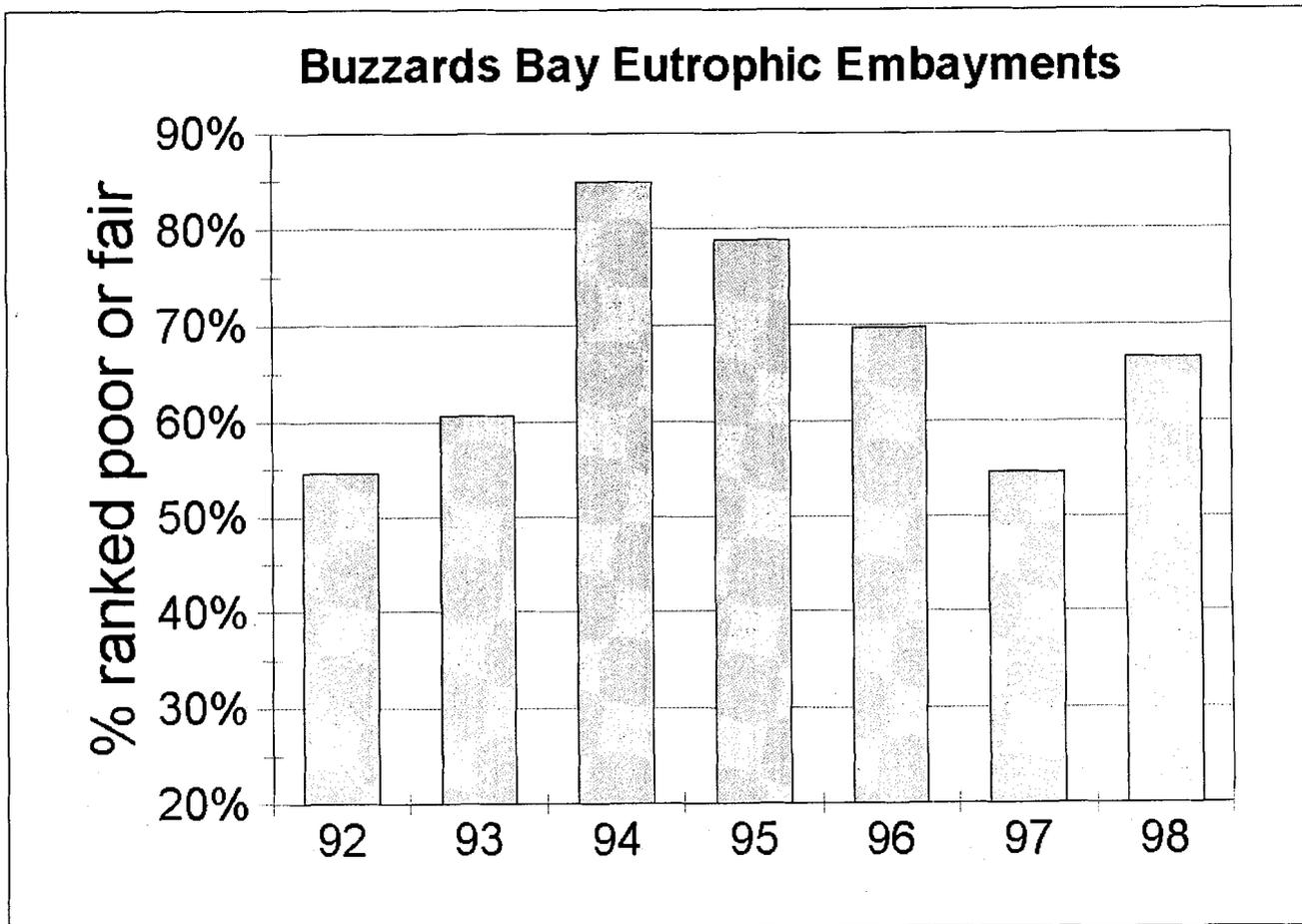
In 2001, the Buzzards Bay Project completed its \$85,000 319 grant titled Managing Nitrogen Sensitive Embayments through Land Conservation, working in the Slocums River (Dartmouth and New Bedford) and Onset

Bay (Wareham) watersheds. This grant had a \$29,000 cash match from Massachusetts Environmental Trust. Funds have been largely used to pay for appraisals for properties to be purchased for permanent open space protection. This initiative resulted in more than 1,079 acres of land protected by municipality and Lands Trusts land purchases and conservation restrictions.

The BBP prepared nitrogen-loading evaluations of New Bedford Harbor and the Wareham River at the request of the US EPA to assist in the development of nitrogen TMDLs for the sewage treatment facilities discharging to those embayments (Fairhaven and Wareham).

The Coalition for Buzzards Bay continues to implement the Buzzards Bay Baywatchers monitoring program. This initiative is focused on evaluating nitrogen impacts of land use on more than 30 Buzzards Bay embayments. This is one of the most successful programs of its kind in the country. The last report issued by the Coalition was in 1999. In the figure below is a summary of the number of bays classified as fair to poor during the first 7 years of the program. As shown, there appears to be a trend toward improved water quality. More importantly, the bay wide monitoring program has established baseline and trend data for 28 embayments that is being used by state and local managers.

In late 2001, the Executive Office of Environmental Affairs and the University of Massachusetts at Dartmouth agreed to commit \$13.8 million dollars over 6 years to conduct nitrogen loading assessments and develop ecosystem response models for 87 Massachusetts embayments, including those in Buzzards Bay. This work is a logical extension of the groundbreaking work developed by the Buzzards Bay Project.



Chapter 4. Action Plan: Managing On-site Wastewater Disposal Systems

CCMP Goal

1. *Prevent public health threats and environmental degradation from on-site wastewater disposal systems*

CCMP Objectives

1. *To enforce the provisions contained in Title 5 regulations.*

2. *To upgrade pre-Title 5 systems suspected of contaminating groundwater or surface waters.*

New regulations and policies by DEP, better local training, expertise, and local awareness has improved Title 5 enforcement and the subsequent replacement of failed systems. Another factor has been the creation of "betterment" programs (enriched at the local level because of action by the BBAC in providing enabling legislation (in 1995), and by DEP for creating a state program in 1997). The betterment programs have eliminated many financial obstacles preventing septic system upgrades by the homeowner. The most important improvement however, was a new requirement by DEP in the 1996 Title 5 regulations to have septic systems inspected at property transfer. This single change has resulted in a tremendous compliance of failed septic systems to new Title 5 standards. Perhaps most remarkably is the fact that this process is now self driven through the bank financing process.

3. *To address the inadequacies of Title 5 through Board of Health regulations*

Several towns have adopted regulations that supplement Title 5.

4. *To improve the Title 5 Code through recognition of nitrogen impacts, virus transport, and sensitive areas.*

Title 5 code revisions in 1996 by DEP, with suggestions from the BBP, went a long way toward addressing these concerns (see nitrogen action plan). The regulation of on-site systems however, cannot solve the N loading problem alone.

5. *To promote innovative technology that will reduce nitrogen*

The Alternative Septic System Test Center, described in the Nitrogen Action Plan, accomplishes this objective.

CCMP Commitments:

Buzzards Bay Municipalities

1. *Falmouth, Bourne, Wareham, Marion and Westport will pursue amending their Board of Health regulations to allow for better treatment and removal of viruses from on-site wastewater. Target date: 1991-1992.*

Only Falmouth adopted such regulations. The 1996 Title 5 changes for high percolating soils is felt, by many, to address some of these concerns.

Other Recommended CCMP Actions:

1. *DEP should amend the Title 5 Code so that it becomes a more comprehensive environmental regulation. Target date: 1992.*

New regulations were completed in 1995 and promulgated in 1996.

2. *DEP should elevate the priority of the Title 5 Program. Target date: 1992.*

Completed in 1995 with regulatory changes. The Title 5 program became very elevated because of various public controversies on proposed regulatory changes.

3. *All boards of health should employ a full-time qualified health agent. Target date: 1992-1994.*

Completed by 1995.

4. *All boards of health should adopt a series of regulations that address the placement of septic systems in special resource areas. Target date: 1991-1993.*

Overall Title 5 changes in 1995 addressed many of these issues, making local action unnecessary.

5. *All boards of health should amend their regulations by increasing the setback distance required between on-site wastewater disposal systems and resource areas or requiring adjustments to the system design and application rate to account for virus transport. Target date: 1991-1993.*

New Title 5 regulations in 1995. In addition, the passage in 1997 of the Rivers Protection Act by the Massachusetts Legislature provided a 100 foot setback from most streams. These actions have made it less pressing for municipalities to adopt local regulations, although some towns, like the Falmouth Conservation Commission have added additional setbacks.

Analysis

In 1992, when the BBP was beginning its implementation efforts, many bay watershed municipalities did not have a health professional on staff to oversee inspection of existing septic systems or the siting of new systems. To meet this basic need, the BBP, through its municipal grant program funded a cooperative effort between the towns of Marion, Rochester, and Acushnet to create the first ever Regional Health District among the three towns, and provided funding for the first year to hire a shared Health Agent

for the District. This cooperative effort was an important accomplishment for the BBP as inter-municipal cooperation was a key goal of the CCMP. The District remains in effect today and was the basis for the creation of a similar position a few years to serve New Bedford, Acushnet, and Rochester. With the increased management responsibilities under the wastewater disposal regulations, "Title 5", the District concept should be expanded to provide for full-time health agents in all Bay communities.

The Buzzards Bay Project has been very active in working with local Boards of Health toward improving local health regulations to address inadequacies in the Title 5 Code. Viral transport rates in groundwater were found, through studies compiled for the CCMP, to far exceed the required 50-foot setback distance from septic system leach fields to water bodies and wetlands. To address this, the BBP worked with bay towns to increase the setback distance in local health regulations to a minimum of 100 feet and adjust wastewater application rates to better protect against viruses. Today, only the Town of Acushnet retains a 50-foot setback.

The revisions to Title 5 in 1994 accomplished many changes to the code recommended in the CCMP for the siting and design of septic systems. As noted above, the one area that did not receive adequate attention was the setback of leach fields to wetlands and water bodies. Changes in the system design and loading rates in the code did however result in partial improvements to virus transport concerns expressed in the CCMP. Nitrogen impacts were included in the code but no specific nitrogen sensitive embayments or special wastewater disposal standards for these areas were defined. A very positive result of the revisions, as they relate to enhanced nitrogen removal, was the code's new procedures for the development and acceptance of alternative/innovative septic system technologies. This action directly addresses the Department's CCMP commitment to promote such systems to provide cost-effective nitrogen removal alternatives.

The BBP took an important step to assist local Boards of Health in the upgrade of failing or poorly functioning septic systems and the proper long term maintenance of septic systems through the development of SepTrack. SepTrack was a septic system tracking computer program conceived by the Buzzards Bay Project and jointly developed by the Buzzards Bay Project and Kyran Research Associates through a contract with Massachusetts Coastal Zone Management. This software was developed for municipalities within the Buzzards Bay watershed to help Boards of Health in tracking the operation, maintenance and permitting of septic systems and other health related issues. To support the implementation of SepTrack, the Buzzards Bay Project,

through its municipal grant program, also purchased computers for each area Board of Health. Finally, an intern was hired by the BBP to set up and install historic septic system information and current Assessor's data in each of the Bay towns.

Selected 1999-2001 Accomplishments

1. Denitrifying On-site Septic Systems

In 1998, the BBP constructed the Massachusetts Alternative Septic System Test Center in partnership with Massachusetts DEP, Barnstable County, and UMass Dartmouth CMAST. Testing of Technologies began in 1999, and in 2001 the first 6 fact sheets were issued of alternative septic system performance compared to a conventional system. Also in 2000, the BBP began testing for NSF International to establish national nitrogen testing protocols. The Test Center has held training workshops, and is becoming a statewide repository for performance information on alternative on-site systems. (See fact sheets in Appendix A, and information on the Buzzards Bay website buzzardsbay.org).

Perhaps more important, the Massachusetts Department of Environmental Protection has agreed to fund the Test Center and has placed more personnel and emphasis on the approval of alternative septic systems in Massachusetts.

2. Project Review, Training, and Tech support.

The Buzzards Bay Project has continued to work with Boards of Health and Conservation Commission on the permitting and placement of septic systems.

Chapter 5. Action Plan: Protecting and Enhancing Shellfish Resources

CCMP Goal

1. *Increase availability of shellfish resources for recreational and commercial uses*

This goal is achievable with a combination of reclassification of shellfish areas to either open or rainfall conditional closures.

CCMP Objectives

1. *To keep open all shellfish areas that have not closed and open priority areas that are closed.*

Achievable with considerable diligence and effort by municipalities and state, progress being made.

2. *To enhance efforts to manage shellfish resources at both the state and local levels.*

Title 5 changes, DMF collaborations with municipalities, increased public awareness, betterment programs, additional monitoring, and improved municipal staffing and enforcement are helping achieve this objective.

3. *To increase the capacity and commitment of municipalities to remediate identified pollution sources and to assist in conducting the sanitary survey program.*

Local participation in sanitary surveys has occurred, local action on sanitary survey reports has been slow, but improving greatly.

4. *To increase the ability of DMF to carry out the sanitary survey program and provide technical and financial assistance.*

BBP helped with this effort in the early 1990's, DMF remains somewhat hamstrung by staffing and funding limitations. Local efforts and participation have helped.

5. *To expand use of conditionally approved classification for shellfish areas*

This has been one of the best successes of the recommendations contained in this action as shown in the environmental indicators section. This effort remains a priority with DMF.

CCMP Commitments:

Division of Marine Fisheries (DMF):

1. *DMF will work to train individuals in each Buzzards Bay town in shoreline surveys and strive to develop long-term cooperative arrangements that ensure consistency of town participation and supplements limited state personnel with local manpower. (Target date: 1991-1993.)*

Status: Implemented in policy, and implemented in practice with many towns on an ad hoc basis. Could be expanded if more towns commit manpower and

resources and if DMF also has more manpower (funding) to commit. About 80% complete as of 2001

2. *DMF will encourage Buzzards Bay towns to work cooperatively with them to expand the number of conditionally approved shellfish areas. (Target date: 1991-1993.)*

Same as #1, about 80% complete as of 2001

Department of Environmental Protection (DEP):

1. *DEP will take enforcement action against significant illegal discharges identified by DMF's sanitary surveys. Target date: 12/93*

In practical terms, this responsibility is delegated to municipal boards of health by the state, so this recommendation is inappropriate in that regard. DEP's 1996 rewrite of the Title 5 regulations requiring inspections at property transfer forced action by municipalities. DEP also funded in 1998 a betterment program to help municipalities provide funding to homeowners. Thus, most elements of this are done, and municipalities have probably taken action against 90% of the problems identified in sanitary surveys

Buzzards Bay Municipalities:

1. *Falmouth, Bourne, Mattapoisett, and Dartmouth have initiated coordinated efforts within their towns to identify and set priorities for illegal discharges that may be affecting shellfish beds.*

All town's have completed this to varying degree around Buzzards Bay. Most have focused on discharges from public roads in order to take advantage of state and federal grant money to remediate nonpoint source pollution. The 1996 Title 5 rewrite requiring septic inspections at property transfer, and betterment programs adopted in all towns by the late 1990s facilitated this action.

2. *Falmouth, Bourne, Wareham, and Fairhaven have designated individuals with public health jurisdiction to assist DMF in classifying shellfish areas within their jurisdiction.*

Completed on an ad hoc basis during early 1990s.

3. *With DMF assistance, Fairhaven and Dartmouth will pursue conditionally approved shellfish areas within their towns. (Target date: 1991)*

Dartmouth, New Bedford, Westport, Wareham, and Fairhaven now have conditionally approved areas.

Other Recommended CCMP Actions:

1. *All other coastal municipalities should*

correct identified sources of coliforms and pathogens entering the Bay. (Target date: immediately)

This is a very long-term process that could only be started "immediately". Evidence of progress from 319 grants, MCZM Coastal Pollution Remediation grants (CPR), and ongoing municipal Public Works efforts. Estimated to be 25% complete by 2001.

2. EOEPA should increase funding to carry out the Shellfish Sanitation Program. Target date: July, 1992. Cost: an additional \$400,000 annually.

This did not occur. However, BBP grants, MCZM CPR grants, and DEP 319 grants were able to provide funds for some of the needed monitoring to establish remediation priorities and justify conditional closures. In 2001, fun

3. All other coastal communities should designate an individual with public health responsibility to assist DMF in classifying shellfish areas within their jurisdictions. Target date: 1992. Target date: begin immediately.

Done when need in early 1990s; DMF no longer feels this is necessary. This occurs on an ad hoc basis or when town pursue conditional closures. Viewed as complete.

4. EPA and FDA should develop a new indicator or suite of indicators to replace fecal coliform as an indicator of human health risk.

Research will continue, but a new indicator is unlikely for another 10 years, and is beyond the scope of the Buzzards Bay CCMP.

5. The Massachusetts Legislature should pass legislation to improve financial assistance for shellfish grant program at the local level. Target date: 1992. Suggested funding level: \$400,000 annually.

Transportation Bond funded CZM's CPR program at about this level, state wide. With local awards, Buzzards Bay communities receive about 1/3 of state award.

6. DMF should develop standard methods for towns to report commercial and recreational shellfish catch data as a first step in monitoring resource utilization or losses. Target date: 1993.

Recommendations given to towns but data still not standardized.

Analysis

In 1991 when the Buzzards Bay CCMP was completed, degradation of water quality due to pathogen contamination represented a serious and growing human health risk and economic loss to the Bay's historically

strong shellfishery. In that year, the Bay saw 13,816 acres closed - the greatest number of bed closures in history. This figure had grown quickly moving from only 4,358 acres closed in 1970 and doubling to 8,052 acres by 1980. Throughout the 60s, 70s, and 80s, shellfish beds in Buzzards Bay were being closed due to fecal coliform contamination at ever increasing rates, and these closings were one of most pressing concerns with area residents.

By the summer of 2001, however, the Bay had regained over 6,000 acres of permanently closed shellfish harvest areas, returning the Bay to a closure figure that had not been seen in the Bay since 1980. This improvement is due to both real improvements in water quality and increased use of conditional closures in many areas along the Bay's coastline. During this period, most striking achievement was the reopening of 700 acres of shellfish beds in Clark's Cove in April 1992, but other openings, such as 200 acres in Broadmarsh River in 1997, and others elsewhere explain the turn around

While the Buzzards Bay Project contributed to this turn

1995: Clark's Cove reopens to shellfish harvest after nearly a century of closure

Clark's Cove is a small bay located on the western shore of Buzzards Bay between the town of Dartmouth and the City of New Bedford. Regular discharges of raw sewage from New Bedford's antiquated sewer system had closed all of the City's shellfish harvest area. Beginning in the late 1980s, the City's Wastewater Division began extensive work on the Combined Sewer Overflow (CSO) system and by the early 1990s had stopped all dry weather CSO flows to the Cove.

This work was supported by three Buzzards Bay Project awards to the City totaling \$77,500. First, Estuary Program funds were provided for enhanced water quality sampling and analysis in Clark's Cove to accurately define when and where the Cove was experiencing pathogen contamination. This Sanitary Survey support documented real water quality improvements in the Cove and laid the groundwork for a shellfish harvest management strategy protective of public health. To meet the goal of reopening as much of the Cove as possible, The Buzzards Bay Project also funded the repair of a CSO Sluice Gate as well as in depth investigations and remediation of illegal residential sewer cross connections to storm drains discharging to the Cove.

The resulting improvements to dry weather fecal coliform counts as a result of the City's efforts prompted the Massachusetts Division of Marine Fisheries to allow for the upgrading of the Cove from Prohibited status to Conditional Approval after 91 years of closure. Within five months of reopening, Clark's Cove yielded approximately \$364,000 in quahogs employing more than two dozen full time fishermen. Applying a conservative multiplier to this figure, the ripple effect on the local economy from this harvest amounts to over \$1.5 million.

around, the real credit belongs to the State Division of Marine Fisheries (DMF) and numerous municipal officials who have worked together to identify and remediate pollution sources. The Project however helped form the wave of new thinking on what the problems and solutions were to the shellfish bed closure problem. In fact, the Project's emphasis on stormwater as the principal source and conveyance of fecal coliforms in many embayments and harbors would result in new state programs to help towns fund solutions to the stormwater problem and spawned similar initiatives in the Project's sister NEP, the Mass Bays Program.

The Buzzards Bay Project's efforts began in 1989 with a series of Project workshops that brought together scientists, agency staff, municipal officials and citizens to discuss the ever increasing shellfish bed closures in the Bay. The workshops were meant to both educate and to formulate recommendations for the Management Plan.

These early meetings made clear that the increasing shellfish bed closures in Buzzards Bay were not the result of municipal wastewater plants, but rather the result of cumulative impacts of local land uses. So called "non-point sources" of pollution like failing septic systems, stormwater discharges, farm animal wastes, agricultural sources, boat discharges, pets, and even waterfowl (especially where populations were encouraged by human feedings) were the more likely culprits. Of these sources, water quality monitoring had shown that in many embayments, stormwater was often the major conveyor and source of fecal coliforms causing these closures.

These findings prompted several important recommendations in the CCMP. First, towns should adopt the goal of allowing no further direct discharges to surface waters and wetlands. Second, those discharges contributing to shellfish closures should be prioritized for remediation. Finally, the Division of Marine Fisheries should work with area municipalities to allow "rainfall conditional openings." That is, DMF should allow shellfishing during dry periods, in areas where it has been demonstrated that fecal coliform concentrations are low enough so that shellfish are safe to consume.

The first challenge to keeping shellfish beds open in Buzzards Bay occurred in 1989 when new monitoring and sanitary survey requirements imposed by the US Food and Drug Administration could not be met by the DMF because of insufficient manpower and laboratory capacity. In the face of potential widespread management closures of the Bay, the Buzzards Bay Project supported a DMF proposal to upgrade area laboratories to handle the additional water sampling needed. Specifically the project gave \$35,000 in grants to the City of New Bedford and Barnstable County

Health Department to upgrade their laboratories and to pay for the analysis of extra samples collected by DMF. To meet federally imposed deadlines, DMF staff also trained local officials to assist with the sanitary surveys in their communities.

The upgrade of area laboratories and the closer coordination between DMF and municipal officials were to have long-term benefits for Buzzards Bay. Most important, by 1991 DMF could begin implementing a rainfall conditional closure strategy for selected Buzzards Bay embayments.

Conditional Closures

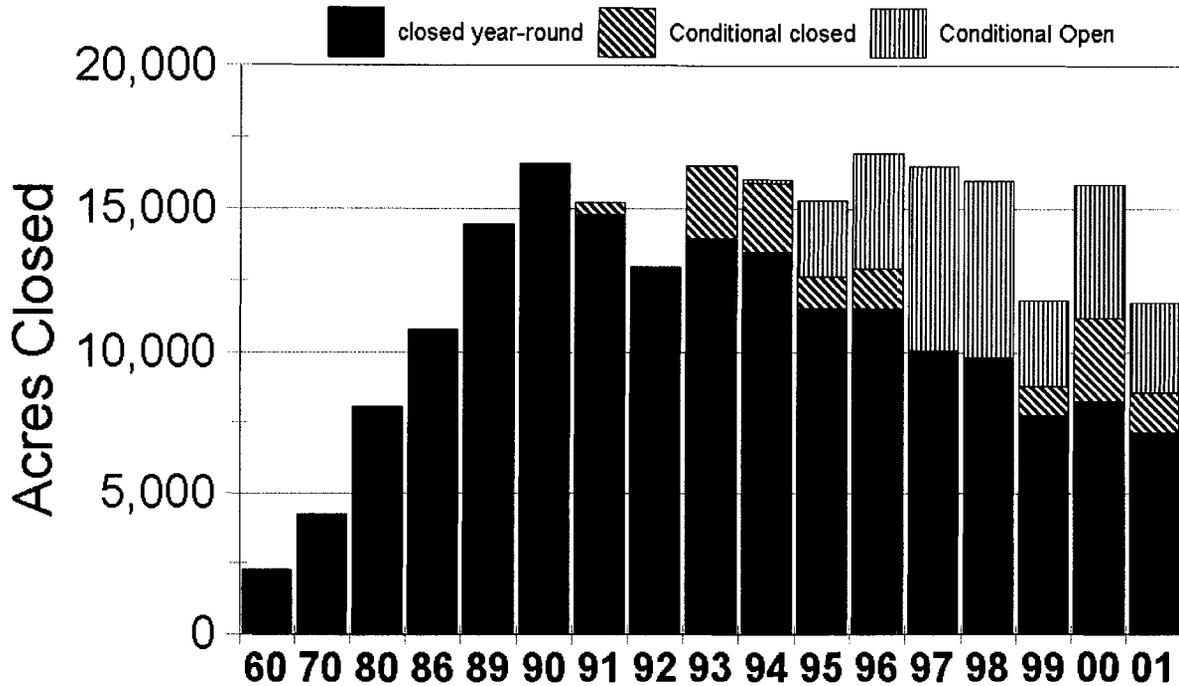
The expanded use of the Conditional Closure by the Division of Marine Fisheries has been responsible for most of the bed openings since 1991. Defined as one of the primary goals in the Buzzards Bay CCMP, conditional openings recognize that elevated bacteria counts in many of the Bay's embayments are directly related to surface runoff during rain events. Shellfish beds in the Westport River, Clark's Cove, and Little Bay in Fairhaven have all been moved from closed to conditional in the past five years. This management technique establishes a rainfall threshold unique to each embayment by which the local shellfish warden raises a red flag adjacent to the shellfish beds alerting fishermen that the area is closed.

In support of this reclassification and remediation effort in the Westport Rivers, the Buzzards Bay Project has provided \$10,000 to the Town of Westport Board of Health in cooperation with a local watershed organization to establish a detailed bacterial monitoring program in the Rivers - one of the Bay watershed's most historically productive shellfisheries. Westport was the first Bay community to begin the use of conditional closure management in 1990. Funding from the BBP worked to support the expansion of both cleanup and bed management activities by creating a certified laboratory operated by the town Health Director to focus on regular and detailed bacteria testing. The data generated by the town of Westport continues to target hot spots for remedial activities along the rivers shoreline.

The interconnectedness of each of the Buzzards Bay CCMP's Action Plans is not exhibited anywhere better than in the Project's goals regarding shellfish resources. The work of the Buzzards Bay NEP in this area has been undertaken largely under the umbrella of bacteria focused water quality restoration efforts through stormwater remediation, onsite wastewater management, and managing boat wastes. The restoration of the Bay's abundant shellfish habitats for harvest is a product of many of the initiatives undertaken by the Project in the past five years.

Buzzards Bay Shellfish Bed Closures

(conditional status about July 1)



closed year round = "prohibited" + "Restricted" + "Management" closures

Selected 1999-2001 Accomplishments

Most of the BBP's efforts to open or protect shellfish beds are contained in the following **Controlling Stormwater Runoff** action plan and are not included here to avoid redundancy. However, we repeat here the graphic of shellfish bed closures in Buzzards Bay to emphasize the continuing trend of the state's Division of Marine Fisheries to reclassify areas that were permanently closed to being open during dry periods (rainfall conditional closures) or at least during non-summer periods (seasonal closures). These openings represent the combined benefit of improved water quality and efforts to gather water quality to allow for rainfall conditional closures.

Chapter 6. Action Plan: Controlling Stormwater Runoff

CCMP Goals

1. Prevent new or increased untreated stormwater flows to Buzzards Bay that would adversely affect shellfish harvesting areas, swimming beaches, water quality, and wetlands.
2. Correct existing stormwater runoff problems that are causing or contributing to water quality degradation or shellfish bed closures in Buzzards Bay.

The first goal is extremely difficult to achieve, but progress is being made by more towns adopting stormwater regulations. Considerable funding on the second goal has been realized, but many discharges in Buzzards Bay remain, and will require at least \$20 million in additional local, state, and federal funds.

CCMP Objectives

1. To institutionalize at the local level (through education and regulation) the use of Best Management Practices (BMPs) for stormwater control in newly developed areas.

Several town boards have adopted the model BBP-SCS stormwater local regulations. This local work is complimented by new state stormwater guidance promulgated in 1997.

2. To develop a regional and local program to execute appropriate mitigation measures for existing stormwater discharges. The program would include construction, operation, and maintenance of stormwater control structures.

MCZM implemented the Coastal Pollution Remediation grant program to address this issue, and the Buzzards Bay Project coordinates town and state collaborations, but these programs and efforts are on an ad hoc basis.

CCMP Commitments:

Department of Environmental Protection (DEP):

1. DEP will work cooperatively with EPA to develop a policy including criteria to determine when permits for stormwater discharges are required. DEP will include these criteria in its State Water Quality Standards. DEP will also consolidate its regulatory authority for controlling stormwater runoff. (Target date: 6/93).

The DEP accomplished much of this through stormwater remediation policy adopted in 1996. EPA's Phase II Stormwater Permit Program will assist greatly in meeting this commitment.

Buzzards Bay Municipalities:

Bourne, Wareham, and Marion will pursue adoption of subdivision rules and regulations

that require best management practices for stormwater runoff. Target date: 1992

Boards in the towns of Rochester, Marion, Falmouth and Fairhaven have adopted parts or all of the BBP regulations, other towns (Bourne) are working with the project.

Other Recommended CCMP Actions

1. All other Buzzards Bay communities should adopt subdivision bylaws that require that best management practices for stormwater runoff be incorporated into any new development plans. Target date: 1994.

Municipal Planning Boards completed: Fairhaven, Marion, and Rochester, Falmouth

2. Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish-bed closures. Target date: beginning immediately, as funds allow.

All town's are undertaking this task to a varying degree, requires a long term commitment. About 20% complete.

3. The Commonwealth, through the Executive Office of Environmental Affairs, should provide funding for local stormwater remediation projects. Target date: 1993.

The Buzzards Bay Project was successful in securing \$250,000 from the state Transportation Bond in 1995 and 1996. This program was so successful, the state made the program statewide and called it the MCZM "Coastal Pollution Remediation" program.

4. The State Legislature should not continue to exempt bridgework and road widening by the state DPW from review by local conservation commissions. Target date: 1992.

Not completed, but beginning about 1996, the newly named Mass Highway Department (MHD) began making courtesy filings with local conservation commissions, and began hiring environmental engineers to work with towns and coordinate with state agencies. Viewed therefore as 20% complete.

5. SCS should institute a program for implementing best management practices on agricultural lands in the Buzzards Bay area. Target date: 1991.

This program was in place in the early 1990s.

Remediation of Existing Stormwater Discharges

By far, the greatest amount of federal and state financial resources associated with Buzzards Bay Project

implementation efforts, and Project technical assistance, was spent on remediation of existing stormwater discharges contributing to shellfish bed closures and water quality degradation throughout the bay watershed. Funding for these projects was provided by the Buzzards Bay Project through its EPA funded Municipal Grant Program, by the Massachusetts Department of Environmental Protection through the federal 319 program, and by the Massachusetts Office of Coastal Zone Management's Coastal Pollutant Remediation Program. The Buzzards Bay Project staff continues to help local officials in the identification of funding sources and the development of successful projects. This allowed the BBP and local communities to leverage Estuary Program funds far beyond their limits. Rough estimates on the remediation of all of the Bay's untreated discharges were estimated at \$10 million in the CCMP Financial Plan.

The Project was greatly helped in this work through a partnership with the USDA Natural Resources Conservation Service in which NRCS staff works with the Buzzards Bay Project in design and review of various forms of stormwater remediation facilities. These projects included such varied forms of stormwater BMPs as traditional stormwater infiltration structures, innovative constructed wetland systems, improved agricultural management practices, and urban sewer/stormwater cross connection remediation.

Besides structural solutions to urban runoff, the BBP also provided public education funding to the citizens' volunteer organization, the Coalition for Buzzards Bay, to stencil stormwater catch basins throughout the Bay watershed with the message, "Don't Dump, Save Our Bay" in 1993. In portions of New Bedford with a large bilingual population, the message was printed in Portuguese. In addition to the stenciling work, the Coalition also coordinated a BBP funded mapping project by interns from the Massachusetts Maritime Academy to locate and describe all stormwater catch basins, conveyance piping, and discharges in most of the Bay area. This information was eventually refined and improved upon by the Buzzards Bay Project with grant money from the Massachusetts Highway Department, and in 2001 the Buzzards Bay Project drafted a stormwater atlas every known storm drain pipe and associated catch basin in 8 Buzzards Bay municipalities. A sample map is included in Appendix D.

The Buzzards Bay Project has also extensively worked in assisting town boards to develop adequate regulations to address new and existing stormwater discharges, and our "unified stormwater regulations for all boards. Below are highlights of two comprehensive stormwater remediation initiative that have spanned over a decade in two embayments.

Buttermilk Bay

Extensive work in Buttermilk Bay at the northeast corner of the Bay between the towns of Wareham and Bourne early in the CCMP development process revealed a total of 20 stormwater discharges, which were delivering the majority of bacterial and other pollutant loadings to the embayment. As a result, large portions of Buttermilk Bay were closed to the harvest of shellfish. After nearly a decade of work, all but the most minor discharges to Buttermilk Bay have or are currently being remediated. Due to availability of sandy soils along the shores of Buttermilk, infiltration of stormwater was the preferred alternative at all of the sites. Stormwater remediation has proved more difficult in the western portions of the Bay watershed where soil impermeability and high groundwater have ruled out infiltration as a viable alternative.

FUNDING BUTTERMILK BAY

- Electric Avenue, Wareham \$100,000 (EPA)
- Buttermilk Bay Stormwater 319, Bourne \$144,000 (MA DEP 319 Nonpoint Pollutant Remediation Program)
- Red Brook, Wareham \$65,000 (EPA)
- Indian Mound Beach, Wareham \$111,562 (MCZM Coastal Pollutant Remediation Program)
2000 CPR Grant: \$60,000 (CZM)
* Grant awards represent Federal and State funding support and do not include local contributions.

Onset Bay

Driven in large part by a \$1.9 million investment by the Town of Wareham to extend municipal sewer service to portions of Onset village, the Buzzards Bay Project assisted town managers in pulling together funding and technical assistance toward coordinating the installation of stormwater BMPs in conjunction with planned sewer installation. The result was a comprehensive remediation of all wastewater and stormwater flows contributing to the closure of 111 acres of shellfish harvest beds in the East River, Broad Cove, and Muddy Cove. Muddy Cove was classified as Prohibited to harvest and East River/Broad Cove was Seasonally Approved for partial harvest of shellfish. Once complete, this work will have addressed all primary pollution sources to the Coves and is expected to reopen much of the area to harvest.

- Riverside & Onset Design, Wareham \$15,000 (BBP Municipal Grant Program)
- Riverside & Onset Construction, Wareham \$100,000 (BBP Municipal Grant Program)
- Point Independence Construction, Wareham \$71,600 (MCZM Coastal Pollutant Remediation)
- Point Independence Design, Wareham

\$15,000 (MCZM Coastal Pollutant Remediation Program)

* Grant awards represent Federal and State funding support and do not include local contributions.

Improving Management of Stormwater in New Development

Preventing new direct untreated discharges to surface waters was one of the most important goals outlined in the Buzzards Bay CCMP. It was common sense when considering the high cost of remediating existing discharges; it is simply true that an ounce of prevention is worth a pound of cure. At the time of completion of the CCMP, all of the towns surrounding Buzzards Bay had regulations on the books addressing the construction of new stormwater conveyance systems to control flooding or stormwater volume. Often these rules required that stormwater be delivered as quickly and as directly as possible to the nearest water body or wetland without any attention paid to the quality of the stormwater and its effect on water resources and shellfish habitat. Only if both stormwater quantity and quality are addressed can a town expect to prevent new problems with shellfish bed closures and water quality degradation. Another problem the BBP observed was that requirements among town boards were not consistent and sometimes even contradictory.

To address these problems, the Buzzards Bay Project developed a model stormwater management regulation entitled, Unified Rules and Regulations for Stormwater Management for use by Planning Boards, Boards of Health, and Conservation Commissions, which was released in January 1996. By 2001, about 6 Buzzards Bay municipal boards have adopted the regulations in whole or part

Selected 1999-2001 Accomplishments

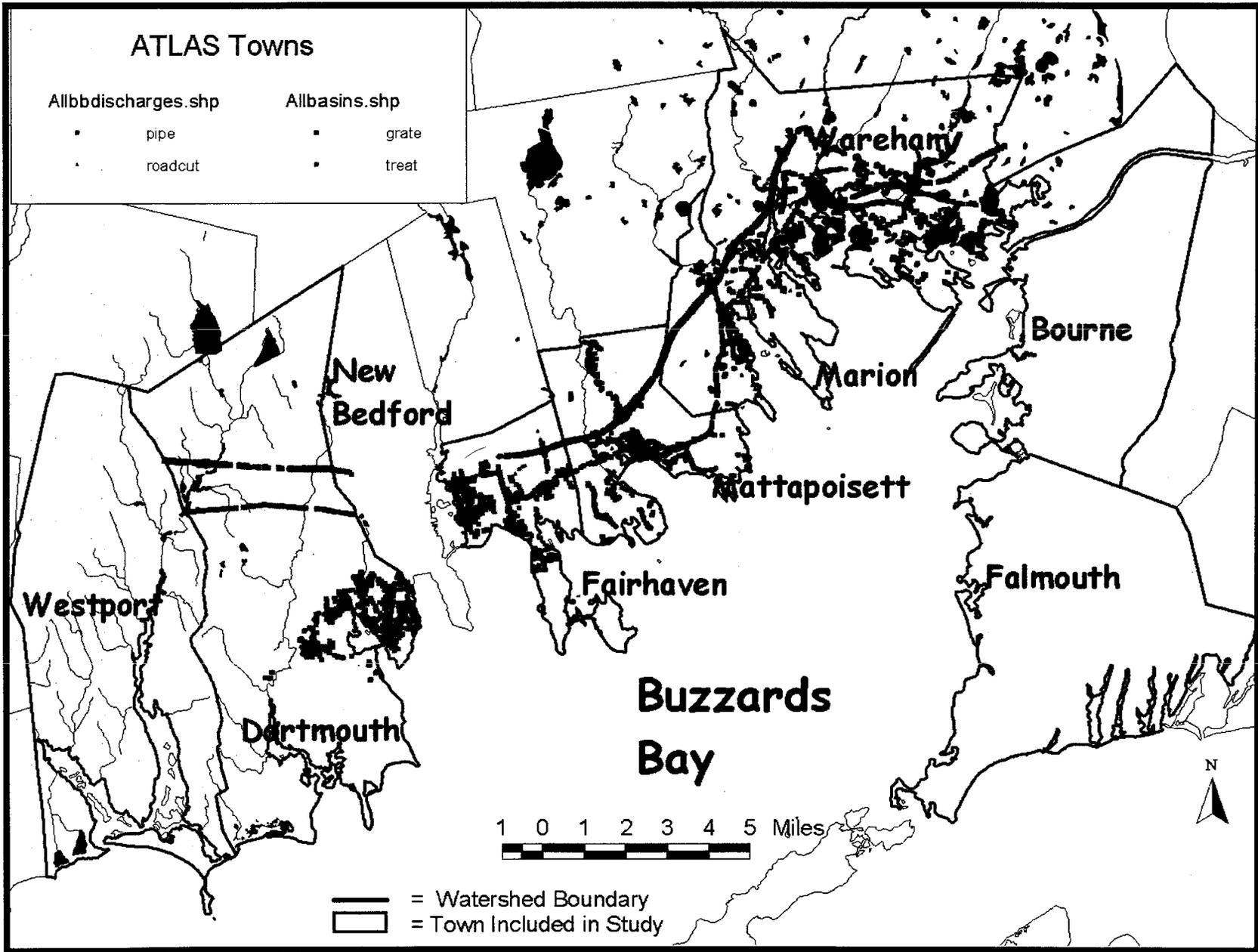
- 1) Our work on our 319 grant for Buttermilk Bay stormwater remediation, Phase II, was completed in 2001. An additional grant for \$60,000 was received by the town of Bourne from MCZM. We produced an educational flyer and display (for Bourne Town Hall).
- 2) In late 2001, the BBP initiated a new grant with the town of Wareham for a stormwater remediation project in Onset Bay, and the work is ongoing.
- 3) In December 2001, the Buzzards Bay Project completed a draft stormwater atlas of all Buzzards Bay discharges. The location of discharges and catch basins mapped is shown on the overview map on the next page.

1991-1995 Case Study: Spragues Cove Constructed Wetland for Stormwater Treatment

Spragues Cove is on the western side of Sippican Harbor in the Town of Marion. The Cove's shellfish beds, immediately adjacent to the town's only public bathing beach, were closed due to bacterial contamination from stormwater runoff. Two storm drain systems discharged into Spragues Cove, the largest of which drained a 64 acre area of roads and driveways in the densely developed lower portions of Marion village.

In 1991, the Town of Marion and the Buzzards Bay Project began exploring options for treating this stormwater runoff prior to discharge. The result was the design (provided by NRCS) and construction of a 3-acre manmade wetland system to treat the "first flush" of stormwater entering the Cove. Stormwater contaminants such as bacteria, sediments, and nutrients are removed through natural physical and biological processes within the staged wetland and open water system. Along with the water quality benefits, the Spragues Cove stormwater wetland provides enhanced wildlife and fish habitat and replaces a filled parking area that was formerly a salt marsh.

The system was constructed in 1995 with funding from the Buzzards Bay Project, an EPA/DEP 319 Nonpoint Source Pollution grant, the Town of Marion, US Fish and Wildlife Service, and private contributions. Once the construction was completed, a large citizen effort was mobilized to plant the system with a variety of wetland species such as cattail, bulrush, and lily in order to make the system function like a wetland to remove contaminants. The Spragues Cove Project has been and continues to be not only an extremely successful stormwater remediation project but an equally important community environmental education and wetlands restoration effort. Initial water quality monitoring during the summer of 1996 has revealed large reductions in fecal coliform bacteria by the system.



Chapter 7: Action Plan: Managing Sewage From Boats

CCMP Goal

Eliminate the discharge of wastewater from all boats in Buzzards Bay embayments

CCMP Objectives

1. *To build more pumpout facilities and to promote their use by educating boaters, making facilities more accessible, and enforcing the regulations*

Essentially complete regarding pumpout availability but use and enforcement require additional effort.

2. *To develop financially self-sustaining pumpout programs at the town level*

Pump-outs are either privately or publicly owned and are essentially self-sustaining.

3. *To designate embayments in Buzzards Bay as No-Discharge Areas (NDA).*

Completed in 2000, See Analysis below

CCMP Commitments:

1. *DEP, using its Chapter 91 permitting authority, will require new marinas or expansions of existing marinas (greater than 10 additional slips) to have adequate pumpout facilities. Target date: Beginning 12/92.*

Completed. Policy adopted about 1992.

2. *DEP will implement a policy ensuring adequate management and treatment for sewage pumped from boats. Target date: Beginning 1992.*

Completed. Policy implemented about 1992 based on BBP work.

3. *DEP will implement a policy to eliminate toxic additives in marine sanitation devices. Target date: 1991.*

Completed.

4. *DEP will review problems of treating and disposing of boat sewage. Interim Action: DEP, with assistance from EPA, will continue to provide technical assistance and oversight to the town of Marion in developing advanced boat sewage treatment technology now being tested at a pilot project at the town's wastewater treatment facility.*

Pilot project completed in Marion with mixed success.

Coastal Zone Management Office (CZM)

1. *CZM and DEP will develop a program that ensures adequate pumpout facilities for all*

harbor areas. Target Date: 12/92.

With Chapter 91 and Clean Vessel Act (CVA) funding this was achieved. MCZM also included pump-out funding in their CPR municipal grant program to address gaps in pump-out coverage.

2. *CZM and the U.S. Environmental Protection Agency (EPA) will assist Buzzards Bay municipalities to develop a strategy for designating EPA "no discharge areas" within coastal embayments. The Buzzards Bay Project and the Buzzards Bay Action Committee will work with municipalities to encourage construction of boat pumpout facilities as well as the delineation of no discharge areas in Buzzards Bay. Target date: 1992*

Formal process was not necessary. The overall programs success led to the Governor's statewide nomination in 1998.

3. *CZM, under its Coastal Facilities Improvement Program, will give serious consideration to eligible projects that propose to construct municipal marine pump-out facilities where needed and appropriate. Target date: 1991*

CFIP was not funded for several years. Clean Vessel Act funding, established in part because of support from the Massachusetts Congressional delegation and testimony by Buzzards Bay municipal officials, began providing the necessary funding in 1994.

Environmental Protection Agency (EPA)

1. *EPA, under the Clean Water Act, will designate an embayment in Wareham as a no-discharge area. Target date: 12/91*

A town-wide designation was made in 1991.

Buzzards Bay Municipalities:

1. *Dartmouth, Westport, Marion, Mattapoisett, and Fairhaven, with grants from the Buzzards Bay Project, will provide mobile or land based boat pumpout facilities and develop management plans for ensuring their use. Target date: 7/91*

Completed by 1994.

Other Recommended CCMP Actions

Boards of Health and Harbormasters should enforce the use of pumpout facilities by all boaters using Type III MSD's or portable toilets in Buzzards Bay embayments. Target date: 1993.

Not Completed. Unresolved enforcement mechanisms and manpower shortages remain a problem.

Analysis

At the time of CCMP completion in 1992, only 11 publicly available boat pumpout facilities existed in the entire Bay and they were significantly underutilized. Research conducted by the BBP during CCMP development and elsewhere in the US showed that water quality surrounding marinas often showed elevated fecal coliform bacteria during peak periods of boat usage. The Buzzards Bay Project endeavored quickly to remedy this situation by both establishing more pumpouts and raising public awareness of the convenient and cheap (often free) availability of them. Buzzards Bay Project funding was awarded to most towns to establish or upgrade pumpout facilities throughout the Bay.

In 1992, the Town of Wareham had the first marine no-discharge area on the East Coast. The Town of Westport followed in 1995. In 1994, the federal Clean Vessel Act (CVA) began providing states and local coastal communities with grants for the construction of pumpout facilities. The creation of the CVA grant program allowed the Buzzards Bay Project to refocus its limited Municipal Grant Program funding to other CCMP tasks while still providing a mechanism to provide adequate, well-distributed pumpout facilities in all corners of the Bay. In Massachusetts, the CVA Program is administered by the Department of Fisheries, Wildlife, and Environmental Law Enforcement in cooperation with MCZM. The program is funded by part of the fuel and equipment tax paid by boaters. With BBP and CVA funding assistance in 1996, Buzzards Bay boaters are now never far from available public pumpout facilities. The Bay now has full pumpout coverage with a total of 24. Groundwork by the BBP in identifying the needs of Buzzards Bay municipalities was key in ensuring that Buzzards Bay received a large share of CVA money in Massachusetts, and in Massachusetts being one of the first states to tap into the CVA funds. All these efforts led to the eventual designation of all of Buzzards Bay as a no discharge area in 2000.

Selected 1999-2001 Accomplishments

By 1997, there were adequate boat pump-out facilities in each town around Buzzards Bay (with the exception of the Island municipality of Gosnold) to enable a bay wide no-discharge designation. Consequently, in 1999, the Buzzards Bay Action Committee, with technical support from the BBP, prepared a bay wide nomination package. The application was submitted in 2000, and in August 2000, all of Buzzards Bay was designated as a No Discharge Area.

Chapter 8: Action Plan: Managing Sewage Treatment Facilities

CCMP Goal

1. *Achieve Water Quality Standards and Protect Natural Resources at all POTW Discharge Points*

CCMP Objective

1. *To improve POTW efficiencies by setting limits on chlorine residual discharges and monitoring for effective effluent disinfection, encouraging industrial pollution prevention and pretreatment efforts, and reducing nitrogen inputs.*

Chlorine limits have been reduced or eliminated for Sewage Treatment facilities in Buzzards Bay. The Buzzards Bay Toxic Use Reduction Program and especially the City of New Bedford pretreatment program at the new wastewater facility have had exceptional results (see also Toxic Action Plan).

CCMP Commitments:

Department of Environmental Protection (DEP)

1. *DEP will designate all existing aquatic Areas of Critical Environmental Concern (ACECs) as outstanding resource waters subject to the highest level of protection under the Antidegradation provisions of the Clean Water Act.*

Completed, but enforcement action unclear.

2. *DEP will work with the Buzzards Bay Project, Coastal Zone Management, and the Cape Cod Commission to determine if additional areas within the Buzzards Bay watershed should be designated as ACECs. Target date: 1992*

Not completed. The ACEC mechanism appears to have lost momentum.

Environmental Protection Agency (EPA)

1. *EPA will conduct evaluations of Dartmouth, Wareham and Fairhaven municipal discharges. Using the ten criteria established under Section 403(c) of the Clean Water Act, EPA will ensure that these discharges are not having an adverse impact on coastal water quality and ecosystems. Target date: 9/91*

Not originally completed but beginning in 1997, EPA began using nitrogen loading limits developed by the BBP to establish nitrogen TMALs.

Other Recommended CCMP Actions:

1. *The state management framework for*

protecting the quality of surface water should be made more comprehensive to address nitrogen from existing and future sewage treatment facilities. In particular, DEM should enforce the Ocean Sanctuary Act.

Beginning about 1997, DEP began using the BBPs nitrogen loading TMAL limits in its permit decision-making process.

2. *Communities should develop and implement plans to reduce effluent volume. These plans should include strategies to reduce groundwater infiltration and stormwater inputs, as well as to promote water conservation by individuals and businesses.*

New Bedford has completed a remarkable job, reducing flow by more than 40%. Falmouth, Wareham, and Marion all with some success.

3. *Communities should develop and implement programs of industrial pretreatment and industrial and household hazardous waste reduction where appropriate.*

New Bedford is doing an excellent job and controls its own pretreatment program. Other facilities do not have pretreatment programs, but also lack the industrial base.

4. *Future sewage treatment facilities and outfalls should be sited so that they minimize pathogen contamination, nitrogen impacts, and threats to human health and marine ecosystems.*

No outfalls have been sited, but in 1994 the Massachusetts Military Reservation sewage treatment facility groundwater discharge was sited 7 miles from the treatment site near the Cape Cod Canal according to BBP and others recommendations, specifically to prevent causing nitrogen loading problems in Falmouth's poorly flushed coastal ponds.

There are six Publicly Owned Treatment Works (wastewater treatment facilities) in the Buzzards Bay drainage basin. One of these facilities discharge to groundwater (Falmouth); the others discharge to surface waters. Since 1991, no new discharges have been pursued. The New Bedford and Dartmouth facilities discharge to the open waters of the bay while the Fairhaven, Marion, and Wareham facilities all discharge to shallow embayments. Nitrogen management at these facilities was of primary concern to the BBP when it began its implementation efforts.

The Marion Wastewater Treatment Plant discharges to Aucoot Cove through a small freshwater stream at the head of the cove. In 1991, the Buzzards Bay Project funded a comprehensive water quality monitoring study by scientists at the Woods Hole Oceanographic

Institution to assess nutrient related impacts from the Marion POTW on Aucoot Cove. The results of this study showed that nitrogen loading relative to the depth and circulation characteristics of the cove was not having a significant effect on water quality. In addition to nitrogen related work in Marion, the town ceased use of chlorine for disinfection - an important part of the Buzzards Bay CCMP's objectives for POTWs - in exchange for ultraviolet disinfection. Similarly at the Dartmouth Wastewater Treatment Plant, the town's completed upgrade of its facility included the use of UV disinfection.

Both the Wareham and Fairhaven Wastewater Treatment Plants discharge to tidally restricted, shallow embayments. Neither plant has discontinued use of chlorine for disinfection, nor have they completed adequate evaluations of nitrogen related impacts from their discharges on the Wareham River estuary and inner New Bedford Harbor respectively. Both embayments continue to exhibit eutrophic conditions as evidenced in water quality monitoring results produced as part of the Buzzards Bay Citizens Water Quality Monitoring Program. During the past year, the situation has changed, and the Buzzards Bay Project is currently participating in a review of the discharge permit for both the Wareham and Fairhaven facilities with federal and state regulators who are considering establishing nitrogen limits for both discharge.

The Falmouth Wastewater Treatment Plant serves the densely developed town center and village of Woods Hole and discharges this waste via groundwater in the West Falmouth Harbor drainage basin. Therefore, the facility delivers pollutant loadings to the harbor more than what watershed land uses produce. This has resulted in the early signs of eutrophication in the upper reaches of West Falmouth Harbor where nitrogen is entering the Harbor through a concentrated groundwater plume. In 1995 the Buzzards Bay Project partially funded a water quality analysis and detailed flushing study of West Falmouth Harbor and continues to participate in the development of nitrogen management strategies for the West Falmouth Harbor watershed in cooperation with town officials and Cape Cod Commission staff. Since then, the Buzzards Bay Project has produced several reports outlining nitrogen management needs for the West Falmouth Harbor watershed and these documents are expected to change discharge limits for the 1999 permit renewal as well as other changes in how Falmouth manages non-point sources of nitrogen.

Finally, the greatest improvement in wastewater treatment in Buzzards Bay occurred during the summer of 1996 with the completion of a \$100 million Secondary Treatment Plant in the City of New Bedford. Mandated under a Consent Decree filed under the Clean Water Act,

plant construction began in 1994. The Buzzards Bay Project has supported wastewater treatment initiatives in New Bedford through its ongoing efforts to reduce and prevent toxic industrial inputs to the collection system through its Toxic Use Reduction Program (discussed in Reducing Toxic Pollution section). In addition, Bay Project staff helped in the review of the plant's discharge for possible nitrogen related impacts in 1993.

Selected 1999-2001 Accomplishments

In 2001, the town of Wareham agreed with the Buzzards Bay Project and the US EPA to limit nitrogen seasonally to less than 6 ppm as part of their next sewage treatment facility upgrade.

The Buzzards Bay Project developed preliminary nitrogen loading recommendations for New Bedford Harbor, which is the discharge site of the Town of Fairhaven sewage treatment facility. Because of concerns with the cost of upgrading the plant, the US EPA region I provided \$70,000 to evaluate more comprehensively flushing in New Bedford Harbor. The BBP helped guide and oversee the contractor undertaking this work. This study is not yet complete.

Chapter 9. Action Plan: Reducing Toxic Pollution

CCMP Goal

Protect the public health and the bay ecosystem from the effects of toxic contamination entering Buzzards Bay.

CCMP Objectives

1. To reduce the amount of toxic contamination entering Buzzards Bay.
2. To reduce hazardous leachate from landfills and to minimize other nonpoint sources of toxic contaminants to the Bay.
3. To meet all state, federal, and local action levels for water and seafood.

Broad changes in state policies, the enactment of the Toxic Use Reduction Act, and stricter state enforcement on the discharge of toxic materials has had a tremendous impact on the use and discharge of toxic materials. The BBP Toxics Use Reduction Program made great strides in assisting businesses in the New Bedford area become aware of state regulations and technical assistance programs. The New Bedford Wastewater Treatment Facility's pretreatment program and elimination of dry weather discharges have had a tremendous impact on toxic discharges to Buzzards Bay. Containment of the PCB hot spot in New Bedford harbor has also helped reduced migration of toxics into Buzzards Bay.

Objectives:

1. To reduce the amount of toxic contaminants entering Buzzards Bay.
2. To reduce hazardous leachate from landfills and to minimize other nonpoint sources of toxic contaminants to the bay.
3. To meet all state, federal, and local action levels for water and seafood.

The BBP has not worked on objectives #2 or #3.

Recommended CCMP Actions:

1. Municipalities should establish and implement a program of toxic-waste reduction for industries that discharge directly into receiving waters or sewage treatment facilities. Target date: 1993.

The Commonwealth passed, in 1994, a Toxic Use Reduction Act that required a 50% reduction of hazardous wastes by the year 1997. This goal was exceeded. Unfortunately, in the case of New Bedford, increasing water costs and downturn of the economy caused manufacturing plant closings, but other industries adapted and implemented water savings toxics reduction programs.

2. DEP should reduce oil entering the environment through enforcement of adequate collection regulations. Target dates: Oil

strategy policy enforcement, immediately; legislative action on refundable tax, 1992; boat waste collection regulations, 1993.

Automobile waste oil has been handled well, but no action has been taken on boat waste oil.

3. Buzzards Bay municipalities should collect and properly dispose of household hazardous waste on a continual basis. Target dates: DEP household hazardous waste permitting by 1992; bans on organic degreasers by 1993; funding by 1993.

Most towns now have periodic toxic waste pickup days, degreasers were banned, but funding for program expansion has not appeared.

4. SCS and the Cooperative Extension Service should develop and implement strategies to minimize the use and potential off-site impact of agrochemicals. Target dates: 75% implemented by 1995.

SCS (now NRCS) has an ongoing technical assistance program. However, action on implementing BMPs from flow-through cranberry bogs (that is, bogs where pesticide runoff cannot be adequately managed), has been hindered by industry resistance.

5. EOEA should establish sediment criteria that are protective of the ecosystem and of human health for selected contaminants. Target date: Draft PAH policy by September 1991; final by 1992; sediment criteria by 1994.

Draft policy proposed but not finalized.

6. EOEA should coordinate with the Massachusetts Department of Public Health to review the current seafood-testing program and develop recommendations for future actions. Target date: 1992.

No action.

Analysis

Issues related to the New Bedford superfund site are addressed largely in the New Bedford chapter. The Buzzards Bay Project's work on toxic pollution has been limited to two areas: 1) the indirect benefits of our stormwater remediation program, which, although focused on fecal coliform bacteria, also reduces the discharge of many toxic contaminants. 2) a toxic use reduction program for businesses in the greater New Bedford area.

The only other activity has been the Buzzards Bay Project's implementation of the "Buzzard Bay Project Toxics Use Reduction Program" (BBP/TUR) with four years of support from the EPA through a competitive

TURA program. The focus of the program was to educate and make known the availability of technical resources to local manufacturers and service industries that contribute to the waste stream processed by the New Bedford Publicly Owned Treatment Works (POTW). This initiative helped both the public and private sector become aware of the significant environmental improvements in New Bedford and has educated the city's industrial community to the concepts of toxic use reduction and the positive impact pollution prevention makes upon the environment.

In December of 1993 an advisory committee for toxic use reduction was formed that included a wide range of state and local officials. The program carried out 15 different workshops to local industries designed to address the toxic use reduction needs of industry. Workshops topics included Materials Management and Chemical Reporting, Sustainable Manufacturing, Impacting Water Use, Clean Air Conference for Dry Cleaners, Metals Recovery and Abatement, Fats, Oils and Greases in the Waste Stream, Making Compliance Work for You, Pollution Prevention for Marinas and Boat Repair Facilities, Pollution Prevention Day, Solvent Degreasers, Wastewater Treatment in New Bedford and BOD Discharge into the Waste Stream for Fish Processors.

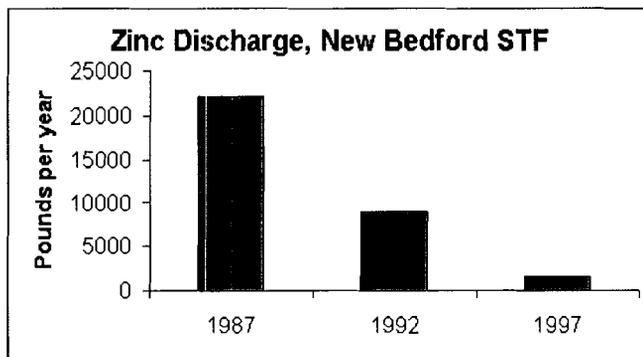
The TUR program also created brochures aimed at making area industries aware of award opportunities for toxic use reduction. Beginning with the creation of a repository of EPA and State environmental agency documents, we have as well publicized the Governor's Award for Toxic Use Reduction and we were successful in the fact that several companies we encouraged actually were the recipients of the award. Area companies were also made aware of innovative toxic use reduction strategies through our monthly newsletter "Options". Businesses were particularly enlightened about grant programs and award opportunities.

For example, in 1996, the BBP/TUR program was instrumental in facilitating the award of a NICE³ United States Department of Energy grant for \$425,000, to Brittany Dye in New Bedford. The grant helped the company in starting a major process modification necessary to carry out innovative textile finishing. The grant allowed for the modernization of processes enabling them to reduce their energy consumption by half, and even though they will be able to increase the amount of cloth they process, at the same time they decreased the amount of toxics discharged into the municipal collection system.

In 1997, the BBP ended its Toxic Use Reduction program due to cutbacks in federal funds.

Selected 1999-2001 Accomplishments

The City of New Bedford has been continuing its successful wastewater industrial pretreatment program. The success of this program is illustrated by the graphic below, showing reductions of zinc in the facility discharge. This trend is similar to the reduction for many other contaminants.



Chapter 10. Action Plan: Preventing Oil Pollution

CCMP Goals

1. Reduce the amount of petroleum hydrocarbons entering Buzzards Bay
2. Minimize the occurrence of oil spills in Buzzards Bay, large & small
3. Minimize the environmental effects from oil inputs to Buzzards Bay

Appreciable action has been taken in meeting all three goals.

CCMP Objectives

1. To promote a regional strategy for preventing and managing oil spills.

BBAC mutual aid agreement which was supported by the Buzzards Bay Project as grants to municipalities for oil spill containment equipment. In 1997 regional oil spill coordinators began to meet quarterly and began annual oil spill training exercises.

2. To implement a source-reduction plan for chronic inputs of PAHs to Buzzards Bay.

Upgrades to the New Bedford Sewage Treatment Facility, improved stormwater treatment, elimination of New Bedford dry weather CSO discharges, the stenciling of storm drains by the Coalition for Buzzards Bay, weekly Coast Guard inspections of New Bedford Harbor, and stricter air emissions have all contributed to reduced PAH inputs to Buzzards Bay, but the reductions have not been quantified.

3. To provide adequate facilities for the collection of waste oil from cars and boats.

Waste Oil collection facilities for autos are well established throughout Buzzards Bay municipalities and the state. The Seafood Coop began waste oil collection from boats during the early 1990s, but this process collapsed with the failure of the Seafood Coop due to fishing industry declines and hardships. Coast Guard inspections of the harbor are believed to some to be resulting in more boat engine oil being dumped at sea instead of the harbor.

4. To take enforcement actions against the illegal discharge of oil.

The Coast Guard's aggressive inspection and enforcement of oil dumping laws in New Bedford harbor has resulted in a dramatic improvement of water quality there (coupled with the elimination of dry weather discharges from CSOs). Source reduction and waste oil permitting enforcement has not been undertaken by DEP.

CCMP Commitments:

The Coastal Zone Management Office (CZM)

1. CZM will provide technical assistance to Buzzards Bay communities developing contingency plans in each municipality. Target date: Beginning 1991.

Completed in Westport. Baywide plan synopsis collated by BBAC. Coast Guard contingency plan completed but revision process is on going.

2. Encourage the satisfactory completion of oil spill contingency plans by each municipality. Target date: Beginning 1991

Completed as above with support from the BBAC.

The Buzzards Bay Action Committee (BBAC)

1. BBAC will ensure that each municipality appoints an oil spill coordinator responsible for overseeing maintenance and deployment of equipment and for directing response activities. Target date: 1991

Completed by 1993.

2. BBAC will develop a mutual aid protocol that will govern the purchase and use of oil spill equipment by the towns. Target date: 4/92

Completed by 1994.

3. BBAC will develop model regulations that will: a) require all boatyards and marinas to maintain oil containment and cleanup equipment on site; and b) manage the appropriate fueling of vessels. Target date: 2/92

Completed. Legislation is now pending based on BBAC recommendations.

The U.S. Coast Guard

1. Coast Guard will conduct training sessions on the use of oil spill equipment and other contingency plan activities for all Buzzards Bay towns once a year. Target date: Beginning 1991.

Completed in 1997 as part of BBP funded training through Massachusetts Maritime Academy. Coast Guard completed a classroom course in 1999.

2. Coast Guard will review and approve each municipality's contingency plan and utilize those plans in the event of a spill. Target date: Beginning 1992.

Coast guard is folding information from municipalities into its own contingency plan. In 2001, the Buzzards Bay Action Committee, with support from the Buzzards Bay Project, completed an updated oil spill contingency plan and provided this to the Coast Guard. The Coast Guard has agreed to refer to this document when responding to spills.

3. Coast Guard will advise municipalities on the appropriate spill equipment that should be maintained. Target date: Beginning 1991

Status: completed, through the BBP and BBAC; DEP has also adopted a policy on the use of dispersants in Buzzards Bay

Buzzards Bay Municipalities

1. Falmouth, Bourne, Wareham, Marion, Mattapoisett, Fairhaven, New Bedford, Dartmouth, and Westport have appointed oil spill coordinators, some of whom are developing local contingency plans.

2. Marion (through its Marine Resources Commission) is working with the boatyards and marinas to ensure they maintain adequate oil response equipment.

Believed completed.

3. The Coalition for Buzzards Bay will continue to work with state legislators to refile a bill in December 1991 that addresses oil spill prevention including: pilot accountability language, better pilot testing and training including recertification on a regular basis, and pilotage requirements in the upper portions of Buzzards Bay and the Cape Cod Canal. An early version of the bill was filed in December 1990 but was not voted upon.

Legislation finalized in 1995.

Other Recommended CCMP Actions:

1. To reduce the impact of future spills, DEP should coordinate annual regional oil spill response drills for Buzzards Bay communities on land, to ensure preparedness and proper interface between themselves and local personnel. Target date: Beginning 1992.

Unknown.

2. All other communities should require all boatyards and marinas to have specified response equipment on site. Target date: 1993

Not completed.

3. All levels of government should adopt a policy to minimize or reduce oil entering the Bay. Municipalities should require performance standards for catch basins that remove oil and grease and implement a maintenance program. Target date: 1992-1994.

Not completed.

4. Enforcement Task Force of the Executive Office of Environmental Affairs should enforce

proper storage and disposal of oil. Target date: Immediately.

Not completed.

5. Buzzards Bay communities should adopt regulations managing fueling of vessels; regulations should include a provision requiring booms and absorbent material available at all fuel loading facilities. Target date: 1993.

Not completed.

6. The state should develop a policy and criteria for the use of dispersants in Buzzards Bay during oil spills. Target date: 1992.

Policy adopted after the Argo Merchant oil spill in Rhode Island.

7. DEP should adopt a policy for treating stormwater by requiring oil and gas traps, absorbent pads, and regular catch-basin maintenance. Target date: 1992

Elements addressed in stormwater guidance document.

8. The Coast Guard should install a more effective navigational system at the western entrance of the Cape Cod Canal. Target date: 1992

Completed as a result of the Coalition working with the Coast Guard and area legislators pushing passage of pilotage bill.

Buzzards Bay is a major transit route for small tanker and barge traffic transporting heating and industrial oil and gasoline into greater Boston and northern New England markets. Between 1969-1989, it is estimated that more than 1600 tons of petroleum entered Buzzards Bay from oil spills.

Buzzards Bay has been the site of several catastrophic oil spills. The second largest spill occurred in 1969 when approximately 155,000 gallons of #2 fuel oil spilled when the barge Florida ran aground off West Falmouth. The largest spill occurred in 1974 when 165,000 gallons of #2 fuel oil spilled when the tanker Buchard 65 struck bottom near Cleveland Ledge. In recent years, improvements to navigation and more rigorous pilotage requirements are believed to be minimizing risks of future spills in Buzzards Bay. Nonetheless, smaller spills from barge and vessel groundings in the bay have continued during the 1980s and 1990s. One of the more memorable of these was the grounding of the Queen Elizabeth II in 1993 and January 1996 grounding of the barge North Cape off Moonstone Beach in Rhode Island has raised concerns of local officials about oil preparedness.

Most municipalities with wastewater treatment plants

and large industrial components have pretreatment programs in place to reduce inflows of oils, PAHs and other toxic compounds. The effectiveness of these programs can be documented through contaminant concentration trends in effluent discharges. New Bedford has been highly successful in this regard and its sludge has been reclassified from Class 3 to Class 1, enabling its use for fertilizer and soil amendments in public areas.

Boat oil waste is only an issue in New Bedford Harbor, a commercial fishing port. Some policy changes by the City such as pursuing harbor dumpers has resulted in increased volume of waste oil collected in the Harbor, but much presumably is still dumped at sea. The Project has renewed calls to the City to provide adequate facilities and provide further incentives for the collection of oil.

Selected 1999-2001 Accomplishments

1. In 2000, the Buzzards Bay Project and the City of New Bedford received more than \$180,000 in grant funds to build an oil reclamation facility to capture oil in bilge water of fishing vessels in New Bedford harbor. For a number of reasons, this work may not continue as planned.

Chapter 11. Protecting Wetlands and Coastal Habitat

CCMP Goal

Long-term increase of high-quality wetlands and coastal habitat in Buzzards Bay.

The BBP's stated goal preceded similar pronouncements at the state and federal level!

CCMP Objectives

1. To protect existing wetlands.

Considerable progress on all fronts

2. To encourage restoration of wetlands (and allow replication as a last resort).

DEP and the Massachusetts Wetland Restoration Program has adopted this objective as policy. The BBP's recently completed draft Atlas of Tidally Restricted Salt Marshes will open the door to considerable state and federal wetland restoration funding.

3. To improve enforcement of wetlands laws.

BBP's technical assistance program to municipalities, funding of conservation agents, behind the scenes collaboration with state and federal wetland authorities, and selective confrontational strategies such as in the cases in Mattapoisett and Acushnet has gone a long way toward improving enforcement of wetland's laws in the Buzzards Bay watershed.

4. To upgrade the capability of local conservation commissions.

Ongoing technical assistance program and seed money for Conservation Agent has helped to achieve this goal.

5. To encourage non-permitting options as a supplement to the issuance of permits whenever possible.

The BBP's effort since 1997 on open space planning and assisting in open space acquisition, conservation easement, and watershed planning has enabled the BBP to comprehensively tackle this issue.

6. To protect and restore habitat used by threatened, rare and endangered coastal species and anadromous and catadromous fish.

The principal effort of the BBP has been with the restoration of herring runs and protecting the Roseate Tern habitat at Bird Island.

CCMP Commitments:

Department of Environmental Protection (DEP)

1. DEP has identified Buzzards Bay as a priority area for implementing the Wetlands Conservancy Program. Mattapoisett and Westport were included in the program during 1990 and 4 additional towns are scheduled for 1991. DEP's goal is to ultimately include all

Buzzards Bay towns in the Conservancy Program. Target dates: Implementation in Mattapoisett and Westport - 1993, Implementation in 4 additional towns - 1993-1995.

Completed on schedule.

DEP will use its water quality certification authority under Section 401 of the Clean Water Act and in conjunction with the Wetlands Protection Act to:

2. Require analysis of alternative strategies and options before wetlands are allowed to be destroyed or altered and only allow destruction under extreme circumstances or in projects with an overriding public purpose.

Policy implemented.

3. Require restoration or replication, at a ratio of at least 1:1, of any wetlands that are allowed to be altered or destroyed.

Policy adopted.

4. Require the same level of analysis and protection for isolated vegetated wetlands and intermittent streams as for other wetland areas. Target date: 1991

Not completed, but 1994 revised wetland regulations enhanced the protection of isolated BVWs.

5. DEP will establish criteria for designating wetlands as waters of the Commonwealth using water quality standards, and subjecting these areas to stringent controls under the Antidegradation provision of the Clean Water Act. Target date: 1992.

Completed, including the ability to designate nitrogen sensitive embayments for purpose of Title 5, but "stringent controls" are subjective in this instance.

Buzzards Bay Project

1. The Buzzards Bay Project staff will develop criteria for determining the appropriate size of a buffer area. Target date: 1991.

The BBP has established buffer recommendations and criteria in Falmouth Conservation Commission recommendations.

Buzzards Bay Municipalities

1. Dartmouth will pursue watershed zoning on a limited basis as part of its Harbor Management Plan. Target date: 1992

Not implemented?

Other Recommended CCMP Actions:

1. DEP should amend the regulations to the Wetland Protection Act to better protect wetlands in order to achieve and exceed the Commonwealth's no net loss policy. Target date: 1993. The following recommendations address current weaknesses in the Act:

a) When wetlands are allowed to be altered or destroyed, require restoration and/or replication at a ratio of at least 2:1.

DEP adopted a 1:1 ratio.

b) Stipulate specific limits on the total area of wetlands that can be destroyed by limited projects.

Not completed.

c. If discretionary destruction of BVWs is allowed, it should be in accordance with the above recommendations.

Not completed

d. Define performance standards for the 100-ft buffer zone around wetlands.

Not completed, except under the requirements of the 1997 Rivers Bill.

e. Require mandatory attendance by conservation commission members at Wetland Protection Act training courses.

Not completed.

f. Enhance protection of marine habitat and resources contained in lands under the ocean.

No change.

2. Conservation commissions should upgrade their ability to protect wetlands. Target date: 1991-1994.

All towns except one have conservation agents. Continued progress through BBP training, workshops, and BBP requested technical review and wetland delineations.

3. Town boards and local environmental organizations should assist in protecting wetlands. Target date: 1991-1994.

Coalition has put considerable effort into raising public awareness on selected projects.

4. Communities (selectmen, conservation commissions, land trusts, etc.) should fully utilize nonregulatory wetlands protection techniques wherever possible. Target date: 1991-1994.

BBP efforts on open space planning, open space acquisitions, and conservation restrictions have gone far to meet this recommendation.

5. DEP should prohibit the issuance of permits to chronic violators of the Wetlands Protection Act. Target date: 1992.

This may not be legal, and may need to be rejected as a CCMP recommendation.

6. All municipalities should adopt embayment or harbor management plans that identify watershed uses for their entire coastline. Target date: 1994.

Only little progress.

Analysis

One of the major themes of the Buzzards Bay CCMP is to achieve better wetlands and habitat protection. In Massachusetts, because of the "home rule" provisions of the state constitution, it is the municipal Conservation Commissions that are the "first line of defense" and principal authority in implementing the state's wetland regulations or more stringent local bylaws. Unfortunately, like many municipal boards, Conservation Commissions members are unpaid volunteers that receive little training in either interpreting wetland regulations or in identifying wetland boundaries. Conservation Commissions are also an appointed board, subject to local political pressures. It is for these reasons the Buzzards Bay Project has spent a considerable amount of time in providing training and technical assistance to Conservation Commissions.

In 1993, the Buzzards Bay Project initiated a wetlands technical assistance program. Since then, the Buzzards Bay Project has conducted more than 100 training workshops to improve the expertise of local officials. At the request of the municipalities and concerned residents the Project has conducted many site visits and reviewed dozens of engineering plans. Project staff have also provided legal testimony at Wetland Adjudicatory hearings. Also, as part of the state match to the Project's federal funding, in 1991 the Project pushed to have the Buzzards Bay basin one of the first areas of the state to have "core wetlands" mapped as part of the state's then newly renewed "Wetlands Conservancy Program." These maps have proved invaluable in identifying areas where core wetlands are found and where wetlands have been altered.

Restoration of Anadromous Fish Runs

Anadromous fish species like alewives (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) have declined dramatically during the past century in Buzzards Bay. Not only are these fish historically important as a fishery in Buzzards Bay, they are also an important food species for many fish, whales, and coastal birds such as the roseate tern (*Sterna dougallii*), a US endangered species whose largest colony in North America resides in Buzzards Bay.

Today, many of the herring runs in Buzzards Bay support only a fraction of their estimated maximum annual population. Reduced herring populations in any particular river or stream system can be caused by many factors including physical obstructions to migration, overfishing, poor water quality, or inadequate spawning habitat. Of these, physical constraints in the form of dams, roadway construction, and other water control structures are by far the greatest impediment to herring migration in Buzzards Bay rivers.

The Buzzards Bay Project has invested considerable effort in helping to improve herring runs in the Bay's most productive river systems and continues to work closely with the Massachusetts Division of Marine Fisheries (DMF) to identify where anadromous fish improvements are needed and will provide the most benefit. Together the Project and DMF have identified two river systems in the Buzzards Bay watershed as priorities for herring restoration - the Mattapoissett and Weweantic.

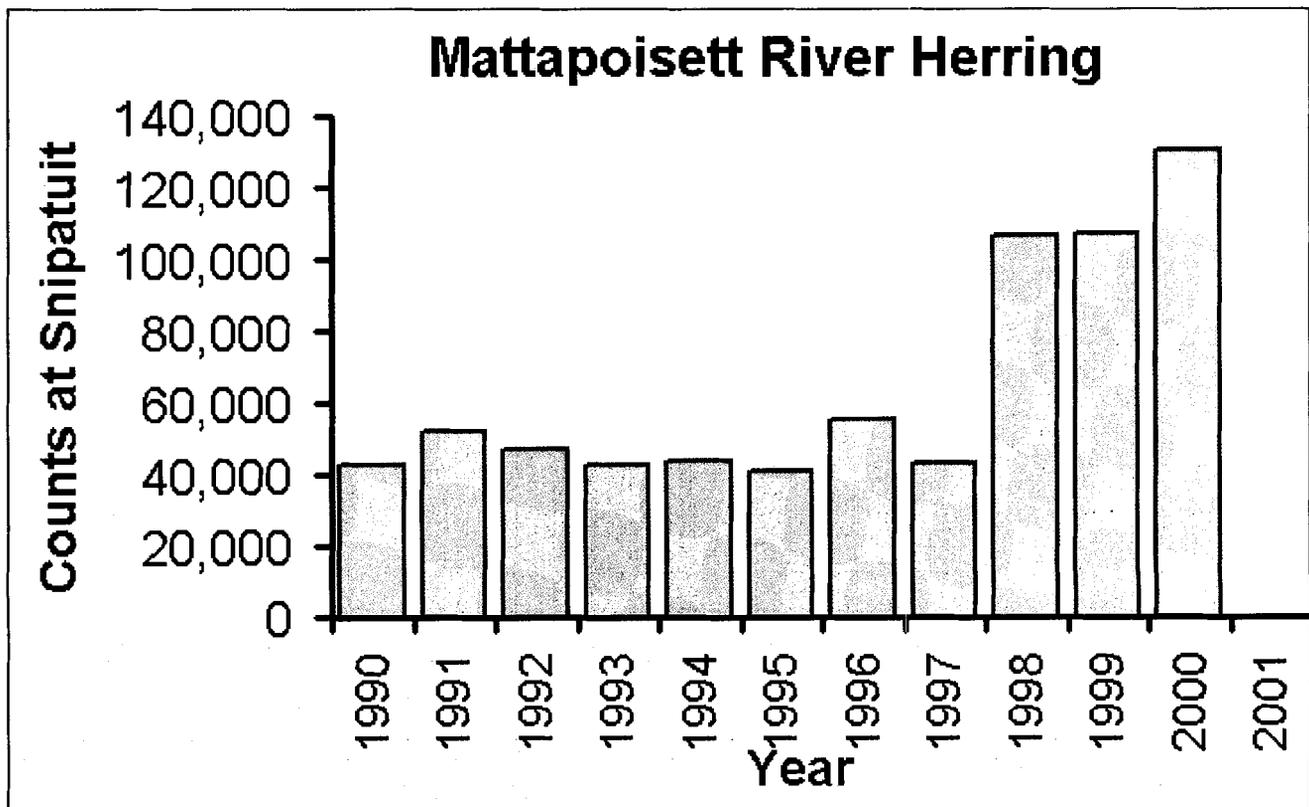
The Mattapoissett River

The Mattapoissett River, which begins at Snipatuit Pond in Rochester and flows 20 miles south to its discharge into Mattapoissett Harbor, has historically contained the Bay watershed's most productive and abundant herring populations. At its peak at the turn of the century, the

barrels, or approximately 1.4 million fish, with the total fish stock estimated at 1.8 and 1.9 million fish per year. During this century, the fish stock has drastically declined until the fishery was almost extinguished. Local efforts, starting in the mid 1980's, have allowed the herring fishery to begin a slow recovery and the total fish stocks have increased as shown by the figure below.

Near the river's headwater spawning area in Snipatuit Pond, five culverts beneath Snipatuit Pond Road were small in diameter (30") and submerged. Because herring typically migrate during daylight hours and lighted passages are required for migration, these long darkened culverts presented a significant obstacle to their upstream migration. The solution to the problem was the replacement of the small culverts with a single large box culvert, which would allow for more light to reach the interior of the culvert and eliminate the existing obstacle to migration. The Buzzards Bay Project funded this project and construction was performed by the Rochester Highway Department.

Near the river's mouth at the Route 6 dam, additional problems were impeding fish passage on the Mattapoissett. The fishway at the dam restricted upstream passage of alewives as it was both too steep and too turbulent. In addition, water elevations at the dam, which are controlled for municipal water supplies, required better management during normal operating conditions



river had an estimated annual sustainable yield of 3000

and during herring run season (March through May). To

accomplish these connected goals of improving the fish ladder and improving water management, the towns of Mattapoissett, Marion, Rochester, and Fairhaven joined together to seek funding for the project. Improvements to the dam structure were funded by the Commonwealth of Massachusetts with local support from each town. Additional funds for the fishway were provided by the Buzzards Bay Project. The new fish ladder is a denil-type structure and was installed at the dam in December 1996. This project has resulted in a dramatic increase in herring population.

Selected 1999-2001 Accomplishments

1) The Buzzards Bay Project received more than \$60,000 in grants to develop and implement an Atlas of tidally restricted salt marshes in Buzzards Bay. The Draft Atlas of Tidally Restricted Salt Marshes was completed in March 1999. The final is about to be released. This inventory also included a prioritization for remediation of these areas. The atlas included all altered or potentially impacted coastal wetlands, culverts restricting flows, and the nuisance introduced invasive species *Phragmites* (bull rush) areas, which are the targets of restoration. The Massachusetts Wetland Restoration Program provided the initial funding, and DEP hired an intern to work out of the BBP office. In 2000 and 2001 the Buzzards Bay Project received additional funding to complete, print, and distribute the atlas. The completion of the draft atlas is already creating special opportunities that will arise out of this effort with the US Army Corps of Engineers and the US Fish and Wildlife grant programs. Most notably, in 2001, the US Army Corps agreed to do a feasibility study of removing debris under a 300 foot wide bridge over the Westport River East Branch estuary.

2) The BBP prepared an EPA "5 star" proposal for a wetland restoration project in Fairhaven in the Winsegansett Marsh. In 2000, the 5 star was completed, and in 2001 a companion project funded by the Section 319 program was completed. A brochure on this project was prepared.

3) In 1999 and 2000, the Buzzards Bay Project assisted the Kittansett Golf Club with a 25-acre salt marsh restoration program. The BBP initiated this work by prompting action by the Golf Course which owned several obstructed salt marsh areas. The Golf Club agreed to do this work totally at their expense and follow BBP restoration recommendations. They completed all phases of the work by 2000.

Chapter 12. CCMP Chapter: Pollution Remediation Projects in New Bedford

Goal

Support the ongoing projects designed to remediate pollution in New Bedford Harbor and to restore habitats and use to the greatest extent possible.

Progress has been slow but continuous in New Bedford.

Recommended Actions:

Superfund Cleanup and Restoration

1. EPA and DEP should continue to move forward on adoption and implementation of a remediation plan.

EPA and DEP moved too fast for public support that subsequently delayed the hot spot cleanup.

2. Trustees (EOEA, DOI, and NOAA) should oversee development and implementation of a restoration plan that benefits those who have been most affected by lost use of the resource.

After many years of delay, now fully underway.

Treatment Facility and CSO Recommendations

1. The City of New Bedford should continue to meet deadlines for the planning efforts (as outlined in its draft Facilities Plan) to upgrade its treatment facility to secondary treatment. The City of New Bedford is preparing a Final Facilities Plan which will incorporate comments from state and federal agencies and the general public. The Facilities Plan includes all the technical and design details, requirements and schedules related to constructing and operating the plant. Siting the treatment facility and outfall and securing finances to proceed with construction are major issues to be resolved.

The City completed facility in 1995, ahead of schedule, under budget. The facility is performing exceptionally well.

2. The City of New Bedford, with DEP and EPA, should carefully coordinate CSO and sewage treatment facility upgrades so that benefits from CSO remediation can be realized as soon as possible.

Elimination of dry weather discharges opened Clarks Cove to shellfishing in 1994. New funding initiatives by Fall River and New Bedford with Congressional delegation should prompt new efforts to upgrade CSO infrastructure and eliminate more discharges.

3. The City of New Bedford should implement approved plans for CSO upgrades. Target dates: Ongoing, with project-specific times according to the various plans.

As in #2

Chapter 13: CCMP Chapter: Land Use Management

CCMP Goal

1. To manage and direct growth so that critical resource areas are protected from cumulative impacts

Recommended Actions:

Local Actions

1. Each town in the Buzzards Bay area should conduct a buildout analysis to determine its maximum potential use under current zoning and subdivision bylaws. The results of a buildout analysis will allow land-use plans to be developed as a first step in implementing a program. This may ensure the protection of critical resource areas.

The Buzzards Bay Project has completed this for selected subwatersheds, and for entire towns in the case of Marion. EOEa with support from the Southeast Regional Planning and Economic Commission completed build outs for all Buzzards bay towns in 2000.

2. Each town in Buzzards Bay should adopt a strategy of using existing rules and regulations and provide for project oversight or tracking. Under the current management framework the most effective approach to land-use management combines adoption of compatible zoning bylaws, subdivision rules, health regulations and nonregulatory techniques. This strategy provides a comprehensive approach that takes effect at all levels of land permitting and development.

No formal process exists, but de facto progress toward the goal.

3. Towns should be aggressive in using the full authority of their local boards to carefully regulate land-use activities so that the most valuable and sensitive areas receive full protection. Boards of health, in particular, have extensive powers and authority to expand their historic role of protecting public health and the environment. Under current legislation, boards of health are probably best suited to protect critical resource areas from the cumulative effects of growth and development, although planning boards and conservation commissions have authority to implement regulations protective of natural resources.

Modest and piecemeal progress.

4. Towns should preserve and enhance the viability of existing cranberry bogs through

appropriate land use management regulations. Cranberry and surrounding uplands, when properly managed, have less impact on the environment than the same land used for residential or commercial development and for these reasons, should be preserved.

No action required-reconsider this recommendation.

5. Towns should establish buffer zones around cranberry bogs through the use of cluster zoning or other appropriate land use techniques. Residential structures should not be constructed within 200 feet of a bog. This would create a buffer zone to protect cranberry bogs from the adverse effects of development and also protect the public from exposure to pesticide applications on bogs.

No action or political support.

Regional Actions

1. Regional planning agencies (RPAs) should provide technical assistance to communities in conducting buildout analyses and planning for land-use management. RPAs should encourage the creation of management plans for areas that extend beyond community boundaries. They should also work with all communities around Buzzards Bay and provide effective management tools for regulating land-use activities. Performance standards, such as nitrogen-loading bylaws, are particularly valuable.

This work was completed by SRPEDD and EOEa for all Buzzards Bay communities by 2000. The BBP ensured that all municipalities had updated open space plans by 2001.

2. RPAs should be aggressive in protecting critical resources. When they comment on development projects through the MEPA process, RPAs should focus attention on the protection of critical resource areas. Moreover, the regulations and management tools that will be developed by the newly formed Cape Cod Commission (CCC) should be used as models by other regional agencies. The CCC will be establishing guidelines for regulating developments of regional impact, i.e., extremely large projects and projects that will affect critical resource areas that cross town boundaries. Regional agencies are the appropriate bodies for coordinating these types of inter-municipal projects.

CCC has adopted BBP's nitrogen management strategy

3. RPAs should work to establish uniform regulatory controls for the Cranberry Industry for use by towns to minimize confusion and allow for efficient compliance.

No, implausible, reconsider recommendation.

State Actions

1. Massachusetts should take a leadership role in land-use management by adopting the recommendations of the Special Commission on Growth and Change and incorporating that report into comprehensive legislation.

State policy changes requiring open space plans for certain grant funds, Cape Cod Commission requirements for local comprehensive plans, and other state initiatives contribute to about 25% progress on this initiative.

2. The Executive Office of Environmental Affairs should develop guidelines for ACEC management plans and require that towns and regions develop and adopt plans. This concern can be addressed through broadening and strengthening the ACEC program. The Executive Office of Environmental Affairs should be aggressive in nominating and designating ACECs, and then mandating local and regional management plans as required. Management plans should contain specific provisions that will adequately protect the resource areas.

MCZM has begun drafting guidelines. Also guidance provided in 1996 publication..

3. The Environmental Protection Agency and the Department of Environmental Protection should codevelop a policy on antidegradation as it relates to nutrient (especially nitrogen) inputs to embayments and other pollutants. Projects that are reviewed through the MEPA process should be addressed in terms of the cumulative effects from excessive levels of nitrogen. Permits should not be issued for development projects that exceed the critical limits of any pollutant in a sensitive embayment.

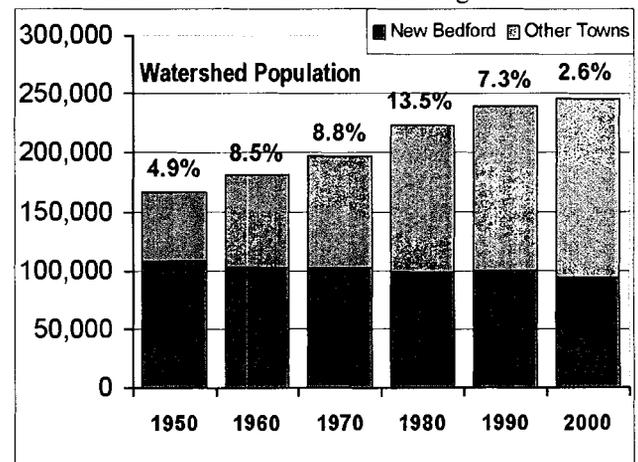
DEP and EPA have begun employing the BBP's TMAL nitrogen management strategy. DEP and EPA requiring nitrogen TMDLs for new sewage facilities. EOEA and UMass funding a \$13 Million dollar study to establish embayment specific nitrogen TMDLs for all Massachusetts embayments.

4. Massachusetts should create agricultural incentive zones, similar to an ACEC, to protect intensive farm areas from encroachment by development projects.

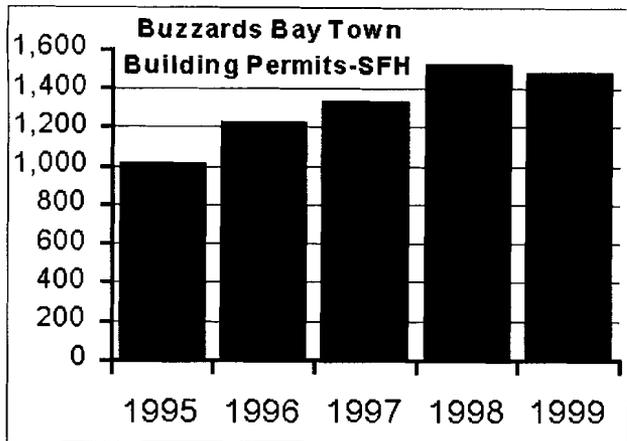
The APR program and dairy farm price supports have partially supported the goal, but as written, this recommendation needs to be rethought.

Open Space Planning Assistance

Population in the Buzzards Bay drainage basin increased nearly 49% between 1950 and 1986 and is still growing. Most of this development has and continues to occur in low and medium density areas, indicating a move towards suburban sprawl and away from more established urban centers. In fact, the City of New Bedford continues to experience population declines. The ability of the Bay environment to sustain its relatively healthy water quality and resources is being threatened as growth expands into these previously undeveloped forests and coastal areas. The increase in the number of Single Family Home (SFH) building permits issued places great pressure on the ability of town boards to enforce environmental regulations.



These newly developed areas are contributing new pollutant loads to the Bay ecosystem from increased runoff from roads and lawns and increased wastewater disposal through onsite septic systems or increased loads to municipal wastewater treatment facilities. Imprudent development will ultimately impact coastal systems by providing pollutants such as bacteria, viruses, heavy metals, hydrocarbons, and nutrients with pathways to the Bay. Development in flood zones, near wetlands, and on barrier beaches threatens the Bay's natural abilities to attenuate pollutants and reduces habitat for both marine and terrestrial wildlife.



The Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) recognizes the importance of land conservation and community open space planning in protecting the Bay watershed's most sensitive water resources and critical habitats from inappropriate development. Such resource areas include coastal and freshwater wetlands, river and stream corridors, and watersheds to nitrogen-sensitive embayments and public drinking water supplies.

In December 1994, the Buzzards Bay Project applied for and was awarded funding through Section 104(b)(3) of the Federal Water Pollution Control Act to initiate a technical assistance program to assist a minimum of three Bay watershed municipalities in developing comprehensive Open Space Plans. The focus of the Buzzards Bay Project's involvement under this grant would be to help develop Open Space Plans that enhance wetlands and water quality protection. This application was based on the Buzzards Bay Project's experience in assisting the Town of Marion with an update of their Open Space Plan in 1993.

In early 1996, the Buzzards Bay Project released a Request for Planning Assistance to Buzzards Bay communities to fulfill their Open Space Planning needs. The response was overwhelming, and this initiative has continued every subsequent year. In 2002, the Buzzards Bay Project is writing the Carver open space plan and assisting in two others.

The Massachusetts Division of Conservation Services, a state agency under the Executive Office of Environmental Affairs, approves Open Space and Recreation Plans for five-year intervals making the town eligible for grant funding to purchase land for conservation under the Commonwealth's Self-Help and Urban Self-Help Programs and the Federal Land and Water Conservation Fund. In the spring of 1996, a \$300 million Open Space Bond Bill was passed in the Massachusetts legislature. In 1999, new funding was provided specifically targeting open space acquisitions in

Southeastern Massachusetts, including Buzzards Bay. Because communities with accepted Open Space Plans are eligible for funding to support local land acquisition initiatives, the Buzzards Bay Project's Open Space Planning Initiative has better enabled Buzzards Bay municipalities to take advantage of these funds.

Geographic Information Systems (GIS)

The Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) identified local governments within the Bay watershed as having the primary responsibility for the implementation of land use and natural resource management measures necessary to protect and restore water quality and living resources in the Bay. Comprehensive watershed planning, growth management, as well as natural resource protection and utilization efforts all require access to accurate information in formats that can be related to one another for analysis. In the early 1990s, most towns did not have adequate inventories of coastal and inland natural resources or the baseline parcel ownership information in formats that could be interpreted together. In response to this need, the Buzzards Bay Project made available funding \$43,000 from its Municipal Grant Program to encourage the development and expansion of town and regional computerized Geographic Information Systems (GIS).

These municipal GIS systems have proven valuable tools for communities to improve town land use inventories, mapping, and data management capabilities. From the Buzzards Bay Project's coastal water quality planning perspective GIS meets a number of important planning needs. Build-out analysis and other parcel level calculations are greatly aided by using GIS. Once GIS hardware and software are in place within the town, digitized town parcel data can be used to identify watershed development densities, characterize natural features and pollutant loadings, locate undeveloped areas or areas serviced by sewer or town water within a defined boundary, and numerous other forms of information useful in the development of informed land use decisions.

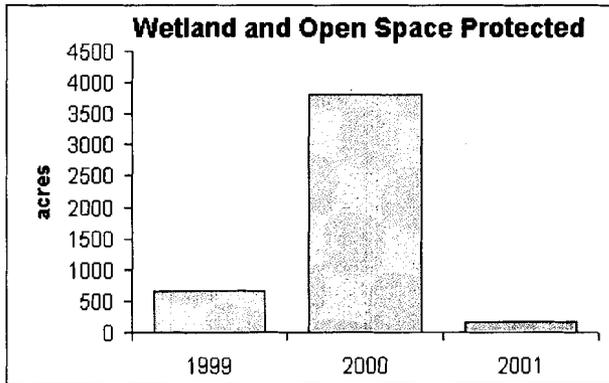
The Buzzards Bay Project has developed and reproduced the first in a series of CD-ROMs containing all GIS data available in the Buzzards Bay watershed. Working together with MassGIS and the Cape Cod Commission, this compact disk consolidates this information in one easy to use format. This GIS CD was released in December 1998, and continues to be made available to Buzzards Bay municipalities.

Selected 1999-2001 Accomplishments

- 1) The Buzzards Bay Project completed, in late 2001, a 319 grant demonstrating how nitrogen to coastal waters can be managed by protecting open space.

2) The Buzzards Bay Project continues to provide support to the Bay Lands Center, established originally by the Buzzards Bay Project, and now overseen and implemented by the Coalition for Buzzards Bay.

3) Our Open Space Plans and other efforts, together with collaborations by the Coalition for Buzzards Bay, prompted the acquisition of several important parcels during the past several years, including most notably a 650 acre parcel in Dartmouth in 2000.

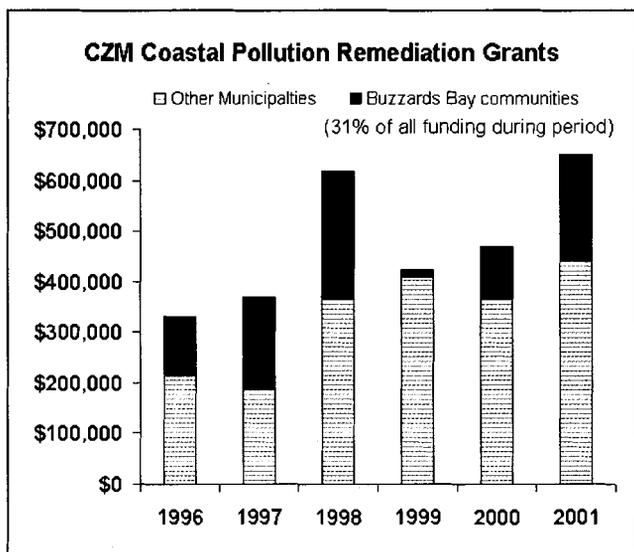


Chapter 14. Resources and Financing

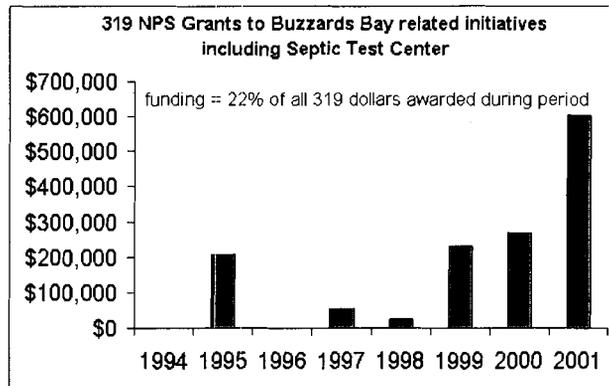
Current Approach

The Buzzards Bay Project has had a highly effective municipal grant program in place since 1990. This program, funded through EPA Section 320, EPA demonstration project funds, Congressional add-ons and state match programs, has been highly effective at facilitating CCMP actions. The Project has also been highly successful in securing state and federal competitive grants either on its own or in partnership with municipalities. The successful technical assistance offered to the municipalities in grant development is illustrated by the number of grants awarded to Buzzards Bay municipalities by the MCZM Coastal Pollution Remediation (CPR) Program and the DEP Section 319 program.

For example, Buzzards Bay municipalities account for 12.5% of all Massachusetts Coastal communities, yet during the existence of the CPR programs, grants to Buzzards Bay communities, for projects in the Buzzards Bay watershed account for more than 31% of all CPR grants. Similarly, Buzzards Bay municipalities account for less than 4% of all Massachusetts municipalities eligible for Section 319 Non-point source pollution grants for Buzzards Bay Towns and BBP partners have accounted for nearly 22% of all grants awarded (including awards to state agencies) between 1994 and 2001.



The financing of implementation activities and leveraging of CCMP actions is part of an ongoing aggressive strategy by the Buzzards Bay Project to tap into various state and federal financial and technical assistance programs. Other Buzzards Bay Project Partners have similarly had success in attracting state and federal dollars. For example, the Coalition, for the



past four years, has had \$100,000 of dedicated state funds to implement their citizen water quality monitoring program.

The success of grant and other funds acquired by the Buzzards Bay Project and partners is illustrated by the figure on the next page showing Buzzards Bay Project funding. The graph includes some 319 NPS grants to municipalities in which the Buzzards Bay Project received no direct funding, but which was a partner in the grant. Also included in the graph are any 319 grants that supported the Septic System Test Center.

It is clear from this figure that modest federal "base funding" through the NEP has paid big dividends for Buzzards Bay. With funding of project staff secure, the Buzzards Bay Project was able to focus its grant proposal writing on securing funds for municipalities, or specific implementation initiatives.

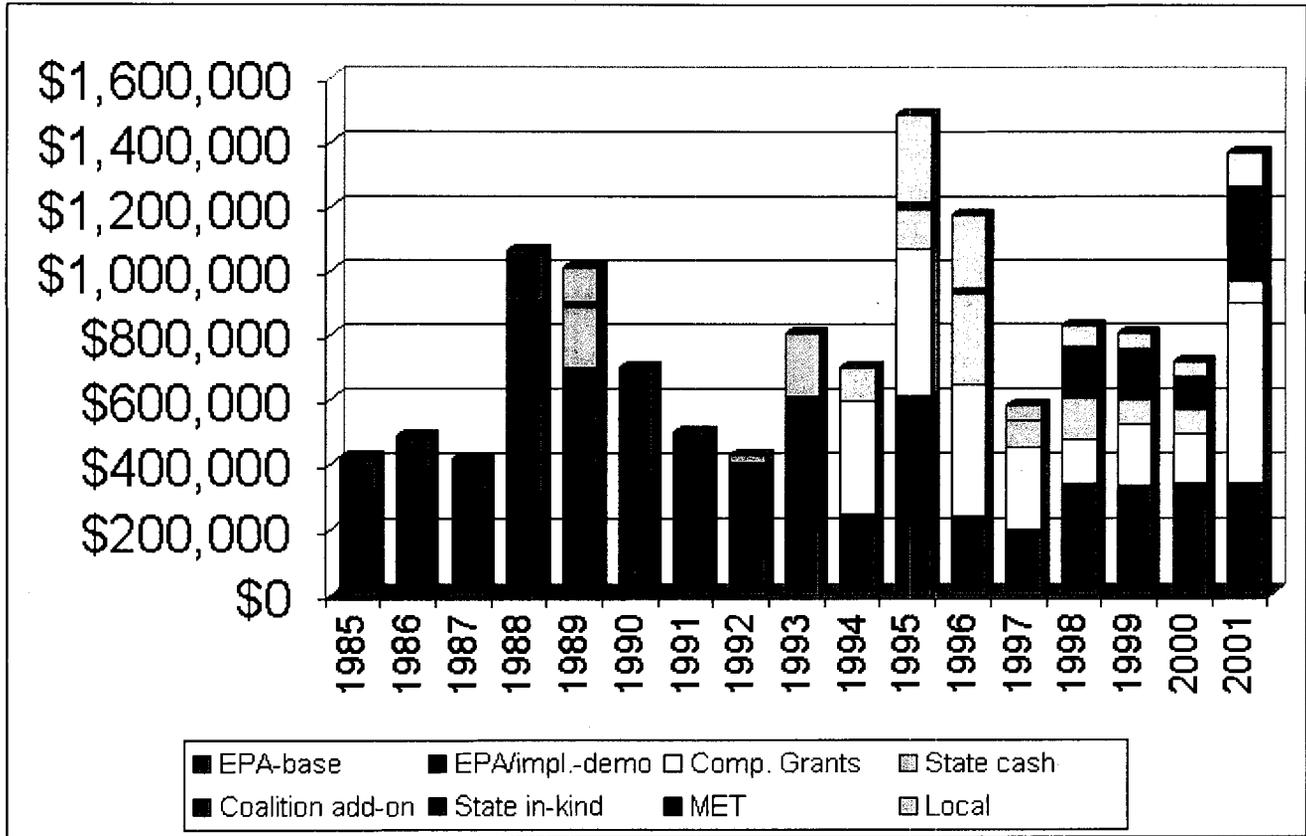
Beginning in 1996, the Buzzards Bay Project has made a new collaboration with the Massachusetts Environmental Trust (MET), a quasi-public environmental philanthropy established by the Massachusetts legislature in 1988 through the settlement of a federal lawsuit over the pollution of Boston Harbor. The Trust funds environmental restoration and education projects focusing on coastal issues. Recognizing the value of the Commonwealth's two National Estuary Programs - the Buzzards Bay Project and the Massachusetts Bays Program - the Trust established a challenge fund to provide match funding for federal grants pursued by the NEPs for implementation activities. In the first years of the agreement, the Buzzards Bay Project utilized more than \$145,000 in Trust funding to match successful federal s.319 and ISTEPA awards for land conservation and stormwater remediation projects.

In 2000, the Massachusetts Environmental Trust eliminated this targeted program for CCMP implementation, but the Trust has continued to encourage applications by the Buzzards Bay Project for implementation activities, and last year, the Buzzards

Bay Project received directly \$60,000 in Trust funding.

The Future

The Buzzards Bay Project expects continued success in securing state and federal competitive grants, Massachusetts Environmental Trust funding, and state bond moneys to fund specific implementation projects. Moreover, state and federal agencies are increasingly willing to dedicate their own limited internal resources to help implement the recommendations contained in the CCMP.



Chapter 15. Institutional Coordination and Public Participation

Buzzards Bay Project staff (BBP) have successfully forged strong institutional arrangements with local, state and federal stakeholders. The emphasis however, has been on fostering partnerships with town regulatory boards because most CCMP actions are directed at local government. The staff's focus has been on providing technical assistance to planning boards, boards of health and conservation commissions. This assistance takes the form of bylaw development, workshops, open space planning, septic system tracking, stormwater treatment designs, GIS capability and other useful implementation tools. Since CCMP approval in 1992, BBP staff have had the opportunity to work in all 11 major Buzzards Bay towns to varying degrees. The expertise that the staff has been able to provide has strengthened local capacity and accelerated CCMP implementation. Besides technical assistance, the BBP has helped local grant writers with proposals, and secured highly competitive state and federal funds that were probably otherwise out of reach.

An excellent example of the BBP's ability to strengthen local capacity and facilitate CCMP implementation can be seen with the deployment of SepTrack. SepTrack is a specialized software package designed by the BBP to allow communities to better manage information related to onsite septic systems. SepTrack was initiated because local boards of health typically lack the ability to efficiently and effectively monitor septic system permits and inspection and maintenance information due to inefficient staffing and information processing equipment and systems. The BBP helped relieve this problem by providing computers and the specialized software to 11 boards of health in the watershed. Now, SepTrack is allowing these boards to be more productive and responsive, awhile at the same time freeing staff for much-needed field inspections, enforcement and pressing health and environmental issues.

The Buzzards Bay Action Committee's (BBAC) monthly meetings have also been effective in furthering local partnerships. These sessions have allowed discussions that both promote the BBP's activities and provide an opportunity to hear from town representatives about community needs. The BBAC has used these exchanges to help establish the BBP's funding priorities and to ensure that the municipal perspective is integrated into the overall yearly agenda.

Beyond establishing strong local relations, the BBP has also developed a solid working arrangement within state government. This starts with the Project being housed within the Massachusetts Coastal Zone Management Office (CZM) which provides a special institutional advantage. The project has used the prestige of CZM and the expertise of key staff to further the accomplishment

of many program priorities within the Buzzards Bay watershed. CZM also provides valuable administrative support to the project.

Because nitrogen management is a key component of the CCMP, the BBP has concentrated much of its focus on increasing the state's profile in nitrogen-related issues. The BBP was instrumental in assisting the Massachusetts Department of Environmental Protection (DEP) to incorporate nitrogen management issues into its rewrite of the state onsite septic system code in 1994. The project is also working close with DEP in the review of nitrogen issues involving sewage treatment upgrades in Buzzards Bay and other coastal watersheds. DEP is utilizing the Buzzards Bay nitrogen methodology and is planning a workshop with BBP and EPA-New England to standardize this application. This arrangement has elevated the state's ability to manage nitrogen, and gone a long way toward helping CCMP implementation.

The BBP and DEP have also combined as partners in the development and implementation of the Alternative Septic System Test Center. While the BBP secured funding for the project through an Environmental Technology Initiative grant, both organizations will capitalize on it. The purpose of the center is to evaluate and promote new onsite technologies with an emphasis on nitrogen removal. This will help with CCMP implementation, as the widening use of de-nitrifying systems is a major action called for in the CCMP. It will also serve DEP by providing state program managers with consistent testing protocols and a high level of confidence in the effectiveness of new technologies prior to permitting. The center will accelerate the regulatory process and allow for more alternative systems sooner.

At the federal level, the project has also institutionalized close working relationships with two key federal agencies, EPA and the Natural Resources Conservation Service (NRCS). The EPA Project Officer for the BBP was detailed for several years to the project office in Marion to help with CCMP implementation. This allowed for the closest possible association with EPA-New England and enabled the BBP to better leverage EPA resources in support of the CCMP. This very close relationship continues today. In addition, an NRCS employee has been situated in the first the Marion office then the Wareham office of the BBP for the past six years to help the communities with stormwater problems. Through this arrangement, the Project has concentrated much attention and funding on stormwater issues, one of the major water quality concerns highlighted in the CCMP. This accommodation has also enabled the project to develop an excellent relationship with NRCS, which is particularly important because the BBP has drawn on that agency's expertise in nonpoint

source pollution.

Finally, the BBP receives overall policy direction and budget approval from its five member Steering Committee. Members represent EPA- New England, CZM, BBAC, the Coalition for Buzzards Bay (a citizen activist organization), and the Southeastern Regional Planning and Economic Development District. The committee provides the proper blend of federal, state, regional, and local government, as well as citizen representation. It makes the difficult funding decisions implicit with a shrinking resource base, but allows the project director and staff the necessary management flexibility to administer the details of ongoing projects.

Appendix A: Buzzards Bay NEP Implementation Report
 Recommended Action status as of 12-2001

		Totals=	112	Com=	55	71%	Nitrogen Action Plan	
ActionPlan	Action Type	actiontarget countdate	year	1 for comp.	% comp.	comments	recommendation	
Nitrogen	Goal						GOAL: No beneficial water uses will be lost, nor adverse ecosystem effects	
Nitrogen	Goal						GOAL: Restore any beneficial water uses and ecosystems lost or impacted by the excessive contribution of nitrogen to any embayment within Buzzards Bay.	
Nitrogen	objective						1. Control the amount of nitrogen entering Buzzards Bay as a whole.	
Nitrogen	objective						2. Limit new additions of nitrogen entering nitrogen-sensitive embayments.	
Nitrogen	objective						3. Reduce the amount of nitrogen entering nitrogen-impacted embayments.	
Nitrogen	objective						4. Develop and support the use of alternative technologies that achieve denitrification of wastewater.	
Nitrogen	objective						5. Monitoring program to assess the effectiveness of management actions ecosystem health	
Nitrogen	action	1 Jun-93				DEP + UMass agree to fund \$13 million study developing 60% embayment TMDLs	1. DEP will adopt regulatory standards for nitrogen inputs to coastal embayments in its 1993 revision to State Water Quality Standards.	
Nitrogen	action	1 Dec-91	2001	1	100%	DEP agrees to fund Test Center and provide necessary personal for oversight	2. DEP will promote development/acceptance of alternative wastewater technologies by assigning additional personnel to pilot projects.	
Nitrogen	action	1 Jan-91	1994	1	100%		1. EPA, through its Near Coastal Waters Program, will construct and evaluate approximately four experimental denitrifying onsite wastewater disposal systems in Buzzards Bay municipalities.	
Nitrogen	action	Omit Jan-91				NO ACTION REQ: Reassessed, No longer applicable	2. EPA will contribute a water quality specialist's skills in working on nitrogen issues within the context of DEP's Anti-Degradation Task Force.	
Nitrogen	action	1 Sep-92	1991	1	100%		1. Bourne, Wareham and Plymouth adopt Buttermilk Overlay District	
Nitrogen	action	1 Sep-92			33%		1. Dartmouth adopt N management strategy for Apponagansett Bay	
Nitrogen	action	1 Sep-92			33%		1. Westport adopt N management strategy for Westport Rivers	
Nitrogen	action	1 Sep-92			20%		Municipalities adopt N-loading bylaws, subdivision regulations, or health regulations for appropriate embayments.	
Nitrogen	action	1			10%		Cape Cod Cranberry Growers' Association and Plymouth County Conservation District continue implementation of WQ Protection Initiative	
Shellfish	goal						Increase availability of shellfish resources for recreational and commercial uses.	
Shellfish	objective						1. Keep open all shellfish areas that have not closed and open priority areas that are closed.	

Shellfish	objective					2. Enhance efforts to manage shellfish resources at both the state and local levels.	
Shellfish	objective					3. Increase the capacity and commitment of municipalities to remediate identified pollution sources, assist in conducting the sanitary surveys.	
Shellfish	objective					4. Increase the ability of DMF to carry out the sanitary survey program and provide technical and financial assistance.	
Shellfish	goal					5. Expand the use of the conditionally approved classification for shellfish areas.	
Shellfish	action	1	Dec-93		80%	1. DMF will work Buzzards Bay town reps in shoreline surveys and develop long-term cooperative arrangements	
Shellfish	action	1	Dec-93		80%	2. DMF will encourage Buzzards Bay towns to work cooperatively expand the number of conditionally approved shellfish areas.	
Shellfish	action	Omit	Dec-93		NO ACTION REQ: BOH responsibility	DEP will take enforcement action against significant illegal discharges identified by DMF's sanitary surveys.	
Shellfish	action	1		1999	1	100%	1. Falmouth, Bourne, Mattapoisett, and Dartmouth have initiated coordinated efforts within their towns to identify and set priorities for illegal discharges that may be affecting shellfish beds.
Shellfish	action	1		1994	1	100%	2. Falmouth, Bourne, Wareham, and Fairhaven have designated individuals with public health jurisdiction to assist DMF in classifying shellfish areas within their jurisdiction.
Shellfish	action	1	Dec-91	1996	1	100%	3. With DMF assistance, Fairhaven and Dartmouth will pursue conditionally approved shellfish areas within their towns.
Shellfish	action	1	Apr-92		25%		1. All other coastal municipalities should correct identified sources of coliforms and pathogens entering the Bay.
Shellfish	action	1	Jul-92		funding declined 40%FY01		2. EOEPA should increase funding to carry out the Shellfish Sanitation Program.
Shellfish	action	1	Dec-92	1993	1	100%	3. All other coastal communities should designate an individual with public health responsibility to assist DMF in classifying shellfish areas within their jurisdictions.
Shellfish	action	1			done for emerg, no longer needed		4. EPA and FDA should develop a new indicator or suite of indicators to replace fecal coliform as an indicator of human health risk.
Shellfish	action	1			33%NA		5. The Massachusetts Legislature should pass legislation to improve financial assistance at the local level, \$400K.
Shellfish	action	1	Dec-92		33% CPR program		6. DMF should develop standard methods for towns to report commercial and recreational shellfish catch data as a first step in monitoring resource utilization or losses.
Shellfish	action	1	Dec-93	1994	1	100%	but not all towns adhere?
Stormwater	goal						1. Prevent new or increased untreated stormwater flows to Buzzards Bay that would adversely affect shellfish harvesting areas, swimming beaches, water quality, and wetlands.
Stormwater	goal						2. Correct existing stormwater runoff problems that are causing or contributing to water quality degradation or shellfish-bed

closures in Buzzard Bay.

Stormwater	Objective					1. To institutionalize at the local level (through education and regulation) the use of best management practices for stormwater control in newly developed areas.
Stormwater	Objective					2. To develop a regional and local program to execute appropriate mitigation measures for existing stormwater discharges. The program would include construction, operation, and maintenance of stormwater control structures.
Stormwater	action	1 Jun-93	1996	1	100%	DEP will work with EPA to develop a policy to determine when permits for stormwater discharges are required. DEP will include these criteria in State WQ Standards and will consolidate regulatory authority for controlling stormwater runoff.
Stormwater	action	1 Dec-92				Bourne, Wareham, and Marion will pursue adoption of subdivision rules and regulations that require best management practices for stormwater runoff.
Stormwater	action	1 Dec-94			33%	1. All other Buzzards Bay communities should adopt subdivision bylaws that require that best management practices for stormwater runoff be incorporated into any new development plans.
Stormwater	action	1			20%	2. Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish-bed closures.
Stormwater	action	1 Dec-93	1995	1	100%	3. The Commonwealth, through the Executive Office of Environmental Affairs, should provide funding for local stormwater remediation projects.
Stormwater	action	1 Dec-92			20%	4. The State Legislature should not continue to exempt bridge work and road widening by the state DPW from review by local conservation commissions.
Stormwater	action	1	1992	1	100%	5. SCS should institute a program for implementing best management practices on agricultural lands in the Buzzards Bay area.
Boat Sewage	goal					Eliminate the discharge of wastewater from all boats in Buzzards Bay embayments.
Boat Sewage	objective					1. To build more pumpout facilities and to promote their use by educating boaters, making facilities more accessible, and enforcing the regulations.
Boat Sewage	objective					2. To develop financially self-sustaining pumpout programs at the town level.
Boat Sewage	objective					3. To designate embayments in Buzzards Bay as no-discharge area.
Boat Sewage	action	1 Dec-92	1992	1	100%	1. DEP, using its Chapter 91 permitting authority, will require new marinas or expansions of existing marinas (greater than 10 additional slips) to have adequate pumpout facilities.
Boat Sewage	action	1 Jan-92	1992	1	100%	2. DEP will implement a policy ensuring adequate management and treatment for sewage pumped from boats.

Boat Sewage	action	1	1992	1	100%	3. DEP will implement a policy to eliminate toxic additives in marine sanitation devices. Target date: 1991.
Boat Sewage	action	1	1992	1	100%	4. DEP will review problems of treating and disposing of boat sewage. Interim: DEP, with assist. EPA, will continue to provide technical assistance and oversight to the town of Marion in developing advanced boat sewage treatment technology now being tested at a pilot project at the town's wastewater treatment facility.
Boat Sewage	action	1				
Boat Sewage	action	1 Dec-92	1994	1	100%	1. CZM and DEP will develop a program that ensures adequate pumpout facilities for all harbor areas. 2. CZM and EPA will assist municipalities to designate EPA "no discharge areas" within coastal embayments. The BBP and the BBAC will work to encourage construction of boat pumpout facilities and no discharge areas in Buzzards Bay.
Boat Sewage	action	1 Dec-92	2000	1	100%	3. CZM, under its Coastal Facilities Improvement Program, will give serious consideration to eligible projects that propose to construct municipal marine pump-out facilities where needed and appropriate.
Boat Sewage	action	1 Dec-91	1998	1	100%	EPA, under the Clean Water Act, will designate an embayment in Wareham as a no-discharge area.
Boat Sewage	action	1 Dec-91	1999	1	100%	Dartmouth, Westport, Marion, Mattapoisett, and Fairhaven, with grants from the Buzzards Bay Project, will provide mobile or land based boat pumpout facilities and develop management plans for ensuring their use.
Boat Sewage	action	1 Jul-91	1994	1	100%	
Boat Sewage	action	1 Dec-93				Enforcement issue 10%remains unresolved Boards of Health/ Harbormasters should enforce the use of pumpout facilities
Onsite Wastewater	goal					Prevent public health threats and environmental degradation from on-site wastewater disposal systems.
Onsite Wastewater	objective					1. To enforce the provisions contained in Title 5 regulations.
Onsite Wastewater	objective					2. To upgrade pre-Title 5 systems suspected of contaminating groundwater or surface waters.
Onsite Wastewater	objective					3. To address the inadequacies of Title 5 through board-of-health regulations.
Onsite Wastewater	objective					4. To improve the Title 5 code through recognition of nitrogen impacts, virus transport, and sensitive areas.
Onsite Wastewater	objective					5. To promote innovative technology that will reduce nitrogen.
Onsite Wastewater	action	1 Dec-92	1996	1	100%	Falmouth, Bourne, Wareham, Marion and Westport will pursue amending their Board of Health regulations to allow for better treatment and removal of viruses from on-site wastewater (See Appendix E).
Onsite Wastewater	action	1 Dec-92	1996	1	100%	1. DEP should amend the Title 5 Code so that it becomes a more comprehensive environmental regulation.
Onsite Wastewater	action	1 Dec-92	1995	1	100%	2. DEP should elevate the priority of the Title 5 Program.

Onsite Wastewater	action	1 Dec-94	1995	1	100%	some share part-time agent	3. All boards of health should employ a full-time qualified health agent.
Onsite Wastewater	action	1 Dec-93			80%		4. All boards of health should adopt a series of regulations that address the placement of septic systems in special resource areas.
Onsite Wastewater	action	1 Dec-93			35%	Partially achieved by 1996 Title 5 regs, River protection Act 1997	5. Boards of health amend regulations to increase setback distance required between on-site wastewater disposal systems and resource areas or application rate to account for virus transport.
Oil Pollution	goal						1. Reduce the amount of petroleum hydrocarbons entering Buzzards Bay.
Oil Pollution	goal						2. Minimize the occurrence of oil spills in Buzzards Bay, both large and small.
Oil Pollution	goal						3. Minimize the environmental effects from oil inputs to Buzzards Bay.
Oil Pollution	objectives						1. To promote a regional strategy for preventing and managing oil spills.
Oil Pollution	objectives						2. To implement a source-reduction plan for chronic inputs of PAHs to Buzzards Bay.
Oil Pollution	objectives						3. To provide adequate facilities for the collection of waste oil from cars and boats.
Oil Pollution	objectives						4. To take enforcement actions against the illegal discharge of oil.
Oil Pollution	action	1	1994	1	100%		1. CZM will provide technical assistance to Buzzards Bay communities developing contingency plans in each municipality.
Oil Pollution	action	1	1994	1	100%		2. CZM will encourage the satisfactory completion of oil spill contingency plans by each municipality.
Oil Pollution	action	1 Dec-91	1993	1	100%		1. BBAC will ensure that each municipality appoints an oil spill coordinator responsible for overseeing maintenance and deployment of equipment and for directing response activities.
Oil Pollution	action	1 Apr-92	1994	1	100%		2. BBAC will develop a mutual aid protocol that will govern the purchase and use of oil spill equipment by the towns.
Oil Pollution	action	1 Feb-92	1997	1	100%		3. BBAC will develop model regulations that will: a) require all boatyards and marinas to maintain oil containment and cleanup equipment on site; and b) manage the appropriate fueling of vessels.
Oil Pollution	action	1 Feb-91	1997	1	100%		1. Coast Guard will conduct training sessions on the use of oil spill equipment and other contingency plan activities for all Buzzards Bay towns once a year.
Oil Pollution	action	1 Feb-92	2001	1	100%	Plans developed, but USCG must use their own plan, Town plans= 1st response, rev 2001 plans with USCG	2. Coast Guard will review and approve each municipality's contingency plan and utilize those plans in the event of a spill.
Oil Pollution	action	1 Mar-91	1997	1	100%		3. Coast Guard will advise municipalities on the appropriate spill equipment that should be maintained.
Oil Pollution	action	1	1994	1	100%		Falmouth, Bourne, Wareham, Marion, Mattapoisett, Fairhaven, New Bedford, Dartmouth, and Westport have appointed oil spill coordinators, some of whom are developing local contingency plans.

Oil Pollution	action	1	1995	1	100%	2. Marion (through its Marine Resources Commission) is working with the boatyards and marinas to ensure they maintain adequate oil response equipment.	
Oil Pollution	action	1	1995	1	100%	3. The Coalition for Buzzards Bay refile a bill that addresses oil spill prevention including: pilot accountability, pilot testing, training recertification on a regular basis, and pilotage requirements in Buzzards Bay and the Cape Cod Canal.	
Oil Pollution	action	1	Mar-92	0	100%	1. DEP should coordinate annual regional oil spill response drills for Buzzards Bay communities on land, to ensure preparedness and proper interface between themselves and local personnel. assumed by oil spill coordinators	
Oil Pollution	action	1	Dec-93		25%	2. All other communities should require all boatyards and marinas to have specified response equipment on site. 3. All levels of government should adopt a policy to minimize or reduce oil entering the Bay. 25% legislation filed	
Oil Pollution	action	1			50%	4. Enforcement Task Force of the Executive Office of Environmental Affairs should enforce proper storage and disposal of oil.	
Oil Pollution	action	1		1	100%	4b. Buzzards Bay communities should adopt regulations managing fueling of vessels; regulations should include a provision requiring booms and absorbant material available at all fuel loading facilities.	
Oil Pollution	action	1	Dec-93		50%	5. The state should develop a policy and criteria for the use of dispersants in Buzzards Bay during oil spills. 50% legislation filed	
Oil Pollution	action	1	Dec-92	1993	1	100%	6. DEP should adopt a policy for treating stormwater by requiring oil and gas traps, absorbent pads, and regular catch-basin maintenance.
Oil Pollution	action	1	Dec-92	1995	1	100%	6. The Coast Guard should install a more effective navigational system at the western entrance of the Cape Cod Canal.
Wetlands	goal					Long-term increase of high-quality wetlands and coastal habitat in Buzzards Bay.	
Wetlands	objective					1. To protect existing wetlands.	
Wetlands	objective					2. To encourage restoration of wetlands (and allow replication as a last resort).	
Wetlands	objective					3. To improve enforcement of wetlands laws.	
Wetlands	objective					4. To upgrade the capability of local conservation commissions.	
Wetlands	objective					5. To encourage non-permitting options as a supplement to the issuance of permits whenever possible.	
Wetlands	objective					6. To protect and restore habitat used by threatened, rare and endangered coastal species and anadromous and catadromous fish.	
Wetlands	action	1	Dec-93	1995	1	100%	1. DEP implement the Wetlands Conservancy Program. Mattapoisett and Westport were included in the program during 1990 and 4 additional towns are scheduled for 1991. DEP's goal is to program changed, all ultimately include all Buzzards Bay towns in the Conservancy Program. towns mapped

Wetlands	action	1	1994	1	100%	2. DEP will use WQ cert under 404 to Require analysis of alternative strategies and options before wetlands are allowed to be destroyed or altered and only allow destruction under extreme circumstances or in projects with an overriding public purpose.
Wetlands	action	1	1995	1	100%	3. Require restoration or replication, at a ratio of at least 1:1, of any wetlands that are allowed to be altered or destroyed.
Wetlands	action	1	Dec-91			4. Require the same level of analysis and protection for isolated vegetated wetlands and intermittent streams as for other wetland areas.
Wetlands	action	1	Dec-92	1997	100% 1997	1995 WQ Cert 401 permits, River Protection Act in 1996, stormwater standards adopted 3. DEP will establish criteria for designating wetlands as waters of the Commonwealth using water quality standards, and subjecting these areas to stringent controls under the Antidegradation provision of the Clean Water Act.
Wetlands	action	1	Dec-91	1996	100%	1. The Buzzards Bay Project staff will develop criteria for determining the appropriate size of a buffer area.
Wetlands	action	1			0%	1. Dartmouth will pursue watershed zoning on a limited basis as part of its Harbor Management Plan.
Wetlands	action		Dec-93		33%	1997 River Protection Act partly the answer 1. DEP should amend the regulations to the Wetland Protection Act to better protect wetlands in order to achieve and exceed the Commonwealth's no net loss policy.
Wetlands	action	1			50%	adopted 1.1 1a. When wetlands are allowed to be altered or destroyed, require restoration and/or replication at a ratio of at least 2:1.
Wetlands	action	1			50%	5000 sq. ft rule, concept not workable 1b. Stipulate specific limits on the total area of wetlands that can be destroyed by limited projects.
Wetlands	action	1			30%	Revised wetland regs addressing problem 1c. If discretionary destruction of BVWs is allowed, it should be in accordance with the above recommendations.
Wetlands	action	1			50%	1996 Stormwater Guidance and town regs 1d. Define performance standards for the 100-ft buffer zone around wetlands.
Wetlands	action	1			0%	Rejected for DEP, Boards of Selectmen should adopt policy 1e. Require mandatory attendance by conservation commission members at Wetland Protection Act training courses.
Wetlands	action	1			10%	Falmouth regulations adopted 2001 1. Enhance protection of marine habitat and resources contained in lands under the ocean.
Wetlands	action	1	Dec-94	1996	75%	most towns improved local regs 2. Conservation commissions should upgrade their ability to protect wetlands.
Wetlands	action	1	Dec-94		70%	Increased collaboration among boards 3. Town boards and local environmental organizations should assist in protecting wetlands.
Wetlands	action	1	Dec-94		80%	Most Towns doing this 4. Communities (selectmen, conservation commissions, land trusts, etc.) should fully utilize nonregulatory wetlands protection techniques wherever possible.
Wetlands	action	1	Dec-92		25%	illegal, but certain policies help 5. DEP should prohibit the issuance of permits to chronic violators of the Wetlands Protection Act.

Wetlands	action	1	10%	Marion	6. All municipalities should adopt embayment or harbor management plans that identify watershed uses for their entire coastline.
Shifting Shore	Goal				1. Protect public health and safety from problems associated with higher waters and shifting shorelines.
Shifting Shore	Goal				2. Reduce the public financial burden caused by the destruction of or damage to coastal property.
Shifting Shore	Goal				3. Plan for the loss of buffering wetlands and shifting sand formations.
Shifting Shore	Objective				1. To incorporate sea-level rise and shoreline change phenomena into all relevant planning and management programs.
Shifting Shore	Objective				2. To develop a comprehensive strategy for handling existing structures in areas predicted to be affected by future shoreline changes.
Shifting Shore	Objective				3. To adopt regulatory and nonregulatory measures for guiding growth and development in areas that will be influenced by new shorelines.
Shifting Shore	Objective				4. To restructure the flood and hazard insurance programs in threatened areas so that the financial burden on the general public is decreased.
Shifting Shore	action	1 Dec-91	30%	Rivers Protection Act resource area "Land Subject to Coastal Storm Flowage" (100 year floodplain)	DEP will amend its wetlands regulations and adopt performance standards for the
Shifting Shore	action	1 Feb-91	1	100%	1. CZM will provide technical assistance to Buzzards Bay area planning boards, conservation commissions and other relevant local committees, commissions and boards in mapping coastal areas that are, or will be, affected by erosion and/or sea level rise.
Shifting Shore	action	1 Apr-91	1	100%	2. CZM will provide technical assistance to Buzzards Bay communities in developing by-laws, regulations, guidelines, and policies for building in flood zones mapped by the Federal Emergency Management Agency.
Shifting Shore	action	1 Dec-94	20%	1996 Rivers Protection Act and 1996 new Title 5 regs in part	1. Buzzards Bay communities should pass bylaws increasing the required setback for septic systems from groundwater, waterbodies, and vegetated wetlands for areas subject to sea-level rise, erosion, or flooding.
Shifting Shore	action	1 Dec-94	20%	handled by new T5 regs in part	2. Buzzards Bay communities should establish coastal construction setbacks and regulate construction activities more stringently for areas predicted to be subject to sea-level rise, erosion, or flooding.
Shifting Shore	action	omit		not possible/ No longer applicable	3. Buzzards Bay communities should establish higher flood elevations that exceed the minimum elevations mapped by the Federal Emergency Management Agency.
Wastewater Facilities	goal				Achieve water quality standards and protect natural resources at all POTW discharge points.

Wastewater Facilities	objective						To improve POTW efficiencies by setting limits on chlorine residual discharges and monitoring for effective effluent disinfection, encouraging industrial pollution prevention and pretreatment efforts, and reducing nitrogen inputs.
Wastewater Facilities	action	1	Dec-92	1996	1	100%	1. DEP will designate all existing aquatic Areas of Critical Environmental Concern (ACECs) as outstanding resource waters subject to the highest level of protection under the Antidegradation provisions of the Clean Water Act.
Wastewater Facilities	action	1	Dec-92			10%	2. DEP will work with the Buzzards Bay Project, Coastal Zone Management, and the Cape Cod Commission to determine if additional areas within the Buzzards Bay watershed should be designated as ACECs.
Wastewater Facilities	action	1	Dec-91			50%	1. EPA will conduct evaluations of Dartmouth, Wareham and Fairhaven municipal discharges. Using the ten criteria established under Section 403(c) of the Clean Water Act, EPA will ensure no adverse impact on coastal water quality and ecosystems.
Wastewater Facilities	action	1		1997	1	100%	1. The state management framework for protecting the quality of surface water should be made more comprehensive to address nitrogen from existing and future sewage treatment facilities. In particular, DEM should enforce the Ocean Sanctuary Act.
Wastewater Facilities	action	1				70%	2. Communities should develop and implement plans to reduce effluent volume.
Wastewater Facilities	action	1				75%	3. Communities should develop and implement programs of industrial pretreatment and industrial and household hazardous waste reduction where appropriate.
Wastewater Facilities	action	1		1994	1	100%	4. Future sewage treatment facilities and outfalls should be sited so that they minimize pathogen contamination, nitrogen impacts, and threats to human health and marine ecosystems.
Toxics	Goal						Protect the public health and the Bay ecosystem from the effects of toxic contaminants entering Buzzards Bay.
Toxics	objectives						1. To reduce the amount of toxic contaminants entering Buzzards Bay.
Toxics	objectives						2. To reduce hazardous leachate from landfills and to minimize other nonpoint sources of toxic contaminants to the Bay.
Toxics	objectives						3. To meet all state, federal, and local action levels for water and seafood.
Toxics	action	1	Dec-93	1994	1	100%	1. Municipalities should establish and implement a program of toxic-waste reduction for industries that discharge directly into receiving waters or sewage treatment facilities.
Toxics	action	1				50%	2. DEP should reduce oil entering the environment through enforcement of adequate collection regulations.

Toxics	action	1	1995	1	100%	3. Buzzards Bay municipalities should collect and properly dispose of household hazardous waste on a continuous basis.
Toxics	action	1	Dec-95		50%	4. SCS and the Cooperative Extension Service should develop and implement strategies to minimize the use and potential off-site impact of agrichemicals
Toxics	action	1	Dec-92		75%	5. EOEa should establish sediment criteria that are protective of the ecosystem and of human health for selected contaminants.
Toxics	action	1			50%	6. EOEa should coordinate with the Massachusetts Department of Public Health to review the current seafood-testing program and develop recommendations for future actions.
New Bedford	Goal					1995 CZM whitepaper on aquaculture and public health Support the ongoing projects designed to remediate pollution in New Bedford Harbor and to restore habitats and use to the greatest extent possible.
New Bedford	action	1			90%	1. EPA and DEP should continue to move forward on adoption and implementation of a remediation plan.
New Bedford	action	1	1998	1	100%	2. Trustees (EOEA, DOI, and NOAA) should oversee development and implementation of a restoration plan that benefits those who have been most affected by lost use of the resource.
New Bedford	action	1	1995	1	100%	1. The City of New Bedford should continue to meet deadlines for the planning efforts (as outlined in its draft Facilities Plan) to upgrade its treatment facility to secondary treatment.
New Bedford	action	1	1994	1	100%	2. The City of New Bedford, with DEP and EPA, should carefully coordinate CSO and sewage treatment facility upgrades so that benefits from CSO remediation can be realized as soon as possible.
New Bedford	action	1			80%	3. The City of New Bedford should implement approved plans for CSO upgrades.
Landuse Mgt	goal					To manage and direct growth so that critical resource areas are protected from cumulative impacts.
Landuse Mgt	action	1	2000	1	100%	1. Each town in the Buzzards Bay area should conduct a buildout analysis to determine its maximum potential use under current zoning and subdivision bylaws. BBP and EOEa completed for towns
Landuse Mgt	action	1			50%	2. Each town in Buzzards Bay should adopt a strategy of using existing rules and regulations and provide for project oversight or tracking.
Landuse Mgt	action	1			25%	3. Towns should be aggressive in using the full authority of their local boards to carefully regulate land-use activities so that the most valuable and sensitive areas receive full protection.
Landuse Mgt	action	Omit				4. Towns should preserve and enhance the viability of existing cranberry bogs through appropriate land use management regulations. River Protection Act relaxed wetland regulation, viability depends upon the economy, need to reassess

Landuse Mgt	action	Omit			Needs Reconsideration	5. Towns should establish buffer zones around cranberry bogs through the use of cluster zoning or other appropriate land use techniques. Residential structures should not be constructed within 200 feet of a bog.
Landuse Mgt	action	1	2001	100%	EOEA/SRPEDD buildouts, BBP open space plans, and DEP new Nloading analysis announced in 2001	1. Regional planning agencies (RPAs) should provide technical assistance to communities in conducting buildout analyses and planning for land-use management.
Landuse Mgt	action	1		1	25%	2. RPAs should be aggressive in protecting critical resources.
Landuse Mgt	action	Omit			Not Appropriate and No authority	3. RPAs should work to establish uniform regulatory controls for the Cranberry Industry for use by towns to minimize confusion and allow for efficient compliance.
Landuse Mgt	action	1		25%	Very ambitious and lofty goals, Cape Cod Commision requires Local Comprehensive Plan for Falmouth Bourne, and some state policy changes	1. Massachusetts should take a leadership role in land-use management by adopting the recommendations of the Special Commission on Growth and Change and incorporating that report into comprehensive legislation.
Landuse Mgt	action	1		50%	draft guidelines developed by MCZM	2. The Executive Office of Environmental Affairs should develop guidelines for ACEC management plans and require that towns and regions develop and adopt plans.
Landuse Mgt	action	1		50%	TMDLs ongoing	3. The Environmental Protection Agency and the Department of Environmental Protection should codevelop a policy on antidegradation as it relates to nutrient (especially nitrogen) inputs to embayments and other pollutants.
Landuse Mgt	action	Omit			APR Program farmer price supports may be best practical now, need to reassess	4. Massachusetts should create agricultural incentive zones, similar to an ACEC, to protect intensive farm areas from encroachment by development projects.
CCMP Implementation	action	1		20%	discussed	CCMP Action Plans incorporated into the Massachusetts Coastal Zone Management Plan (CZMP).

Appendix A: Buzzards Bay NEP Implementation Report
 Recommended Action status as of 12-2001

ActionPlan	Action Type	actiontarget countdate	year 1 comp.	1 for comp.	% comp.	comments	recommendation
		112		55	71%		111 Nitrogen Action Plan
Nitrogen	Goal						GOAL: No beneficial water uses will be lost, nor adverse ecosystem effects
Nitrogen	Goal						GOAL: Restore any beneficial water uses and ecosystems lost or impacted by the excessive contribution of nitrogen to any embayment within Buzzards Bay.
Nitrogen	objective						1. Control the amount of nitrogen entering Buzzards Bay as a whole.
Nitrogen	objective						2. Limit new additions of nitrogen entering nitrogen-sensitive embayments.
Nitrogen	objective						3. Reduce the amount of nitrogen entering nitrogen-impacted embayments.
Nitrogen	objective						4. Develop and support the use of alternative technologies that achieve denitrification of wastewater.
Nitrogen	objective						5. Monitoring program to assess the effectiveness of management actions ecosystem health
Nitrogen	action	1 Jun-93				DEP + UMass agree to fund \$13 million study developing 60% embayment TMDLs	1. DEP will adopt regulatory standards for nitrogen inputs to coastal embayments in its 1993 revision to State Water Quality Standards.
Nitrogen	action	1 Dec-91	2001	1	100%	DEP agrees to fund Test Center and provide necessary personal for oversight	2. DEP will promote development/acceptance of alternative wastewater technologies by assigning additional personnel to pilot projects.
Nitrogen	action	1 Jan-91	1994	1	100%		1. EPA, through its Near Coastal Waters Program, will construct and evaluate approximately four experimental denitrifying onsite wastewater disposal systems in Buzzards Bay municipalities.
Nitrogen	action	Omit Jan-91				NO ACTION REQ: Reassessed, No longer applicable	2. EPA will contribute a water quality specialist's skills in working on nitrogen issues within the context of DEP's Anti-Degradation Task Force.
Nitrogen	action	1 Sep-92	1991	1	100%		1. Bourne, Wareham and Plymouth adopt Buttermilk Overlay District
Nitrogen	action	1 Sep-92			33%		1. Dartmouth adopt N management strategy for Apponagansett Bay
Nitrogen	action	1 Sep-92			33%		1. Westport adopt N management strategy for Westport Rivers
Nitrogen	action	1 Sep-92			20%		Municipalities adopt N-loading bylaws, subdivision regulations, or health regulations for appropriate embayments.
Nitrogen	action	1			10%		Cape Cod Cranberry Growers' Association and Plymouth County Conservation District continue implementation of WQ Protection Initiative
Shellfish	goal						Increase availability of shellfish resources for recreational and commercial uses.
Shellfish	objective						1. Keep open all shellfish areas that have not closed and open priority areas that are closed.

Shellfish	objective					2. Enhance efforts to manage shellfish resources at both the state and local levels.
Shellfish	objective					3. Increase the capacity and commitment of municipalities to remediate identified pollution sources, assist in conducting the sanitary surveys.
Shellfish	objective					4. Increase the ability of DMF to carry out the sanitary survey program and provide technical and financial assistance.
Shellfish	goal					5. Expand the use of the conditionally approved classification for shellfish areas.
Shellfish	action	1 Dec-93			80%	1. DMF will work Buzzards Bay town reps in shoreline surveys and develop long-term cooperative arrangements
Shellfish	action	1 Dec-93			80%	2. DMF will encourage Buzzards Bay towns to work cooperatively expand the number of conditionally approved shellfish areas.
Shellfish	action	Omit Dec-93				DEP will take enforcement action against significant illegal discharges identified by DMF's sanitary surveys.
Shellfish	action	1	1999	1	100%	1. Falmouth, Bourne, Mattapoisett, and Dartmouth have initiated coordinated efforts within their towns to identify and set priorities for illegal discharges that may be affecting shellfish beds.
Shellfish	action	1	1994	1	100%	2. Falmouth, Bourne, Wareham, and Fairhaven have designated individuals with public health jurisdiction to assist DMF in classifying shellfish areas within their jurisdiction.
Shellfish	action	1 Dec-91	1996	1	100%	3. With DMF assistance, Fairhaven and Dartmouth will pursue conditionally approved shellfish areas within their towns.
Shellfish	action	1 Apr-92			25%	1. All other coastal municipalities should correct identified sources of coliforms and pathogens entering the Bay.
Shellfish	action	1 Jul-92			funding declined 40% FY01	2. EOEPA should increase funding to carry out the Shellfish Sanitation Program.
Shellfish	action	1 Dec-92	1993	1	100%	done for emerg, no longer needed 3. All other coastal communities should designate an individual with public health responsibility to assist DMF in classifying shellfish areas within their jurisdictions.
Shellfish	action	1			33% NA	4. EPA and FDA should develop a new indicator or suite of indicators to replace fecal coliform as an indicator of human health risk.
Shellfish	action	1 Dec-92			33% CPR program	5. The Massachusetts Legislature should pass legislation to improve financial assistance at the local level, \$400K.
Shellfish	action	1 Dec-93	1994	1	100%	but not all towns adhere? 6. DMF should develop standard methods for towns to report commercial and recreational shellfish catch data as a first step in monitoring resource utilization or losses.
Stormwater	goal					1. Prevent new or increased untreated stormwater flows to Buzzards Bay that would adversely affect shellfish harvesting areas, swimming beaches, water quality, and wetlands.
Stormwater	goal					2. Correct existing stormwater runoff problems that are causing or contributing to water quality degradation or shellfish-bed

closures in Buzzard Bay.

Stormwater	Objective					1. To institutionalize at the local level (through education and regulation) the use of best management practices for stormwater control in newly developed areas.	
Stormwater	Objective					2. To develop a regional and local program to execute appropriate mitigation measures for existing stormwater discharges. The program would include construction, operation, and maintenance of stormwater control structures.	
Stormwater	action	1	Jun-93	1996	1	100%	DEP will work with EPA to develop a policy to determine when permits for stormwater discharges are required. DEP will include these criteria in State WQ Standards and will consolidate regulatory authority for controlling stormwater runoff.
Stormwater	action	1	Dec-92				Bourne, Wareham, and Marion will pursue adoption of subdivision rules and regulations that require best management practices for stormwater runoff.
Stormwater	action	1	Dec-94			33%	1. All other Buzzards Bay communities should adopt subdivision bylaws that require that best management practices for stormwater runoff be incorporated into any new development plans.
Stormwater	action	1				20%	2. Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish-bed closures.
Stormwater	action	1	Dec-93	1995	1	100%	3. The Commonwealth, through the Executive Office of Environmental Affairs, should provide funding for local stormwater remediation projects.
Stormwater	action	1	Dec-92			20%	4. The State Legislature should not continue to exempt bridge work and road widening by the state DPW from review by local conservation commissions.
Stormwater	action	1		1992	1	100%	5. SCS should institute a program for implementing best management practices on agricultural lands in the Buzzards Bay area.
Boat Sewage	goal						Eliminate the discharge of wastewater from all boats in Buzzards Bay embayments.
Boat Sewage	objective						1. To build more pumpout facilities and to promote their use by educating boaters, making facilities more accessible, and enforcing the regulations.
Boat Sewage	objective						2. To develop financially self-sustaining pumpout programs at the town level.
Boat Sewage	objective						3. To designate embayments in Buzzards Bay as no-discharge area.
Boat Sewage	action	1	Dec-92	1992	1	100%	1. DEP, using its Chapter 91 permitting authority, will require new marinas or expansions of existing marinas (greater than 10 additional slips) to have adequate pumpout facilities.
Boat Sewage	action	1	Jan-92	1992	1	100%	2. DEP will implement a policy ensuring adequate management and treatment for sewage pumped from boats.

Boat Sewage	action	1	1992	1	100%	3. DEP will implement a policy to eliminate toxic additives in marine sanitation devices. Target date: 1991.
Boat Sewage	action	1	1992	1	100%	4. DEP will review problems of treating and disposing of boat sewage.
Boat Sewage	action	1				Interim: DEP, with assist. EPA, will continue to provide technical assistance and oversight to the town of Marion in developing advanced boat sewage treatment technology now being tested at a pilot project at the town's wastewater treatment facility.
Boat Sewage	action	1 Dec-92	1994	1	100%	1. CZM and DEP will develop a program that ensures adequate pumpout facilities for all harbor areas.
Boat Sewage	action	1 Dec-92	2000	1	100%	2. CZM and EPA will assist municipalities to designate EPA "no discharge areas" within coastal embayments. The BBP and the BBAC will work to encourage construction of boat pumpout facilities and no discharge areas in Buzzards Bay.
Boat Sewage	action	1 Dec-91	1998	1	100%	3. CZM, under its Coastal Facilities Improvement Program, will give serious consideration to eligible projects that propose to construct municipal marine pump-out facilities where needed and appropriate.
Boat Sewage	action	1 Dec-91	1999	1	100%	EPA, under the Clean Water Act, will designate an embayment in Wareham as a no-discharge area.
Boat Sewage	action	1 Jul-91	1994	1	100%	Dartmouth, Westport, Marion, Mattapoisett, and Fairhaven, with grants from the Buzzards Bay Project, will provide mobile or land based boat pumpout facilities and develop management plans for ensuring their use.
Boat Sewage	action	1 Dec-93			10%	Enforcement issue remains unresolved Boards of Health/ Harbormasters should enforce the use of pumpout facilities
Onsite Wastewater	goal					Prevent public health threats and environmental degradation from on-site wastewater disposal systems.
Onsite Wastewater	objective					1. To enforce the provisions contained in Title 5 regulations.
Onsite Wastewater	objective					2. To upgrade pre-Title 5 systems suspected of contaminating groundwater or surface waters.
Onsite Wastewater	objective					3. To address the inadequacies of Title 5 through board-of-health regulations.
Onsite Wastewater	objective					4. To improve the Title 5 code through recognition of nitrogen impacts, virus transport, and sensitive areas.
Onsite Wastewater	objective					5. To promote innovative technology that will reduce nitrogen.
Onsite Wastewater	action	1 Dec-92	1996	1	100%	de facto accomplished via state Title 5 regulation revisions Falmouth, Bourne, Wareham, Marion and Westport will pursue amending their Board of Health regulations to allow for better treatment and removal of viruses from on-site wastewater (See Appendix E).
Onsite Wastewater	action	1 Dec-92	1996	1	100%	1. DEP should amend the Title 5 Code so that it becomes a more comprehensive environmental regulation.
Onsite Wastewater	action	1 Dec-92	1995	1	100%	2. DEP should elevate the priority of the Title 5 Program.

Onsite Wastewater	action	1 Dec-94	1995	1	100%	some share part-time agent	3. All boards of health should employ a full-time qualified health agent.
Onsite Wastewater	action	1 Dec-93			80%		4. All boards of health should adopt a series of regulations that address the placement of septic systems in special resource areas.
Onsite Wastewater	action	1 Dec-93			35%	Partially achieved by 1996 Title 5 regs, River protection Act 1997	5. Boards of health amend regulations to increase setback distance required between on-site wastewater disposal systems and resource areas or application rate to account for virus transport.
Oil Pollution	goal						1. Reduce the amount of petroleum hydrocarbons entering Buzzards Bay.
Oil Pollution	goal						2. Minimize the occurrence of oil spills in Buzzards Bay, both large and small.
Oil Pollution	goal						3. Minimize the environmental effects from oil inputs to Buzzards Bay.
Oil Pollution	objectives						1. To promote a regional strategy for preventing and managing oil spills.
Oil Pollution	objectives						2. To implement a source-reduction plan for chronic inputs of PAHs to Buzzards Bay.
Oil Pollution	objectives						3. To provide adequate facilities for the collection of waste oil from cars and boats.
Oil Pollution	objectives						4. To take enforcement actions against the illegal discharge of oil.
Oil Pollution	action	1	1994	1	100%		1. CZM will provide technical assistance to Buzzards Bay communities developing contingency plans in each municipality.
Oil Pollution	action	1	1994	1	100%		2. CZM will encourage the satisfactory completion of oil spill contingency plans by each municipality.
Oil Pollution	action	1 Dec-91	1993	1	100%		1. BBAC will ensure that each municipality appoints an oil spill coordinator responsible for overseeing maintenance and deployment of equipment and for directing response activities.
Oil Pollution	action	1 Apr-92	1994	1	100%		2. BBAC will develop a mutual aid protocol that will govern the purchase and use of oil spill equipment by the towns.
Oil Pollution	action	1 Feb-92	1997	1	100%		3. BBAC will develop model regulations that will: a) require all boatyards and marinas to maintain oil containment and cleanup equipment on site; and b) manage the appropriate fueling of vessels.
Oil Pollution	action	1 Feb-91	1997	1	100%		1. Coast Guard will conduct training sessions on the use of oil spill equipment and other contingency plan activities for all Buzzards Bay towns once a year.
Oil Pollution	action	1 Feb-92	2001	1	100%	Plans developed, but USCG must use their own plan, Town plans= 1st response, rev 2001 plans with USCG	2. Coast Guard will review and approve each municipality's contingency plan and utilize those plans in the event of a spill.
Oil Pollution	action	1 Mar-91	1997	1	100%		3. Coast Guard will advise municipalities on the appropriate spill equipment that should be maintained.
Oil Pollution	action	1	1994	1	100%		Falmouth, Bourne, Wareham, Marion, Mattapoisett, Fairhaven, New Bedford, Dartmouth, and Westport have appointed oil spill coordinators, some of whom are developing local contingency plans.

Oil Pollution	action	1	1995	1	100%	2. Marion (through its Marine Resources Commission) is working with the boatyards and marinas to ensure they maintain adequate oil response equipment.	
Oil Pollution	action	1	1995	1	100%	3. The Coalition for Buzzards Bay refile a bill that addresses oil spill prevention including: pilot accountability, pilot testing, training recertification on a regular basis, and pilotage requirements in Buzzards Bay and the Cape Cod Canal.	
Oil Pollution	action	1	Mar-92	0	100%	1. DEP should coordinate annual regional oil spill response drills for Buzzards Bay communities on land, to ensure preparedness and proper interface between themselves and local personnel.	
Oil Pollution	action	1	Dec-93		25%	2. All other communities should require all boatyards and marinas to have specified response equipment on site.	
Oil Pollution	action	1			50%	3. All levels of government should adopt a policy to minimize or reduce oil entering the Bay.	
Oil Pollution	action	1		1	100%	4. Enforcement Task Force of the Executive Office of Environmental Affairs should enforce proper storage and disposal of oil.	
Oil Pollution	action	1	Dec-93		50%	4b. Buzzards Bay communities should adopt regulations managing fueling of vessels; regulations should include a provision requiring booms and absorbant material available at all fuel loading facilities.	
Oil Pollution	action	1	Dec-92	1993	1	5. The state should develop a policy and criteria for the use of dispersants in Buzzards Bay during oil spills.	
Oil Pollution	action	1	Dec-92	1995	1	6. DEP should adopt a policy for treating stormwater by requiring oil and gas traps, absorbent pads, and regular catch-basin maintenance.	
Oil Pollution	action	1	1993	1	100%	6. The Coast Guard should install a more effective navigational system at the western entrance of the Cape Cod Canal.	
Wetlands	goal					Long-term increase of high-quality wetlands and coastal habitat in Buzzards Bay.	
Wetlands	objective					1. To protect existing wetlands.	
Wetlands	objective					2. To encourage restoration of wetlands (and allow replication as a last resort).	
Wetlands	objective					3. To improve enforcement of wetlands laws.	
Wetlands	objective					4. To upgrade the capability of local conservation commissions.	
Wetlands	objective					5. To encourage non-permitting options as a supplement to the issuance of permits whenever possible.	
Wetlands	objective					6. To protect and restore habitat used by threatened, rare and endangered coastal species and anadromous and catadromous fish.	
Wetlands	action	1	Dec-93	1995	1	100%	1. DEP implement the Wetlands Conservancy Program. Mattapoisett and Westport were included in the program during 1990 and 4 additional towns are scheduled for 1991. DEP's goal is to program changed, all ultimately include all Buzzards Bay towns in the Conservancy Program.

Wetlands	action	1	1994	1	100%	2. DEP will use WQ cert under 404 to Require analysis of alternative strategies and options before wetlands are allowed to be destroyed or altered and only allow destruction under extreme circumstances or in projects with an overriding public purpose.
Wetlands	action	1	1995	1	100%	3. Require restoration or replication, at a ratio of at least 1:1, of any wetlands that are allowed to be altered or destroyed.
Wetlands	action	1	Dec-91		45%	decline: Army Corps and DEP affected by Tolloch decision 4. Require the same level of analysis and protection for isolated vegetated wetlands and intermittent streams as for other wetland areas.
Wetlands	action	1	Dec-92	1997	100%	1995 WQ Cert 401 permits, River Protection Act in 1996, stormwater standards adopted 1997 3. DEP will establish criteria for designating wetlands as waters of the Commonwealth using water quality standards, and subjecting these areas to stringent controls under the Antidegradation provision of the Clean Water Act.
Wetlands	action	1	Dec-91	1996	1	100% in model regs 1. The Buzzards Bay Project staff will develop criteria for determining the appropriate size of a buffer area.
Wetlands	action	1			0%	1. Dartmouth will pursue watershed zoning on a limited basis as part of its Harbor Management Plan.
Wetlands	action		Dec-93		33%	1997 River Protection Act partly the answer 1. DEP should amend the regulations to the Wetland Protection Act to better protect wetlands in order to achieve and exceed the Commonwealth's no net loss policy.
Wetlands	action	1			50%	adopted 1.1 1a. When wetlands are allowed to be altered or destroyed, require restoration and/or replication at a ratio of at least 2:1.
Wetlands	action	1			50%	5000 sq. ft rule, concept not workable 1b. Stipulate specific limits on the total area of wetlands that can be destroyed by limited projects.
Wetlands	action	1			30%	Revised wetland regs addressing problem 1c. If discretionary destruction of BVWs is allowed, it should be in accordance with the above recommendations.
Wetlands	action	1			50%	1996 Stormwater Guidance and town regs 1d. Define performance standards for the 100-ft buffer zone around wetlands.
Wetlands	action	1			0%	Rejected for DEP, Boards of Selectmen should adopt policy 1e. Require mandatory attendance by conservation commission members at Wetland Protection Act training courses.
Wetlands	action	1			10%	Falmouth regulations adopted 2001 1. Enhance protection of marine habitat and resources contained in lands under the ocean.
Wetlands	action	1	Dec-94	1996	75%	most towns improved local regs 2. Conservation commissions should upgrade their ability to protect wetlands.
Wetlands	action	1	Dec-94		70%	Increased collaboration among boards 3. Town boards and local environmental organizations should assist in protecting wetlands.
Wetlands	action	1	Dec-94		80%	Most Towns doing this 4. Communities (selectmen, conservation commissions, land trusts, etc.) should fully utilize nonregulatory wetlands protection techniques wherever possible.
Wetlands	action	1	Dec-92		25%	illegal, but certain policies help 5. DEP should prohibit the issuance of permits to chronic violators of the Wetlands Protection Act.
Wetlands	action	1			10%	Marion 6. All municipalities should adopt embayment or harbor management plans that identify watershed uses for their entire

coastline.

Shifting Shore	Goal			1. Protect public health and safety from problems associated with higher waters and shifting shorelines.
Shifting Shore	Goal			2. Reduce the public financial burden caused by the destruction of or damage to coastal property.
Shifting Shore	Goal			3. Plan for the loss of buffering wetlands and shifting sand formations.
Shifting Shore	Objective			1. To incorporate sea-level rise and shoreline change phenomena into all relevant planning and management programs.
Shifting Shore	Objective			2. To develop a comprehensive strategy for handling existing structures in areas predicted to be affected by future shoreline changes.
Shifting Shore	Objective			3. To adopt regulatory and nonregulatory measures for guiding growth and development in areas that will be influenced by new shorelines.
Shifting Shore	Objective			4. To restructure the flood and hazard insurance programs in threatened areas so that the financial burden on the general public is decreased.
Shifting Shore	action	1 Dec-91	Rivers Protection Act 30% doing this in part	DEP will amend its wetlands regulations and adopt performance standards for the resource area "Land Subject to Coastal Storm Flowage" (100 year floodplain).
Shifting Shore	action	1 Feb-91	1 100%	1. CZM will provide technical assistance to Buzzards Bay area planning boards, conservation commissions and other relevant local committees, commissions and boards in mapping coastal areas that are, or will be, affected by erosion and/or sea level rise.
Shifting Shore	action	1 Apr-91	1 100%	2. CZM will provide technical assistance to Buzzards Bay communities in developing by-laws, regulations, guidelines, and policies for building in flood zones mapped by the Federal Emergency Management Agency.
Shifting Shore	action	1 Dec-94	1996 Rivers Protection Act and 1996 new Title 5 20% regs in part	1. Buzzards Bay communities should pass bylaws increasing the required setback for septic systems from groundwater, waterbodies, and vegetated wetlands for areas subject to sea-level rise, erosion, or flooding.
Shifting Shore	action	1 Dec-94	handled by new T5 20% regs in part	2. Buzzards Bay communities should establish coastal construction setbacks and regulate construction activities more stringently for areas predicted to be subject to sea-level rise, erosion, or flooding.
Shifting Shore	action	omit	not possible/ No longer applicable	3. Buzzards Bay communities should establish higher flood elevations that exceed the minimum elevations mapped by the Federal Emergency Management Agency.
Wastewater Facilities	goal			Achieve water quality standards and protect natural resources at all POTW discharge points.

Wastewater Facilities	objective						To improve POTW efficiencies by setting limits on chlorine residual discharges and monitoring for effective effluent disinfection, encouraging industrial pollution prevention and pretreatment efforts, and reducing nitrogen inputs.
Wastewater Facilities	action	1	Dec-92	1996	1	100%	1. DEP will designate all existing aquatic Areas of Critical Environmental Concern (ACECs) as outstanding resource waters subject to the highest level of protection under the Antidegradation provisions of the Clean Water Act.
Wastewater Facilities	action	1	Dec-92			10%	2. DEP will work with the Buzzards Bay Project, Coastal Zone Management, and the Cape Cod Commission to determine if additional areas within the Buzzards Bay watershed should be designated as ACECs.
Wastewater Facilities	action	1	Dec-91			50%	1. EPA will conduct evaluations of Dartmouth, Wareham and Fairhaven municipal discharges. Using the ten criteria established under Section 403(c) of the Clean Water Act, EPA will ensure no adverse impact on coastal water quality and ecosystems.
Wastewater Facilities	action	1		1997	1	100%	1. The state management framework for protecting the quality of surface water should be made more comprehensive to address nitrogen from existing and future sewage treatment facilities. In particular, DEM should enforce the Ocean Sanctuary Act.
Wastewater Facilities	action	1				70%	2. Communities should develop and implement plans to reduce effluent volume.
Wastewater Facilities	action	1				75%	3. Communities should develop and implement programs of industrial pretreatment and industrial and household hazardous waste reduction where appropriate.
Wastewater Facilities	action	1		1994	1	100%	4. Future sewage treatment facilities and outfalls should be sited so that they minimize pathogen contamination, nitrogen impacts, and threats to human health and marine ecosystems.
Toxics	Goal						Protect the public health and the Bay ecosystem from the effects of toxic contaminants entering Buzzards Bay.
Toxics	objectives						1. To reduce the amount of toxic contaminants entering Buzzards Bay.
Toxics	objectives						2. To reduce hazardous leachate from landfills and to minimize other nonpoint sources of toxic contaminants to the Bay.
Toxics	objectives						3. To meet all state, federal, and local action levels for water and seafood.
Toxics	action	1	Dec-93	1994	1	100%	1. Municipalities should establish and implement a program of toxic-waste reduction for industries that discharge directly into receiving waters or sewage treatment facilities.
Toxics	action	1				50%	2. DEP should reduce oil entering the environment through enforcement of adequate collection regulations.

Toxics	action	1	1995	1	100%	3. Buzzards Bay municipalities should collect and properly dispose of household hazardous waste on a continuous basis.
Toxics	action	1	Dec-95		50%	4. SCS and the Cooperative Extension Service should develop and implement strategies to minimize the use and potential off-site impact of agrichemicals
Toxics	action	1	Dec-92		75%	5. EOEAs should establish sediment criteria that are protective of the ecosystem and of human health for selected contaminants.
Toxics	action	1			50%	6. EOEAs should coordinate with the Massachusetts Department of Public Health to review the current seafood-testing program and develop recommendations for future actions.
New Bedford	Goal					1995 CZM whitepaper on aquaculture and public health Support the ongoing projects designed to remediate pollution in New Bedford Harbor and to restore habitats and use to the greatest extent possible.
New Bedford	action	1			90%	1. EPA and DEP should continue to move forward on adoption and implementation of a remediation plan.
New Bedford	action	1	1998	1	100%	2. Trustees (EOEA, DOI, and NOAA) should oversee development and implementation of a restoration plan that benefits those who have been most affected by lost use of the resource.
New Bedford	action	1	1995	1	100%	1. The City of New Bedford should continue to meet deadlines for the planning efforts (as outlined in its draft Facilities Plan) to upgrade its treatment facility to secondary treatment.
New Bedford	action	1	1994	1	100%	2. The City of New Bedford, with DEP and EPA, should carefully coordinate CSO and sewage treatment facility upgrades so that benefits from CSO remediation can be realized as soon as possible.
New Bedford	action	1			80%	3. The City of New Bedford should implement approved plans for CSO upgrades.
Landuse Mgt	goal					To manage and direct growth so that critical resource areas are protected from cumulative impacts.
Landuse Mgt	action	1	2000	1	100%	1. Each town in the Buzzards Bay area should conduct a buildout analysis to determine its maximum potential use under current zoning and subdivision bylaws. BBP and EOEAs completed for towns
Landuse Mgt	action	1			50%	2. Each town in Buzzards Bay should adopt a strategy of using existing rules and regulations and provide for project oversight or tracking.
Landuse Mgt	action	1			25%	3. Towns should be aggressive in using the full authority of their local boards to carefully regulate land-use activities so that the most valuable and sensitive areas receive full protection.
Landuse Mgt	action	Omit				River Protection Act relaxed wetland regulation, viability depends upon the economy, need to reassess 4. Towns should preserve and enhance the viability of existing cranberry bogs through appropriate land use management regulations.

Landuse Mgt	action	Omit			Needs Reconsideration	5. Towns should establish buffer zones around cranberry bogs through the use of cluster zoning or other appropriate land use techniques. Residential structures should not be constructed within 200 feet of a bog.
Landuse Mgt	action	1	2001	100%	EOEA/SRPEDD buildouts, BBP open space plans, and DEP new Nloading analysis announced in	1. Regional planning agencies (RPAs) should provide technical assistance to communities in conducting buildout analyses and planning for land-use management.
Landuse Mgt	action	1		1 25%		2. RPAs should be aggressive in protecting critical resources.
Landuse Mgt	action	Omit			Not Appropriate and No authority	3. RPAs should work to establish uniform regulatory controls for the Cranberry Industry for use by towns to minimize confusion and allow for efficient compliance.
Landuse Mgt	action	1		25%	Very ambitious and lofty goals, Cape Cod Commission requires Local Comprehensive Plan for Falmouth Bourne, and some state policy changes	1. Massachusetts should take a leadership role in land-use management by adopting the recommendations of the Special Commission on Growth and Change and incorporating that report into comprehensive legislation.
Landuse Mgt	action	1		50%	draft guidelines developed by MCZM	2. The Executive Office of Environmental Affairs should develop guidelines for ACEC management plans and require that towns and regions develop and adopt plans.
Landuse Mgt	action	1		50%	TMDLs ongoing	3. The Environmental Protection Agency and the Department of Environmental Protection should codevelop a policy on antidegradation as it relates to nutrient (especially nitrogen) inputs to embayments and other pollutants.
Landuse Mgt	action	Omit			APR Program farmer price supports may be best practical now, need to reassess	4. Massachusetts should create agricultural incentive zones, similar to an ACEC, to protect intensive farm areas from encroachment by development projects.
CCMP Implementation	action	1		20%	discussed	CCMP Action Plans incorporated into the Massachusetts Coastal Zone Management Plan (CZMP).

Buzzards Bay Project National Estuary Program

Implementation Activities

FY 99 Workplan and Budget

revised 7/21/99

Workplan Tasks

Specialized Technical Assistance

The Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) is largely a non-regulatory document, with most recommendations directed toward municipalities because they have the greatest authority and capacity to address the growth related and non-point source pollution problems facing the bay and watershed. As a result, since completion of the CCMP, the focus of the Buzzards Bay Project has been to provide technical assistance, and where feasible, financial assistance to towns in their efforts to implement the Plan.

Because municipalities often lack adequate technical staff to develop or implement many of the recommendations contained in the CCMP, during the past six years the Buzzards Bay Project has been providing essential and much needed specialized technical assistance to municipal boards. This technical assistance not only focuses on specific initiatives funded with Project state and federal funds, but a wide range of CCMP issues as well.

This year the major areas of concentration of the Project's technical assistance program will remain: stormwater control and reopening of shellfish beds, promoting better management of on-site systems, evaluation and promotion of innovative alternative septic systems, improved local wetlands and habitat protection, helping establish comprehensive nitrogen management strategies for sensitive embayments, and helping towns adopt open space plans that emphasize protection of water quality, habitat, and living resources.

The Buzzards Bay Project will also continue an initiative started last year jointly with the citizen's group Coalition for Buzzards Bay titled the "Bay Lands Center." This Lands Center, now transferred from the Buzzards Bay Project to the citizen's group the Coalition for Buzzards Bay, has brought together eight bay area land trusts seeks to enhance land conservation in the 17 cities and towns that together comprise the Buzzards Bay watershed. The Coalition's Bay Lands Center has already had great success in helping acquire or set aside several large tracts of land in the Buzzards Bay watershed. In the coming year, the Buzzards Bay Project will continue to provide technical assistance to the Bay Lands Center and the coalition by preparing GIS maps, maintaining data bases of large landowners, and conducting land-use analyses.

As part of a separate grant from DEP, the Buzzards Bay Project drafted in early 1999 drafted an atlas of tidally restricted wetlands in Massachusetts. This work has set the stage for state and federally agencies, and the Buzzards Bay Project to address a large portion of the more than 170 restrictions

identified in the Atlas. This atlas, which is being approved through the state's Wetland Restoration and Banking Program, puts the Buzzards Bay Project and watershed municipalities in an excellent position for new federal wetland restoration programs which require state approved wetland restoration management plans. All Buzzards Bay Project technical staff will be dedicating appreciable time in the 1999 and 2000 calendar years to implement this initiative to restore hundreds of acres of salt marsh around Buzzards Bay.

The Project will also be dedicating appreciable effort toward conducting and implementing a similar stormwater inventory and atlas of stormwater discharges in Buzzards Bay through a federal ISTEA highway grant. By the end of 1999, the project will have produced an atlas and remediation priorities for all coastal stormwater discharges around Buzzards Bay. As a companion to this effort, the Project will continue its previous efforts to promote a stormwater bylaw developed by the Project that enables Planning Boards, Boards of Health, and Conservation Commissions to adopt a consistent set of local regulations to prevent any new stormwater problems, and avoid future costly remediation action. Both these measures address key CCMP recommendations and are key components of the Clean Water Action Plan.

In order to protect valuable wetlands, water quality, habitat, and open space, the Buzzards Bay Project will help the Town of Acushnet and the city of New Bedford develop open space plans that address these issues. This work continues on previous years successes in completing open space plans for the City of Fall River, and Towns of Westport and Mattapoisett. Municipalities with completed open space plans, especially those that target environmentally sensitive areas for acquisition, have an excellent chance to receive new state funds to protect these valuable landscapes, as well as to take advantage of federal lands legacy initiative under the Clean Water Action Plan.

Staff expertise will be available to assist local planning boards in developing critical nitrogen loading limits for nitrogen sensitive embayments and employing strategies for reducing loading limits to these embayments. This work will involve instructing town personnel in understanding the "state of the art" nitrogen management strategy developed by the Buzzards Bay Project. Willing boards will be assisted in conducting build out analysis, nitrogen loading computations, and the use of certain analytical models to determine embayment flushing cycles. This year the Buzzards Bay Project will be continuing its efforts to help establish nitrogen TMDL for three watershed municipal sewage treatment facilities (Wareham, Fairhaven, and Falmouth). This activity will be essential to continue implementation of the Project's CCMP nitrogen action plan, and TMDL elements of the federal Clean Water Action Plan.

Technical assistance personnel will attend all public hearing and town meetings to support the technical basis for regulatory changes. An additional focus of Project staff will be helping towns prepare grant applications for state and federal monies to help fund many of these tasks.

Other technical assistance tasks identified for Buzzards Bay Project staff:

- Sponsor a continuing series of workshops and meetings with selected town boards and staff that further implementation of key provisions with the CCMP.
- Follow-up with towns regarding weaknesses identified in the Coalition's report cards with offers of technical assistance from the Project.

-Use Buzzards Bay Action Committee meetings and other meetings with municipal officials as forums for discussing progress in implementing the CCMP.

Technology Transfer to Other Estuaries

This task is being undertaken with BBP NEP funds through travel already incorporated as travel lines within individual staff contracts to enable Buzzards Bay staff to attend national meetings and impart the knowledge gained through the above to other National Estuary Programs.

Municipal Grants (matching funds)

The Buzzards Bay Project will work with state and local officials to provide a minimum of \$75,000 of state transportation bond Coastal Pollution Remediation (CPR) grants. These grants require a 25% local match of total project costs. This will result in a minimum \$100,000 of non-federal match to our grant.

In addition, \$73,821 of the Buzzards Bay Project's federal base funding will be provided to Buzzards Bay municipalities in the form of minigrants covering a wide range of topics, from oil spill training, herring restoration, shellfish bed restoration, and GIS data, among other areas. Implementation of this program and conformance with federal Clean Water Action Plan goals will be overseen by the Buzzards Bay Project's Steering Committee. The Buzzards Bay Project requires a match (25% of project total or 33% of award) to these grants. This municipal contribution will provide an additional \$21,200 match toward our federal grant, bringing our total match to \$121,200.

The Project will assist Buzzards Bay municipalities securing other state and federal grants in their efforts to implement the CCMP.

BUDGET DETAIL*

Award: 7/21/99 Amendment=\$17,000, for a total of \$335,000 in FY99 federal funds

Travel: \$0.00

Some of the Buzzards Bay Project's base funding (\$5,000) will be administrated by New England Interstate Water Pollution Control Commission under a separate Cooperative agreement to facilitate National Travel. The remainder of travel budget is included within staff contracts in the Contractual category. *Therefore no funds are in this grant category on our grant.*

Contractual: \$247,673.00

1) Funds for Project staff (\$184,927) are contractual positions to implement the municipal technical assistance program. Those positions will be funded for the course of the budget period as follows (amounts below includes local travel and portion of travel for national meetings):

Executive Director	\$61,289/11 months;
Administrative Assistant	\$36,050/12 months;
Wetlands Specialist	\$47,668/10.5 months;
GIS Land Use Analyst	\$39,920/10.5 months;

Due to Massachusetts EOE A budgeting procedures, these positions must be shown as contractual because they will not involve official state positions, but rather "contractual employees." Balance of annual salary will be sought from other grants.

2) Municipal Grants will be awarded in the amount of \$73,821 in various implementation grant categories to be determined including but not limited to Oil Spill Training, Herring Restoration, GIS data creation, shellfish bed restoration, and wetlands protection.

Supplies: \$12,000.00

Postage, phone, communication, printing, paper, office supplies, copier, etc.

Other: \$23,477.00

Rent and Utilities+ Cleaning, medicaid, state audit, and other chargebacks

Indirect costs: \$40,775

18.5% charge on all grants funds except those directed to municipal governments and supplies.

Match: state: \$75,000 in state bond CPR program grant funds to municipalities
local: \$25,000 in match to state CPR grants to municipalities
local: \$21,200 in match to BBP grants awarded to municipalities under this Cooperative Agreement
TOTAL MATCH: \$121,200

*This budget detail is in support of the additional \$335,000 that is being added to this grant agreement through FY99 amendments.

wrkpln99

Buzzards Bay Project National Estuary Program

Implementation Activities

FY 00 Workplan and Budget

Workplan Tasks

Specialized Technical Assistance

The Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) is largely a non-regulatory document, with most recommendations directed toward municipalities because they have the greatest authority and capacity to address the growth related and non-point source pollution problems facing the bay and watershed. As a result, since completion of the CCMP, the focus of the Buzzards Bay Project has been to provide technical assistance, and where feasible, financial assistance to towns in their efforts to implement the Plan.

Because municipalities often lack adequate technical staff to develop or implement many of the recommendations contained in the CCMP, during the past six years the Buzzards Bay Project has been providing essential and much needed specialized technical assistance to municipal boards. This technical assistance not only focuses on specific initiatives funded with Project state and federal funds, but a wide range of CCMP issues as well.

This year the major areas of concentration of the Project's technical assistance program will remain: stormwater control and reopening of shellfish beds, promoting better management of on-site systems, promotion of innovative alternative septic systems, improved local wetlands and habitat protection, helping establish comprehensive nitrogen management strategies for sensitive embayments, and helping towns adopt open space plans that emphasize protection of water quality, habitat, and living resources.

The Project will continue dedicating appreciable effort toward conducting and implementing a stormwater inventory and atlas of stormwater discharges in Buzzards Bay funded through a federal ISTEA highway grant. This project was delayed because the state and federal ISTEA funds were held up by more than a year. This inventory and follow-up technical assistance program will address key CCMP recommendations and are also key components of the Clean Water Action Plan.

In order to protect valuable wetlands, water quality, habitat, and open space, the Buzzards Bay Project will continue to help the Town of Acushnet and the City of New Bedford develop open space plans that address these issues. This work continues on previous years successes in completing open space plans for other municipalities. Municipalities with completed open space plans, especially those that target environmentally sensitive areas for acquisition, have an excellent chance to receive new state funds to protect these valuable landscapes, as well as to take advantage of federal lands legacy initiative under the Clean Water Action Plan.

Staff expertise will be available to assist local planning boards in developing critical nitrogen loading limits for nitrogen sensitive embayments and employing strategies for reducing loading limits to these embayments. Last year the BBP completed a review of eight years of citizen monitoring program water quality data. Based on this review, the project revised its nitrogen management recommendations and management strategy, including proposed new more stringent limits (TMDLS

and TMALs) for some Buzzards Bay embayments.. In the coming year, the Buzzards Bay Project will update and prepare a new Buzzards Bay subbasin nitrogen loading evaluation based on these new recommended limits. Willing boards will be assisted in conducting build out analysis, nitrogen loading computations, and the use of certain analytical models to determine embayment flushing cycles. This year the Buzzards Bay Project will be continuing its efforts to help establish nitrogen TMDL for two watershed municipal sewage treatment facilities (Wareham and Fairhaven). Last year and into 2000, the Cape Cod Commission and DEP adopted the BBPs approach for managing nitrogen to West Falmouth Harbor from the municipal treatment system. The project will also continue participating in regional and national meetings describing the BBP's TMDL approach and how it relates to the Clean Water Action Plan.

Technical assistance personnel will attend all public hearing and town meetings to support the technical basis for regulatory changes. An additional focus of Project staff will be helping towns prepare grant applications for state and federal monies to help fund many of these tasks.

Other technical assistance tasks identified for Buzzards Bay Project staff:

- Sponsor a continuing series of workshops and meetings with selected town boards and staff that further implementation of key provisions with the CCMP.
- Follow-up with towns regarding weaknesses identified in the Coalition's report cards with offers of technical assistance from the Project.
- Use Buzzards Bay Action Committee meetings and other meetings with municipal officials as forums for discussing progress in implementing the CCMP.

Technology Transfer to Other Estuaries

This task is being undertaken with BBP NEP transferred to the New England Interstate Water Pollution Control Commission to provide travel to BBP staff and key partners (Coalition for Buzzards Bay and Buzzards Bay Action Committee) to attend national meetings and impart the knowledge gained through the above to other National Estuary Programs.

Municipal Grants (matching funds)

The Buzzards Bay Project will work with state and local officials to provide a minimum of \$75,000 of state transportation bond Coastal Pollution Remediation (CPR) grants. These grants require a 25% local match of total project costs. This will result in a minimum \$100,000 of non-federal match to our grant.

In addition, \$56,000 of the Buzzards Bay Project's federal base funding will be provided to Buzzards Bay municipalities in the form of minigrants covering a wide range of topics, from oil spill training, herring restoration, shellfish bed restoration, and GIS data, among other areas. Implementation of this program and conformance with federal Clean Water Action Plan goals will be overseen by the Buzzards Bay Project's Steering Committee. The Buzzards Bay Project requires a match (25% of project total or 33% of award) to these grants. This municipal contribution will provide an additional \$18,600 match toward our federal grant, bringing our total match to \$118,635.

The Project will assist Buzzards Bay municipalities securing other state and federal grants in their efforts to implement the CCMP.

wrkpln00

BUDGET DETAIL*

Award: \$320,000

Travel: \$0.00

A portion of The Buzzards Bay Project's base funding (\$10,000) will be administrated by New England Interstate Water Pollution Control Commission under a separate Cooperative agreement to facilitate National Travel.

Contractual: \$247,673.00

1) Funds for Project staff (\$190,403) are contractual positions to implement the municipal technical assistance program. Those positions will be funded for the course of the budget period as follows (**amounts below includes local travel and benefit compensation**):

Executive Director	\$65,587/12 months;
Administrative Assistant	\$36,443/12 months;
Wetlands Specialist	\$47,020/10 months;
GIS Land Use Analyst	\$38,353/10 months;

Due to Massachusetts EOE budgeting procedures, these positions must be shown as contractual because they will not involve official state positions, but rather "contractual employees." Balance of annual salary will be sought from other grants.

2) Municipal Grants will be awarded in the amount of \$66,000 in various implementation grant categories to be determined including but not limited to Oil Spill Training, Herring Restoration, GIS data creation, shellfish bed restoration, and wetlands protection.

Supplies: \$9,000.00

Postage, phone, communication, printing, paper, office supplies etc.

Other: \$27,700.00

Rent and Utilities+ Cleaning, medicaid, state audit, and other charge backs

Indirect costs: \$41,778

18.5% charge on all grants funds except those directed to municipal governments and supplies.

Match: state: \$75,000 in state bond CPR program grant funds to municipalities
local: \$25,000 in match to state CPR grants to municipalities
local: \$22,200 in match to BBP grants awarded to municipalities under this Cooperative Agreement
TOTAL MATCH: \$122,200

*This budget detail is in support of the additional \$320,000 that is being added to our existing grant agreement through FY00 amendments.

Buzzards Bay Project National Estuary Program

Implementation Activities

FY 01 Workplan and Budget

Workplan Tasks

Specialized Technical Assistance

The Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) is largely a non-regulatory document, with most recommendations directed toward municipalities because they have the greatest authority and capacity to address the growth related and non-point source pollution problems facing the bay and watershed. As a result, since completion of the CCMP, the focus of the Buzzards Bay Project has been to provide technical assistance, and where feasible, financial assistance to towns in their efforts to implement the Plan.

Because municipalities often lack adequate technical staff to develop or implement many of the recommendations contained in the CCMP, during the past six years the Buzzards Bay Project has been providing essential and much needed specialized technical assistance to municipal boards. This technical assistance not only focuses on specific initiatives funded with Project state and federal funds, but a wide range of CCMP issues as well.

This year the major areas of concentration of the Project's technical assistance program will remain: stormwater control and reopening of shellfish beds, promoting better management of on-site systems, promotion of innovative alternative septic systems, improved local wetlands and habitat protection, helping establish comprehensive nitrogen management strategies for sensitive embayments, and helping towns adopt open space plans that emphasize protection of water quality, habitat, and living resources.

The Project will continue dedicating appreciable effort toward conducting and implementing a stormwater inventory and atlas of stormwater discharges in Buzzards Bay funded through a federal ISTEA highway grant. This project was delayed because the state and federal ISTEA funds were held up by more than two years. Work has been able to continue because of a DEP 319 grant and a MET grant. This inventory and follow-up technical assistance program will address key CCMP recommendations. The Project will assist Buzzards Bay municipalities securing other state and federal grants in their efforts to implement the recommended remediation sites.

In order to protect valuable wetlands, water quality, habitat, and open space, the Buzzards Bay Project, this year the Project will help the Towns of Carver and Rochester address these issues. This work continues on previous years successes in completing open space plans for other municipalities. We completed open space plans for last years targeted municipalities, the Town of Acushnet and City of New Bedford. Municipalities with completed open space plans, especially those that target environmentally sensitive areas for acquisition, have an excellent chance to receive new state funds to protect these valuable landscapes, as well as to take advantage of new federal wetlands protection programs.

Staff expertise will be available to assist local planning boards in developing critical nitrogen loading limits for nitrogen sensitive embayments and employing strategies for reducing loading limits to these embayments. Two years ago the BBP completed a review of eight years of citizen monitoring program water quality data. Based on this review, the project revised its nitrogen management recommendations and management strategy, including proposed new more stringent nitrogen limits (referred to as Nitrogen TMDLs or TMALs) for some Buzzards Bay embayments. Last year, these findings came into play in decisions involving the reissuance of two sewage treatment plant discharges. As of this writing, both the Town of Fairhaven and Town of Wareham will have nitrogen TMDLs based on BBP recommended methodologies. Because data for the Fairhaven treatment plant is still preliminary, the Buzzards Bay Project will work with EPA to develop a scope to evaluate flushing in New Bedford harbor, where the Fairhaven Treatment Plant is located.

The Buzzards Bay Project nitrogen loading reevaluation is still underway because the state has just release land use data for the 1990s. In the coming year, the Buzzards Bay Project will update and prepare a new Buzzards Bay subbasins nitrogen loading evaluation based on these both the new recommended limits and revised land use. Willing boards will be assisted in conducting build out analysis, nitrogen loading computations, and the use of certain analytical models to determine embayment flushing cycles. Last year and into 2000, the Cape Cod Commission and DEP adopted the BBP's approach for managing nitrogen to West Falmouth Harbor from the municipal treatment system. The project will also continue participating in regional and national meetings describing the BBP's TMDL approach. The Buzzards Bay Project will assist Buzzards Bay municipalities comply with new nitrogen TMDLs.

The Buzzards Bay Project is assisting Buzzards Bay municipalities comply with Phase II of the NPDES stormwater program. The Buzzards Bay Project will assist town in the mapping of stormwater discharges, mapping collection systems, and other elements of Phase II requirements.

Technical assistance personnel will attend all public hearing and town meetings to support the technical basis for regulatory changes. An additional focus of Project staff will be helping towns prepare grant applications for state and federal monies to help fund many of these tasks.

Other technical assistance tasks identified for Buzzards Bay Project staff:

- Sponsor a continuing series of workshops and meetings with selected town boards and staff that further implementation of key provisions with the CCMP.
- Follow-up with towns regarding weaknesses identified in the Coalition's report cards with offers of technical assistance from the Project.
- Use Buzzards Bay Action Committee meetings and other meetings with municipal officials as forums for discussing progress in implementing the CCMP.

Technology Transfer to Other Estuaries

This task is being undertaken with BBP NEP funds transferred to the New England Interstate Water Pollution Control Commission to provide travel to BBP staff and key partners (Coalition for Buzzards Bay and Buzzards Bay Action Committee) to attend national meetings and impart the knowledge gained through the above to other National Estuary Programs. Last years expenditures in this grant category are summarized in the FY00 reporting summary table below. This year a

similar suite of programs will be attended.

Match to the Cooperative Agreement.

Below is a summary of the \$397,658 match that is being provided to meet the match under this Cooperative Agreement (\$330,000) and the Cooperative Agreement to New England Interstate Water Pollution Control Commission (\$10,000) for BBP National Travel.

1) **Municipal support to Coalition (\$3,000).** For three years in a row, the Coalition has received \$100,000 from the Commonwealth for its citizen's water quality monitoring program for Buzzards Bay. The program was initially started and funded by the Project, then transferred over to the Coalition. The success of the citizen's monitoring program is integral to the success of Buzzards Bay Project implementation of nitrogen loading recommendation in the Buzzards Bay CCMP and for establishment of sewage treatment facility TMDLs. We are not including these grants from the state to the Coalition for this program, but the municipalities have been contributing \$3,000 per year to the Coalition for the cost of this program.. These funds help pay for analytical costs.

2) **Municipal support to BBAC (\$18,000).** The Municipalities of Buzzards Bay pay \$18,000 per year to support the Buzzards Bay Action Committee to projects to implement the Buzzards Bay CCMP.

3) **BBAC meetings (\$15,125).** The BBAC is composed of high level municipal officials (generally Selectmen, Town Administrators, or Department heads that meet monthly (11 municipalities at 11 meetings per year for 2.5 hours per meeting). The purpose of these meetings is to discuss CCMP implementation, specific progress on projects, and coordination with the Buzzards Bay Project and Coalition for Buzzards Bay. The average hourly rate assigned to these municipal officials value assigned is estimated to be \$50 per hour (including fringe and indirect). The total value of this contribution is \$15,125.

4) **Municipal support for Open Space Plans (\$25,200).** The Buzzards Bay Project is again writing open space plans for two municipalities (this year will be Rochester and Carver). Our staff will direct 18 municipal officials and volunteers appointed by the Boards of Selectmen to two Opens Space Committees as to information and data needs. These officials will meet twice per month (4 hours) an average of 10 months during any calender. The average hourly rate assigned to these municipal officials value assigned is estimated to be \$35 per hour (including fringe and indirect). The total value of this contribution is \$25,200.

5) **EOEA Buzzards Bay Watershed Team Projects (\$178,000).** An important success of the Buzzards Bay CCMP and Mass Bays CCMP is that the Commonwealth of Massachusetts, through EOEA, has established a watershed program called the "Watershed Initiative." This program was modeled after the success of the state's two NEP Bay Programs which were the first coastal watershed programs in the state. Importantly, EOEA has created a Buzzards Bay watershed Team Leader position (now staffed by a former Buzzards Bay Project staff member), and dedicated funds toward tasks identified as high priorities in the CCMP. The Buzzards Bay

watershed Team Leader is joining the Buzzards Bay Project Steering Committee as a non-voting member. Two Buzzards Bay Project staff members are members of the Buzzards Bay watershed Team.

Five specific tasks of the Buzzards Bay watershed salient to the Buzzards Bay CCMP and included here as match are as follows:

a) Buzzards Bay watershed Video. EOEA is contributing \$20,000 toward the production of a new Buzzards Bay environmental video (the last Buzzards Bay video was made in 1991 and paid for by EPA).

B) EOEA is contributing \$40,000 toward the Head of the Bay Westport NPS pollution evaluation. This initiative integrates with two grants obtained by the Buzzards Bay Project to inventory stormwater discharges and to develop BMP designs based on these studies.

C) EOEA is contributing to \$18,000 to help certify vernal pools in the Buzzards Bay watershed. Less than 70 vernal pools have been certified in the watershed, yet the Natural Heritage program has identified more than 1000 potential additional sites based on interpretation of aerial photographs.

D) EOEA is contributing \$70,000 to a Slocums River Flushing study to support nitrogen management and TMDLs for the Slocum River.

E) EOEA is providing \$15,000 to establish a Buzzards Bay Green way. The funds will be used to identify, praise, and map parcels for creation of the green way.

EOEA is providing \$15,000 for a Wetland Challenge Grant.

10) **CZM CPR grants (\$100,000+ \$33,333 local match).** The state has targeted \$100,000 in CZM Coastal Pollution Remediation funds to Buzzards Bay municipalities to help meet match needed under this cooperative agreement. Since a 25% total project match is required for these grants, \$33,333 in municipal match is generated.

11) **Municipal Match to BBP grant (\$5,000).** The \$15,000 in the BBP mini-grant program will generate a minimum of \$5,000 in municipal match.

12) **Town of Westport Match to Watershed Grant (\$20,000).** The town of Westport is providing \$20,000 to match and EOEA watershed grant to identify and remediate NPS inputs to the head of the Westport River. These funds are being used to pay for designs and aerial photographs with 2 foot contour elevations for planning purposes.

Other commitments

Implementation of this program and conformance with EPA Water Quality goals and will be overseen by the Buzzards Bay Project's Steering Committee.

Funds in the amount of \$10,000 are included through a separate Cooperative Agreement with the New England Interstate Water Pollution Control Commission. These funds are to 1) cover travel for the NEP Program Office, Management Conference members, or other associated stakeholders to appropriate national and regional conferences, workshops, or meetings; 2) provide peer-to-peer technical assistance to other NEPs or neighboring communities; and 3) bring in staff or stakeholders from other NEPs or watershed programs to assist an NEP.

The Buzzards Bay Project will submit complete Government Performance Results Act reporting information to EPA as specified in the EPA Funding Guidance. As a requirement of this agreement, the BBP will provide information on the GPRA performance measures to EPA by January 11, 2002.

FY00 Reporting

Included in this workplan is travel information and public health summary information expenditures from the previous cooperative agreement to meet reporting requirements .

Past Travel

Travel to Meetings of National and regional importance July 1, 2000 to June 30, 2001

Joe Costa, BBP	October 2000	ANEP/EPA meeting, Sebasco Maine	\$597
John Rockwell, BBP	August 2000	Society Wetlands Scientists	\$1,100
Aria Brissette, BBP	November 2000	EPA Financing Meeting	\$124
Sarah Wilkes, BBP	November 2000	EPA Financing Meeting	\$124
Joe Costa, BBP	March 2001	ANEP NEP meeting	\$1,542
Len Gonsalves, BBAC	March 2001	ANEP NEP meeting	\$978
John Rockwell, BBP	May 2001	National Wetlands meeting	\$1,630
Aria Brissette, BBP	May 2001	National Wetlands meeting	\$1,575
Sarah Wilkes, BBP	May 2001	National Wetlands meeting	\$1,008
Mark Rasmussen, CBB	June 2001	Citizen WQ monitoring Meeting	\$1,000
John Rockwell, BBP	June 2001	PSWQAT NEP smart growth	\$1,030
		TOTAL	\$10,708

Supplemental Funds

In last years cooperative agreement, \$30,000 was provided for environmental tracking. This work is resulting in the production of a status and trends report and the GPRA report. A final report on these expenditures will be submitted by September 30, 2001

Major Accomplishments July 1, 2000 to ongoing

- 1) Completed open space plans for New Bedford and Acushnet
- 2) Completed preliminary reviews of loading and TMDLs for Fairhaven and Wareham. EPA Region 1 has requested additional assistance
- 3) completion of alternative septic system fact sheets is imminent
- 4) Expended all funds for water quality and beach monitoring
- 5) wrote or assisted in the development of 5 grant application funds for Buzzards Bay municipalities.
- 6) Received, in collaboration with the City of New Bedford Harbor Development commission, nearly \$200,000 in grant funds to create a bilge water waste oil collection facility to reduce the discharge of oil in the marine environment.
- 7) The BBAC handed out more than 6000 bilge socks to recreational boaters during the summer of 2000. The BBP was a partner in this effort and assisted in outreach.

Work ongoing

Because of delays in awarding, municipal mini-grant awards or initiation of tasks by towns, this work is ongoing.

worrkplanfy01

BUDGET DETAIL*

Award: \$330,000 (+10,000 at NEIWPC for National Travel)

Personnel: \$63,277 (BBP Executive Director)

Travel: \$2,000

A portion of The Buzzards Bay Project's base funding (\$10,000) will be administrated by New England Interstate Water Pollution Control Commission under a separate Cooperative agreement to meet National Travel requirements.

Fringe: \$18,477
29.1% charge on all personnel

Contractual: \$148,333

1) Funds for Project staff (\$131,332) are contractual positions to implement the municipal technical assistance program. Those positions will be funded for the course of the budget period as follows (**amounts below includes local travel and benefit compensation**):

Administrative Assistant	\$39,111 for 12 months;
Wetlands Specialist	\$50,691 for 10 months;
GIS Land Use Analyst	\$41,530 for 10 months;

Due to Massachusetts EOE budgeting procedures, these positions must be shown as contractual because they will not involve official state positions, but rather "contractual employees." Balance of annual salary will be sought from other grants.

2) A Municipal Minigrant of \$17,001 will be awarded in a category based on discussions with the Buzzards Bay Action.

Supplies: \$10,448
Postage, phone, communication, printing, paper, office supplies etc.

Other: \$35,289
Rent and Utilities, Cleaning, medicaid, state audit, MassGIS, and other charge backs

Indirect costs: \$52,176
22.8% charge on all grants funds except municipal governments and selected in "other".

Match:

\$397,658 (see detail in work plan)

*This budget detail is in support of the additional \$330,000 that is being added to our existing grant agreement through FY01 amendments.

wrkpin01

Buzzards Bay Status & Trends

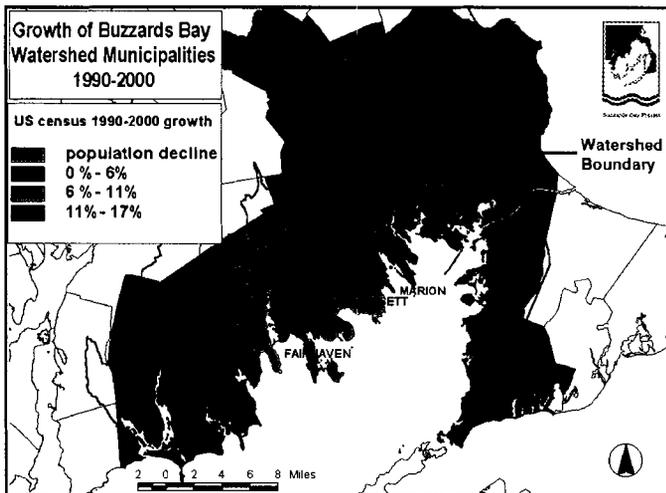
January 2002



Buzzards Bay Project

Population Trends

The 2000 US Census has affirmed that the Buzzards Bay watershed remains a fast growing area. Among principal towns in the watershed, population growth averaged 8.8%¹. Actual rates varied widely among towns, ranging from an actual decline of 6.2% during the decade in the City of New Bedford, to a tie of 16.8% population increase in the Towns of Rochester and Falmouth.



Data from US Census Bureau.

The population trends are actually complex. Because one third of the watershed population is found in New Bedford, a city with a declining population, the population in the entire watershed increased only 2.6% in the decade². If New Bedford is excluded, total population in the remaining watershed increased 9.8%.

The population downturn in New Bedford appeared to have occurred principally in the first half of the 1990s. In the past few years, permits for new single family units and multifamily units in New Bedford have been increasing, and the city has been undergoing redevelopment. These changes, coupled with proposed extension of commuter rail service and the planned New Bedford airport expansion suggest a higher growth rate in the watershed for the next decade.

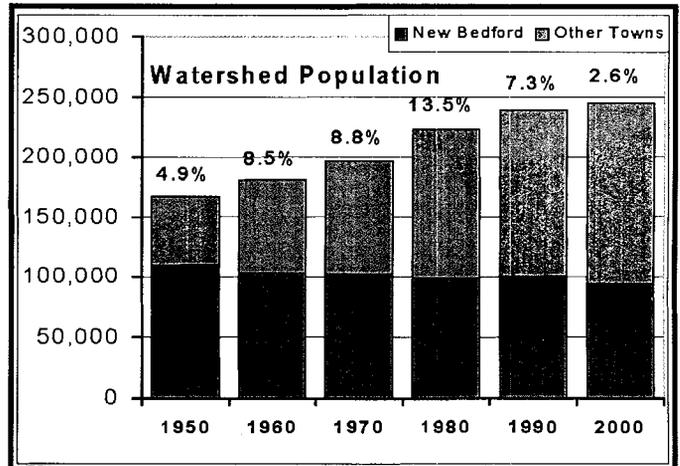
Construction and New Development

Like most coastal areas, the Buzzards Bay watershed is losing more and more open land to development. One of the strongest indicators of population trends and changes in land use are the number of permits municipalities issue for the

¹ Unweighted average.

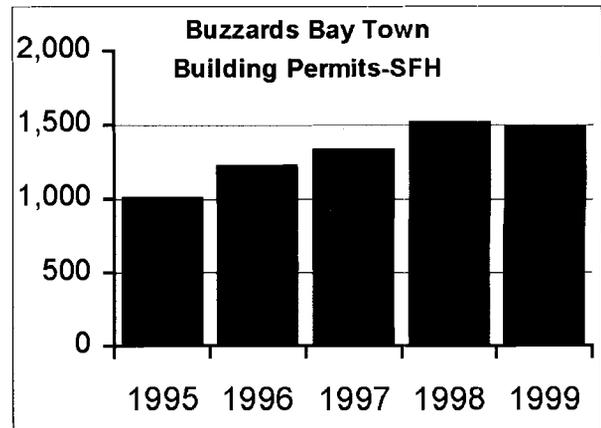
² Based on watershed populations for Westport, Dartmouth, New Bedford, Acushnet, Fairhaven, Mattapoisett, Rochester, Wareham, and 80% of Bourne, 25% of Falmouth, 84% of Carver, 20% of Plymouth, and 6% of Middleborough (values based on % of population in watershed in the 1990 census).

construction of single family homes (SFH). What is remarkable about this data is that the number of permits issued increased 50% in the last five years, suggesting higher population growth rates in the future.

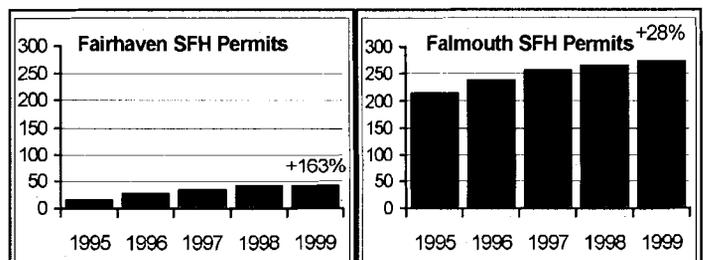


Data from US Census Bureau.

Like population growth, new home construction is not occurring at equal rates among Buzzards Bay towns. For example, the Town of Fairhaven, which has a very stable population, still had a 163% increase in the number of new home permits over 5 years, but annual permits totaled less than 50 per year. In the Town of Falmouth, permits have increased only 28%, but the town issued a remarkable 273 permits for new homes in 1999. The challenge to Falmouth's infrastructure and permitting capacity has been so great, that in 1996, the town set a cap of 200 permits per year (with certain projects excluded.)



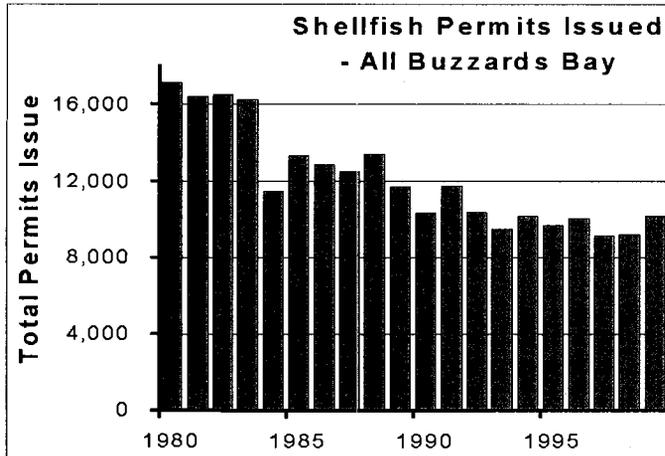
All Single Family Home permits issued by Buzzards Bay towns. Data from US Census Bureau.



Single family home permits issued in two Buzzards Bay towns 1995-2000

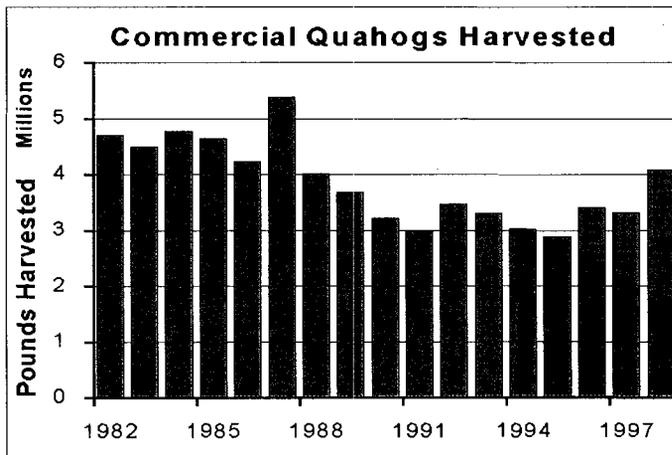
Shellfish Resources

When evaluating shellfish resources, there are two types of information of interest to managers. "How healthy and abundant are shellfish resources?", and "How many shellfish beds are closed?" To answer the first question is very difficult, and there is no method or data quantifying total shellfish populations in Buzzards Bay. The answer to this question is important, because shellfish populations can decline because of pollution, loss of habitat, disease and over-fishing.



Yearly totals of all permits issued by Buzzards Bay towns. Data courtesy of Massachusetts Division of Marine Resources.

One indirect measure of shellfish available are the number of shellfish harvesting permits sold by towns. The number of shellfish permits reflects many factors including the price of shellfish, closures, changes in permit fees, as well as the abundance of shellfish, so this data must be interpreted with caution. These data show that the number of permits sold has declined throughout the 1980s and early 1990s, but may have stabilized, possibly due to improved water quality in some areas, or possibly population increases.

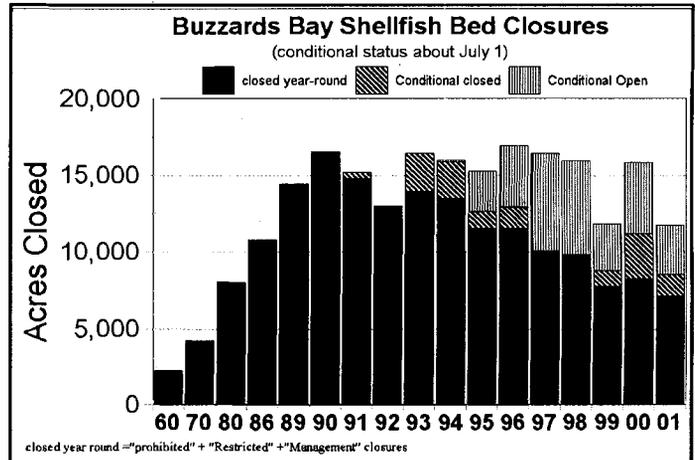


Data courtesy of Massachusetts Division of Marine Fisheries. Data from Gosnold excluded because incomplete.

Another indirect measure of shellfish available, are the number of pounds of shellfish harvested, as reported by commercial shellfisherman. These catch statistics are best exemplified by the data for quahogs, which account for most of the total poundage harvested in Buzzards Bay. Declines in catch during the 1980s and early 1990s probably reflect increasing shellfish bed closures. Increases during the 1990s have been due in part to opening of

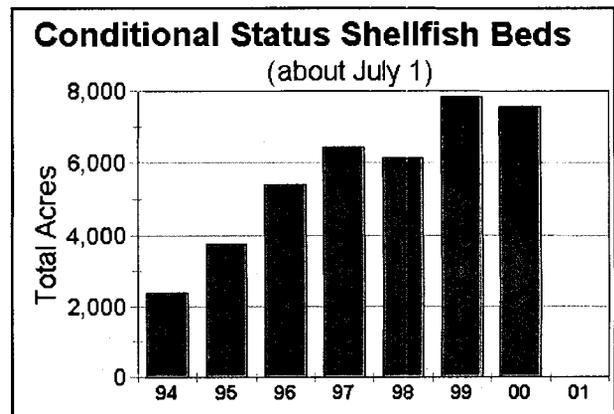
formerly closed areas, such as Clark's Cove in New Bedford which opened in the mid 1990s for the first time in 70 years.

However, the most important statistic relating to shellfish, and the goals of the Buzzards Bay Comprehensive Conservation and Management Plan, are the number of acres of shellfish beds closed to shellfishing. As shown in the figure below, total acres permanently closed to shellfishing has been steadily declining since the early 90s.



Data courtesy of Massachusetts Division of Marine Fisheries. Data from Elizabeth Islands excluded. In this graph "year round" closure in graph equivalent to prohibited + restricted + management closure classifications as defined at about July 1 of each year. "Temporarily closed" are seasonal and rainfall conditional closures on that date.

This trend is the direct result of two factors. First, the Massachusetts Division of Marine Fisheries, in cooperation with Buzzards Bay municipalities, put into place a program to document the relationship between rainfall and fecal coliform concentrations. This has allowed for the conversion of permanently closed areas to "rainfall conditional" openings. Thus, many areas are being opened for the first time in many years, at least during low rainfall periods. This program was successful only because the municipalities were simultaneously requiring upgrades of failed septic systems, identifying illegal ties to stormwater systems, sewerage lying areas, and treating stormwater discharges in borderline areas. These shellfish bed openings are one of the most important success stories of Buzzards Bay.



Data courtesy of Massachusetts Division of Marine Fisheries. Elizabeth Islands data excluded. Totals include both seasonal and rainfall conditional classifications either open or closed.

Rare and Threatened Species

Roseate Tern

One half of North America's breeding pairs of the Roseate Terns (*Sterna dougallii*) can be found on two tiny islands in Buzzards Bay. The species is classified by the EPA as a US Endangered Species. Over the past two decades, considerable effort has been put into the study and management of this population to prevent the local extinction of this tern. Most recent efforts include habitat management and gull control on the islands beginning in the early 1990s.

These protection efforts have paid off, with the return of Roseate Terns to Ram Island for the first time in twenty years. Many of the birds on Ram Island appear to have initially relocated from Bird Island, but with total habitat area increased, the total breeding pair population has been steadily increasing during the past several years, and this trend is expected to continue.

During the 1990s, Bird Island has faced severe erosion problems, threatening the tern habitat. To save the island from destruction, and to further manage and protect the tern population, the New Bedford Superfund trustees have awarded more than a million dollars to protect and preserve Bird Island.

Piping Plover

Piping Plover (*Charadrius melodus*) are small, sand-colored shorebirds that frequent Atlantic coast beaches from Newfoundland to North Carolina. These birds are beach nesters, favoring open habitat in sparsely vegetated dunes or just above the high de line. Piping Plover are not colonial breeders but space their nests at least 50-100 meters apart, usually more.

Predation and human disturbance have contributed to the scarcity and decline of plovers. Nearshore development, increased beach use, use of off road vehicles, and scavenging by predators (Red Fox, Raccoons, Striped Skunk) attracted by human garbage have contributed to piping plover decline throughout the 20th century.

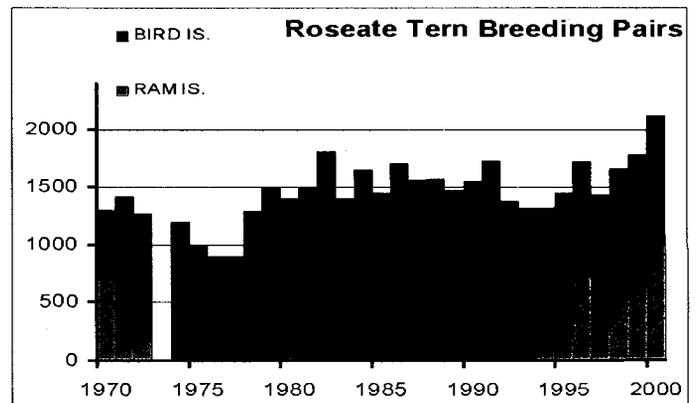
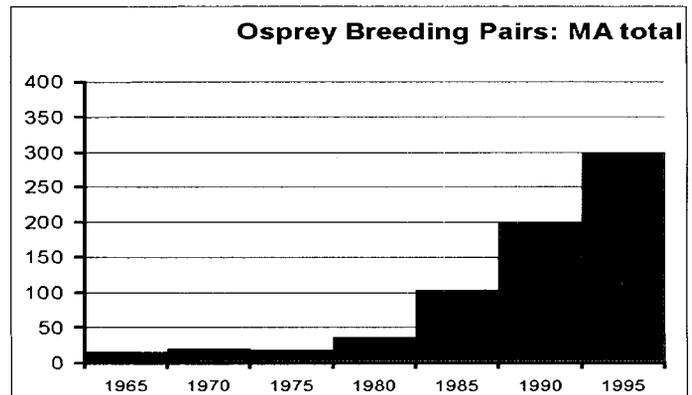
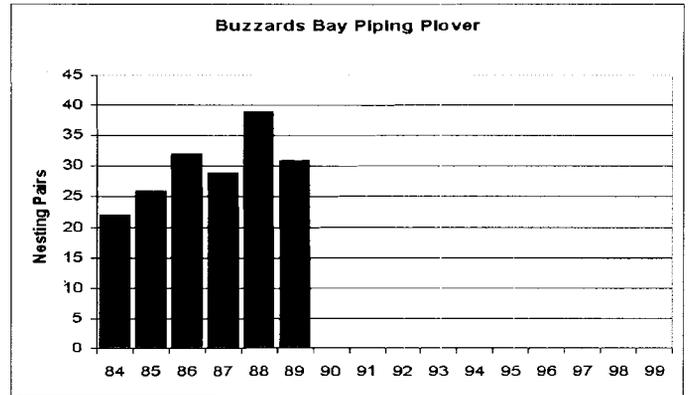
The Piping Plover are currently listed as a "threatened" species in Massachusetts. As a result of this classification, and state and local action to protect plover habitat, the plover population has grown. Most successful have been efforts to fence in nest sites against predators, to exclude pedestrian and recreational vehicle traffic from nesting areas, and gull management programs.

Osprey

The Osprey (*Pandion haliaetus*) is a large bird of prey, about the size of a small eagle or a large hawk. Osprey population declined dramatically in the US during the 20th century because of the use of the pesticide DDT. With the prohibition on the use of DDT in the 1970s, and the gradual burial and sequestering of the compound, ospreys have shown a marked recovery.

The other factor affecting Osprey population has been the decline in number of suitable nesting sites and habitat. Ospreys build their large stick nests high in dead trees or, when they find predator-free islands, on the ground. In recent decades natural nest sites have dwindled as the coastline has become more developed. Ospreys have discovered that artificial structures –

such as channel markers, power poles, and specially designed platforms atop poles – make safe, sturdy nesting locations. For example, nearly all of the 152 nests active in Massachusetts in 1989 were built on artificial structures. Osprey platform construction by ornithologists have contributed to the recovery of the species. Trend data is not available for Buzzards Bay only, but the statewide data is representative since Buzzards Bay accounts for one fourth of the state population.

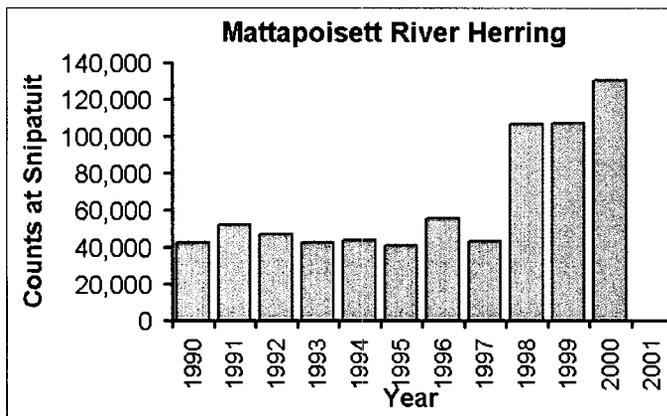


Buzzards Bay Roseate Tern breeding pairs. Data courtesy of Brad Blodget, State Ornithologist, Massachusetts Division of Fisheries and Wildlife.

Herring Runs

Throughout the past decade, municipalities have been repairing and replacing inadequate herring runs. In some cases, ladders that have been out of service for years have been replaced. Most notably are new herring ladders at Adamsville Pond in Westport, Snipatuit Pond in Rochester, at the Route 6 dam in Mattapoisett over the Mattapoisett River, and improvements of the Weweantic River herring run to name a few systems.

Each herring run has its own story to tell, but unfortunately, few herring ladders in Buzzards Bay have fish counters installed on them to document improvements. One herring run that does have a counter is the Mattapoisett River at the Route 6 dam. In 1997, an improved fish ladder was installed at the Route 6 dam in Mattapoisett. This work complimented a restoration further upstream at the Snipatuit Pond dam in 1996. These two projects resulted in a dramatic increase in herring migrating upstream.

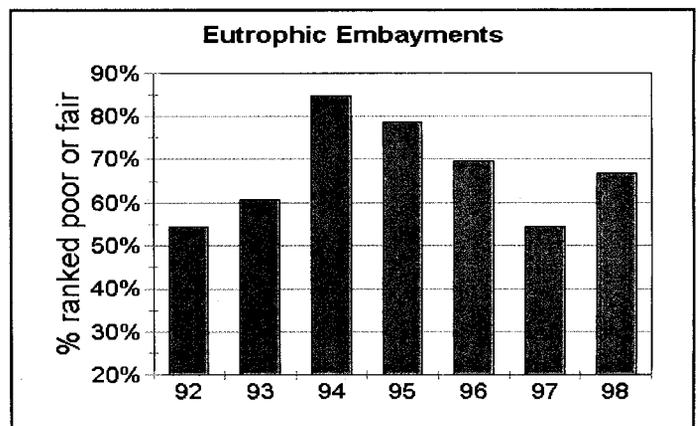


Nitrogen Loading

With regard to nitrogen loading, it is widely believed that most actions to manage nitrogen will not result in improved water quality since there is a lag time between watershed inputs and groundwater discharges to coastal waters is often many years to decades. The exception to this rule is better managed direct discharges like sewage outfalls, or sewerage immediately along the coast. In these cases, improved water quality may be observed in just a few years.

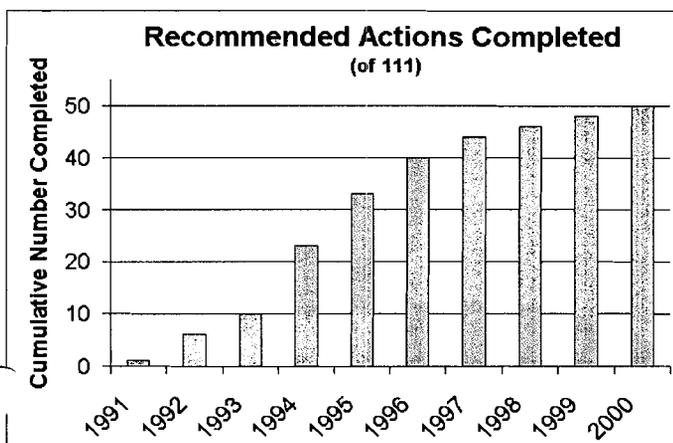
The Buzzards Bay citizen's monitoring program was created in 1992 cooperatively with the Coalition for Buzzards Bay (Coalition) under the guidance and with funding from the Buzzards Bay Project. In 1996, the Coalition assumed full responsibility and funding for the program. The objective of this program is to gather data to support management action, especially through embayment comparisons, and to track long term trends in water quality. This monitoring program has shown that although the central portions of Buzzards Bay have very good water quality, many embayments exhibit eutrophic conditions. Each embayment has its own suite of sources and potential management solutions. In order to encapsulate the myriad of measures monitored by the program, the BBP created a eutrophication index to score each embayment on a 0-100 scale. Embayments with scores less than 35 are labeled "eutrophic", embayments with scores of 35 to 65 are labeled fair. Those with scores greater than 65 are labeled "good to excellent."

In the figure below, these eutrophication classifications are summarized for 33 representative areas monitored in the program. As shown there appears to be a slight improvement in the number of embayments with poor to fair water quality. Even more important, the monitoring program is establishing trends for each embayment to track localized impacts. Please refer to the Baywatchers II report and Baywatchers map in Appendix D.



Implementation of the Buzzards Bay Comprehensive Conservation and Management Plan (CCMP)

The Buzzards Bay Project has begun a new implementation tracking system that enables the Buzzards Bay Project to easily track the number of CCMP recommendation achieved, as well as to assign uncompleted actions a percent complete rating. Of the 119 specific recommendations contained in the 1991 CCMP, 7 have been determined by the Project to be either no longer relevant or applicable. Of the 112 recommended actions, 50 were deemed to be completed by December 2001 as shown by the figure below. It is evident that many of the easier to achieve recommended actions were completed in the early 1990s, with progress on the remaining more difficult to achieve recommendations, coming slowly.

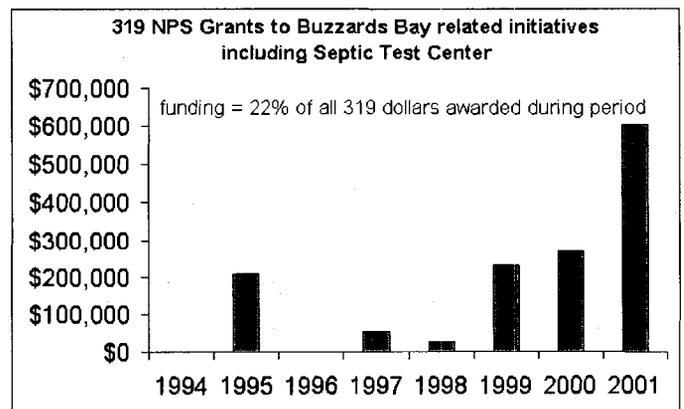
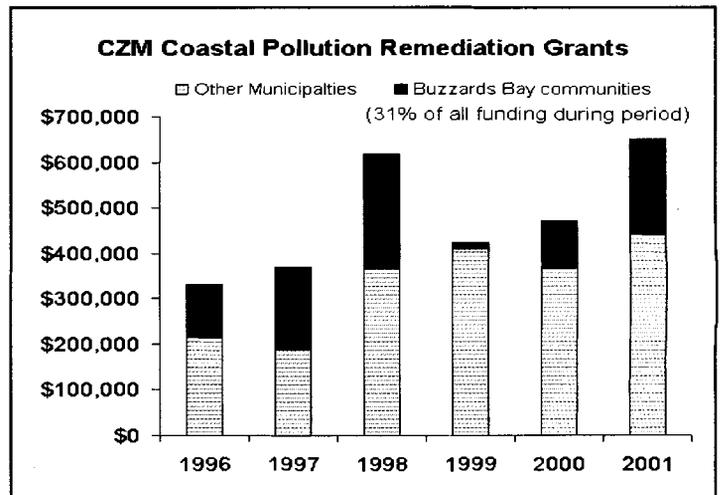


In the adopted tracking system, completed actions are assigned 100% and a date of completion. Incomplete actions assigned a % partial completion value, from 0% to 100%. This estimate was based on best professional judgment of BBP staff and others familiar with specific recommended actions. Although only 50 of 112 CCMP actions are 100% complete, by averaging in a percentage for partially completed actions, all specific actions recommended the CCMP are estimated to be 71% complete.

Funding implementation of the CCMP

The Buzzards Bay Project has had a highly effective municipal grant program in place since 1990. This program, funded through various sources, has allowed the Buzzards Bay Project to help initiate many CCMP recommendations. In addition, the Project has also been highly successful in securing state and federal competitive grants that have been either directly awarded to the Project or partner municipalities. The successful technical assistance offered to the municipalities in grant development is illustrated by the number of grants awarded to Buzzards Bay municipalities by the Massachusetts Office of Coastal Zone Management Coastal Pollution Remediation (CPR) Program and the Department of Environmental Protection Section 319 Nonpoint Source Pollution grant program.

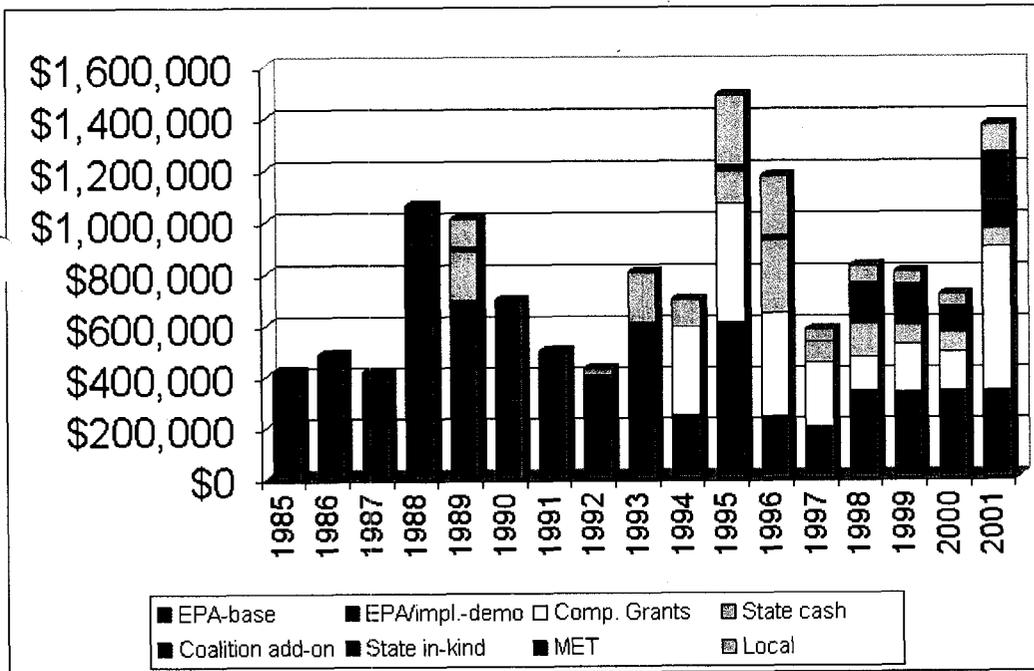
For example, Buzzards Bay municipalities account for only 12.5% of all Massachusetts coastal communities, yet during the existence of the CPR program, grants to Buzzards Bay communities, for projects in the Buzzards Bay watershed, account for more than 31% of all CPR grants. Similarly, Buzzards Bay municipalities account for less than 4% of all Massachusetts municipalities eligible for Section 319 grants for Buzzards Bay, but have accounted for nearly 22% of all grants awarded (including awards to state agencies) between 1994 and 2001.



The financing of implementation activities and leveraging of CCMP actions is part of an ongoing aggressive strategy by the Buzzards Bay Project to tap into various state and federal financial and technical assistance programs. Other Buzzards Bay Project Partners have similarly had success in attracting state and federal dollars. For example, after Buzzards Bay Project funding for Coalition's water quality monitoring program was zeroed out, the coalition succeeded in obtaining \$100,000 of dedicated state funds annually to implement their citizen's water quality monitoring program.

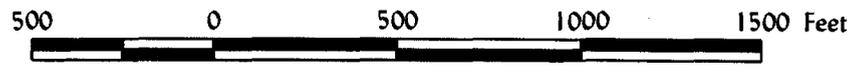
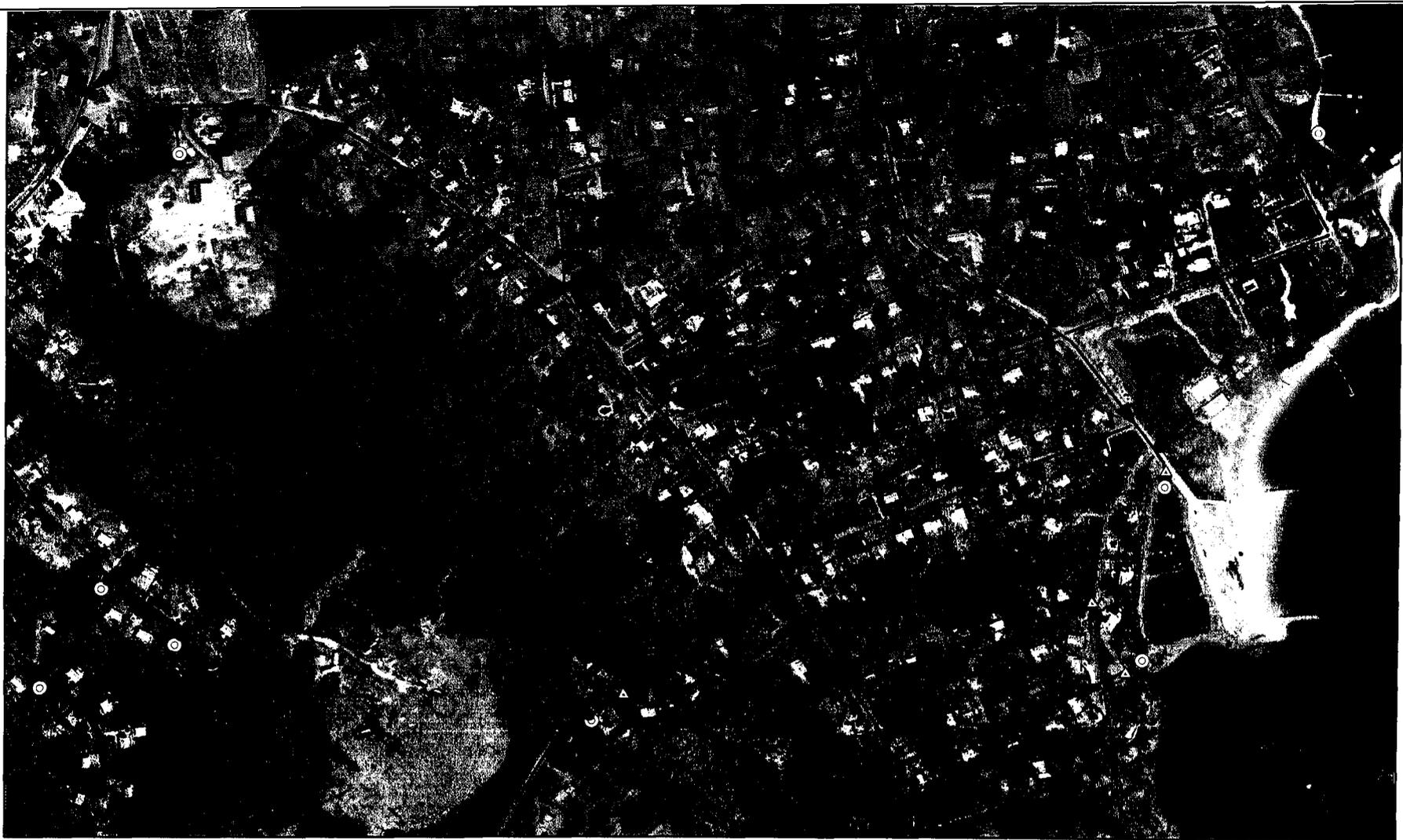
DRAFT Do Not Circulate

The successful acquisition of competitive grants and other funds acquired by the Buzzards Bay Project and its partners is illustrated by the figure below of Buzzards Bay Project funding. It is clear from this figure that modest federal "base funding" through the NEP has paid big dividends for Buzzards Bay. The Buzzards Bay Project continues to develop new concepts for grants, and we expect this success to continue.

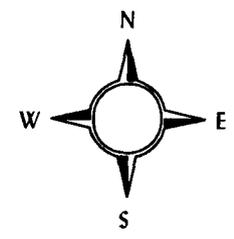


Marion Village Stormdrain System





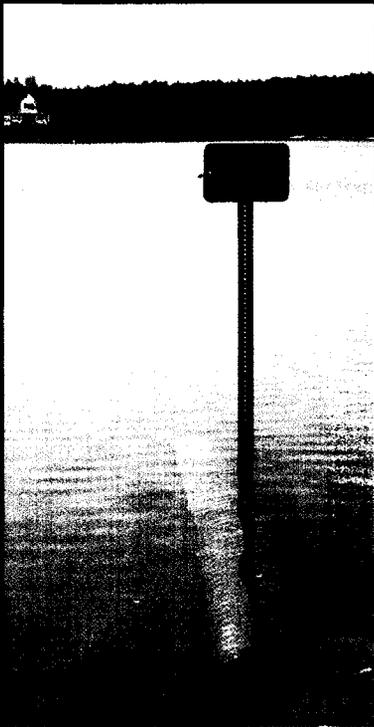
- | | | | |
|---|----------------------|---|----------------------|
| ● | Untreated Catchbasin | ● | Stormwater Treatment |
| ● | Treated Catchbasin | ↗ | Flow Direction |
| ⊙ | Discharge Pipe | ▨ | Lakes and Ponds |
| △ | Roadcut | ∩ | Rivers and Streams |



Map prepared by Buzzards Bay Project National Estuary Program
 2870 Cranberry Highway, E. Wareham, MA 02538
 Draft Atlas of Stormwater Discharges in the Buzzards Bay Watershed, November, 2001

Atlas of Stormwater Discharges in the Buzzards Bay Watershed

Rainwater running off streets, parking lots, roofs, lawns, golf courses, agricultural land and other pervious and impervious areas carry contaminants into bays, rivers, and ponds. Some stormwater contaminants like bacteria, are forcing the closure of shellfish beds and sometimes the temporary closure of swimming beaches around Buzzards Bay. Most often, paved roads and parking lots that are connected to Buzzards Bay by drainpipes and road cuts offer direct pathways for contaminants that were once isolated from the Bay.

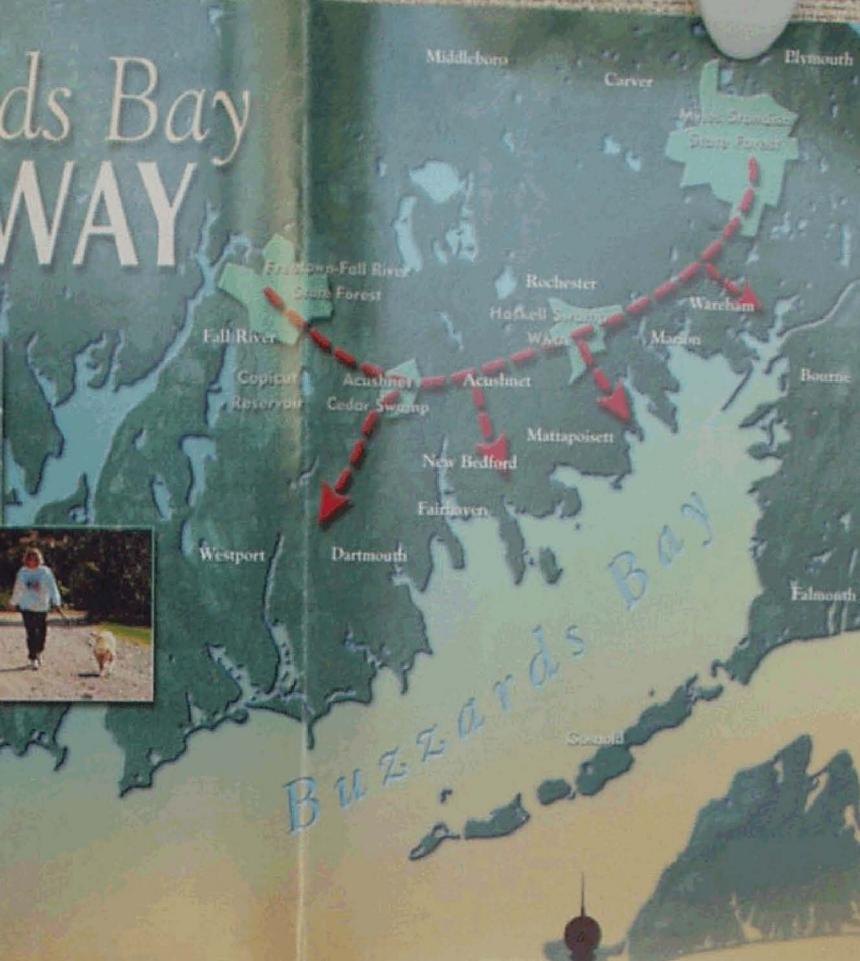


This atlas is meant to inventory, in maps and tables, all known stormwater discharges pipes and road cuts discharging to tidal waters in the Buzzards Bay basin. It also identifies all known contributing catch basins and surface areas for each of these stormwater discharges. Finally, based on drainage system size, available water quality data for discharges of stormwater and the receiving surface waters we attempt to establish priorities for remediation of stormwater based on water quality

December 2001
DRAFT

by the
BUZZARDS BAY PROJECT NATIONAL ESTUARY PROGRAM
with support from
MASSACHUSETTS HIGHWAY DEPARTMENT
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
MASSACHUSETTS ENVIRONMENTAL TRUST

Buzzards Bay GREENWAY



Protect Bay Lands... Protect the Bay

Buzzards Bay Greenway will do more than connect our region's rich tapestry of forests and open lands, meandering rivers, sweeping estuaries and ancient paths with a fabulous network of walking trails. Buzzards Bay Greenway will also help protect the Bay.

By protecting vital forests and river lands within the Buzzards Bay watershed, the greenway will help to preserve water quality in the rivers and the Bay. Acting as living filters, these forests and river lands capture rainfall, regulate stormwater and streamflow, and significantly reduce harmful nutrients from washing into the Bay. Healthy Bay lands mean a healthy Bay.



Buzzards Bay Greenway is an initiative of The Coalition for Buzzards Bay, in partnership with local communities, local land trusts and the National Park Service. For more information, contact The Coalition at (508) 999-6363, www.baybuzzardsbay.org. Except where noted, photos by Kendra Clifton.

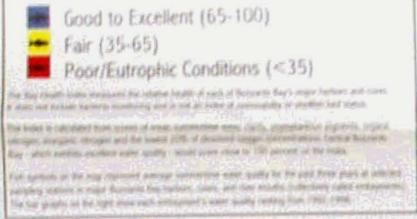


BUZZARDS BAY WATER QUALITY 1992-1998



THE COALITION FOR BUZZARDS BAY • Baywatchers II Report

The Buzzards Bay Health Index

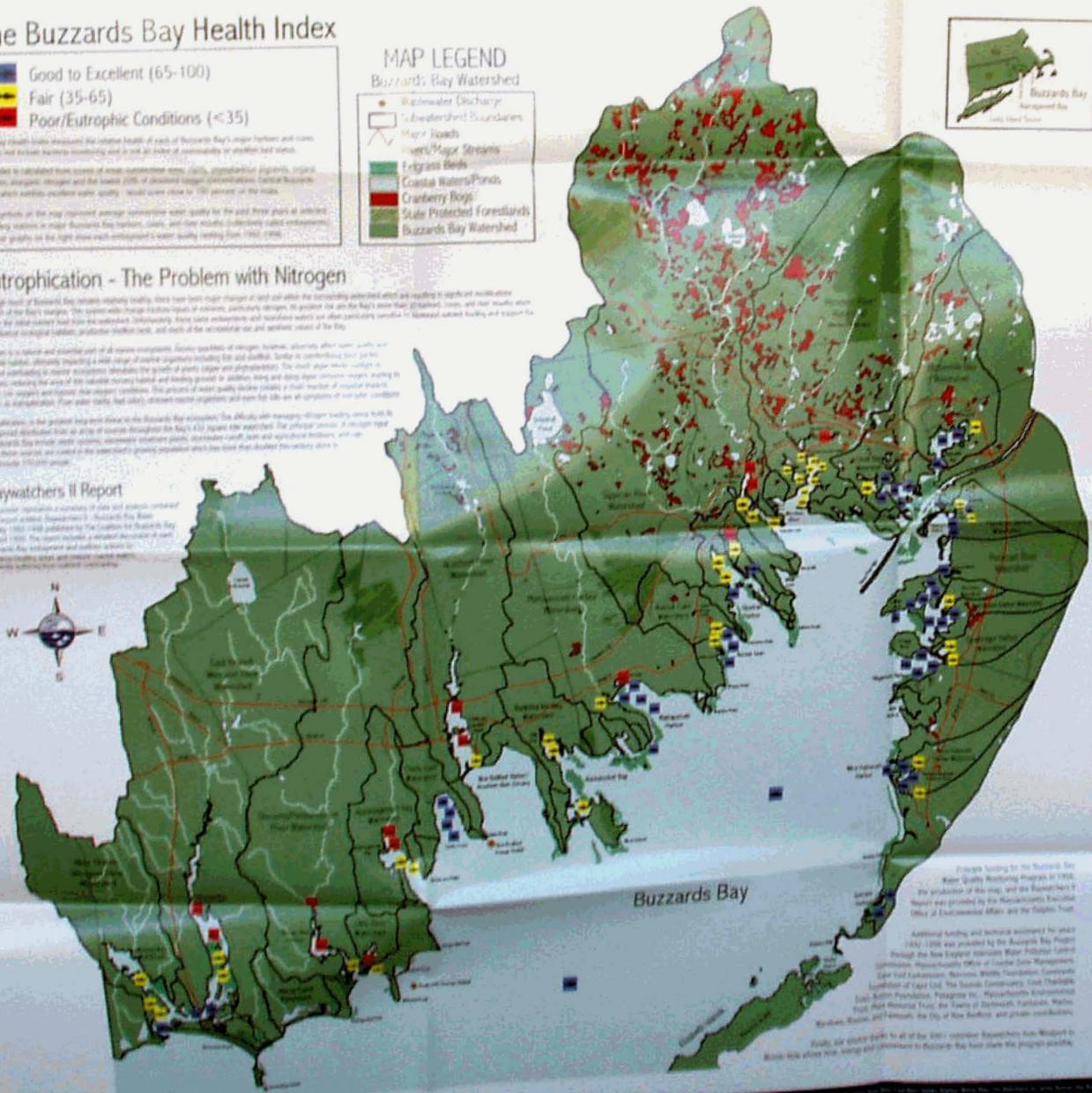


Eutrophication - The Problem with Nitrogen

Although much of Buzzards Bay remains relatively healthy, there have been major changes in land use within the surrounding watershed which are leading to eutrophication in much of the Bay's waters. The most visible change is the loss of forests, particularly in the western and central parts of the Bay's watershed. This loss of forest cover has led to a significant increase in nitrogen runoff into the Bay. Nitrogen is a key nutrient for eutrophication, and its excess can lead to the growth of harmful algae and other organisms. This can result in oxygen depletion, which can harm or kill fish and other aquatic life. The loss of forests also leads to an increase in sediment runoff, which can further exacerbate the problem. The good news is that there are many ways to reduce nitrogen runoff, such as planting trees, using fertilizers responsibly, and improving wastewater treatment. It is important that we take action now to protect the health of Buzzards Bay and its watersheds.

Baywatchers II Report

This report provides a summary of the water quality monitoring program in Buzzards Bay from 1992 to 1998. It includes information on the locations of monitoring stations, the parameters measured, and the results of the monitoring. The report also discusses the factors that may be affecting water quality and provides recommendations for further action. The data shows that water quality has generally improved since 1992, but there are still many areas that need attention. Continued monitoring and action are needed to ensure the long-term health of Buzzards Bay.



Trends In Embayment Health, 1992-1998



Buzzards Bay Water Quality Monitoring Program

The Buzzards Bay Water Quality Monitoring Program is a collaborative effort between the Massachusetts Department of Environmental Protection, the City of New Bedford, and the Coalition for Buzzards Bay. The program monitors water quality in Buzzards Bay and its watersheds to ensure the health of the Bay and its resources. The program includes regular sampling and monitoring of water quality parameters, as well as public education and outreach efforts. The results of the monitoring are reported in the Baywatchers II Report.

SAVE BUZZARDS BAY
COALITION FOR BUZZARDS BAY

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www.coalitionforbuzzardsbay.org

Atlas of Stormwater Discharges in the Buzzards Bay Watershed

DEP Project No. 00-02/319

Prepared by

Joseph Costa and Aria Brissette
Buzzards Bay Project National Estuary Program
Massachusetts Coastal Zone Management
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(508) 291-3625

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and
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DRAFT

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Acknowledgments

The *Atlas of Stormwater Discharges of the Buzzards Bay Watershed* is the result of a multi-agency cooperative study of stormwater discharges along the coast of Buzzards Bay in southeastern Massachusetts. The original inventory of information was funded by the Massachusetts Highway Department, with a grant from the Intermodal Surface Transportation Efficiency Act (ISTEA) program. Additional funding was provided by the Massachusetts Department of Environmental Protection (DEP 00-03/319) to refine and publish the Atlas in a form more directly usable by local and state officials. Site locations, maps and data summaries published in this Atlas were developed and produced by the Buzzards Bay Project National Estuary Program, a unit of the Massachusetts Office of Coastal Zone Management.

BBP staff participating in the development and production of this atlas included Joseph Costa, Aria Brissette, John Rockwell, Bernadette Taber, Tracy Warncke, Sarah Wilkes, and Mark Borelli. The staff of the Massachusetts Division of Marine Fisheries was of considerable assistance in providing water quality data and helping identify priority sites. These individuals included Michael Hickey, Thomas Hoops, Frank Germano, Greg Sawyer, and David Whitaker.

SECTION I: OVERVIEW AND METHODS

About This Atlas

This study was undertaken to identify all discreet stormwater discharges along the coast of Buzzards Bay, Massachusetts, together with their contributing drainage areas. All Buzzards Bay coastal municipalities were included in the study, except the City of New Bedford, which was excluded because the complexity of the city's combined sewer-overflow system could not be addressed within the scope and funding of the original grants.

With regard to the stormwater discharges included in this study, the sites we have included are almost exclusively discharge pipes and major road cuts. For the most part, we have excluded overland runoff areas, except known major livestock areas—mostly dairy cows—that are believed to contribute appreciably to degradation of water quality.

The purpose of this Atlas is to aid state and municipal officials in identifying stormwater discharge sites that are potential sites of remediation, particularly those sites where remediation may achieve appreciable improvements in water quality. Such a listing will help government officials identify restoration opportunities when road and bridge work is being contemplated, and as a justification for acquiring grant funds. Although the Buzzards Bay Project made considerable efforts to identify all stormwater discharges in Buzzards Bay, we recognize some sites may have been overlooked, and our list should not be considered definitive.

The prioritization ranking included in this report is for planning purposes. The ranking is meant to assist managers in identifying sites most likely to warrant consideration. This priority list is not meant to be a definitive evaluation of the suitability of any particular site for restoration. The scoring of prioritization was biased toward identifying sites that are most likely to result in changes in shellfish bed classification. That is, we attempted to find remediation sites that might give “the biggest bang for the buck”.

Our estimate of the cost of remediation was derived from a simplified costing model based on local projects and best professional judgment, and was considered approximate for the purposes of establishing prioritization and cost rankings. Actual costs will depend upon many variables particular to each site.

Information in the Atlas

The study area for this project encompassed the southeastern coast of Massachusetts, extending from the border of Rhode Island, to the southwestern tip of Cape Cod at Woods Hole (See Figure 1). The following eight Buzzards Bay municipalities were included: Westport, Dartmouth, Fairhaven, Mattapoisett, Marion, Wareham, Bourne, and Falmouth. The Atlas contains the following information:

- Maps showing locations of stormwater discharges to Buzzards Bay, particularly stormwater pipes and major road cuts, with an additional map showing areas of livestock concentration that may be contributing to water quality degradation. The stormwater discharge maps include all catch basins and assumed lines of flow.
- Summary information on one or two priority sites for each town.
- Detailed summary table information for all sites, including estimated impervious surface, drainage areas, numbers of structures, and other features of the database.

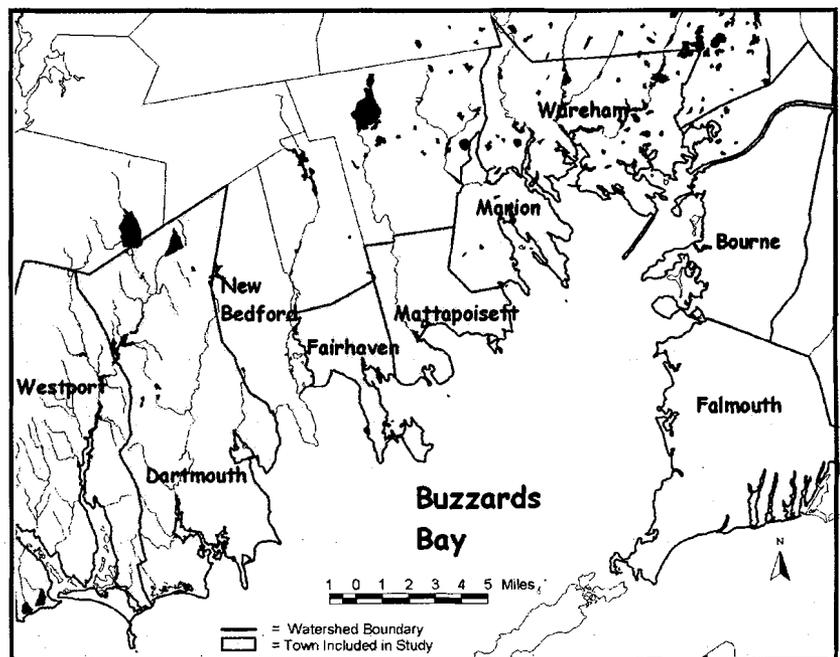


Figure 1. Municipalities included in this study are highlighted bright yellow on this map.

Distribution of the Atlas [note: this will be done for the final]

Maps in this Atlas include both 8 ½ x 11 inch plates and 11 x 17 inch plates. In Appendix IV, large format wall maps (34 x 44 inches) are included in pockets, with one map prepared for each town. To reduce printing costs, respective towns received maps only of their municipality and adjoining ones. Copies of the Atlas provided to regional and statewide agencies included all municipal maps in Appendix IV.

Distribution of the atlas included single copies to the public library of each coastal community and municipal Department of Public works. Additional copies were provided to the following municipal agencies of each community in the study area: municipal executive (mayor, town manager, selectmen), Board of Health, Planning Board, and Conservation Commission. The large format maps of this atlas were sent to fire chiefs in each municipality because the maps have proven highly valuable to identify storm system flow whenever there is an accidental spill of oil or other contaminants on roads and highways. The atlas was also made available to local environmental groups and other interested parties. A PDF version of the atlas was posted on the Buzzards Bay Project's web site, www.buzzardsbay.org. The atlas and data sets will also be provided on a CD. Additional copies of this Atlas may be obtained by writing to the Buzzards Bay Project, 2870 Cranberry Highway, East Wareham, MA 02538.

How To Use The Information in the Atlas

The *Atlas of Stormwater Discharges of the Buzzards Bay Watershed* documents all known stormwater discharges and contributing catch basins along the shore of nearly all of Buzzards Bay. This Atlas was designed for use by municipalities, state agencies, and other organizations to initiate stormwater remediation activities at these sites when

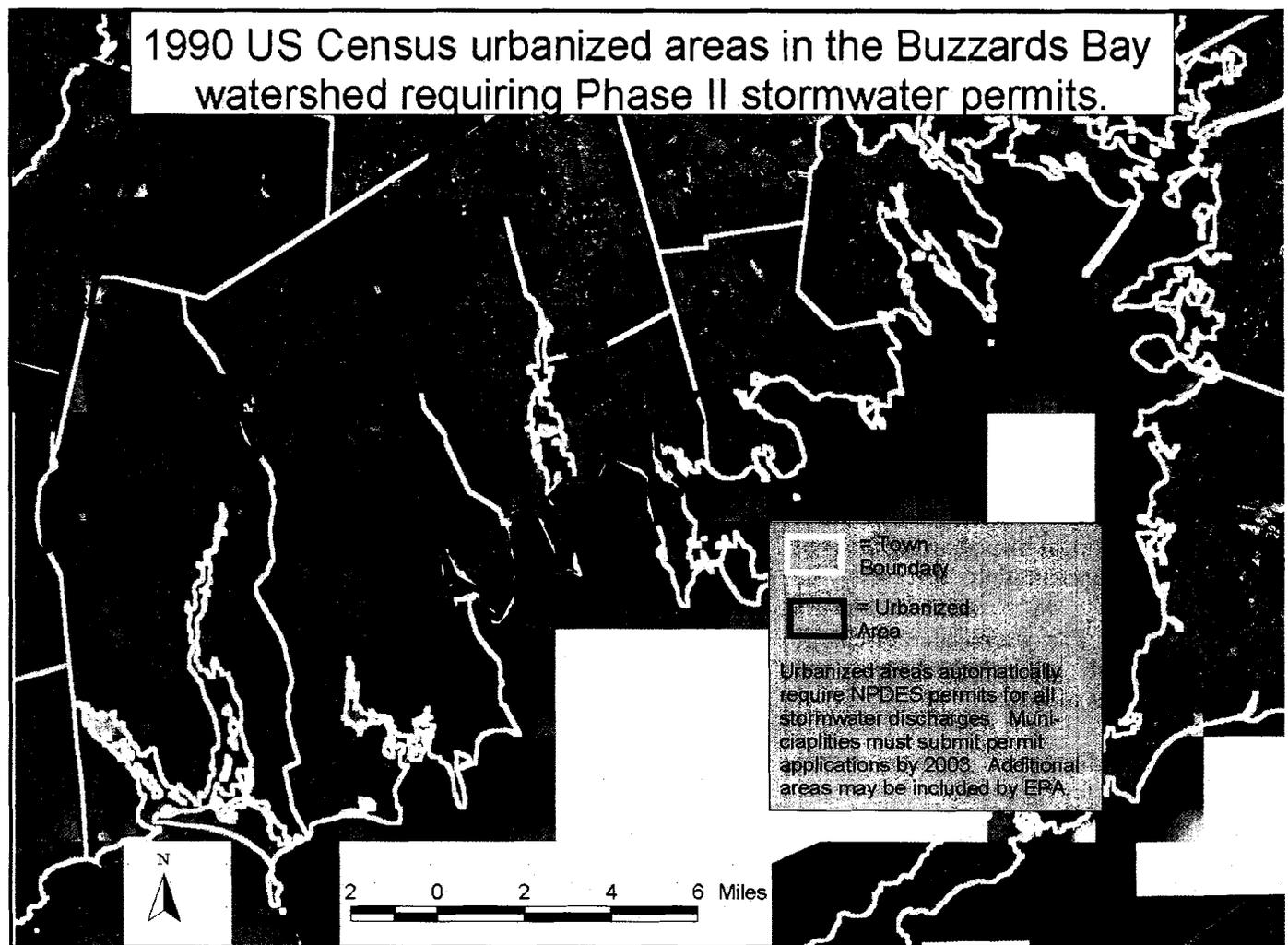


Figure 2. Phase 2 stormwater permit "urbanized areas" requiring a stormwater management plan.

appropriate. Municipal public works departments are particularly encouraged to check this Atlas when road or bridgework is being considered either by state or municipal departments. Installation of stormwater BMPs during roadwork is often the most cost effective strategy for improving water quality. The Atlas also serves as a source of information for projects under consideration as part of the Regional Transportation Plan and those eligible for state and federal transportation funding. Finally, by 2003, several Buzzards Bay communities (Fig. 2) must prepare stormwater management plans under the Phase II stormwater permit process promulgated by the US EPA.

Background: The problem with stormwater

Controlling stormwater runoff was identified as a priority “Action Plan” in the Buzzards Bay Comprehensive Conservation and Management Plan (CCMP), a watershed management plan approved by the Commonwealth of Massachusetts and the US EPA in 1991. In the CCMP, it was recognized that rainwater running off streets, parking lots, roofs, lawns, golf courses, agricultural land and other pervious and impervious areas carries a number of important contaminants into Buzzards Bay via stormwater drains and other pathways. Paved roads and parking lots that are connected to Buzzards Bay by drainpipes offer major contaminant pathways for wastes that were once isolated from the Bay. Often these discharges are conspicuous to the public (e.g., figure 3).

One of the best documented problems associated with stormwater runoff is bacterial loading from stormwater runoff forcing the closure of shellfish beds and sometimes the temporary closure of swimming beaches in Buzzards Bay embayments. Stormwater runoff is also contributing to other water quality problems, including pollution from hydrocarbons, metals, nutrients, and floatable debris, and accelerated sedimentation. Although concerns and uncertainties remain about the long-term impact of many of these contaminants, especially toxic contaminants discharged during storm events, the CCMP identified action to reduce the closures of shellfish beds due to fecal coliform bacteria in stormwater runoff. It was felt this strategy would often help reduce other contaminants as well, because BMPs to reduce stormwater fecal coliforms would contribute to the attenuation of other pollutants.

In Buzzards Bay, years of site-specific data have pointed to stormwater as a major source of bacterial contamination in most of the 30 or more embayments that surround Buzzards Bay. Only in a handful of embayments are sewage facility treatment discharges, combined sewer overflows, or farm animal wastes the principal cause of bacteria related water quality impairments.

In the Buzzards Bay CCMP, two goals were identified:

1. Prevent new or increased untreated stormwater flows to Buzzards Bay that would adversely affect shellfish harvesting areas, swimming beaches, water quality, and wetlands.
2. Correct existing stormwater runoff problems that are causing or contributing to water quality degradation or shellfish-bed closures in Buzzard Bay.

While these goals seem straightforward and simple, the cost of remediating all existing major stormwater discharges in Buzzards Bay (excluding CSOs in New Bedford) will exceed \$20 million dollars. The management and permitting of new discharges to minimize water quality impacts is piecemeal among many municipal departments and state agencies, often without consistent standards. At present, most new storm drains are being regulated entirely at the local

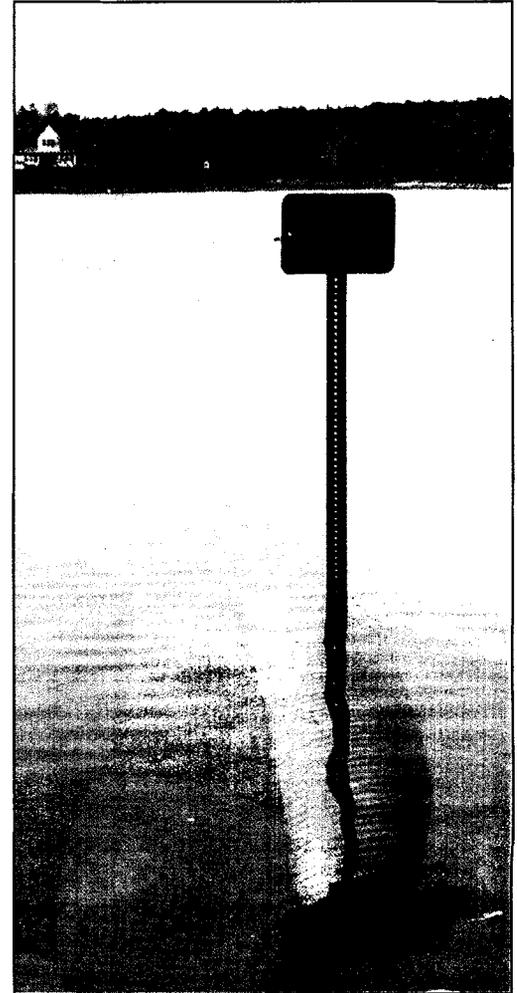


Figure 3. A submerged storm drain near a Wareham beach.

level through subdivision bylaws and road-drainage regulations. This type of local regulation is sometimes inconsistent from one community to the next. Another problem is the fact that both local public works departments (DPWs) and the State Highway Department (MHD) have, as their primary mission, the construction of safe roads. This includes the removal of stormwater from those roads as quickly as possible. Historically, resource protection and water quality considerations had been secondary to this mission. Often these kinds of projects have been exempt from wetland permit filing, and in some instances, filing requirements have been ignored. Furthermore, existing problematic stormwater discharges were rarely systematically remediated in any community. Exacerbating the problem is the fact that requirements within a single town's boards are not consistent and sometimes even contradictory. Even more complex are situations where stormwater from more than one town may be contributing to water quality degradation or shellfish-bed closures in a specific embayment. Each contributing town must enact similar and equitable stormwater controls in order for the affected resource to be fully protected.

Many changes have occurred during the past decade to help address these problems. In 1996, the Buzzards Bay Project began promoting a set of unified stormwater management regulations for Boards of Health, conservation Commissions, and Planning Boards. Already many Planning Boards, Conservation Commissions, and Boards of Health have adopted regulations or policies that address stormwater discharges. Additionally, in 1999, the Commonwealth of Massachusetts issued stormwater policies to assist state regulators and municipal conservation commissions in reviewing new proposed stormwater discharges in order to meet the goals of the state's Wetland Protection Act. Both the Buzzards Bay Project's unified regulations, and the state stormwater Policy Guidance document have common goals and standards to address stormwater discharges.

The state stormwater policies and the Buzzards Bay Project's model local regulations include performance standards for stormwater flow rate, volume, and quality. In the case of the Buzzards Bay Project's model regulations, two goals are to be met: 1) No new construction, whether public or private should create any new direct untreated stormwater discharges that degrade water quality or living resources, and 2) Stormwater must be treated onsite rather than be discharged to other public or private conveyance systems (which often discharge to surface waters).

Impacts of stormwater discharges

Investigations by the Massachusetts Division of Marine Fisheries and the Buzzards Bay Project and have identified stormwater runoff as the primary factor contributing to most closures of shellfish beds around Buzzards Bay. Stormwater can be considered a pollution source and a conveyance mechanism for inland sources of contamination. In practical terms, stormwater may convey problems arising from failed septic systems or bad farm management practices to the coast, where the pollutants may have a greater impact on public health and the environment.

The principal pollutant of concern used to evaluate stormwater discharges in Buzzards Bay is fecal coliform contamination. Residents, municipal officials, and managers alike identified fecal coliform contamination as a priority management issue by because of the widespread closure of shellfish resource areas along shore (Figure 3). These closures accounted for 10,000 to 15,000 acres. Moreover, because stormwater discharges and rainfall are highly linked to fecal coliform concentrations in the receiving waters in most areas of Buzzards Bay, the management and control of untreated stormwater discharges has remained a top priority in Buzzards Bay. Due to the geometry of the Buzzards Bay coastline, restoration of bay water quality is highly dependent on localized remediation of stormwater runoff.

While it is true that the area of shellfish bed closure represents a tiny portion of the overall area of Buzzards Bay, these closures are located along the fringes of Buzzards Bay where they have the greatest impact. That is because certain popular species such as soft-shell clams, bay scallops, and oysters are harvested nearly exclusively from these near shore areas. Even somewhat deeper water species like the quahog are most abundant in the coastal bays. For both commercial and recreational fisherman, large portions of areas where they have easy access are closed during the summer because of elevated fecal coliform bacteria levels.

Finally, in the next few years, all Massachusetts municipalities will be switching standards from fecal and total coliform bacteria, to an *Enterococci* bacteria standard. While the change in standard alone will not result in many new beach closures, requirements to use 24 hour rapid assays, to publicly post the results, and to immediately close beaches above new safe swimming standards will result in many new beach closures. Already, in 2001 certain state beaches on

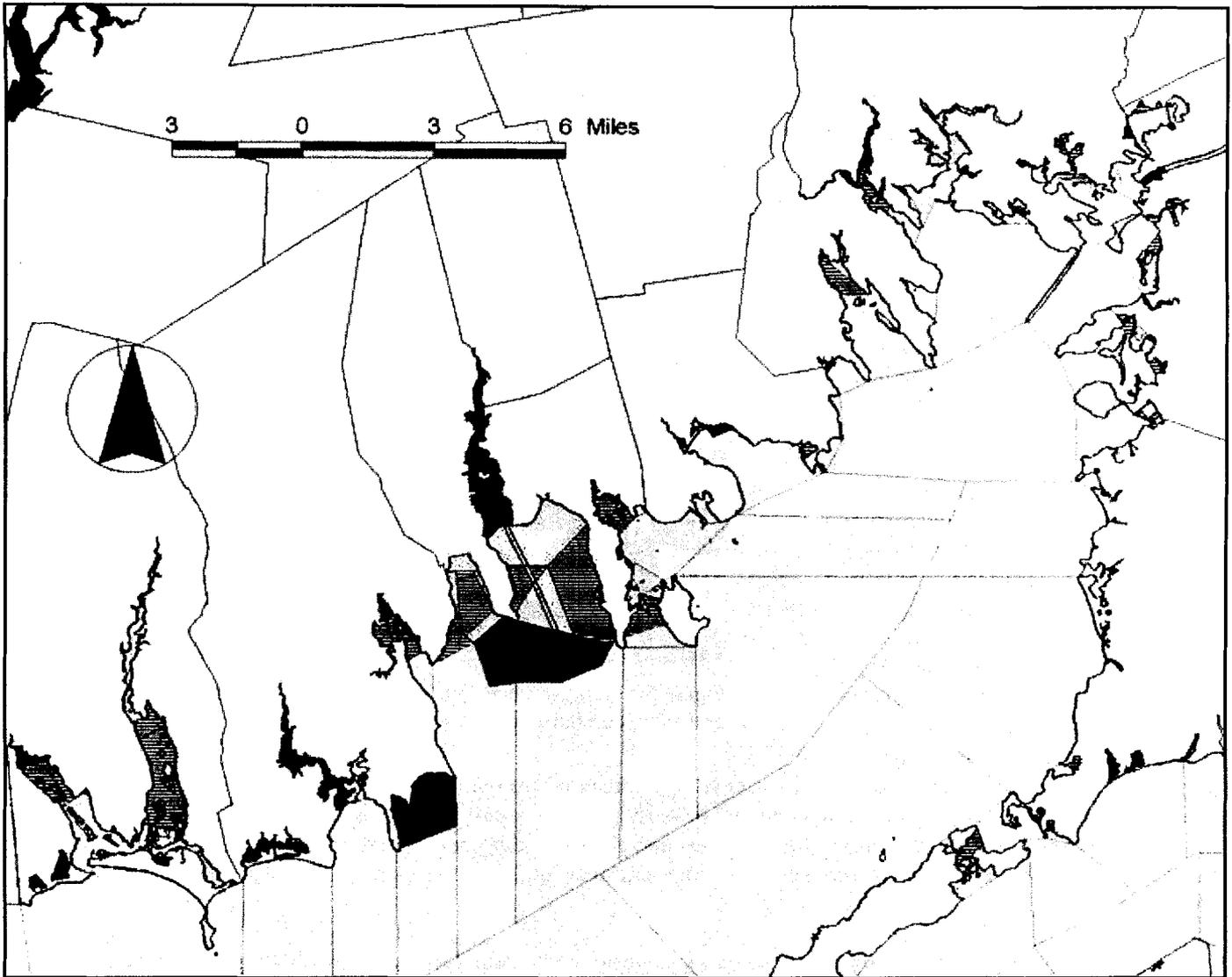


Figure 4. Shellfish Resource Area Classifications in Buzzards Bay. Pink and Red areas are closed year round, green areas are closed at least portions of each year.

Cape Cod and elsewhere have had beach closings after heavy rains for the first time ever. Such new closings at municipal beaches in the future, will more than ever, initiate action to remediate stormwater discharges.

Stormwater remediation solutions

No single stormwater remediation technique solves all runoff problems. Fundamentally, managers must determine whether it is more cost effective to reduce sources in a watershed such as reducing animal manure runoff or replacing failed septic systems. If the most egregious sources are addressed, strategies to improve water quality generally focus around treating the “first flush” of discharge from a stormwater system. This is because the first ¼ to ½ inch of rain tends to convey the greatest portion of pollutants to a bay.

Accepted best management practices (BMPs) for stormwater include:

- Infiltration devices to increase the percolation of stormwater into soil and thus decrease overland runoff volume, including porous pavement, soak-away pits or dry wells, seepage or infiltration trenches, recharge or percolation basins and grass swales
- Wet detention basins to detain runoff and allow for settling of pollutants associated with sediments and reduction of nutrients through biological processes

- Vegetated swales and constructed wetlands
- Public works cleaning practices to remove potential pollutants from streets and storm sewers, including street cleaning and cleaning catch basins and storm sewer pipes.

A proper mix of stormwater control techniques can satisfy four major concerns: flooding, erosion, water quality, and groundwater recharge. Individual site conditions, type and use of receiving waters, and cost will determine the most appropriate design. Costs are usually determined by the system's capacity, which is primarily designed to handle the "first flush" from a storm, when contaminant levels are highest. Maintenance costs, however, may exceed construction costs with certain systems. Of the techniques listed, infiltration devices are often the most efficient at controlling coliform pollution from stormwater runoff for existing development. Open access settling and infiltration basins may be the preferred option for new development because of easier maintenance.



Figure 5. Settling basin and constructed wetland at Spragues Cove. The system was designed to treat stormwater from Marion center.

The greatest potential for utilizing the full range of BMPs for stormwater control is in undeveloped areas where the reduction of future pollutant loadings can be realized for the least cost. There is a great opportunity in such areas to employ land-use planning, especially in subdivision designs, to reduce future runoff volumes and corresponding pollutant loads. Developing communities can incorporate structural measures to reduce runoff and can also implement construction-site erosion BMPs into their development plans.

In developed areas, structural controls may be expensive to implement and land for retention basins may be either prohibitively expensive or not available at all. For example, the large infiltration structure installed along Buttermilk Bay at Electric Avenue cost over \$100,000 to complete. Simpler solutions for other sites may be far cheaper to implement depending upon the depth of groundwater, soils types, road width, and utility lines among other factors. In this report, guidelines for stormwater management cannot be thoroughly treated, and the reader should refer to the Buzzards Bay Project's Unified Stormwater Regulations for Municipal Boards in Appendix C, the Commonwealth of Massachusetts Stormwater Guidance document, and BMP guidebooks like *Controlling Urban Runoff* by the Washington District ? .

As discussed above, the construction of stormwater treatment facilities can be costly. Any town that is contemplating such an effort must consider all facets of the issue, including land acquisition, installation techniques, cost, treatment effectiveness, and maintenance requirements. Sampling data may be needed to determine the relative impact of each drain on water quality degradation. Before targeting a particular storm drain for action, the town should ensure that the problem is not emanating from septic systems that are "cross-connecting" with the drain. This atlas will help with that process and help identify priority sites.

Most stormwater drains in Buzzards Bay are primarily wet weather discharges only. Those that have continuous, dry weather flows may be an indication of illegal cross connections with sewer lines or septic systems. Alternatively, dry weather flows could merely indicate groundwater infiltration.

Mapping Methodologies

The maps in this report were developed by extensive field surveys, evaluation of engineering plans on file with town

and state highway departments, and discussions with town engineers. All maps were submitted to municipal public works departments for review. For field investigations, each street near shore was walked to locate catch basins and these features were marked on plans, quad sheets and paper copies of MassGIS one half-meter orthophotographs in hand (Fig. 6). Catch basins, discharge pipes, and road cuts were marked on the maps using homes, intersections, and other features on the orthophoto maps as guides. We believe this methodology resulted in feature coverage accuracy of 25 feet or better.

Storm drainpipe connections were determined by examining available engineering plans, and inspecting or removing storm drain covers to identify invert pipe elevations and placement. Presumed flow directions were determined from apparent land surface elevations in the field or review of state 10 m orthophotograph 3-meter elevation contours.

Because of time, cost, and access constraints on collecting data for this study, no attempt was made to precisely measure discharge pipe diameter or apparent flow. The decision to not precisely measure pipe diameter was based on the fact that there is little relationship between storm water flow and pipe diameter. Often pipe diameter depended mostly on the when the drainage system was constructed, and what entity constructed it. Another problem was that some pipes were located under water or in heavy brush. Some pipes have dry weather flow. Such dry weather flow could be the result of infiltration of water in pipe joints, sump pumps, or other factors. Because the pipes were identified during different seasons, during dry weather and wet, documenting flow was beyond the scope of this survey.

Although this study made no attempt at quantify flow, we reviewed DMF sanitary surveys. These reports contained anecdotal information about storm water discharges and dry weather flows, and in some cases fecal concentrations of discharges immediately along shore near shellfish resource areas.

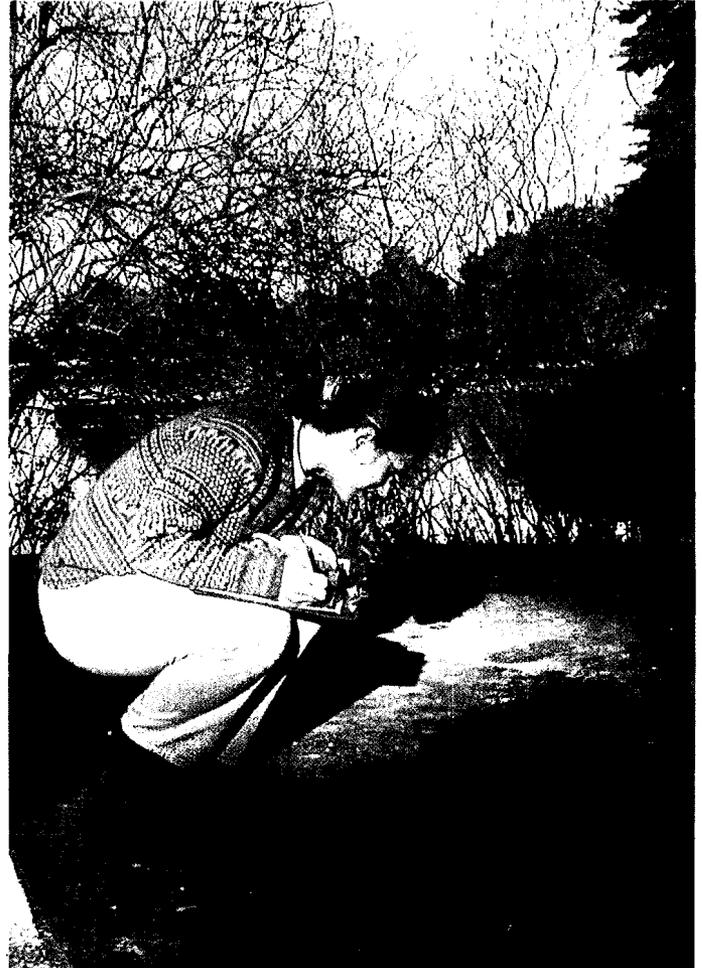


Figure 6. Inspecting and mapping storm drains in the field.

Data collected on paper maps in the field were transferred to ARCVIEW by eye, using the same MassGIS one half-meter orthophotographs as a base map. The final field survey and GIS data layer creation was conducted by the same individual to ensure maximum accuracy. Data layers were coded so that each stormwater discharge had a unique identifier in the format TTBB####, where TT is a two letter town mnemonic, BB a two letter bay mnemonic, and #### a number. A similar coding system was used for catch basins. Within the ARCVIEW database, each catch basin had a field identifying a stormwater discharge connection where known.

Remediation Costs Assumptions

Approximate costs of remediation were determined using the following formulation:

\$2000 per catch basin + \$10 per linear foot of drainage network x 2 if roads are less than 20 feet x3 if water table is less than 5 feet below the surface or poorly draining soils (using NRCS soils maps as an indicator).

This approach is somewhat crude but was believed to be accurate within an order of magnitude, and adequate for ranking projects by cost.

Prioritization methodology

To evaluate stormwater remediation sites, the following information was gathered for each discharge:

- number of catch basins in stormwater network
- length of stormwater collection system
- number of homes in drainage area, both sewered and unsewered
- estimated impervious surface area within drainage area
- estimated cost of remediation
- sensitivity of receiving waters to changes in pollution

Most of these calculations were conducted in ARCVIEW. For example, storm drain networks were connected “polyline” features and linear length of the network was automatically calculated in ARCVIEW. For summary statistics of catch basin numbers, ARCVIEW DBF files were converted to Excel spreadsheets, where pivot tables were created to summarize the data. Certain calculations were done partially manually. For example, the number of house in the drainage area was counted by counting all houses visible within 200 feet of the drainage network, as visible in 1999 aerial orthophotographs used as base maps.

The calculation of contributing impervious surface areas was based on the assumption that each residential unit contributed 2000 square feet of impervious surface area for roofs, sidewalks and driveways for units on parcels greater than 1/3 acre or more. For units on parcels less than 1/3 acre, 1500 acres per unit was assumed. Estimated road width (measured on orthophotographs) was multiplied times the length of the roads service by the drainage network.

The Buzzards Bay Project mapped sewered areas of Buzzards Bay (see Fig. 7). Most typically, either all or none of the homes in any particular drainage were sewered.

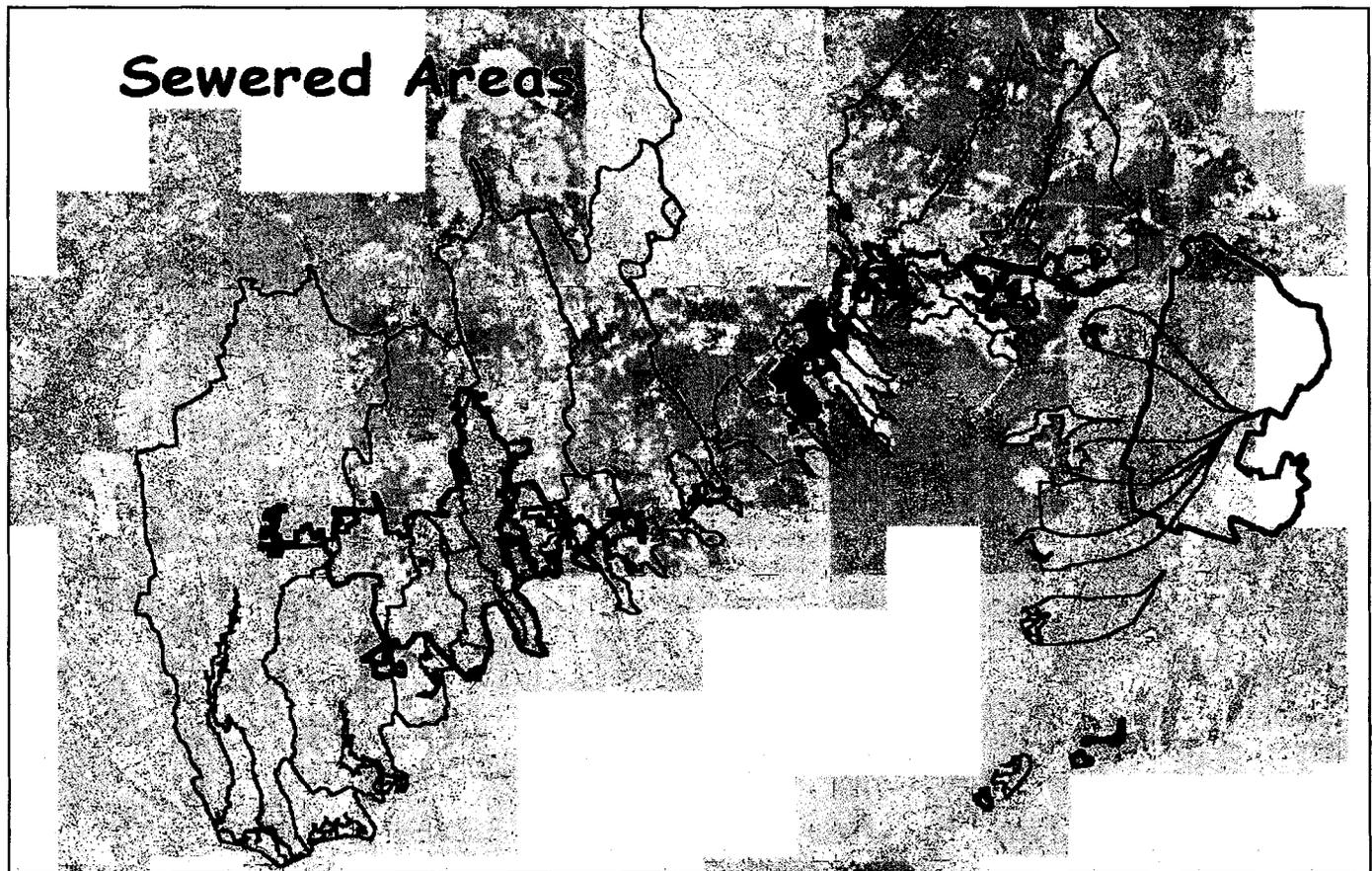


Figure 7. Map showing sewered areas of Buzzards Bay (purple bounded areas). The large area on Cape Cod represents the Massachusetts Military Reservation. The entire area shown is not developed, but any units within this area are connected to a sewage treatment facility.

Site scoring

The scoring of sites to establish priorities was conducted as follows:

Existing Classification (10 points):

Depending on the location of a storm water discharge, it was awarded a certain number of points based on shellfish resource areas. If the discharge was to a freshwater stream, it was awarded points based on the closest receiving marine waters. Existing Classifications of the Shellfish resource areas have great bearing on the appropriateness of any initiative to treat storm water. For example, areas classified as "Prohibited" as a result of a required closure in the proximity of a sewage treatment facility discharges received 0 points. Other points were as follows:

- Prohibited (required around STF outfall): 0 points
- Prohibited (other reasons): 5 points
- Restricted: 5 Points
- Management Closure: 5 Points
- Conditionally Restricted: 12 Points
- Conditionally Approved: 10 Points
- Approved: 7 Points

Sensitivity of receiving waters (20 points):

Whatever the existing designation of a shellfish resource area, it is true that the classification of that areas is more sensitive to changes in water quality because mean water quality is very close to the criteria for a classification change. Although it is possible to examine in a statistical way the geometric means of the resource areas, this data is not in digital form, and thus beyond the scope of this study. Rather, the assessed sensitivity of the receiving waters was based on queries with the DMF regional officer to determine, based on professional judgment, whether a slight improvement or decline in water quality would result in a classification change (e.g., open areas converted to seasonal closure with storm water remediation, or an open area is about to be closed because of ever escalating fecal concentrations.).

- Negligible benefits (0 points) if receiving waters were grossly polluted or exceptionally clean and well flushed with no water quality problems
- Modest benefits (10 points) if receiving water are near a change in classification, but the source represents less than 20% of the contributing drainage area
- Appreciable benefits (20 points) if receiving water are near a change in classification, but the source represents more than 20% of the contributing drainage area

Cost (20 points):

More points were awarded for less costly projects. Projects estimated to cost \$5,000 or less received 20 points, project above 300,000 received 0 points. Projects in between these costs received points using this equation:

$$\text{Cost Points} = (\ln(\text{value}) - \ln(0 \text{ pt. value})) / (\ln(100 \text{ pt. value}) - \ln(0 \text{ pt. value})) \times 20$$

Sewering (5 points):

Drainage areas where 80% or more of the homes were sewered received a bonus 5 points because it was believed that managing non-point sources would be easier to achieve. OR?? Drainage areas where 25% or less of the homes were sewered received a bonus 5 points because it was believed that stormwater BMPs would be more likely to help reduce pollution discharges.

Percent of the problem (10 points):

For each embayment, many stormwater sources may exist. For this calculation, the drainage area for the discharge source was divided by the surface areas of all drainage areas within the embayment. One point was awarded for each nearest ten percent. For discharges not within confined embayments, 0 points was awarded.

Proximity to public or private swimming beaches (10 points)

If the discharge was within 200 feet of a private beach, 5 points was received, 10 points for a public beach.

Proximity to viable shellfish beds (10 points)

If the discharge was within 200 feet of a mapped shellfish resource area with records of appreciable stock, 10 points was awarded. This score was based on discussions with the DMF area biologist based on best professional judgment.

SECTION II: Results: Summary Tables and Overview

[Editors note: In this draft, only the towns of Wareham, Dartmouth, Marion, Mattapoisett, and Fairhaven area included. The towns of Westport, Bourne and Falmouth will be added subsequently.]

More than 1638 drainage pipes and 7318 catch basins were inventoried with this survey, and entered into a GIS system. The drainage system mapped to these discharge pipes covered 374.6 km. A map showing all sites is shown in Figure 8. A review of figure 6 shows that the number of stations identified overwhelms the map at the scale shown. A more meaningful scale map of the entire drainage basin can be found in the back folder of maps in Appendix A, and in the individuals plates for each town in the body of the report.

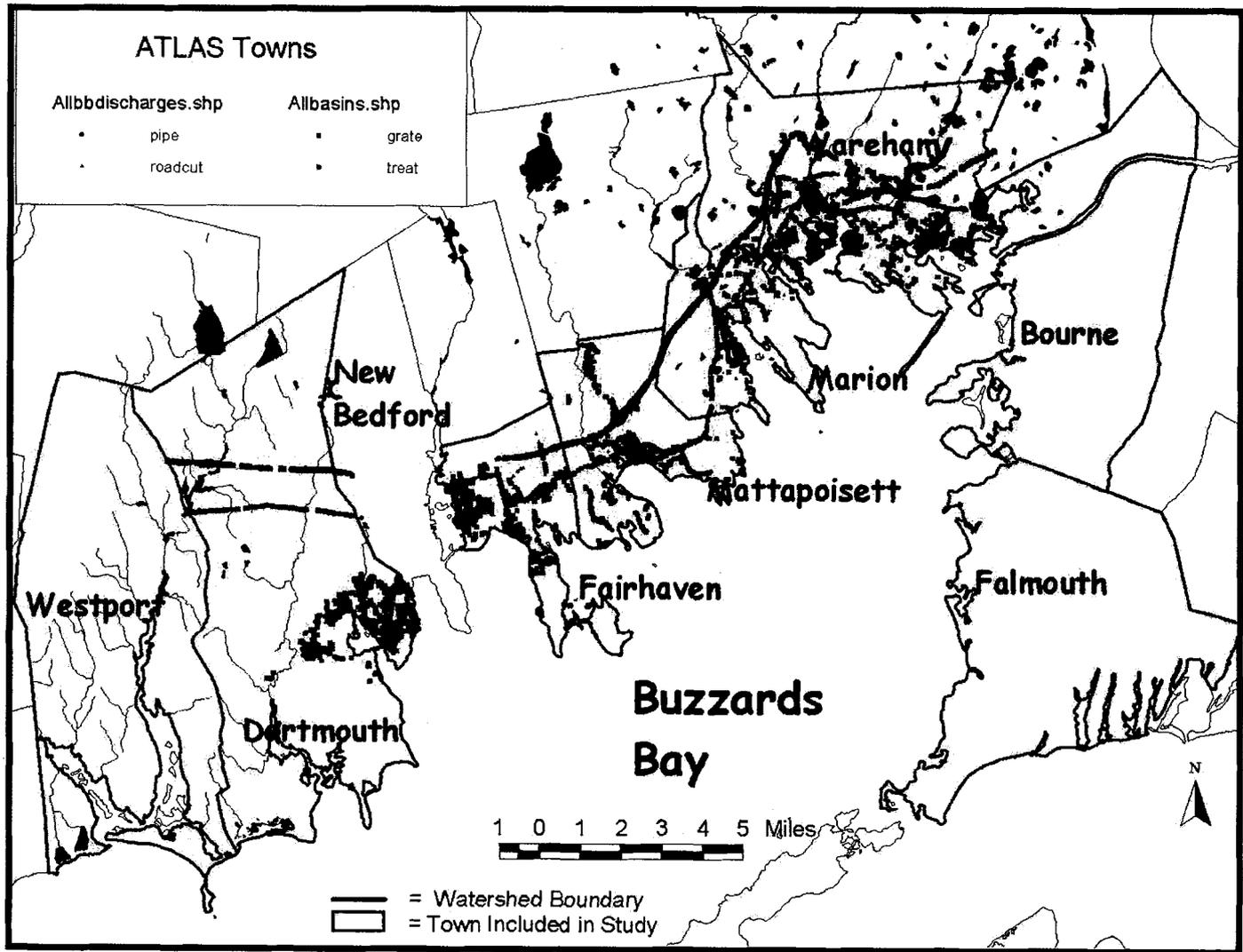


Figure 8. Map of all storm drains, road cuts, and catch basins in Buzzards Bay watershed communities. This map is too large a scale to show individual discharge pipes and basins and is provided here to give the reader a sense of the scope of the stormwater discharge inventory.

There was considerable variation in the number of stormwater discharge pipes and contributing catch basins in each of the municipalities surveyed in this study. These variations were due to the area of the town surveyed, density of development, percent of land as wetlands, age of development, proximity of highways to the coast, and other factors. Also contributing to differences was the fact that not all towns had an equal distance from shore surveyed. Part of this was due to the fact that all of state highways Rt. 195 and Rt. 6 were included in the study for all towns. Table 1 shows the total number of stormwater discharges (pipes and road cuts) in each municipality surveyed. Table 2 shows the total number of catch basins in each municipality, including the number tied to a system that treats at least the first flush of stormwater. Table 3 shows the total length of the stormwater network mapped in each community, as well as the average combined system length.

SECTION III: Results: Selected priority sites

ATLAS OF
TIDALLY RESTRICTED SALT MARSHES
IN THE
BUZZARDS BAY WATERSHED
MASSACHUSETTS

Salt marshes are among the Commonwealth's most valuable natural resources. However, many coastal wetlands around Buzzards Bay are negatively impacted by human activities that decrease tidal flow into these systems. This Atlas identifies tidally restricted salt marshes and was designed for use by municipalities, state agencies, and other organizations to initiate salt marsh restoration projects around Buzzards Bay.



FEBRUARY 2002
FINAL

BUZZARDS BAY PROJECT NATIONAL ESTUARY PROGRAM
MASSACHUSETTS WETLANDS RESTORATION Program
MASSACHUSETTS ENVIRONMENTAL TRUST

ATLAS OF TIDALLY RESTRICTED SALT MARSHES

BUZZARDS BAY WATERSHED MASSACHUSETTS

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Acknowledgments

The *Atlas of Tidally Restricted Salt Marshes of the Buzzards Bay Watershed* is the result of a multi-agency cooperative study of tidal wetlands along the coast of Buzzards Bay in southeastern Massachusetts. The project was funded by the Massachusetts Executive Office of Environmental Affairs Wetlands Restoration Program (WRP) and the Massachusetts Environmental Trust. Additional funding was provided by the Massachusetts Department of Environmental Protection (DEP 99-04/319). Site locations, maps and data summaries published in this Atlas were developed and produced by the Buzzards Bay Project National Estuary Program, a unit of the Massachusetts Office of Coastal Zone Management. The format and text of the atlas was adapted from the *Atlas of Tidally Restricted Marshes - North Shore of Massachusetts* (WRP, 1999).

BBP staff participating in the development and production of this atlas included Joseph Costa, Mary Johnson, John Rockwell, Bernadette Taber, Tracy Warncke, and Sarah Wilkes, and David Tanguay, Bridgewater State College.

About This Atlas

Study Purpose

This study was undertaken to identify salt marsh vegetation impaired by tidal flow restrictions along the coast of Buzzards Bay, Massachusetts. Of particular concern were salt marshes that had been impacted by transportation related facilities such as roads, causeways and footpaths. These restrictions result in diminished tidal exchange in the upper reaches of a wetland system and ultimately impact the health of a salt marsh by decreasing salinity levels.

The purpose of this Atlas is to aid state and municipal officials in identifying potential tidal restrictions. Such a listing will help government officials identify potential remediation opportunities when road and bridge work is being contemplated.

Although the Buzzards Bay Project made considerable efforts to identify all tidal restriction sites in Buzzards Bay, we recognize some sites may have been overlooked, and our list should not be considered definitive.

The prioritization ranking included in this report is for planning purposes. The ranking is meant to assist managers in identifying sites most likely to warrant consideration. This priority list is not meant to be a definitive evaluation of the suitability of any particular site for restoration. Our cost or remediation was based on a simplified costing model, and was considered approximate for the purposes of establishing prioritization and cost rankings. Actual costs will depend upon many variables particular to each site.

Information in the Atlas

The study area for this project encompassed the southeastern coast of Massachusetts, extending from the border of Rhode Island, to the southwestern tip of Cape Cod at Woods Hole (See Figure 1). The following nine Buzzards Bay municipalities were included: Westport, Dartmouth, New Bedford, Fairhaven, Mattapoisett, Marion, Wareham, Bourne, and Falmouth. The Atlas contains the following information:

- Maps showing locations of tidal restrictions to salt marshes along the Buzzards Bay coastline.
- Background information on tidal restrictions and methods to restore adequate tidal flow.
- Detailed information on priority restoration sites.

Distribution of the Atlas

Distribution of the atlas included single copies to the public library of each coastal community and municipal Conservation Commission. Additional copies were provided to the following municipal

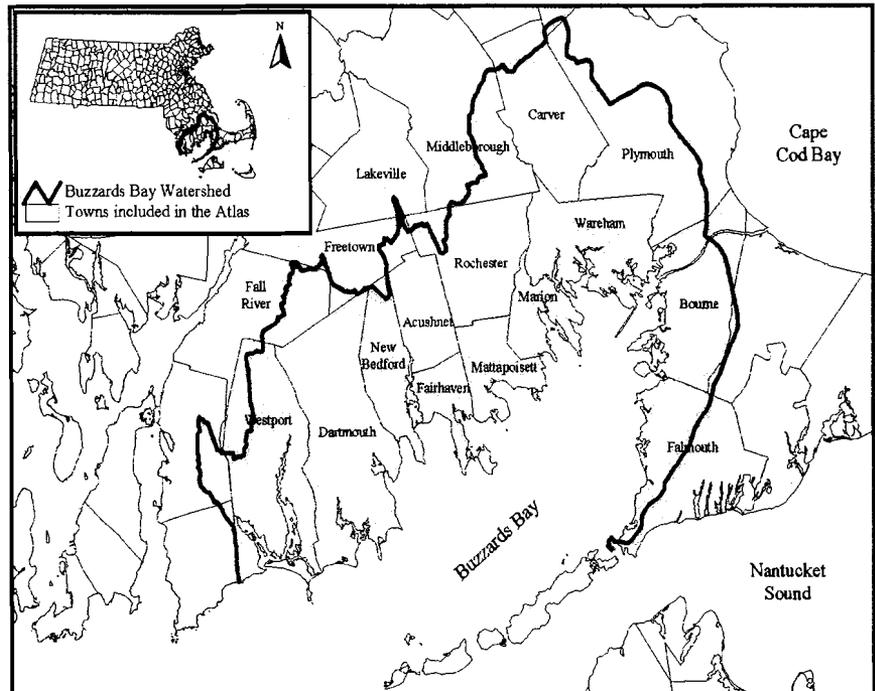


Figure 1. Study area was portions of Buzzards Bay watershed coastal communities (shaded), within the Buzzards Bay watershed (red line).

agencies of each community in the study area: municipal executive (mayor, town manager, selectmen), Planning Board, and Department of Public Works. It was also made available to local environmental groups and other interested parties. Additional black and white copies of this Atlas may be obtained by writing to the Buzzards Bay Project, 2870 Cranberry Highway, East Wareham, MA 02538. The Atlas is also available on the Buzzards Bay Project's website: www.buzzardsbay.org.

How To Use The Information in the Atlas

The *Atlas of Tidal Restricted Salt Marshes of the Buzzards Bay Watershed* documents salt marshes that have been adversely impacted by human activities, especially transportation related facilities, along the coast of Buzzards Bay in Massachusetts. This Atlas was designed for use by municipalities, state agencies, and other organizations to initiate salt marsh restoration activities at these sites when appropriate. Municipal public works departments are particularly encouraged to check this Atlas when road or bridge work is being considered. In some instances, an act as simple as replacing an old structure will have a positive environmental restoration effect. The Atlas also serves as a source of information for projects under consideration as part of the Regional Transportation Plan and those eligible for state and federal transportation funding.

Background

Coastal wetlands are primarily comprised of tidal marshes and associated intertidal habitats (e.g., mud flats, sandy beaches, and rocky shores) that occur along tidal rivers and estuarine embayments. Salt marshes are one of the most familiar and abundant type of tidal wetland. Salt marshes are regularly flooded by salt water with the lunar tidal cycle. For a few days each month, during spring tides (extra high tides that occur near full and new moons), tidal waters rise to flood the upper limits of the salt marsh. Plants growing in these wetlands have developed special adaptations for the conditions that occur during the regular flooding of saltwater. Some of these halophytes or "salt-loving plants" are listed in Appendix A. It is because of these specific environmental conditions that tidal restrictions (such as a road culvert that is too small) cause a threat to upstream salt marsh habitat. When the marsh vegetation above a tidal restriction doesn't receive the normal amount of tidal flushing, it begins to die and other more invasive species take over.

Coastal wetlands are among the Commonwealth's most valuable natural resources. Tidal flushing has created a highly productive environment that provides food and habitat for many creatures. Often called the ocean's farmlands, coastal wetlands provide the foundation of a

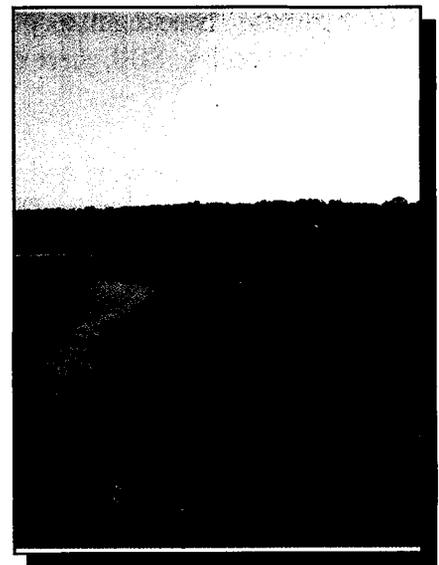


Figure 2. A healthy, unrestricted salt marsh

detritus-based food web that ultimately supports many coastal fish and bird species.

In addition, these wetlands provide habitat along the Atlantic Flyway for migratory waterfowl and serve as important breeding areas for many of these species. For black ducks, wetlands are used as critical overwintering areas. Tidal wetlands serve as vital nursery and spawning grounds for many commercially and recreationally important fish and shellfish species (Appendix A). Coastal wetlands also buffer the land against erosive storm-generated waves and frequently store temporary flood waters. In colonial times, salt marshes provided salt hay, which was used for fodder, mulch, insulation, packaging, and other purposes. There is a demand for the weed-free salt hay, which today is used as mulch in suburban gardens. Some salt marshes have been hayed for over 200 years.



Figure 3. Tidal Restriction Site FH19 Bass Creek Road, Fairhaven

Recognizing the value of salt marsh functions, the Commonwealth of Massachusetts passed the “Jones Act” in 1963 to protect salt marshes. This was the first law in the country adopted to protect coastal wetlands from dredging, filling, and other impacts. Prior to this time, many salt marshes were used to dispose of dredged material or filled for port development, industrial facilities, and housing. Many remaining salt marshes have been additionally degraded by minor filling, mosquito ditching, and restriction of tidal flow.

Since the 1960s, new impacts to the Commonwealth’s salt marshes have been strictly controlled. In the 1970s, Massachusetts adopted the Wetlands Protection Act, which forbids development in inland or coastal wetlands unless approved by the municipal Conservation Commission, with oversight from the Department of Environmental Protection (DEP). Strict regulations under this law virtually prohibit direct adverse impacts to salt marshes. These regulatory efforts have halted most newly contemplated alterations of salt marshes in the Commonwealth. Still, there are some indirect impacts that are difficult to control, and others that may be allowed.

The importance of coastal and inland wetlands was recognized in the Buzzards Bay Comprehensive Conservation and Management Plan, a watershed plan which was approved in 1991 by the Commonwealth of Massachusetts as state policy, as well as by the US EPA. This watershed management plan established the goal of a **“Long-term increase of high-quality wetlands and coastal habitat in Buzzards Bay.”** This goal was to be met through several mechanisms, including the restoration of impaired wetlands.

Until recently, there was no program in Massachusetts to address the historic destruction and degradation of these vital resources. In 1994 the Secretary of the Executive Office of Environmental Affairs established the Massachusetts Wetlands Restoration Program (WRP). The purpose of the program was to further implement the state's new policy of "no net loss of wetlands in the short-term and a net gain in the long-term."

Unlike wetland replication required under permits to compensate for wetland destruction (caused by construction and other activities), WRP’s pro-active wetland restoration projects may be initiated by project sponsors who simply want to bring back our wetland heritage, or who want to help address community water



Figure 4. Tidal Restriction Site MT10 Old access to beach, Mattapoissett

quality and flooding problems or restore wildlife habitat.

This atlas, prepared by the Buzzards Bay Project, along with a similar document covering the North Shore, is part of WRP's pro-active wetland restoration efforts. WRP continues to work with environmental groups, state and federal agencies, municipalities and others on an ongoing basis to implement priority wetland restoration projects identified in these studies. The Buzzards Bay Project often acts as a facilitator of these efforts.

Both the Buzzards Bay Project and the Wetlands Restoration Program provide financial and technical support for the efforts of municipalities, landowners, and other agencies and groups that wish to undertake wetland restoration projects. Individual wetland restoration projects may be initiated under WRP's GROWetlands (Groups Restoring Our Wetlands) initiative. WRP has also organized the Wetlands Restoration Assistance Team (WetRATs), a network of volunteer wetlands scientists, to assist GROWetlands project sponsors in evaluating the restoration potential of wetland sites, designating work plans, and monitoring pre- and -post construction project sites. WRP helps GROWetlands sponsors develop goals and a work plan for restoration projects, secure project funding, organize volunteers, use restoration sites as learning laboratories for schools and groups, and to monitor restored wetlands to ensure success. Please see Appendix B for a more complete description of GROWetlands and a Project Nomination Form. Buzzards Bay Project Wetland Restoration Grants are subject to funding availability.

Impacts to Salt Marshes and Restoration Approaches

What is a Tidally Restricted Salt Marsh?

Many salt and brackish marshes are crossed by highways, local roads, and railroads of various dimensions. These transportation routes pass through tidal marshes and may cross tidal creeks or rivers at one or more locations. Bridges are required to span rivers and broad creeks, and the roadways leading to bridges are built on fill deposited in wetlands. These thoroughfares are often called causeways. Many shorter spans have been filled, with culverts installed under the roadway to allow drainage or tidal flow. Roads crossing small creeks may have the streams channelled through box culverts, some of which are too small to pass full tidal flows necessary to maintain natural salt marsh vegetation upstream.

Culverts may be fitted with tide gates that may further restrict tidal flow or flapper valves that allow fresh water to leave the marsh but will not allow tidal flow to enter the marsh. Bridges may have similar affects if the openings are not wide enough to pass sufficient tidal water to maintain salt and brackish marshes further upstream. At some road crossings no culvert was provided and tidal flow has been eliminated altogether. These hydrologic changes significantly alter the chemical integrity of the upstream salt marsh. The once strongly saline environment changes to one that is brackish or fresh water. This freshening of the salt marsh causes a major transformation in the vegetation. Salt marsh grasses and rushes are displaced by common reed (Figure 5). Common reed often forms a monoculture, with plants growing up to, and in excess of, 12 feet.

This decrease in plant diversity and the change in vegetative structure (from a low grassy meadow to a tall reedy thicket) causes a major shift in wildlife use as typical salt marsh inhabitants are replaced by fewer species. Despite some use of the reeds by more common, generalist species, it is not preferred by any species. This is in marked contrast to salt marsh vegetation which is preferred over other habitats by many wildlife species, including some of our rarer salt marsh specialists.

Restoring Tidal Flow

Where tidal flow is restricted, the main objective of salt marsh restoration is to improve tidal flow to the affected marsh. In many cases, restoration is easily accomplished by removing the restrictive feature or by providing an opening sufficient enough to allow adequate tidal flow. For example, where tidal flow is reduced by undersized culverts (too small to pass the full spring tide), simply replacing the culverts with larger ones, generally the width of the original channel, and ones of appropriate height, may be enough to restore tidal flow.

In other cases, development has taken place in low-lying areas surrounding the marsh and sometimes on fill in the marsh itself. Due to flood risk, restoring full tidal flow to these areas is not possible. However, restoration of sufficient tidal flow to flood a lower portion of the marsh on a regular basis may be possible if it can be shown that this will not increase the risk of flooding to adjacent structures. Allowing for frequent tidal flooding should be sufficient to promote the return of salt marsh vegetation in areas of high salinity (greater than 18 parts per thousand). In areas of lower salinity, improved tidal exchange (by reconnecting the marsh to the adjacent estuary) is still beneficial. Improving tidal flow to the marsh while preventing property flooding can be accomplished by expanding the culvert size and adding a protective device, such as a self-regulating tide gate or a manually or electronically operated tide gate. These gates can establish an opening that allows passage of normal tides, but prevents entry of storm tides. Some structures can be completely closed, if necessary, to facilitate storm protection. Each proposed salt marsh restoration site should be evaluated to consider potential adverse impacts such as flooding before work is begun.

Methods

Site Selection

The first phase of this project identified salt marshes where tidal restrictions were suspected to exist. By looking at aerial photographs of the Buzzards Bay coastline (false-color infra-red and black and white photos) potential sites were located. In these photos it was possible to see subtle color and texture changes in the vegetation around the salt marsh. These photo signatures were verified by looking at a photograph of a known area or by “ground-truthing” (i.e. visiting the site in the photo and comparing what was on the ground with what appeared in the aerial photograph). The study used DEP Wetland Conservancy color infrared aerial photos from spring 1993 (scale 1:12,000) acquired by the James W. Sewall Company. This photography was supplemented with 1:5,000 black and white orthographic Wetlands Conservancy maps captured in 1990 and in some instances other aerial photographs from various sources. The presence of a road or railroad embankment with common reed on the upstream side and typical salt marsh vegetation



Figure 5. *Phragmites australis* stand in a salt marsh.

on the seaward side was used as a marker of a likely restriction. In other cases, the presence of a scouring basin on one or both sides of the embankment suggested uneven flows (e.g. too much water collecting around the restriction and increased outflows with high erosive potential). Bridges with short spans, that is where the channel was considerably narrowed by the bridge, were also viewed as potential restricting structures and scouring basins were usually evident. Common reed stands were also photo interpreted. Narrow marginal bands of common reed along the upland border of salt marshes and very small stands were not identified as they were not considered strongly indicative of a tidal restriction.

The potential restoration sites that were identified in the aerial photographs were then field checked to verify the existence of a restriction, and to collect information about the restricting structure and the affected salt marsh. On-site observation of one or more of the following conditions were considered evidence of a tidal restriction: seaward scouring basin (S), low marsh slumping (L), culvert invert problem detected (CI), *Phragmites australis* (P), ponded water on seaward side of dike or road (PS), ponded water on upstream side of dike or road (PU), seaward culvert opening submerged at mean high tide (SCS), upstream scouring basin (U), culvert broken (CB), vegetation die back (VDB), *Lythrum salicornia* (L), bank erosion (BE), or culvert clogged with debris (CD). (These codes were used in the data spreadsheet available at the Buzzards Bay Project webpage at www.buzzardsbay.org).

Field work was limited to sites with public access. Field data sheets were prepared for all 167 restriction sites. A sample of a blank 2-sided field data collection form is shown in Appendix A. Figure 6 defines some of the parameters identified in the data base.

Photographs of most restrictions were taken with a digital camera to document existing conditions and to show the range in conditions of the restricting structures. The condition of the restricting structure was rated as excellent, good, fair, or poor in relation to these examples (See Field Data). In order to accurately map each restriction, a sub-meter accuracy global positioning system (GPS) was used. The data collected in the field visits was transferred to a Geographic Information System (GIS) database to create a series of GIS maps.

A database was constructed by adding the locations of potential tidal restrictions and tidally restricted wetlands and common reed-dominated stands in tidal marshes to an existing wetland map database and transferred to USGS quadrangles. The resulting maps are used throughout this report.

The distribution of common reed (*Phragmites australis*) was mapped by creating a sketch of the area covered by *Phragmites* on a copy of the black and white 1:2500 orthographic sheet while in the field. Later the map was transferred by eye to 1:2500 digital orthos in ArcView™ using Wetlands Conservancy Program wetland lines as a guide. The size of these polygons was calculated by the ArcView™ software.

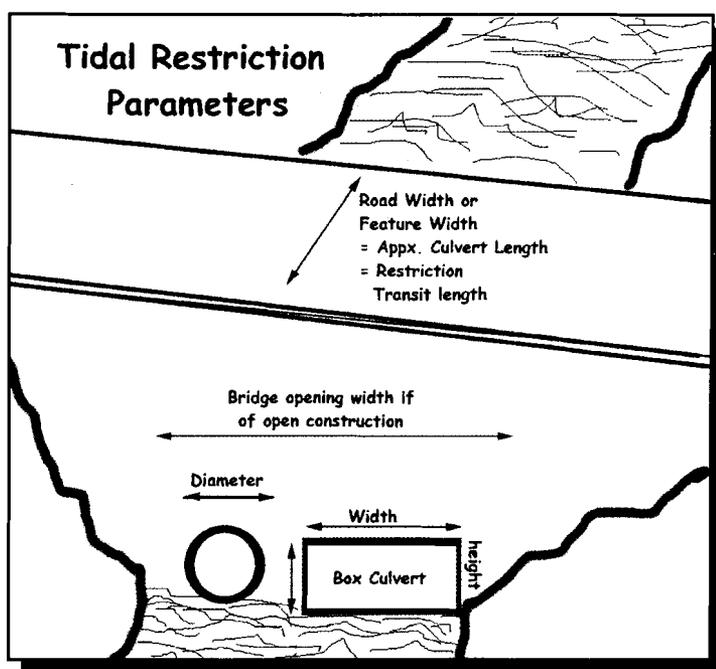


Figure 6. Generalized view of a culvert tidal restriction showing selected parameters inventoried in tidal restriction database.

Prioritization Methodology

Cost Prediction Assumptions

Due to the fact that it would not be cost effective to perform detailed costs analyses for the remediation of all 257 tidal restrictions identified in this Atlas, a simplified method for identifying the top priority sites was developed.

The basis of our cost analysis was the assumption that the cost of remediation was roughly a function of the size of the new culvert and its length. Culvert length was assumed to be 20% longer than road width or from actual measurement. In calculating the size of the replacement culvert, we used the following assumptions:

- 1) Culverts ≤ 15 " diameter (i.e. < 1.25 sq. ft. cross section) would be tripled in diameter.
- 2) Culverts > 15 " diameter or box culverts would be doubled in diameter.

Simplified cost estimates for culvert replacement exist as per Figure 7, but these estimates do not account for practical costs. For example, whether or not the culvert passed under a road, and whether or not the road was paved, whether utilities must be moved, and other factors are important determinants of cost. Design and permitting costs must be considered.

In Figure 8, we show a similar plot based on actual projects in Buzzards Bay. The plot includes 8 actual projects and 5 hypothetical variations of two of the actual projects. For example, in one large box culvert installation, a dilapidated culvert was replaced with a new concrete 4 foot by 8 foot culvert under a paved 25-foot wide rural road, with some tasks handled by a municipal DPW and some by a private contractor. The hypotheticals for this project were made by assuming the new culvert had dimensions of 4 feet by 8 feet and 4 feet by 10 feet, respectively, since that cost was well known and other project costs were held static. Similarly, another project represent hypothetical estimates of the replacement of a 1 foot culvert with a 3 foot culvert on a coastal road in paved and unpaved conditions.

Although there is considerable variation in costs per foot for installation ($r^2 = 0.48$), it is apparent real costs typically range from

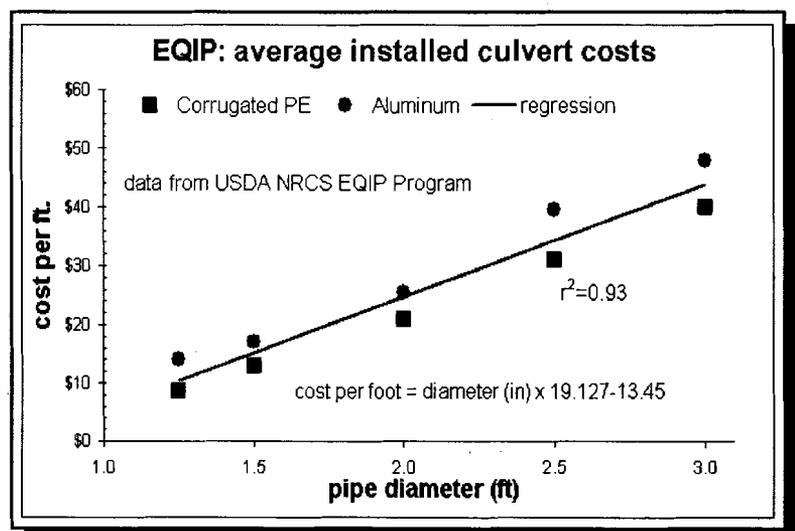


Figure 7. Simplified cost assumptions for culvert installation based on USDA-NRCS model for farm applications (i.e. not typically paved roads).

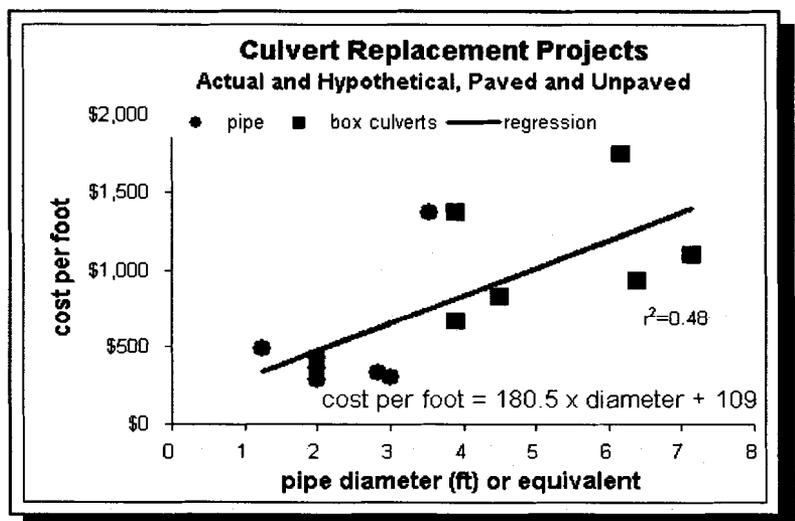


Figure 8. Actual cost of culvert replacement projects in Buzzards Bay including design, permitting, and road repaving costs. Five points represent theoretical variations of projects.

<u>Cost effectiveness</u>	<u>Points</u>
<=\$1, 000 per acre	6
<=\$2, 000 per acre	5
<=\$4, 000 per acre	4
<=\$8, 000 per acre	3
<=\$16, 000 per acre	2
<=\$35,000 per acre	1
>\$35,000 per acre	0

Wetland Impairment scoring (5 points)

In this study, it was presumed that impairment caused by a restriction could be characterized by the degree of cover of the invasive nuisance species *Phragmites*, which tends to replace salt marsh vegetation in areas that are experiencing restricted tidal flow. The *Phragmites* impairment was quantified as the percent of vegetated wetlands composed of *Phragmites*. This is not an ideal characterization of impairment because the presence of *Phragmites* is just one manifestation of impairment, and it is not always present in tidally restricted areas. Nonetheless, *Phragmites* coverage was chosen because it was the only impairment measure that could be made easily for all sites, and the species is widely recognized as a nuisance species. To calculate a percentage, *Phragmites* acreage was divided by acreage of all wetlands that were likely to be affected by reducing the restriction. This latter wetland area was based on Wetlands Conservancy Orthophotograph Map based coverages from MassGIS. Below are the scoring criteria for this parameter and Figure 10 shows the distribution of the resulting scores for each restriction.

<u>% vegetated wetland as <i>Phragmites</i></u>	<u>Points</u>
< 1%	0
< 10%	1
< 20%	2
< 50%	3
< 90%	4
>90%	5

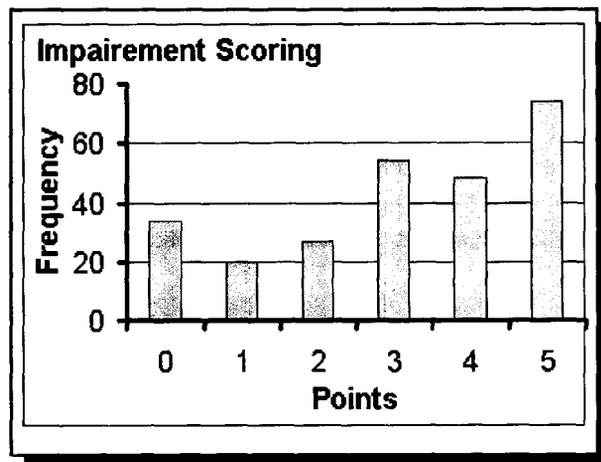


Figure 10. Frequency of scores for wetland impairment. Impairment was based on percent coverage of the marsh by the invasive species *Phragmites*.

Tidal Restriction Size scoring (5 points)

It is likely that there is some relationship between the degree of wetland impairment by a tidal restriction and the cross sectional area of the tidal restriction. Specifically, inferences may be drawn between the cross sectional area of a restriction and the upstream acreage of wetlands potentially affected. While we do not believe there is any single ideal ratio between restriction cross sectional area and upstream acreage (e.g. very elongate systems may require a different ration compared to a situation where wetlands are clustered immediately behind the restriction), clearly some restrictions have too small a cross sectional area, and others appear ample for flushing.

Below are the scoring criteria selected for this parameter and Figure 11 shows the distribution of the resulting scores for each restriction. Because the amount of water needed to pass through a restriction depends upon

the surface area of surface water behind the restriction, surface water was included in the calculation of upstream wetlands.

<u>Restriction Size</u>	<u>Points</u>
<=.05 sq. ft. per acre	5
<=.25 sq. ft. per acre	4
<=1 sq. ft. per acre	3
<=5 sq. ft. per acre	2
<=10 sq. ft. per acre	1
>10 sq. ft. per acre	0

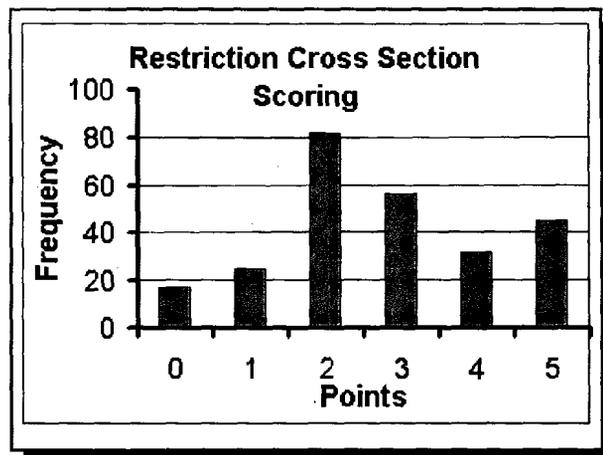


Figure 11. Frequency of scores based on the ratio of cross sectional area of the tidal restriction to size wetland impaired.

Other criteria

Other scoring criteria were as follows:

Restriction on public road/property	3 points - town road or land 2 points - state road or land 3 points - federal road or land
Benefits a public wetland	1 point
Benefits anadromous fish run	4 points (only applied to culverts, not bridge restrictions)
Designated rare/endangered habitat	2 point
Adverse impacts to special resources	-5 points

The scoring of adverse impacts to special resources was based on best professional judgement. While increases in salinity by definition will result in the loss or death of certain freshwater species, it is undesirable to increase salinity where habitat for freshwater endangered species are found, where the salinity of a pond will change, or where anadromous fish spawning areas are lost. These and other reasons are justification for the subtraction of points from the scoring system.

The awarding of points for enlarging restrictions under public property (0 points for private, 3 points for municipal or federal, 2 points for state property) was based on the fact that it is far easier to remediate a publicly owned site because of logistical, cost, permitting, and funding reasons. Town own land was considered the easiest to permit, but federal lands received an equivalent number of points because of the availability of federal funds and support. In practical terms however, only a handful of sites were on federal property. Small culverts can greatly affect anadromous fish runs, so the highest number of bonus points are given for this criteria. If the structure was a bridge, or did not actually impair a herring run, no points were given in this category. If the restriction benefits a publicly owned wetland, or if the area is designated as rare or endangered species habitat by the Natural Heritage and Endangered Species Program, 2 points were given.

Results and Priority Restoration Sites

It was decided that sites receiving a score of 16 or greater were classified as high priority sites. Those with a score of 11 to 15 were medium priority, and those with a score of 10 or less were deemed to be of low

priority. This scoring scheme was selected to roughly correspond with the top 10% and 50% for high and medium priorities respectively. Of the 258 sites evaluated, 30 sites ranked as a high priority, 103 were medium priority, and 128 as low priority.

Such a scoring is of course subjective. In practical terms, work at any of the high or medium priority sites could be justified if a property owner is willing to undertake the work, costs are low, or special opportunities arise. The purpose of these priority scoring was to assist in identifying sites for further study, not a final evaluation of which sites are most appropriate or most suitable for remediation. The profiles of selected sites are not given in any particular order or priority. Table 1 shows the high priority sites. Tables 2 shows more specific details for all sites sorted by town, score and cost per acre. Appendix A has additional detailed information for all sites. Following these tables is a section that profiles the top 14 sites, which those receiving a score of 17 points or higher.

Table 1. High Priority Sites (score 16 or greater).

	Site #	Town	feature	Score	Estimated Cost	cost per acre
1	DA04	Dartmouth	culvert: Nonquitt Marsh	20	\$21,273	\$548
2	FA05	Falmouth	culvert: Road	20	\$19,327	\$1,327
3	FA02	Falmouth	wall: Rock Wall Mill Pond	19	\$13,920	\$942
4	FH18	Fairhaven	culvert/road: Fir Street	19	\$18,840	\$2,173
5	DA02	Dartmouth	bridge: Gulf Road Dike Creek or Saltmeadow	18	\$500,000	\$2,508
6	MT17	Mattapoisett	wall, rock: Rock wall	18	\$12,506	\$2,743
7	DA09	Dartmouth	bridge: Little River Road Little River	18	\$600,000	\$3,310
8	BN41	Bourne	dike: Red Brook Road - Old Road	18	\$13,920	\$6,857
9	WH11	Wareham	culvert: Allen Rd.	17	\$11,332	\$587
10	MN22	Marion	culvert: 13rd hole, Kittansett Golf C.	17	\$13,487	\$665
11	DA17	Dartmouth	culvert: Old Road	17	\$6,206	\$914
12	MT06	Mattapoisett	culvert: Old Mattapoisett Neck Rd.	17	\$43,519	\$1,075
13	FA10	Falmouth	road: Woodneck Rd.	17	\$14,862	\$7,905
14	BN28	Bourne	dike: MBTA Rail Road	17	\$21,459	\$21,038
15	WP17	Westport	road: driveway	16	\$9,710	\$1,000
16	DA06	Dartmouth	culvert/road: cow yard Marsh	16	\$9,246	\$1,032
17	DA07	Dartmouth	culvert/road: Cow Yard Marsh	16	\$9,246	\$1,032
18	MT04	Mattapoisett	culvert: Mattapoisett Neck Road	16	\$43,519	\$1,088
19	DA11	Dartmouth	culvert/road: Little Beach Rd. Allen's Pond	16	\$7,578	\$1,212
20	WH27	Wareham	road: Pilgram Avenue	16	\$26,987	\$2,351
21	MT15	Mattapoisett	culvert: Private Beach Road	16	\$11,592	\$2,531
22	WH10	Wareham	culvert/Road: Indian Neck Road Crooked River	16	\$32,396	\$2,594
23	DA01	Dartmouth	bridge/road: Bridge St. Apponagansett Bay	16	\$1,100,000	\$4,282
24	WH33	Wareham	road: road	16	\$27,530	\$5,304
25	DA27	Dartmouth	dike: path to beach	16	\$13,920	\$6,078
26	WP06	Westport	bridge: Hix Bridge Westport River	16	\$2,800,000	\$13,625
27	DA12	Dartmouth	culvert: Georges Pond	16	\$128,797	\$13,909
28	WH17	Wareham	bridge: Sandwich Rd., Rt 6 Agawam River	16	\$350,000	\$24,544
29	NB08	New Bedford	dike: Shaw Cove Drive New Bedford Harbor	16	\$2,750,000	\$32,974
30	WH38	Wareham	rocks: Swifts Beach Playground	16	\$90,448	\$53,387

Results

Table 2. Results: Summary of all sites sorted by municipality and restriction site ID.

Site #	Town	Priority Score	est. cost	cost per veg. acre	Restriction Structure	Remediated? surface water	Vegetated total wetland	acres behind rest.	Wetland with surface water	Phragmites acres	% Phragmites	Score for % Phrag	Score for Wetland acreage	Score Remediation Cost per acre	Score for cross section per acre	Score for public restriction	Score Anadromous fish run	Score Rare/Endg. Sp. Habitat	Score adverse restor. impacts		
BN41	Bourne	18	\$13,920	\$6,857	dike	N	0.0	2.0	2.0	2.7	134%	5	1	3	5	0	0	4	0	0 Red Brook Road - Old Road	
BN28	Bourne	17	\$21,459	\$21,038	dike	N	0.0	1.0	1.0	1.0	100%	5	1	1	5	2	1	0	2	0 MBTA Rail Road	
BN39	Bourne	15	\$15,943	\$3,833	dike	N	0.0	4.2	4.2	3.0	73%	4	1	4	4	0	0	0	2	0 bog dike	
BN16	Bourne	15	\$21,029	\$5,593	culvert	N	0.0	3.8	3.8	3.8	100%	5	1	3	3	3	0	0	0	0 Kenwood Rd.	
BN38	Bourne	15	\$93,574	\$11,467	road	N	0.0	8.2	8.2	0.5	6%	1	2	2	3	3	0	4	0	0 service road Cape Cod Canal	
BN09	Bourne	14	\$560,000	\$7,427	bridge	N	70.4	75.4	145.8	10.0	13%	2	4	3	2	3	0	0	0	0 Shore Road	
BN14	Bourne	14	\$450,000	\$9,174	bridge	N	20.9	49.1	70.0	2.6	5%	1	3	2	2	3	1	0	2	0 Shore Rd. Bridge Pocasset River	
BN15	Bourne	13	\$35,641	\$4,455	culvert	N	0.0	8.0	8.0	1.6	20%	2	2	3	3	3	0	0	0	0 Wings Neck Road	
BN11	Bourne	13	\$19,576	\$5,775	culvert, tide gate	N	0.0	3.4	3.4	0.0	0%	0	1	3	2	3	0	4	0	0 Dam Rd.	
BN10	Bourne	13	\$510,000	\$6,675	bridge	N	71.2	76.4	147.6	10.0	13%	2	4	3	2	2	0	0	0	0 Railroad Bridge	
BN12	Bourne	13	\$11,666	\$6,903	culvert	N	2.5	1.7	4.2	0.2	14%	2	1	3	2	2	1	0	2	0 Railroad	
BN27	Bourne	12	\$12,506	\$12,893	driveway	N	0.0	1.0	1.0	1.0	100%	5	0	2	5	0	0	0	0	0	0
BN29	Bourne	12	\$35,177	\$28,834	railroad	N	0.0	1.2	1.2	1.2	100%	5	1	1	3	2	0	0	0	0	0 BMTA Rail Road
BN43	Bourne	11	\$73,126	\$8,036	dike	N	0.0	9.1	9.1	5.0	54%	4	2	2	3	0	0	0	0	0	0 dike
BN26	Bourne	11	\$31,006	\$24,223	dike	N	0.0	1.3	1.3	0.2	17%	2	1	1	3	2	0	0	2	0	0 Pocasset River, culvert in Dike south central saltmarsh, west of RR bridge
BN08	Bourne	11	\$452,950	\$43,763	road	N	0.0	10.4	10.4	5.0	48%	3	2	0	3	3	0	0	0	0	0 Culvert, Mashnee Rd near spindrift Rd leads to BN43
BN33	Bourne	11	\$2,500,000	\$54,019	railroad bridge	N	12.5	46.3	58.7	2.4	5%	1	3	0	2	2	1	0	2	0	0 railroad bridge Pocasset River
BN06	Bourne	11	\$319,126	\$106,731	road	N	0.0	3.0	3.0	3.0	100%	5	1	0	2	3	0	0	0	0	0 Mashnee Road south of Seabreeze
BN21	Bourne	10	\$13,543	\$19,347	road	N	0.0	0.7	0.7	0.6	89%	4	0	1	5	0	0	0	0	0	0 Scraggy Neck
BN35	Bourne	10	\$15,943	\$45,165	dike	N	0.0	0.4	0.4	0.4	99%	5	0	0	2	3	0	0	0	0	0 dike
BN36	Bourne	10	\$31,006	\$52,552	dike	N	0.0	0.6	0.6	0.6	100%	5	0	0	2	3	0	0	0	0	0 service road
BN04	Bourne	10	\$2,500,000	\$67,787	bridge	N	461.5	36.9	498.3	1.7	5%	1	4	0	2	2	1	0	0	0	0 Railroad Bridge next to Rt.6 Buttermilk Bay
BN03	Bourne	10	\$3,500,000	\$94,902	bridge	N	459.2	36.9	496.1	1.7	5%	1	4	0	2	2	1	0	0	0	0 Rt.6 Bridge Buttermilk Bay
BN24	Bourne	9	\$35,177	\$6,373	road	N	0.0	5.5	5.5	0.7	13%	2	2	3	2	0	0	0	0	0	0 road Red Brook Harbor
BN30	Bourne	9	\$27,530	\$10,047	dike	N	0.0	2.7	2.7	0.6	20%	3	1	2	3	0	0	0	0	0	0 Barrier Beach
BN32	Bourne	9	\$119,435	\$20,628	bridge	N	0.4	5.8	6.2	3.0	52%	4	2	1	2	0	0	0	0	0	0
BN37	Bourne	9	\$27,862	\$47,224	dike	N	0.0	0.6	0.6	0.6	100%	5	0	0	1	3	0	0	0	0	0 old railroad
BN34	Bourne	9	\$31,006	\$91,194	dike	N	0.0	0.3	0.3	0.3	100%	5	0	0	1	3	0	0	0	0	0 service road
BN01	Bourne	9	\$53,948	\$112,391	railroad culvert	N	0.0	0.5	0.5	0.5	100%	5	0	0	2	2	0	0	0	0	0 Railroad
BN05	Bourne	9	\$350,000	\$150,215	bridge/culvert/old wall	N	0.0	2.3	2.3	2.7	117%	5	1	0	0	3	0	0	0	0	0 Bridge, Red Brook Drive
BN40	Bourne	8	\$55,569	\$31,219	dike	N	0.0	1.8	1.8	1.7	96%	5	1	1	1	0	0	0	0	0	0 bog dike
BN25	Bourne	8	\$20,578	\$38,826	road	N	0.0	0.5	0.5	0.1	23%	3	0	0	2	3	0	0	0	0	0 Circuit Avenue

Site #	Town	Priority Score	est. cost	cost per veg. acre	Restriction Structure	Remediated? surface water	Vegetated water acres behind rest.	total wetland acres affected	Phragmites with surface water	% Phragmites	Score for % Phrag	Score for Wetland acreage	Score Remediation Cost per acre	Score for cross section per acre	Score for public restriction	Score Anadromous fish run	Score Rater/Endg. Sp. Habitat	Score adverse restor. impacts			
BN07	Bourne	6	\$9,710	\$5,745	culvert	N	0.0	1.7	1.7	0.0	0%	0	1	3	2	0	0	0	0	Culvert Private Road	
BN17	Bourne	6	\$15,155	\$29,145	dike	N	0.0	0.5	0.5	0.2	33%	3	0	1	2	0	0	0	0	0	Rock Wall
BN02	Bourne	5	\$42,925	\$24,251	culvert/Road	N	4.4	1.8	6.1	0.0	0%	0	2	1	2	0	0	0	0	0	Private Road to Toby Isl.
BN44	Bourne	4	\$536,536	\$1,625,867	railroad	N	0.2	0.3	0.5	0.0	0%	0	0	0	2	2	0	0	0	0	MBTA Rail Road
DA04	Dartmouth	20	\$21,273	\$548	culvert	N	33.5	38.8	72.3	20.7	53%	4	3	6	5	0	0	0	2	0	Nonquitt Marsh
DA02	Dartmouth	18	\$500,000	\$2,508	bridge	N	24.0	199.3	223.3	95.1	48%	3	4	4	3	3	1	0	0	0	Gulf Road Dike Creek or Saltmeadow
DA09	Dartmouth	18	\$600,000	\$3,310	bridge	N	87.3	181.3	268.6	11.3	6%	1	4	4	3	3	1	0	2	0	Little River Road Little River
DA17	Dartmouth	17	\$6,206	\$914	culvert		0.0	6.8	6.8	0.0	0%	0	2	6	5	3	1	0	0	0	Old Road
DA06	Dartmouth	16	\$9,246	\$1,032	culvert/road	N	0.0	9.0	9.0	4.5	50%	3	2	5	4	0	0	0	2	0	cow yard Marsh
DA07	Dartmouth	16	\$9,246	\$1,032	culvert/road	N	0.0	9.0	9.0	4.5	50%	3	2	5	4	0	0	0	2	0	Cow Yard Marsh
DA11	Dartmouth	16	\$7,578	\$1,212	culvert/road	N	0.3	6.3	6.6	2.2	35%	3	2	5	4	0	0	0	2	0	Little Beach Rd. Allen's Pond
DA01	Dartmouth	16	\$1,100,000	\$4,282	bridge/road	N	338.8	256.9	595.7	97.0	38%	3	4	3	3	3	0	0	0	0	Bridge St. Apponagansett Bay
DA27	Dartmouth	16	\$13,920	\$6,078	dike		0.0	2.3	2.3	2.3	100%	5	1	3	5	0	0	0	2	0	path to beach
DA12	Dartmouth	16	\$128,797	\$13,909	culvert	N	11.7	9.3	21.0	5.3	57%	4	2	2	3	2	1	0	2	0	Georges Pond
DA23	Dartmouth	15	\$12,035	\$661	dike		0.0	18.2	18.2	0.1	1%	0	2	6	5	0	0	0	2	0	path
DA08	Dartmouth	15	\$11,717	\$1,512	culvert	N	0.0	7.8	7.8	3.2	41%	3	2	5	3	0	0	0	2	0	Private Driveway Cow Yard Marsh
DA15	Dartmouth	15	\$12,160	\$2,861	culvert	N	0.5	4.3	4.8	1.3	32%	3	1	4	3	3	1	0	0	0	Old Road
DA05	Dartmouth	15	\$180,185	\$4,895	culvert	N	33.5	36.8	70.3	20.7	56%	4	3	3	3	0	0	0	2	0	Barrier beach Nonquitt Marsh
DA03	Dartmouth	14	\$22,664	\$3,006	culvert/road	N	0.0	7.5	7.5	0.6	7%	1	2	4	4	3	0	0	0	0	Smith Neck Rd. Padanaram Salt Marsh
DA24	Dartmouth	14	\$12,789	\$6,394	dike		0.0	2.0	2.0	0.8	42%	3	1	3	5	0	0	0	2	0	dike same as DA25 and DA26
DA26	Dartmouth	14	\$12,789	\$6,394	dike		0.0	2.0	2.0	0.8	42%	3	1	3	5	0	0	0	2	0	dike same as DA24 and DA25
DA25	Dartmouth	14	\$13,543	\$6,771	dike		0.0	2.0	2.0	0.8	42%	3	1	3	5	0	0	0	2	0	dike same as DA24 and DA26
DA28	Dartmouth	14	\$10,715	\$13,068	dike		0.0	0.8	0.8	0.8	100%	5	0	2	5	0	0	0	2	0	same as DA29
DA29	Dartmouth	14	\$10,715	\$13,068	dike		0.0	0.8	0.8	0.8	100%	5	0	2	5	0	0	0	2	0	same as DA28
DA14	Dartmouth	13	\$51,862	\$7,638	culvert	N	0.2	6.8	7.0	0.8	11%	2	2	3	2	3	1	0	0	0	Star of the Sea Drive
DA31	Dartmouth	13	\$10,904	\$37,600	stone wall		1.8	0.3	2.1	0.3	100%	5	1	0	5	0	0	0	2	0	stone wall Allen's Pond
DA30	Dartmouth	13	\$12,035	\$41,499	dike		1.8	0.3	2.1	0.3	100%	5	1	0	5	0	0	0	2	0	dike/tide gate same as DA31
DA16	Dartmouth	11	\$10,637	\$1,194	culvert		0.0	8.9	8.9	0.4	4%	1	2	5	3	0	0	0	0	0	Old Road to beach
DA18	Dartmouth	11	\$6,620	\$2,566	culvert		0.0	2.6	2.6	0.5	19%	2	1	4	4	0	0	0	0	0	
DA13	Dartmouth	11	\$5,860	\$4,070	dike	N	0.7	1.4	2.1	0.0	0%	0	1	3	5	0	0	0	2	0	Common Drive
DA19	Dartmouth	11	\$10,584	\$5,600			0.0	1.9	1.9	0.5	26%	3	1	3	4	0	0	0	0	0	Stone Wall
DA32	Dartmouth	11	\$45,000	\$6,410	stone bridge		0.0	7.0	7.0	1.8	25%	3	2	3	1	0	0	0	2	0	bridge
DA21	Dartmouth	11	\$10,904	\$34,075	rocks		0.0	0.3	0.3	0.3	100%	5	0	1	5	0	0	0	0	0	blocked channel
DA22	Dartmouth	10	\$49,416	\$29,949	culvert		0.0	1.7	1.7	0.5	27%	3	1	1	5	0	0	0	0	0	beach
DA20	Dartmouth	9	\$24,054	\$267,266	culvert		0.0	0.1	0.1	0.1	100%	5	0	0	1	3	0	0	0	0	road
FH18	Fairhaven	19	\$18,840	\$2,173	culvert/road	N	0.0	8.7	8.7	4.4	51%	4	2	4	4	3	0	0	2	0	Fir Street

Site #	Town	Priority Score	Score est. cost	cost per veg. acre	Restriction Structure	Remediated? surface water	Vegetated Wetland acres behind rest.	Total wetland acres affected	Phragmites with surface water	% Phragmites	Score for % Phrag	Score for Wetland acreage	Score Remediation Cost per acre	Score for cross section per acre	Score for public restriction	Score Anadromous fish run	Score Rare/Endg. Sp. Habitat	Score adverse restor. impacts				
FH16	Fairhaven	15	\$76,889	\$6,560	culvert/road	N	0.0	11.7	11.7	1.2	10%	2	2	3	3	3	0	0	2	0	West Island Causeway	
FH19	Fairhaven	15	\$32,396	\$20,504	culvert	N	0.0	1.6	1.6	1.6	100%	5	1	1	3	3	0	0	2	0	Bass Creek Road	
FH10	Fairhaven	14	\$26,835	\$13,832	culvert/road\parkin g lot	N	0.0	1.9	1.9	1.9	100%	5	1	2	3	3	0	0	0	0	0	Shore Drive and parking lot
FH22	Fairhaven	13	\$20,578	\$2,266	culvert/road	N	0.0	9.1	9.1	4.3	47%	3	2	4	4	0	0	0	0	0	0	Winsegansett Ave
FH02	Fairhaven	13	\$12,622	\$9,709	culvert	N	0.0	1.3	1.3	1.3	100%	5	1	2	2	3	0	0	0	0	0	Private Drive
FH20	Fairhaven	12	\$13,047	\$4,499	culvert/path	N	0.0	2.9	2.9	2.4	83%	4	1	3	4	0	0	0	0	0	0	
FH21	Fairhaven	12	\$13,047	\$5,057	culvert/path	N	0.0	2.6	2.6	2.1	82%	4	1	3	4	0	0	0	0	0	0	
FH17	Fairhaven	12	\$16,407	\$9,115	culvert/footpath	N	0.0	1.8	1.8	0.0	0%	0	1	2	3	3	1	0	2	0	0	
FH11	Fairhaven	12	\$121,381	\$18,171	culvert in Hurricane Dike	N	0.0	6.7	6.7	5.6	83%	4	2	1	2	3	0	0	0	0	0	Hurricane Dike @ Egypt Lane Atlas Tack
FH21A	Fairhaven	11	\$13,047	\$9,884	culvert/path	N	0.0	1.3	1.3	1.3	100%	5	1	2	3	0	0	0	0	0	0	
FH08	Fairhaven	11	\$18,110	\$11,462	culvert/barrier beach	N	0.0	1.6	1.6	1.6	100%	5	1	2	3	0	0	0	0	0	0	
FH07	Fairhaven	10	\$25,097	\$4,665	culvert/road	N	0.0	5.4	5.4	1.3	23%	3	2	3	2	0	0	0	0	0	0	Island View Road
FH09A	Fairhaven	10	\$26,835	\$44,725	culvert/road	N	0.0	0.6	0.6	0.6	100%	5	0	0	2	3	0	0	0	0	0	Grand View Ave
FH23	Fairhaven	9	\$62,290	\$53,239	barrier beach	N	0.0	1.2	1.2	1.2	100%	5	1	0	3	0	0	0	0	0	0	
FH05	Fairhaven	9	\$65,766	\$73,894	culvert	N	0.0	0.9	0.9	0.9	100%	5	0	0	1	3	0	0	0	0	0	
FH04	Fairhaven	9	\$502,770	\$359,121	bridge/culvert	N	0.0	1.4	1.4	1.4	100%	5	1	0	0	3	0	0	0	0	0	
FH06	Fairhaven	8	\$25,097	\$8,900	culvert/road	N	0.0	2.8	2.8	0.7	25%	3	1	2	2	0	0	0	0	0	0	Island View Road
FH13	Fairhaven	8	\$15,155	\$28,595	culvert	N	0.0	0.5	0.5	0.5	100%	5	0	1	2	0	0	0	0	0	0	Camp Seaspac Lane
FH09B	Fairhaven	8	\$7,161	\$28,642	culvert	N	0.0	0.3	0.3	0.3	100%	5	0	1	2	0	0	0	0	0	0	Widemarsh Road
FH01	Fairhaven	7	\$7,161	\$7,020	culvert	N	0.0	1.0	1.0	0.0	0%	0	1	3	3	0	0	0	0	0	0	Private Drive
FH03	Fairhaven	7	\$350,000	\$20,504	bridge	N	1.4	17.1	18.5	3.0	18%	2	2	1	2	0	0	0	0	0	0	Peirces Point Bridge
FH12	Fairhaven	7	\$7,578	\$47,361	culvert/road	N	0.0	0.2	0.2	0.2	100%	5	0	0	2	0	0	0	0	0	0	Windward Lane
FH24	Fairhaven	6	\$44,910	\$50,460	barrier beach	N	0.0	0.9	0.9	0.4	42%	3	0	0	3	0	0	0	0	0	0	
FH08A	Fairhaven	5	\$143,807	\$81,708	bridge	N	0.0	1.8	1.8	1.0	56%	4	1	0	0	0	0	0	0	0	0	Raymond St. Beach
FH15	Fairhaven	4	\$7,578	\$14,298	culvert/road	N	0.0	0.5	0.5	0.0	0%	0	0	2	2	0	0	0	0	0	0	Windward Lane
FH14	Fairhaven	3	\$16,407	\$30,956	culvert/road	N	0.0	0.5	0.5	0.0	0%	0	0	1	2	0	0	0	0	0	0	Camp Seaspac Lane
FA05	Falmouth	20	\$19,327	\$1,327	culvert	N	2.3	14.6	16.8	14.6	100%	5	2	5	5	3	0	0	0	0	0	Road
FA02	Falmouth	19	\$13,920	\$942	wall	N	2.3	14.8	17.0	14.8	100%	5	2	6	5	0	1	0	0	0	0	Rock Wall Mill Pond
FA10	Falmouth	17	\$14,862	\$7,905	road	N	4.2	1.9	6.1	1.9	100%	5	2	3	5	0	0	0	2	0	0	Woodneck Rd.
FA08	Falmouth	15	\$11,158	\$1,367	culvert	N	0.4	8.2	8.6	6.8	83%	4	2	5	4	0	0	0	0	0	0	Valley Road
FA01	Falmouth	15	\$6,002	\$1,658	culvert	N	0.0	3.6	3.6	3.6	100%	5	1	5	4	0	0	0	0	0	0	Private Road to Penzance Pt.
FA19	Falmouth	15	\$18,909	\$5,818	culvert	N	2.3	3.3	5.6	0.7	22%	3	2	3	4	3	0	0	0	0	0	Road/Culvert
FA39	Falmouth	15	\$227,538	\$19,717	culvert	N	0.0	11.5	11.5	11.4	99%	5	2	1	3	3	1	0	0	0	0	Wild Harbor
FA27	Falmouth	13	\$8,203	\$2,878	culvert	N	0.0	2.9	2.9	0.8	29%	3	1	4	3	0	0	0	2	0	0	parth north from Wigwam Road Great Sippewisset Marsh

Site #	Town	Priority Score	est. cost	cost per veg. acre	Restriction Structure	Remediated?	surface water	Vegetated Wetland	total wetland	Phragmites	% Phragmites	Score for % Phrag	Score for Wetland acreage	Score for Remediation Cost per acre	Score for cross section per acre	Score for public restriction	Score for Public wetland	Score Anadramous fish run	Score adverse restor. impacts		
FA09	Falmouth	13	\$22,316	\$3,588 culvert	N	0.4	6.2	6.6	4.8	77%	4	2	4	3	0	0	0	0	0	Road/Culvert	
FA07	Falmouth	13	\$36,220	\$4,163 culvert/tide gate	N	0.4	8.7	9.1	7.3	84%	4	2	3	4	0	0	0	0	0	Racing Ave.	
FA34	Falmouth	13	\$57,215	\$34,056 culvert	N	0.5	1.7	2.2	1.6	92%	5	1	1	3	3	0	0	0	0	Little Island Road	
FA33	Falmouth	12	\$8,203	\$4,122 culvert	N	0.0	2.0	2.0	2.0	100%	5	1	3	3	0	0	0	0	0	driveway for Beach Road house	
FA38	Falmouth	12	\$24,633	\$7,533 dike	N	0.0	3.3	3.3	1.7	52%	4	1	3	4	0	0	0	0	0	0	
FA28	Falmouth	12	\$74,607	\$19,531 culvert/dike	N	1.4	3.8	5.2	1.0	27%	3	2	1	3	2	1	0	0	0	MBTA RR Right of Way Great Sippewisset Marsh	
FA20	Falmouth	12	\$124,024	\$56,632 culvert	N	2.2	2.2	4.4	2.2	100%	5	1	0	4	2	0	0	0	0	Railroad/Culvert	
FA26A	Falmouth	11	\$12,490	\$3,394			3.7	3.7	0.2	6%	1	1	4	3	0	0	0	2	0	Wigwam Road Great Sippewisset Marsh	
FA32	Falmouth	11	\$16,407	\$5,159 culvert	N	0.0	3.2	3.2	2.3	73%	4	1	3	3	0	0	0	0	0	footpath	
FA21	Falmouth	11	\$124,024	\$50,212 culvert	N	0.0	2.5	2.5	2.5	100%	5	1	0	3	2	0	0	0	0	Railroad/Culvert	
FA29	Falmouth	10	\$12,027	\$3,724 culvert	N	0.0	3.2	3.2	0.3	9%	1	1	4	4	0	0	0	0	0	Little Neck Road	
FA28B	Falmouth	10	\$160,730	\$42,076 culvert/dike	N	1.4	3.8	5.2	1.0	27%	3	2	0	2	2	1	0	0	0	MBTA RR Right of Way Great Sippewisset Marsh	
FA17	Falmouth	10	\$225,986	\$59,785 culvert	N	6.8	3.8	10.5	2.4	62%	4	2	0	2	2	0	0	0	0	Railroad	
FA06	Falmouth	10	\$19,327	\$101,719 culvert	N	0.0	0.2	0.2	0.2	100%	5	0	0	1	3	1	0	0	0	Road	
FA30	Falmouth	9	\$12,564	\$5,324 culvert	N	0.7	2.4	3.1	0.1	6%	1	1	3	4	0	0	0	0	0	Chapaquoit	
FA11	Falmouth	9	\$42,000	\$9,396 bridge	N	3.2	4.5	7.7	1.6	36%	3	2	2	2	0	0	0	0	0	Santuit Rd. Potter's Hole	
FA03	Falmouth	9	\$12,004	\$26,675 culvert/Wall	N	0.0	0.5	0.5	0.5	100%	5	0	1	3	0	0	0	0	0	Private Driveway	
FA15	Falmouth	9	\$250,000	\$28,769 bridge	N	4.3	8.7	13.0	3.9	45%	3	2	1	0	3	0	0	0	0	West Falmouth Harbor	
FA14	Falmouth	9	\$1,200,000	\$61,381 bridge	N	6.0	19.6	25.6	3.9	20%	2	3	0	0	3	1	0	0	0	Quaker Rd.	
FA16	Falmouth	9	\$1,200,000	\$161,290 bridge	N	18.8	7.4	26.3	2.4	32%	3	3	0	0	3	0	0	0	0	0	
FA12	Falmouth	8	\$60,000	\$20,000 bridge	N	3.4	3.0	6.4	1.6	54%	4	2	1	1	0	0	0	0	0	Bayview Rd.	
FA04	Falmouth	8	\$7,161	\$22,377 culvert	N	0.0	0.3	0.3	0.3	100%	5	0	1	2	0	0	0	0	0	2nd Private Driveway	
FA13	Falmouth	8	\$44,910	\$115,153 culvert	N	0.9	0.4	1.3	0.4	100%	5	1	0	2	0	0	0	0	0	Bayview Rd.	
FA31	Falmouth	7	\$10,637	\$4,507 culvert	N	0.7	2.4	3.1	0.1	6%	1	1	3	2	0	0	0	0	0	driveway for #175	
FA18	Falmouth	7	\$30,427	\$338,073 culvert	N	0.1	0.1	0.2	0.1	100%	5	0	0	2	0	0	0	0	0	Penzance Point Pond	
FA36	Falmouth	5	\$31,006	\$25,838 culvert	N	0.0	1.2	1.2		0%	0	1	1	3	0	0	0	0	0	Wild Harbor beach	
FA37	Falmouth	5	\$19,596	\$31,105 dike	N	0.0	0.6	0.6	0.3	44%	3	0	1	1	0	0	0	0	0	0	
FA25	Falmouth	5	\$24,054	\$50,112 culvert	N	0.0	0.5	0.5	0.0	0%	0	0	0	2	3	0	0	0	0	Megansett Harbor	
FA26	Falmouth	5	\$121,381	\$65,968 culvert	N	0.7	1.8	2.5	0.0	0%	0	1	0	2	0	0	0	2	0	Quaker Rd.	
FA35	Falmouth	2	\$21,412	\$76,472 culvert	N	0.0	0.3	0.3	0.0	0%	0	0	0	2	0	0	0	0	0	0	
FA22	Falmouth	1	\$34,737	\$1,362 culvert	N	7.6	25.5	33.1	0.0	0%	0	3	5	3	0	0	0	0	0	-10 Road /Culvert	
MN22	Marion	17	\$13,487	\$665 culvert	Y	0.0	20.3	20.3	20.0	99%	5	2	6	4	0	0	0	0	0	0	13rd hole, Kittansett Golf C.
MN12	Marion	12	\$8,783	\$2,561 culvert	N	0.0	3.4	3.4	2.8	83%	4	1	4	3	0	0	0	0	0	0	Tide Box
MN14	Marion	12	\$6,743	\$4,783 culvert	N	0.0	1.4	1.4	1.4	100%	5	1	3	3	0	0	0	0	0	0	3rd Fairway cart path
MN15	Marion	12	\$11,633	\$8,250 culvert	N	0.0	1.4	1.4	1.4	100%	5	1	2	4	0	0	0	0	0	0	3rd Fairway cart path

Site #	Town	Priority	Score	est. cost	cost per veg. acre	Restriction	Structure	Remediated?	surface water	Vegetated	total wetland	Phragmites	% Phragmites	Score for % Phrag	Score for Wetland acreage	Score Remediation Cost per acre	Score for cross section per acre	Score for public restriction	Score for Public wetland	Score Anadromous fish run	Score adverse restor. impacts	
MN13	Marion	11	\$11,749	\$5,816	culvert	N	0.0	2.0	2.0	1.9	92%	5	1	3	2	0	0	0	0	0	0	Road to Practice area Kittansett Golf C.
MN17	Marion	11	\$6,743	\$6,021	culvert	N	0.0	1.1	1.1	1.1	100%	5	1	3	2	0	0	0	0	0	0	Patch to 17th Green, Kittansett Golf C.
MN19	Marion	10	\$13,487	\$12,042	culvert	N	0.0	1.1	1.1	1.1	100%	5	1	2	2	0	0	0	0	0	0	17th Fairway Kittansett Golf C.
MN16	Marion	10	\$17,565	\$12,458	culvert	N	0.0	1.4	1.4	1.4	100%	5	1	2	2	0	0	0	0	0	0	0
MN10	Marion	10	\$17,589	\$12,474	culvert	N	0.0	1.4	1.4	0.0	0%	0	1	2	1	3	1	0	2	0	0	Boat Yard Lane Hammets Cove
MN09	Marion	10	\$80,998	\$12,558	culvert	Y	0.0	6.5	6.5	0.5	7%	1	2	2	2	3	0	0	0	0	0	Route 6
MN18	Marion	10	\$16,082	\$14,359	culvert	N	0.0	1.1	1.1	1.1	100%	5	1	2	2	0	0	0	0	0	0	0
MN29	Marion	9	\$6,489	\$5,953	dike	N	0.4	1.1	1.4	0.0	0%	0	1	3	5	0	0	0	0	0	0	old dam
MN02	Marion	9	\$15,889	\$6,407	culvert	N	0.0	2.5	2.5	0.6	23%	3	1	3	2	0	0	0	0	0	0	Acocut Ave.
MN07	Marion	9	\$22,509	\$12,037	culvert	N	0.0	1.9	1.9	0.4	19%	2	1	2	2	0	0	0	2	0	0	Quelle Road
MN08	Marion	9	\$38,489	\$34,675	culvert	N	0.0	1.1	1.1	0.8	76%	4	1	1	1	2	0	0	0	0	0	Route 6
MN30	Marion	9	\$10,150	\$46,136	stonewall	N	0.0	0.2	0.2	0.2	68%	4	0	0	5	0	0	0	0	0	0	stone wall
MN31	Marion	8	\$10,150	\$46,136	stonewall	N	0.0	0.2	0.2	0.1	50%	3	0	0	5	0	0	0	0	0	0	stone wall
MN05	Marion	7	\$15,155	\$17,623	culvert	N	0.0	0.9	0.9	0.4	42%	3	0	1	3	0	0	0	0	0	0	0
MN21	Marion	7	\$15,155	\$72,169	culvert	Y	0.0	0.2	0.2	0.2	100%	5	0	0	2	0	0	0	0	0	0	path to 4th tee Kittansett Golf C.
MN06	Marion	6	\$22,509	\$26,173	culvert	N	0.0	0.9	0.9	0.4	42%	3	0	1	2	0	0	0	0	0	0	Bayberry Lane
MN20	Marion	6	\$13,487	\$48,168	culvert	N	0.0	0.3	0.3	0.3	100%	5	0	0	1	0	0	0	0	0	0	17th Fairway Kittansett Golf C.
MT17	Mattapoissett	18	\$12,506	\$2,743	wall, rock	N	0.0	4.6	4.6	2.9	63%	4	1	4	5	3	1	0	0	0	0	Rock wall
MT06	Mattapoissett	17	\$43,519	\$1,075	culvert	N	0.0	40.5	40.5	4.5	11%	2	3	5	4	3	0	0	0	0	0	Old Mattapoissett Neck Rd.
MT04	Mattapoissett	16	\$43,519	\$1,088	culvert	N	0.0	40.0	40.0	3.8	10%	1	3	5	4	3	0	0	0	0	0	Mattapoissett Neck Road
MT15	Mattapoissett	16	\$11,592	\$2,531	culvert	N	0.0	4.6	4.6	2.9	63%	4	1	4	3	3	1	0	0	0	0	Private Beach Road
MT13	Mattapoissett	15	\$18,022	\$2,177	culvert, rock wall	N	0.2	8.3	8.5	4.8	58%	4	2	4	4	0	1	0	0	0	0	stones across channel
MT03	Mattapoissett	15	\$143,628	\$3,591	culvert	N	0.0	40.0	40.0	3.8	10%	1	3	4	3	3	1	0	0	0	0	Mattapoissett Neck Road
MT09	Mattapoissett	15	\$370,520	\$14,756	bridge, culvert	N	18.8	25.1	43.9	6.2	25%	3	3	2	3	3	1	0	0	0	0	Old Railroad Bridge Eel Pond
MT23	Mattapoissett	14	\$8,783	\$4,284	culvert	N	0.0	2.1	2.1	2.1	100%	5	1	3	2	2	1	0	0	0	0	Road to beach at Nasketucket Reserve Shaws Cove
MT01	Mattapoissett	13	\$7,161	\$1,713	culvert	N	0.0	4.2	4.2	1.3	31%	3	1	5	4	0	0	0	0	0	0	Cecella Lane
MT02	Mattapoissett	13	\$7,161	\$1,713	culvert	N	0.0	4.2	4.2	1.3	31%	3	1	5	4	0	0	0	0	0	0	Cecella Lane
MT05	Mattapoissett	13	\$218,709	\$5,468	culvert	N	0.0	40.0	40.0	3.8	10%	1	3	3	3	3	0	0	0	0	0	Mattapoissett Neck Road
MT07	Mattapoissett	13	\$600,000	\$22,650	bridge	N	12.4	26.5	38.9	5.6	21%	3	3	1	2	3	1	0	0	0	0	Old Railroad Bridge Mattapoissett River
MT18	Mattapoissett	12	\$12,467	\$6,297	culvert	N	0.0	2.0	2.0	1.5	75%	4	1	3	4	0	0	0	0	0	0	cart path
MT10	Mattapoissett	12	\$13,047	\$6,725	culvert	N	0.0	1.9	1.9	1.9	96%	5	1	3	3	0	0	0	0	0	0	old access area to beach
MT12	Mattapoissett	12	\$66,870	\$11,941	culvert	N	0.0	5.6	5.6	3.6	65%	4	2	2	3	0	1	0	0	0	0	Private road
MT38	Mattapoissett	12	\$14,705	\$70,023	road	N	0.0	0.2	0.2	0.2	71%	4	0	0	5	3	0	0	0	0	0	road Old Neck Road
MT11	Mattapoissett	10	\$19,049	\$6,435	culvert	N	0.0	3.0	3.0	2.5	83%	4	1	3	2	0	0	0	0	0	0	Private road

Site #	Town	Priority Score	est. cost	cost per veg. acre	Restriction Structure	Remediated? surface water	Vegetated total wetland acres behind rest.	total wetland acres affected	Phragmites % Phragmites	Score for % Phrag	Score for Wetland acreage	Score Remediation Cost per acre	Score for cross section per acre	Score for Public restriction	Score Anadromous fish run	Score Rare/Endg. Sp. Habitat	Score adverse restor. impacts					
WH38	Wareham	16	\$90,448	\$53,387	rocks	N	0.0	1.7	1.7	1.6	93%	5	1	0	5	3	0	0	2	0	Swifts Beach Playground	
WH31	Wareham	15	\$9,524	\$999	road	N	0.0	9.5	9.5	6.0	63%	4	2	6	3	0	0	0	0	0	0	road
WH01B	Wareham	15	\$1,000,000	\$6,198	bridge	N	221.8	161.3	383.1	57.7	36%	3	4	3	2	2	1	0	0	0	0	Rt.6 Bridge Weweantic River
WH01	Wareham	14	\$1,500,000	\$24,454	bridge/road	N	221.8	61.3	283.1	57.7	94%	5	4	1	1	2	1	0	0	0	0	Rt.6 Bridge Weweantic River
WH35	Wareham	13	\$12,035	\$4,853	dike	N	0.0	2.5	2.5	2.0	81%	4	1	3	5	0	0	0	0	0	0	dike
WH28	Wareham	13	\$12,035	\$9,187	driveway	N	0.0	1.3	1.3	1.3	100%	5	1	2	5	0	0	0	0	0	0	0
WH14	Wareham	13	\$1,750,000	\$17,048	bridge	N	189.5	102.7	292.1	66.0	64%	4	4	1	1	2	1	0	0	0	0	Minot Ave Wareham River
WH39	Wareham	13	\$79,670	\$49,888	culvert	N	0.0	1.7	1.7	1.6	93%	5	1	0	2	3	0	0	2	0	0	Swifts Beach Playground
WH07	Wareham	12	\$24,981	\$2,168	culvert	N	0.0	11.5	11.5	3.8	33%	3	2	4	3	0	0	0	0	0	0	Camp St. Mud Cove
WH14B	Wareham	12	\$500,000	\$4,871	bridge	N	189.5	102.7	292.1	66.0	64%	4	0	3	2	2	1	0	0	0	0	Minot Ave Wareham River
WH16	Wareham	12	\$70,215	\$13,503	culvert	N	0.0	5.2	5.2	3.8	72%	4	2	2	2	2	0	0	0	0	0	Sandwich Rd., Rt 6
WH05	Wareham	12	\$2,000,000	\$27,334	bridge	N	113.4	73.2	186.6	20.7	28%	3	4	1	0	3	1	0	0	0	0	Onset Ave Broad Cove
WH09	Wareham	11	\$6,206	\$1,587	road	N	0.0	3.9	3.9	0.0	0%	0	1	5	5	0	0	0	0	0	0	Baker's Island Road Shell Point Bay
WH06	Wareham	11	\$1,000,000	\$16,064	bridge	N	51.6	62.3	113.9	9.8	16%	2	3	1	1	3	1	0	0	0	0	East Blvd Broad Cove
WH04	Wareham	11	\$13,920	\$17,620	fill	N	0.0	0.8	0.8	0.8	100%	5	0	1	5	0	0	0	0	0	0	Fishermans Cove Rd
WH13	Wareham	11	\$85,721	\$68,577	culvert/road	N	1.4	1.3	2.6	0.9	70%	4	1	0	2	3	1	0	0	0	0	Narrows Road Wareham River
WH24	Wareham	11	\$213,627	\$577,369	railroad	N	1.8	0.4	2.2	0.4	100%	5	1	0	2	3	0	0	0	0	0	railroad Narrow Ave
WH36	Wareham	10	\$12,035	\$3,024	dike	N	0.0	4.0	4.0	0.0	0%	0	1	4	5	0	0	0	0	0	0	dike
WH34	Wareham	10	\$29,043	\$7,297	dike	N	0.0	4.0	4.0	3.0	76%	4	1	3	2	0	0	0	0	0	0	dike
WH15	Wareham	10	\$1,000,000	\$9,742	bridge	N	189.5	102.7	292.1	66.0	64%	4	0	2	1	2	1	0	0	0	0	Railroad Wareham River
WH12	Wareham	10	\$217,720	\$369,017	railroad/culvert	N	0.6	0.6	1.2	0.6	100%	5	1	0	2	2	0	0	0	0	0	Railroad
WH08	Wareham	9	\$7,161	\$1,831	culvert	N	0.0	3.9	3.9	0.0	0%	0	1	5	3	0	0	0	0	0	0	Gomez Way Shell Point Bay
WH30	Wareham	9	\$43,519	\$3,985	dike	N	0.0	10.9	10.9	0.0	0%	0	2	4	3	0	0	0	0	0	0	bog dike with tide gate
WH29	Wareham	9	\$28,503	\$30,982	road	N	0.0	0.9	0.9	0.6	62%	4	0	1	2	2	0	0	0	0	0	Route 6
WH26	Wareham	9	\$12,035	\$52,325	dike	N	0.0	0.2	0.2	0.0	17%	2	0	0	5	0	0	0	2	0	0	driveway
WH32	Wareham	7	\$6,118	\$9,269	road	N	1.9	0.7	2.6	0.0	0%	0	1	2	4	0	0	0	0	0	0	road
WH23	Wareham	7	\$65,766	\$31,317	dike	N	0.0	2.1	2.1	0.8	36%	3	1	1	2	0	0	0	0	0	0	culvert/dike Crook River
WH03	Wareham	7	\$119,010	\$31,906	bridge/road	N	0.0	3.7	3.7	0.1	4%	1	1	1	1	3	0	0	0	0	0	Blackmore Pond Rd. cohacket Brook
WH20	Wareham	7	\$2,000,000	\$146,520	bridge	N	0.0	13.7	13.7	2.8	20%	3	2	0	0	2	0	0	0	0	0	I-195 Cohacket Brook
WH21	Wareham	7	\$1,500,000	\$570,342	bridge	N	5.9	2.6	8.5	0.0	0%	0	2	0	0	2	1	0	2	0	0	I-195 Weweantic River
WH25	Wareham	6	\$12,032	\$52,313	road	N	0.0	0.2	0.2	0.0	17%	2	0	0	2	0	0	0	2	0	0	driveway
WH37	Wareham	6	\$93,435	\$137,404	road	N	0.0	0.7	0.7	0.4	59%	4	0	0	2	0	0	0	0	0	0	Pond Street
WH02	Wareham	4	\$360,000	\$3,600,000	bridge	N	2.2	0.1	2.3	0.0	0%	0	1	0	0	0	1	0	2	0	0	Railroad ROW Bridge Sippican River
WP17	Westport	16	\$9,710	\$1,000	road	N	0.0	9.7	9.7	3.6	37%	3	2	6	3	0	0	0	2	0	0	driveway
WP06	Westport	16	\$2,800,000	\$13,625	bridge	N	311.6	205.5	517.1	135.9	66%	4	4	2	2	3	1	0	0	0	0	Hix Bridge Westport River

Site #	Town	Priority Score	est. cost	cost per veg. acre	Restriction Structure	Remediated? surface water	Vegetated Wetland acres behind rest.	total wetland acres affected	Phragmites acres	% Phragmites	Score for % Phrag	Score for Wetland acreage	Score Remediation Cost per acre	Score for cross section	Score for public restriction	Score Anadromous fish run	Score Rare/Endg. Sp. Habitat	Score adverse restor. impacts				
WP13	Westport	15	\$12,412	\$1,698	rocks	N	0.2	7.3	7.5	2.9	40%	3	2	5	5	0	0	0	0	rocks Westport River		
WP12	Westport	14	\$13,840	\$1,793	culvert	N	0.5	7.7	8.2	3.7	48%	3	2	5	4	0	0	0	0	0	road	
WP01	Westport	14	\$32,396	\$2,847	culvert	N	100.2	11.4	111.6	7.4	65%	4	3	4	5	3	1	4	0	-10	River Road Cockeast Pond	
WP07	Westport	13	\$12,977	\$7,545	dike	N	0.2	1.7	1.9	1.4	79%	4	1	3	5	0	0	0	0	0	0	
WP08	Westport	13	\$14,862	\$10,042	dike	N	0.0	1.5	1.5	1.5	100%	5	1	2	5	0	0	0	0	0	0	
WP03	Westport	13	\$9,200,000	\$12,097	bridge	N	1910.0	760.5	2670.5	0.0	0%	0	4	2	2	2	1	0	2	0	Rt.88 Bridge Westport River	
WP19	Westport	12	\$62,676	\$48,966	road	N	0.0	1.3	1.3	0.7	52%	4	1	0	2	2	1	0	2	0	Route 88 Westport River	
WP10	Westport	11	\$6,960	\$4,094	road	N	0.0	1.7	1.7	0.2	14%	2	1	3	5	0	0	0	0	0	0	cart path
WP04	Westport	10	\$26,835	\$8,945	culvert	N	0.2	3.0	3.2	1.4	45%	3	1	2	4	0	0	0	0	0	0	Cadman's Neck Rd.
WP09	Westport	9	\$17,102	\$11,105	culvert	N	0.2	1.5	1.7	0.0	0%	0	1	2	2	3	1	0	0	0	0	
WP11	Westport	9	\$13,920	\$44,902	dike	N	0.0	0.3	0.3	0.2	77%	4	0	0	5	0	0	0	0	0	0	dike
WP20	Westport	8	\$62,676	\$174,100	road	N	0.0	0.4	0.4	0.0	11%	2	0	0	1	2	1	0	2	0	0	road
WP02	Westport	7	\$16,096	\$24,763	culvert	N	0.0	0.7	0.7	0.6	89%	4	0	1	0	0	0	0	2	0	0	Hulda Cove
WP05	Westport	5	\$10,637	\$8,310	culvert	N	0.2	1.3	1.4	0.0	0%	0	1	2	2	0	0	0	0	0	0	Driveway to 123 Cadman's Neck Road
WP18	Westport	5	\$14,012	\$63,692	road	N	0.1	0.2	0.4	0.0	5%	1	0	0	2	0	0	0	2	0	0	road Westport River
WP15	Westport	5	\$12,035	\$80,232	stone wall	N	0.0	0.2	0.2	0.0	0%	0	0	0	5	0	0	0	0	0	0	stone Wall Hicks Cove-Dunham Creek
WP16	Westport	5	\$12,035	\$133,719	stone wall	N	0.0	0.1	0.1	0.0	0%	0	0	0	5	0	0	0	0	0	0	stone Wall Dunham Creek
WP14	Westport	-	\$25,792	\$7,306	dike	N	3.4	3.5	7.0	0.0	0%	0	2	3	3	0	0	0	0	-10	dike Westport River	

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FAIRHAVEN: Town Beach Entrance, West Island

Tidal Restriction Site FH18

Score = 14, Ranking = High

Site Description

Restriction FH18 was created by the construction of a parking lot which is used for the town beach and the DEM state reservation. The salt marsh behind the barrier beach was filled to create this parking lot. In order to maintain drainage for the marshes on the west side of the road, a perimeter ditch was dug around the parking lot and a culvert placed under Fir Street. The wetlands to the west and north are privately owned, and mapped as habitat for rare & endangered species by the Natural Heritage & Endangered Species Program.

General Information

The restriction consists of a circular, 10" diameter, concrete culvert. The culvert is located under Fir Street, a 30 ft wide, paved road leading to the Fairhaven Town Beach on West Island.

- Culvert condition - fair
- Restriction width - 10 inches
- Restriction length - 36 feet
- Channel width - 4 feet
- Acres of wetlands affected - 13.7
- Acres of *Phragmites* - 1.5

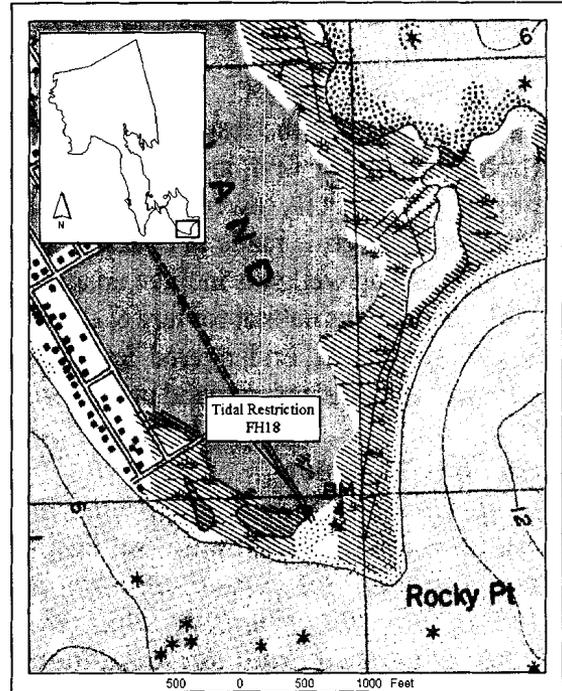
Estimated Remediation Cost

Total estimated cost - \$15,800

Cost per acre - \$1,160

Comments

This site has generated interest among several agencies.



Culvert under Fir Street, upstream side



Culvert under Fir Street, downstream side

BOURNE: Rail Line Salt Marsh Area

Tidal Restriction Site BN12

Score = 13, Ranking = High

Site Description

Restriction BN12 is the result of two culverts located under a railroad track. The first, an aluminum culvert appears fairly new and is at a slightly lower elevation than the second culvert. The second culvert is made of concrete and is badly damaged. The surrounding wetlands include an anadromous fish run and it is also mapped as habitat for rare & endangered species by the Natural Heritage & Endangered Species Program. Both the restriction and affected wetland are on private property.

General Information

The restrictions consist of two circular culverts, one 48" diameter corrugated aluminum and one 30" concrete culvert. The culverts are located under a twenty foot wide railroad track. There is an existing tide gate which is stuck 4" open, and consists of a rotting board on rusting hinges.

- Culvert condition - aluminum - good, concrete - poor
- Restriction width - 2.7 feet
- Restriction length - 12 feet
- Channel width - unknown
- Acres of wetlands affected - 46.20
- Acres of *Phragmites* - 0

Estimated Remediation Cost

Remediation cost - \$10,700

Cost per acre - \$232

Comments

This site is one of a number of restrictions in the Towns of Bourne and Falmouth caused by the old railroad track bed. Culvert replacement under the railroad bed will require participation and permission of the Massachusetts Department of Transportation.



Tidal Restriction BN12b



Tidal Restriction BN12a

WAREHAM: Allen Road restriction on Crooked River

Tidal Restriction Site WH11

Score = 14, Ranking = High

Site Description

Restriction WH11 is the result of an 18" culvert under Alden Road. The restriction is on town property and the wetland is privately owned.

General Information

This restriction consists of a circular, concrete culvert with a diameter of 18". The culvert is located under Allen Road, a 30 foot wide paved road. Presently, the culvert is nearly buried by debris. On the south side of Alden Road, sediment has accumulated blocking the channel and the culvert. An underground water pipe sprays out into the channel.

- Culvert condition - fair
- Restriction width - 1.5 feet
- Restriction length - 36 feet
- Channel width - 3 feet
- Acres of wetlands affected - 29.0
- Acres of *Phragmites* - 8.6

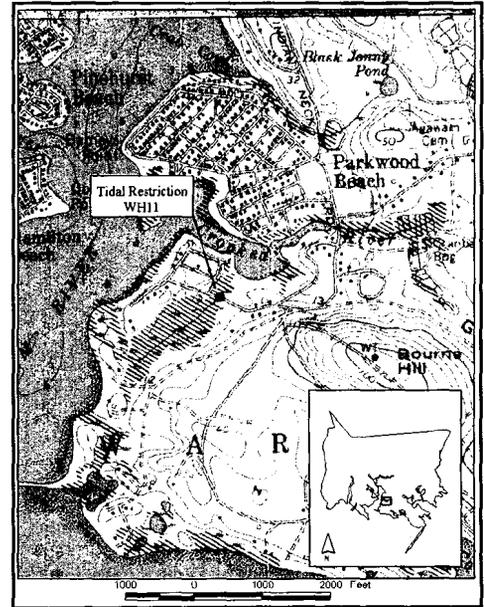
Estimated Remediation Cost

Total estimated cost - \$10,400

Cost per acre - \$359

Comments

A four foot open box culvert and expansion of channel could benefit this site.



Tidal Restriction WH11

t h e



Tidal Restriction WH11



Welcome to the *official* Buzzards Bay Project National Estuary Program Home Page

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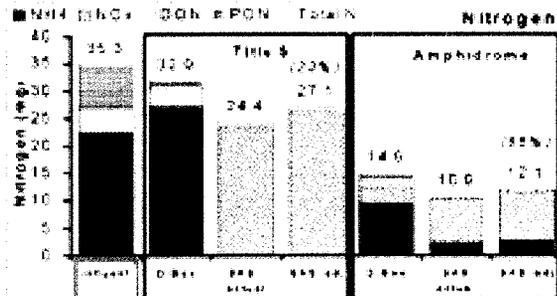
Call us at (508) 291-3625, fax: -3628 or [email us](#). ----- You are visitor **38049** since our start.

Buzzards Bay Project

The views or information contained here do not necessarily reflect the views of the Commonwealth of Massachusetts or the US EPA.

Identity	Events	Bay & Basin	Emergency
Reference	Funding	Links	Legislation
NEP Info	Town Info	GIS Data	Jobs
Press Clips	Weather	Correspondence	Status Trends

**Septic System Test Center:
Second Set of Results Posted!**



PROGRAMS & TECHNICAL ASSISTANCE

Wetlands	Open Space	Nitrogen
Stormwater		
Wastewater	Test Center	Pub. Health
Oil Pollution	Monitoring	

Looking for the citizen's group The Coalition for Buzzards Bay? [Click here.](#)



QUIZ: 3 out of 6 specialty plates in Massachusetts fund environmental projects. Do you know which they are?

RECENT HIGHLIGHTS & SPECIAL TOPICS

[New Beach Testing Requirements promulgated in Massachusetts in 2001](#)

Are towns complying?

[November 2001: New Municipal Oil Response Plan for Buzzards Bay](#)

The Coast Guard is responsible for overseeing the cleanup of oil spills in coastal waters, but the municipalities of Buzzards Bay have put in place a plan of first response until the Coast Guard Can arrive on scene. Click on the link above to see their protocols.

[August 2001: Buzzards Bay Project awards minigrants to Town of Falmouth](#)

The grants, for herring run restoration and stormwater remediation, is the first round of soon to be announced grants to other municipalities.

[A preview of the MCZM "Coastlines" newsletter September 2001 issue](#)

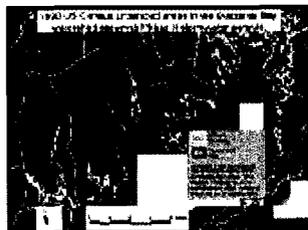
An article on the release of the Septic System Test Center fact sheets by BBP Executive Director, Joe Costa.

[Westport lawsuit on dairy farm manure runoff settled!](#)

After years of meetings, controversy, and conflicts between town officials, shellfisherman, dairy farmers, and citizen's groups, and the first ever [EPA New England CAFO permit](#), a landmark case involving one farmer is settled. Click here to go to the Standard Times newspaper article from 3/27/01.

[A fact sheet on Phase 2 NPDES stormwater permits due in 2003.](#)

What do towns have to do, and will Phase 2 improve water quality? This 26Kb PDF file tries to answer these questions.



[Click on the picture](#) to see a detailed aerial map showing automatic

Phase II areas (400 Kb JPG file).

[A brochure on land use options to manage nitrogen inputs to coastal waters for property owners and town officials.](#)

This is a 216 kB reduced resolution version for the web as a PDF file. If you want the 1 MB version, so you can print and hand out a high resolution double sided copy, just send us an email.

[Inventory of tidally restricted salt marshes: January 2001 DRAFT FINAL AVAILABLE](#)

The Buzzards Bay Project mapped tidally restricted salt marshes and coastal wetlands around Buzzards Bay. The draft final report was released in January 2001.

Click here to learn more.

 [Briefing on the Hix Bridge Tidal Restriction: Should debris under the bridge be dredged?](#)

An October 2000 report, a 1.4 MB PDF file (graphic resolution reduced).

 [New Bedford Standard Times Article:](#)

[At request of BBAC, EPA and State designate Buzzards Bay as a boat "No Discharge Area"](#)
Event and press announcement were held at 11 AM on Friday August 4, 2000 at the State Pier in the City of New Bedford, on the Schooner Ernestina. EPA Regional Administrator Mindy Lubber, and Massachusetts Environmental Secretary Bob Durand, and City of New Bedford Mayor Fred Kalisz make the announcement.

 [The Buzzards Bay NDA fact sheet.](#)

 [Read the Buzzards Bay Project's Report on the Bilge Socks tested](#)
(This is a 435K PDF file and requires Acrobat Reader[™])

Web page written and designed by Joe Costa. Text by Joe Costa and BBP staff.

**A review of the performance of bilge socks proposed for use in
Buzzards Bay recreational boats in response to a request for
proposals issued by the Buzzards Bay Action Committee and the
Town of Dartmouth**

Prepared by
Joseph E. Costa, Ph.D.
Buzzards Bay Project National Estuary Program



Buzzards Bay Project

Final
May 20, 2000

Introduction

Most boats have compartments inside their hull that serve to capture rain and seawater entering the hull of the boat. These compartments also capture fuel and engine oil that may leak within the boat. Boats with fuel compartments, inboard engines, and drive shafts are far more likely to leak oil into these compartments. Maintenance of inboard engines can also result in spills into the bilge. Many bilges can drain automatically when a boat is in motion, but almost all boats have pumps to evacuate the bilge compartment to prevent boats from swamping. These pumps often turn on automatically when water levels rise too high in the boat. The pumping of bilge water laden with fuel and oil is an important source of oil to the marine environment and is often the cause of the oily sheen seen in some harbors or near some marinas.

In the fall of 1999, the Buzzards Bay Action Committee (BBAC) received a grant from the Massachusetts Coastal Zone Management office, through its Coastal Pollution Remediation Program, to provide free bilge oil absorption devices to recreational boaters in Buzzards Bay. These devices are generally referred to as "bilge socks", "bilge pads", or "bilge pillows" depending on their shape. The purpose of this initiative was to raise the awareness of the boating community as to the significance of oil and fuel inputs from boat bilge compartment discharges. Additionally, this initiative was meant to encourage boaters to use oil-absorbing bilge socks to capture this oil and fuel before it is discharged to the marine environment. The grant also provided funds for towns to pay for the establishment of collection sites for the bilge socks, and to pay for their disposal. The Town of Dartmouth, on behalf of the Buzzards Bay municipalities, administered the BBAC grant.

Most boats are expected to require one or two bilge socks during each boating season to capture oil and fuel leaking into their bilge compartments. While each boater would get their first bilge sock free through this program, the expectation is that when boaters see the value of the bilge sock, they will continue to purchase and use them on their own. Although it is believed that bilge socks are not widely used by Buzzards Bay boaters, their typical retail cost of \$7 to \$12 is not viewed as an impediment if their utility and value is recognized and understood. Another benefit of this program is that Buzzards Bay municipalities and private marinas will continue to provide disposal services for bilge socks.

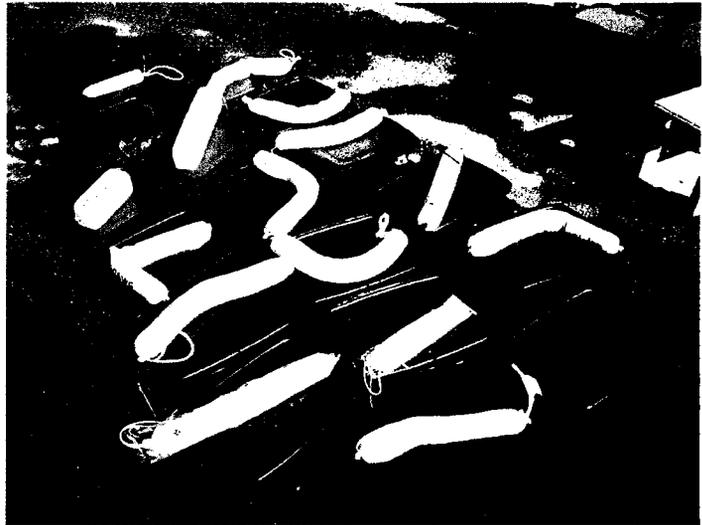
At the request of the Buzzards Bay Action Committee, the Buzzards Bay Project provided technical assistance in the development of the request for proposals and the testing of the bilge socks. A foremost goal of the BBAC was to implement an easy, clean, and cost effective process for recovering bilge oil. Because of concerns about maintaining recycling equipment, OSHA requirements on operating recycling equipment, and permitting and liability issues that would be involved with keep used oil drums on docks, the use of reusable bilge socks was rejected. Instead, single use socks that could be incinerated at conventional waste disposal facilities was the preferred type of product.

Besides desiring single use disposable socks, the BBAC had interest in a "no-mess" product that physically or chemically bound the oil so that when the sock was removed and transported by the boater, or when dozens of the socks were deposited in storage drum, oil would not seep from the devices. This was viewed as a very important consideration because the municipalities did not

want any potential for oil spills should a storage drum be tipped. Also, it was felt that boaters would be more likely to use a product that did not drip oil on their boat or person.

Response to Request for Bids

Eleven companies submitted bids, but 3 of the companies did not submit products. Based on the literature on the products provided, these products all appeared to be made of polyethylene adsorptive fibers. Of the remaining eight companies, several offered more than one product so that altogether 21 products



were submitted. One of the products (a pad) was rejected outright because it did not conform to bid specifications, so that altogether 20 products were tested.

Of the twenty products tested, nine socks consisted of polypropylene fibers, two socks tested (actually one product in two sizes) contained a hydrocarbon absorbing foam, one product contained cellulose, four contained a plasticizing polymer, two had a plasticizing polymer-cellulose blend, and two socks (one product in two sizes) contained emulsifiers with purported bacterial treatment.

Evaluation Criteria

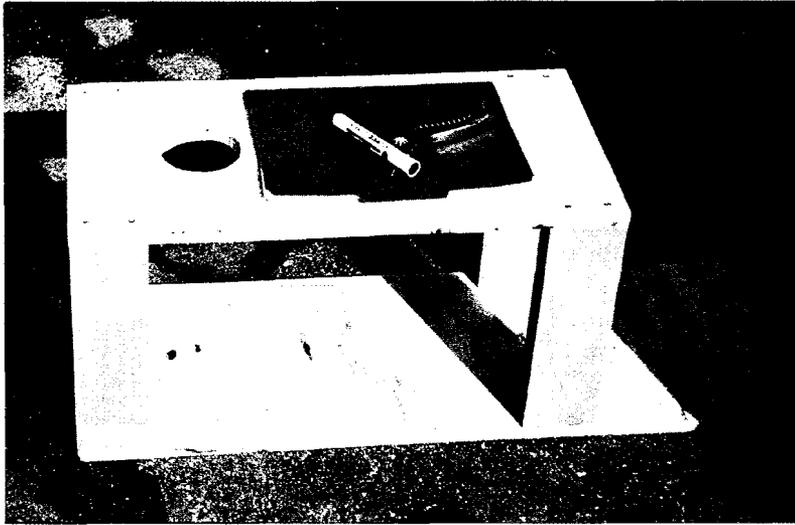
To meet the performance goals identified by the BBAC, the Buzzards Bay Project proposed the following design and performance criteria:

- 1) The absorbent device must be able to pass through a 3 1/2" inch diameter hole with a 12-inch clearance below the hole. This was meant to simulate small bilge compartments on some boats.
- 2) The device must have a rope with loop to enable its attachment and removal from within bilges, and to prevent the device from blocking bilge pumps.
- 3) The device must have a 1.5-quart hydrocarbon capacity.
- 4) The device does not drip or release oil under moderate pressure.

The manufacture also had to confirm that the product was of a material that would be accepted at conventional waste disposal incineration facilities in Massachusetts.

Materials and Methods

The Town of Dartmouth and Buzzards Bay Action Committee performed tests with technical support and guidance from the Buzzards Bay Project. Len Gonsalves, Executive Director of the BBAC procured all materials used in the tests, and conducted and oversaw the tests in the presence of several additional municipal officials including fire chiefs and harbor masters.



A bilge compartment port size-test device was constructed as shown in the plans in Figure 2. The purpose of this device was to ensure that the product could be retrieved from boat bilge compartments with 3.5" openings after becoming saturated with hydrocarbons.

To evaluate hydrocarbon uptake capacity, one and a half quarts of hydrocarbons composed of 3 cups of engine oil (10W30) and



Socks being placed in bins.

3 cups of diesel fuel were added to 10-gallon bins containing 7 gallons of fresh water. The absorbent device was added to the bin and left for 3 days with 1 minute of stirring each day. The bins were kept in an unheated garage. Ambient temperatures in the garage during the test period were approximately 40-50 degrees F. The test site was kept locked and secure.

The device was retrieved after three days and any remaining oil was observed. After the three-day period, the device was evaluated if it passed the three performance tests (absorb 1.5 quarts, pass through the hole, drip test). To evaluate whether the devices released oil under moderate pressure, the absorbent device grasped firmly with two hands and was attempted to be twisted 180 degrees by hand. The individual performing this "twist and squeeze test" applied firm but not too exertive effort, so that even if the device became rigid and could not be twisted 180 degrees as attempted, it would receive about the same pressure as the other devices.



Results

Table 1 summarizes the results of all tests. Five products overtly failed the 1.5-quart hydrocarbon absorption test. Three of these conspicuous failures appeared to be the result of the fact that the products appeared undersized to adsorb the 1.5-quart oil-fuel mix volume. The two emulsifier socks failed to absorb oil to any appreciable degree as claimed. The manufacture of these products claim that the emulsifiers in the sock break down the oil into smaller droplets, and this oil is then broken down by bacteria in the sock so there is no waste oil to dispose of. The results of this test did not support these claims. Because of these overt failures, these products were not tested further.



Most of the remaining socks appeared successful in removing the 1.5-quart fuel-oil mixture. There actually was some variability in oil uptake final performance in the form of some droplets at the surface, but these proved very difficult to quantify or characterize. The volume of this very small amount of residual oil could have also been influenced by the amount of mixing time and exposure to the sock. Because the remaining 15 socks did not overtly fail the 1.5-quart test, and could be judged to have taken up 95% of the oil, it was determined they passed the hydrocarbon absorption test.



Of the 15 absorbent devices that passed the hydrocarbon uptake test, only one did not pass the hole test. This device, a 4-inch foam cube (5.6" diagonal) could not pass through the 3.5 inch hole. This device also failed the squeeze test.

Of the 14 absorbent devices passing the hydrocarbon absorption and hole tests, 11 failed the twist and squeeze test. In particular, any bilge sock filled exclusively with adsorptive materials like polyethylene or cellulose easily failed the squeeze test. In fact, many of these products dripped a milky water-oil immersion when lifted from the test bins or when placed in trays. The two devices that were composed of polymer-cellulose mix did well in oil uptake, however, they still released oil in the twist and squeeze test. Only three devices passed the twist and squeeze test, and these were the only ones composed exclusively of plasticizing polymer compounds that physically or chemically bound the oil.

Conclusion and Discussion

Only three devices passed all tests and criteria outlined in the Request for Bids. These bilge socks were the only ones composed exclusively of plasticizing polymer compounds. These passing socks were Bilge Sock G from Dawg Inc., Bilge Sock H, from Dawg Inc., and

Envirobond bilge sock from Lakefront Enterprises. Based on bid price, the Town of Dartmouth and BBAC selected the Envirobond sock from Lakefront enterprises.

In presenting the findings of this study, the Buzzards Bay Project is not endorsing or recommending against any of the products tested.

Furthermore, the results of these tests should not be considered as invalidating the utility of any

products tested in this study, or other comparable devices on the market. The test results in this report were developed to address some very specific needs identified by Buzzards Bay municipalities. For example, many of the oil adsorptive materials and bilge socks composed of polyethylene or other materials can be wrung out and recycled. Thus, these products, which tend to be cheaper than socks containing polymers, can be recycled and reused, and are cheaper for the consumer. If adequate recycling facilities are available, and if properly handled and bagged by the consumer, these products can have utility in many situations.

The only class of products evaluated in this study that have been found by others to be of questionable efficacy in protecting the environment are those products that contain emulsifiers. Although some of these products are composed of natural plant-derived soap-like products, and are themselves biodegradable and non-toxic, their ability to emulsify oil into small droplets may make the oil more harmful to marine life. In fact, the US Coast Guard and the US EPA expressly prohibit the use of soap products, like dishwashing liquid, to disperse oil spills. Although some of these bilge products contain bacteria that purportedly digest the oil, there has been no independent substantiation of the decomposition of oil in the hours, days or weeks that oil may remain in a bilge compartment before it is pumped overboard. Some government agencies and environmental organizations have questioned the utility of emulsifying products in bilges. For example the Coast Guard and Fisheries and Oceans Department of Canada goes so far as to state "Bilge cleaners, even the biodegradable ones, merely emulsify or break down the oil into tiny, less visible droplets. This process spreads the fluids over a greater volume of water and severely inhibits all forms of marine life from mammals, to fish, to plants, to algae" (<http://www.pacific.ccg-gcc.gc.ca/Epages/offboat/pae/bilges.htm>).

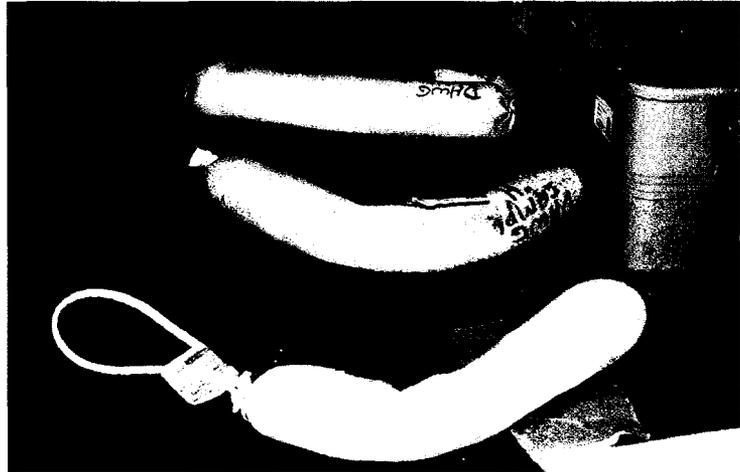


Table 1. Bilge sock test summary of products submitted in response to the BBAC-Town of Dartmouth request for bid. Only products #7G, #7H, and #5 passed all tests and criteria in the Request for Bids. (NT= Not Tested)							
PRODUCT #	Company-Product	Product Type	OIL BIN	initial absorption	3 day 6 cup abs.	hole test	wring test
# 1-long	Petrol Rim Inc	"biological removal", probably emulsifier	1	Low	Fail	Pass	NT
# 1-short	Petrol Rim Inc	"biological removal", probably emulsifier	2	Low	Fail	Pass	NT
# 7-Dawg A	Dawg	polymer-cellulose blend, recommended by Dawg	3	High	Pass	Pass	Fail
# 7-Dawg B	Dawg	polypropylene in polypropelene sock	4	High	Pass	Pass	Fail
# 7-Dawg C	Dawg	Cellulose in polypropelene sock	5	High	Pass	Pass	Fail
# 7-Dawg D	Dawg	polypropylene in polypropelene sock	6	High	Pass	Pass	Fail
# 7-Dawg E	Dawg	polypropylene in polypropelene sock	7	Medium	Pass	Pass	Fail
# 7-Dawg F	Dawg	polymer-cellulose Blend	8	Medium	Pass	Pass	Fail
# 7-Dawg G (pass)	Dawg	Polymer absorbent	9	Medium	Pass	Pass	Pass
# 7-Dawg H (pass)	Dawg	Polymer absorbent	10	Medium	Pass	Pass	Pass
# 5 (pass-selected)	Lakefront Enterprises	envirobond 403 polymer in sock	11	High	Pass	Pass	Pass
# 3	Dock Box Unlimited	not specified, polymer?	12	High	Pass	Pass	Fail
# 6	National Sorbents	polypropelene fibers in sock	13	Low	Fail	Pass	NT
# 9	Young Environment	polypropelene? Sock	18	Low	Fail	Pass	NT
# 8B	Zorbie-long	zorbolite foam	19	Low	Pass	Fail	Pass
# 8A	Zorbie-short	zorbolite foam	17	Low	Fail	Fail	NT
# 2	PCI	polypropylene fibers in sock	20	Medium	Pass	Pass	Fail
# 4-No product submitted	Best Environmental	polypropylene fibers in sock	NA				
# 10-No product submitted	Foss	meltblown polypropelene in nylon sock	NA				
# 11-No product submitted	OilDri	meltblown polypropelene	NA				
# 9B -square pad rejected	Young Environment-pad	square pad equivalent to sock in # 9	rejected				





A GUIDE TO LAND PROTECTION FOR LANDOWNERS

Conservation Options

If you own land and you want to protect its natural features for future generations there are a variety of land protection methods available. Most of these options offer several financial benefits and tax incentives. Landowners often make conservation gifts or restrict future development on their land because they wish to preserve the environmental significance of their property and ensure that their successors will respect their wishes. Below is a summary of the principal techniques available to land owners.



CONSERVATION RESTRICTIONS

A conservation restriction, also called a conservation easement, is one of the most promising techniques available for promoting land conservation. A conservation restriction is a strategy that allows the landowner to maintain ownership and use of the land while limiting development on the property, ensuring that the land remains in the condition the landowner wishes. A conservation restriction is an addition to the existing property deed and the conditions in the conservation restriction are binding on all future owners.

There is great flexibility in creating a conservation restriction. Activities such as farming, forest management, and other land uses that the property owner wishes to pursue are often allowed. A conservation restriction can even be tailored to exclude a portion of the property so that a future home may be built. The landowner's ability to sell the property or bequeath it to heirs remains. The tax benefits, including a reduction in estate and property taxes, are often substantial.



LAND DONATIONS

A. *Gifts in Fee Simple*

Most of the land protected by conservation groups and municipal conservation commissions has been acquired through outright gifts of land by generous and willing donors. If land is given for conservation purposes, the receiving organization is required to maintain the land in its natural state in perpetuity. However, the donor may make specific stipulations as to the use of the land such as "forever wild" or passive recreational use only.

The tax benefits of gifting land are numerous - donors are entitled to an income tax deduction for the value of the property. The deduction is allowed to be up to 30% of the donor's taxable income each year for a period of five years, up to the value of the donation. In addition, both property taxes and estate taxes on the land are eliminated.

Land donation is a simple and highly effective means of conserving land. Much of our open space, from small parks and woodlands to our national parks, is mostly the result of generous land donations.

B. *Gift of a Remainder Interest*

A landowner can give property to a conservation organization or municipal conservation commission but retain the right to live on it. At the death of the landowner, the full ownership of the land transfers to the land trust. A gift of remainder interest will include mutually-agreeable conditions concerning the maintenance and management of the land during the landowner's lifetime. The donor of a remainder interest can generally claim a related income tax deduction, and potentially high estate taxes are eliminated.

C. Bequests

A landowner can convey land to an organization such as a land trust in their will. A deduction from the value of one's taxable estate is allowed for land bequeathed for public purposes.

LIMITED DEVELOPMENT



Landowners may wish to protect property that has conservation value, but are not able to sacrifice what may be their most valuable asset. Limited development can serve as a workable alternative for landowners seeking to preserve their land, and are in need of some direct financial gain from their property.

On appropriate parcels of land, and with a cooperating developer, some development can occur, while the remaining land is permanently protected through one or more of the methods discussed in this guide. The new development will be strategically located to preserve the property's most critical scenic and natural resources, and the owner will receive a cash return from the property. This land conservation method is sometimes referred to as Conservation or Open Space development.

PURCHASES



A.) Fair Market Value

Small regional land trusts and municipal conservation commissions are generally unable to purchase conservation land at fair market value. Larger organizations such as the Massachusetts Audubon Society, The Trust for Public Land, The Trustees of Reservations, and The Nature Conservancy, are often more effective at raising money to purchase exceptional conservation land at fair market value. The Commonwealth of Massachusetts has several land conservation programs that occasionally purchase land that has very significant resource characteristics for preservation.

A regional land trust can act as a liaison for owners of land with outstanding resources that are competitive candidates for acquisition by other organizations or agencies.

B.) Bargain Sale

Under this method, the landowner sells the property to a charitable organization or municipal conservation commission for less than fair market value. This option is more attractive to prospective purchasers, and it can also qualify the seller for income tax deductions, with an overall result comparable to a sale at market value.

Bargain sales are a standard open space acquisition tool for large private land conservation organizations and the Commonwealth of Massachusetts. A small local land trust is generally unable to purchase conservation land, even at bargain sale prices. Some regional or statewide land trusts are able to use this option to protect open space deemed critical to a region's scenic and natural heritage.

C.) Agricultural Preservation Restriction

Administered by the Massachusetts Department of Food and Agriculture, the Agricultural Preservation Restriction (APR) program protects farmland by purchasing the development rights. A permanent deed restriction is placed on the property, ensuring that the farm is never developed, while the farmer is provided with cash from the sale of the development rights and the ability to continue farming.

The APR program is highly competitive, with preference given to working farms, located in agriculturally productive regions of the state, with highly productive agricultural soils.

Acceptance of a farm into the APR program is typically supported by a financial contribution from the local municipality.



Open Space Facts

Permanently protected open space provides critical habitat for wildlife and plants, protects important water supplies, provides areas for recreational activities, protects historically significant places, and preserves the charm and character of the area in which you live.

Upon a landowners death, federal estate taxes on their property can be as high as 55% of the property's fair market value, essentially forcing heirs to sell all or part of the land to pay the taxes. Donation of land or placing a conservation restriction on your property can result in substantial income tax deduction and reduce property and estate taxes.

Over 50% of Americans live in coastal communities, with the percentage expected to grow to 75% by 2020. It is essential to plan for the future of our towns now, while land is still available to preserve.

A total of 32,264 acres (or 17.2% of the total land area) of the Buzzards Bay watershed, from Fall River to Falmouth, is currently permanently protected open space. Of that total, 5,544 acres are protected by local land trusts.



TAKING THE NEXT STEP



If you are interested in learning more about how to protect your property, preserve its natural resources, and generate tax advantages for you and your family, you should contact one of the local or regional land trusts listed below. Representatives from your local land trust will speak with you regarding the special qualities of your property and suggest the best methods for protecting those resources. You should also discuss your options with your legal and financial advisors.

BUZZARDS BAY AREA LAND TRUSTS:

Greater Fall River Land Conservancy

Contact: Michael Labossiere
Phone: (508) 984-3570
PO Box 9155, Fall River, MA 02720

Westport Land Conservation Trust

Contact: Benjamin Guy
Phone: (508) 636-8963
PO Box 92, Westport Point, MA 02791

Dartmouth Natural Resources Trust

Contact: Leslie E. J. Badham
Phone: (508) 991-2289
PO Box P-17, So. Dartmouth, MA 02748

Fairhaven-Acushnet Land Preservation Trust

Contact: Mark Rasmussen
Phone: (508) 999-1086 or (508) 999-6363
PO Box 491, Fairhaven, MA 02719

Mattapoisett Land Trust

Contact: Randall Kunz
Phone: (508) 758-2966
PO Box 31, Mattapoisett, MA 02739

Rochester Land Trust

Contact: Noreen Hartley
Phone: (508) 763-3628
102 Bradford Lane, Rochester, MA 02770

Sippican Lands Trust

Contact: Hod Kenney & Tess Cederholm
Phone: (508) 748-2809
589 Mill Street, Marion, MA 02738

Wildlands Trust of Southeastern Massachusetts

Contact: Mark Primack
Phone: (781) 934-9018 or (781) 934-9009
PO Box 2282, Duxbury, MA 02331

Bourne Conservation Trust

Contact: Steve & Sally Ballentine
Phone: (508) 563-2800
P.O. Box 203, Cataumet, MA 02534

Falmouth 300 Committee

Contact: Tina Dolan
Phone: (508) 540-0876
157 Locust Street, Falmouth, MA 02540

ADDITIONAL SOURCES OF INFORMATION

Bay Lands Center

Contact: Michael Labossiere
Phone: 508-999-6363
17 Hamilton Street, PO Box 3006, New Bedford, MA 02741
More information on conservation options and for local land trust contacts.

Land Trust Alliance

Phone: (202) 638-4725
1319 F Street NW, Suite 50, Washington, DC 20004-1106
The Land Trust Alliance has published a diverse selection of books and informational pamphlets on land conservation strategies.

Landowner Planning Center

Phone: (617) 357-1644
PO Box 4508, Boston, MA 02101-4508
Information on how to order Attorney Stephen J. Small's books on estate planning strategies: Preserving Family Lands, Books I and II and to sign up to receive announcements about publications and other information.

Department of Food and Agriculture

Contact: Rich Hubbard
Phone: (617) 727-3000
100 Cambridge Street, Boston, MA 02202
Information on the Agricultural Preservation Restriction Program

The Trustees of Reservations

Phone: (978) 921-1944
572 Essex Street
Beverly, MA 01915-1530
The Trustees have made available a booklet entitled Land Conservation Options: A Guide for Massachusetts Landowners

WHAT IS THE BUZZARDS BAY PROJECT?

The Buzzards Bay Project, established in 1985, was among the first National Estuary Programs. Today there are 28 Estuary Programs throughout the United States. In 1991, the Project completed the Buzzards Bay Comprehensive Conservation and Management Plan (CCMP) which outlines research conclusions and management strategies for the protection and restoration of water quality and living resources in the Bay and its surrounding 432 square mile watershed.

The Buzzards Bay Project is jointly administered by the Massachusetts Office of Coastal Zone Management and the U.S. Environmental Protection Agency. The primary role of the Project since the completion of the CCMP has and continues to be to provide technical assistance and funding opportunities to municipalities surrounding the Bay to facilitate implementation of the recommendations contained in the CCMP. Please visit our website at <http://www.buzzardsbay.org>



We are grateful to the Wildlands Trust of Southeastern Massachusetts for its assistance in creating this document.

This project has been financed partially with Federal Funds from the Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (the Department) under a s.319 Nonpoint Source Competitive Grant #97-07/319 entitled "Protecting Nitrogen Sensitive Coastal Embayments Through Land Conservation." The contents do not necessarily reflect the views and policies of EPA or of the Department, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.



Buzzards Bay Project
National Estuary Program
2870 Cranberry Highway
E. Wareham, MA 02538

Project is tool to protect water

By **MONICA ALLEN**
 Standard-Times staff writer

NEW BEDFORD — Up until now, scientists could only speculate on the effect that building 300 new homes in Wareham might have on the quality of water in Wareham Harbor. But with the help of \$12.5 million from state and local communities, a team of scientists soon will develop a modeling tool to precisely predict the effect of development on the water quality of this harbor and 88 other estuaries.

University of Massachusetts President William M. Bulger and state environmental officials, including Environmental Secretary Robert Durand, will unveil the details of the Estuaries Project — designed to develop models for 89 estuaries — this morning at

UMass' School for Marine Science and Technology.

Over six years, a team of scientists and regulators will develop individual models to be used by towns around these separate bays that stretch from Mount Hope Bay in Fall River to the waters off Duxbury on the South Shore, including embayments around Buzzards Bay, Cape Cod and the Islands.

"The primary focus is to try to manage the estuaries by not just managing what happens in the water, but by managing what flows from the land into the watershed," said Dr. Brian Howes, a professor at the marine science school who will direct the

See **WATERSHED A7**

Watershed: Project is tool to protect water

CONTINUED FROM A1

scientific portion of the project. "It's another whole level up from what we've been doing," he said. "The previous work has been surveys. But with recent breakthroughs, we've been able to come up with a tool that will look at what goes on in the whole estuary."

Dr. Howes, who has worked for two decades on estuaries, said these models would help town officials decide whether it is better for the health of a particular bay to put in sewers in one section of town or another.

"This will really put the information that people have asked for in their hands so people can make decisions," he said. "This project was generated in large part by citizens."

Town officials, planners and conservation commissioners will be able to evaluate the pros and cons of various developments and can use the models to plan cleanup strategies.

Another example of how the model can be used would be in a case like Slocum River in South Dartmouth, which flows into Buzzards Bay. People have no-



DAVID W. OLIVEIRA/Standard-Times special

The Weweantic River in Wareham will be one of the waterways studied in the Estuaries Project, being undertaken with the help of \$12.5 million from state and local communities.

ted a buildup of sediment at the river's mouth. "This will be able to tell them what kind of benefit they might get from opening up the river by dredging," he said.

"It's not going to be a research study," he said. "It's a planning

tool to help manage the nutrients going into these embayments so they don't degrade any more or, if they are degraded, so we can improve the water quality."

More than two-thirds of the embayments in the project suffer from too much nitrogen coming

from sewage, septic systems, farm runoff and general road runoff.

The nitrogen over-fertilizes the water, causing an excessive bloom of algae. When the algae dies, it drops to the bottom of the bay and decays. As it decays, it sucks oxygen from the water. The low oxygen level, in turn, makes it difficult or impossible for fish and other species to survive.

Citizens who have watched these bays over time have seen a steady decline in the clarity of the water as well as a decline in a number of different species, such as eelgrass, shellfish and finfish.

The Estuaries Project will draw on previous work by the Cape Cod Commission, the Buzzards Bay Project, the Coalition for Buzzards Bay and the Lloyd Center for Environmental Studies.

The first models will include those for the Acushnet River and the Agawam and Wareham rivers. Other initial projects will take place on the Cape and Islands.

Staff writer Monica Allen covers education and the environment. She can be reached at (508) 979-4447 or by e-mail at mallen@s-t.com



LANDS TRUST NEWSLETTER

SUMMER 2001

DEDICATED TO PRESERVING THE LANDS OF SIPPICAN

HAMMETT'S COVE RESTORATION UPDATE

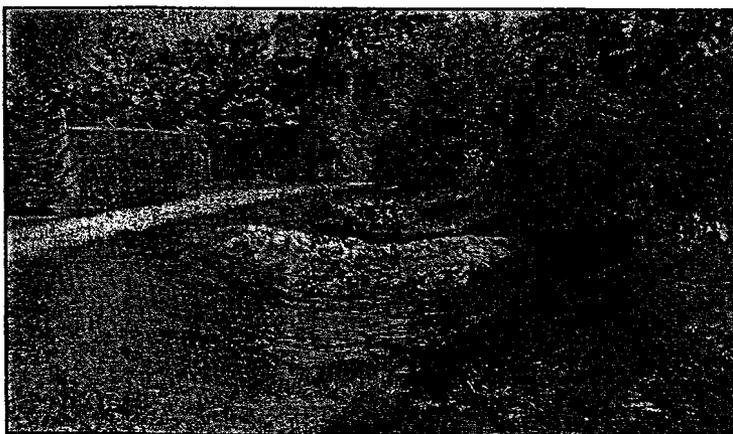
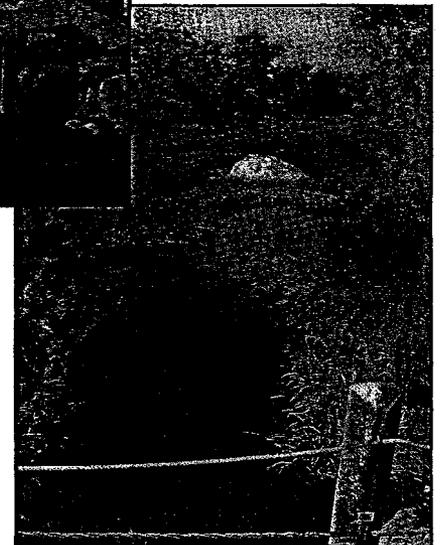
The closure of Creek Road for several days in June called attention to the Town's work to improve the health of the salt water marshes and the quality of water flowing into Hammett's Cove. When Creek Road was constructed many years ago the road surface became a conduit for pollutant laden storm water to flow directly into the cove. The road also divided the 52 acre salt marsh into two sections. On the flood tide the section of the marsh on the north side of Creek Road received salt water through a 30" diameter culvert. This small culvert curtailed the normal flow of salt water into the upper marsh which immediately began to alter the ecology of the marsh. Invasive plants, such as phragmites, began to supplant the natural salt tolerant species. To restore the natural ecology of the extensive marsh to the north of Creek Road a 5' x 6' box shaped culvert has replaced the 2.5' diameter round culvert. This will increase the flow capacity by 400% and should restore the normal salt water flow in and out of the lovely upper marsh, recently donated to the SLT by John Ludes. Over time the increased salinity of the water and higher tidal level should enable the native marsh vegetation to reclaim its historic range. To solve the problem of polluted storm runoff flowing untreated into Hammett's Cove two stormwater basins have been constructed on opposite sides of Creek Road. The one to the north of the road is on land donated to the town many years ago by Bruce and Joyce West. This property is part of the 126 acres recently given permanent protection by the April town meeting. The basin to the south is on a portion of the land recently acquired by the Lands Trust through gift and purchase from the Lipsitt Family. Eventually when Creek Road is resurfaced the runoff will be channeled into the natural treatment basins. Funding for the construction of these basins was provided by the Massachusetts Office of Coastal Zone Management. A pamphlet

describing this project *Restoring Salt Marshes in Buzzards Bay: Taking Action At Hammett Cove* is available from the Buzzards Bay Project (508) 291-3625, and we are indebted to the staff of the Project for the information in this article.



*New Creek
Road Culvert*

*Upper marsh will
benefit from
increased tidal flow*



Storm water basin on Lipsitt Preserve

FIELDS POND TO THE RESCUE OF MARION BOGS & RIVER FRONTAGE

The Fields Pond Foundation, Inc. of Waltham has granted \$15,000 to the Sippican Lands Trust to support the acquisition of 10 acres of Sippican River frontage from Doug Beaton, and to assist with the purchase of development rights for 70 acres of bog-related uplands from Tweedy & Barnes Cranberry Company. These purchases represent the SLT's portion of the larger Beaton Cranberry Conservation Project described elsewhere in this newsletter.

CAPE COD COMMISSION REPORTER



August 30, 2001

Volume 11, Number 16

The newsletter of the regional planning and regulatory agency serving Barnstable County since 1990.

COMING SOON TO A PUBLIC ACCESS CHANNEL NEAR YOU

Coastal Ecosystems: The Video

When it comes to understanding water quality problems in coastal embayments on Cape Cod, scientists and policy makers are making headway standardizing their assessment tools and combining their technical expertise, but the biggest challenge still remains. According to Cape Cod Commission Water Resources Scientist Ed Eichner, public education will be a significant factor in protecting and managing these areas.

With that in mind, Eichner developed an application for a federal Clean Water Act grant through the Massachusetts Department of Environmental Protection and received a \$20,000 award to produce an educational video about coastal water quality. The result is a soon-to-be-released, half-hour production called "Coastal Ecosystems: Is It Too Late to Protect Them?" The video will air on the Cape Cod Community Media

Center's Channel 17 (formerly C3TV) in the Mid Cape region at 9:30 p.m. on Thursdays between August 30 and the end of September. Eichner will also distribute the video to other public access channels around the Cape in the future.

The production features:

- Linda Deegan, of the Marine Biological Laboratory in Woods Hole, discussing the effects of excess nutrients on coastal systems;

- Joseph Costa, of the Buzzards Bay Project, reviewing the specific effects on shellfish;

- Tom Cambareri, of the Cape Cod Commission, discussing the Cape's hydrogeology and how it affects watersheds to coastal embayments;

- Eichner himself, who reviews the impacts of land uses and the possibilities for different treatments and strategies;

...to page 2



Aerial photo of the East Falmouth/Waquoit area coastline showing extensive development along coastal embayments. Nantucket Sound is at the bottom of the photo. A portion of Waquoit Bay is to the far right.

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Dennis DCPC Nomination	7

Coastal video, from page 1...

- Brian Howes, of the University of Massachusetts-Dartmouth, explaining how nutrients are recycled in these environments and what is involved in developing an approach to regulating and managing the areas;

- Mark Ells, of the Barnstable Department of Public Works, discussing the range of treatments for wastewater, including septic systems, sewer systems, and methods in between;

- Maggie Geist, of the Association for the Preservation of Cape Cod, reviewing the importance of public education and public participation in decision making that will protect these resources; and

- Bob Duncanson, of the Water Quality Lab in Chatham, highlighting the significant role citizens can play in collecting water quality data and influencing regulatory and technical decisions.

The Commission has a few copies of the videotape available for loan. Those interested in borrowing a tape should contact Ed Eichner by calling the Commission offices at (508) 362-3828 extension 319, or by sending an e-mail message to: water@capecodcommission.org



Keri Cahoon Named New County Payroll Administrator



Most of the Cape Cod Commission's staff members hold very public positions, ones that bring high visibility to their work. Quietly, steadily, and competently, however, the Commission's administrative staff works behind the scenes to keep the operation on course. After 14 years with the Commission and its predecessor agency, the Cape Cod Planning and Economic Development Commission (CCPEDC), one valued member of the administrative staff will move up to a county-wide position. Executive

Assistant Keri Cahoon will become Barnstable County's new payroll administrator on September 4.

In 1987, Cahoon joined the staff of CCPEDC as a secretary for a transportation grant program. She worked her way to a full-time, general-purpose secretarial position with the agency, which had about 15 employees at the time.

...to page 6

USGS Observation Well Data

The groundwater-level measurements shown below are taken monthly by the Cape Cod Commission's Water Resources Office from nine United States Geological Survey (USGS) index wells. The data are compiled during the last week of each month and are published here and on the Web (www.capecodcommission.org/wells.htm) as soon as possible thereafter. For more information about groundwater levels, please contact Cape Cod Commission Hydrologist Gabrielle Belfit.

August 2001

Location	Well Number	Level*	Record High*	Record Low*	Departure from Average**	
					Monthly	Overall
Barnstable	A1W 230	25.0	20.5	26.6	-1.0	-1.3
Barnstable	A1W 247	25.8	20.5	28.6	-1.3	-1.4
Brewster	BMW 21	11.7	6.9	13.3	-1.7	-1.5
Chatham	CGW 138	24.6	20.9	26.6	-0.6	-0.7
Mashpee	MIW 29	8.6	5.6	10.0	0.3	-0.1
Sandwich	SDW 252	47.7	45.9	48.2	-0.3	-0.4
Sandwich	SDW 253	51.5	45.8	55.1	-1.6	-1.5
Truro	TSW 89	12.4	10.2	13.0	-0.1	-0.4
Wellfleet	WNW 17	11.2	7.3	12.8	-0.7	-0.8

*Feet below land surface.

**Feet above mean sea level.

among the largest in New England, according to the federal Environmental Protection Agency.

The goal of the no-discharge designation is cleaner water, shellfish beds and boating, according to officials.

"Buzzards Bay is a treasured economic and recreational resource, and this designation will help ensure that it remains that way," said Mindy S. Lubber, regional administrator of EPA's New England office during kickoff ceremonies late last summer. "We're seeing dramatic water quality improvements all over New England as a result of no-discharge zones and soon we can expect the same in Buzzards Bay."

Many bay communities, such as the



town of Marion, already had no-discharge rules in place.

"Marion has always been protective of its harbor," says Harbormaster Charlie Bradley.

Still, Bradley sent out letters to area boaters reminding them the no-discharge rules apply to the entire bay. He urged boat owners to have their marine

sanitation devices (MSDs) checked during fitting out this spring, when he will send another reminder.

Officials estimate there are 13,000 vessels home-ported in the bay, but up to 40,000 boats during the season. Of those, somewhere between 3,000 and 4,000 have MSDs, according to Leonard Gonçalves, a Dartmouth city official and head

of the Buzzards Bay Action Committee, a nonprofit organization that spearheaded the move for the EPA designation.

The group rallied support from the 11 bayside communities. The application for the EPA designation was prepared by the Buzzards Bay Project National Estuary Program at the request of the

continued on next page

TIDES: 18-19

LOCAL NOTICES: 21-22

CALENDAR: 24-25

High-tech boats

3 Goetz Custom Boats of Bristol, R.I., has embarked on its most technically advanced boat to date, an Open 60 for J.P. Mouligne.

Block Island Race

8 The 37-year-old Block Island Race Week — a New England institution of sorts — will feature something old and new this year.

Comet comes home

10 Owners of the 54-year-old Sparkman & Stephens yawl Comet hope to finish their circumnavigation in time for a June rendezvous.

Steaming up

14 An electrical engineer really warms up when the subject turns to steam propulsion. "A steam engine," he says, "is a living thing."

Alternative Treatment Systems Effectively Reduce Nitrogen, Test Center On Base Finds

The Buzzards Bay Project National Estuary Program announced that it has released the first findings from the new Massachusetts Septic System Test Center on Cape Cod.

In the first findings, the Waterloo Biofilter and the BioMicrobic's MicroFast System, discharged less than half the nitrogen of a conventional Title V system.

These two technologies were also very effective at removing other pollutants, which makes them a good solution for smaller lots.

The Septic System Test Center facility, completed in 1998, is on the Massachusetts Military Reservation Air National Guard Base next to the base's wastewater treatment facility.

The mission of the test center is to evaluate the performance and operation costs of new technologies in a carefully-controlled and unbiased manner, and to provide this information to municipal boards of health and consumers.

The test center also provides vendors of these technologies a way of getting their systems approved more quickly for use by Massachusetts residents, and at a lower cost.

Three replicates of each technology are tested at the facility for two years.

Companies from as far away as

Health and the Environment, and the University of Massachusetts Dartmouth School of Marine Science and Technology (SMAST).

The construction and operation of this facility was initially funded with a \$450,000 grant from the US Environmental Protection Agency, and subsequently through various other grant programs, including the Massachusetts Environmental Trust.

The first septic system technologies were installed in 1999.

Facility Also Helps Companies Research, Develop, Test New Ideas

Last week, state Secretary of Environmental Affairs Robert Durand released the first four system performance fact sheets to every board of health in Massachusetts.

Three additional technology fact sheets will be released at the end of August, including the results of a nonproprietary recirculating sand filter, a technology in use at many locations around the state.

Buzzards Bay Project Executive Director Joe Costa said, "boards of health should find the first four fact sheets interesting because we included a fact sheet on the performance of the con-

was withdrawn after less than a year of testing."

According to Dr. Costa, one of the objectives of the test center is to carefully document nitrogen removal of innovative wastewater treatment systems, a big concern on Cape Cod and other communities in Southeastern Massachusetts.

"We expect these results will help planners evaluate the use of innovative wastewater technologies to protect nitrogen-sensitive

coastal waters and other areas from the cumulative impacts of septic systems," Dr. Costa said.

The idea for the test center originated in the mid-1990s, when both the Buzzards Bay Project and Barnstable County Department of Health and the Environment were evaluating innovative wastewater treatment technologies at a number of residences and promoting their use in the region.

Representatives of both agencies recognized they would be more successful if they combined efforts and established a centralized testing facility.

Funding, Siting Accomplished

County funds to operate the facility and continue monitoring the technologies.

Brian Howes of UMass Dartmouth's SMAST program is monitoring the nutrient removal of the technologies.

"We were fortunate in having Dr. Howes participate in the program, considering his extensive experience in studies monitoring groundwater and coastal transport of nutrients from septic systems and other sources on Cape Cod and elsewhere," said Mr. Costa.

County Environmental Manager George Heufelder is now the facility operator at the test center. Mr. Heufelder is also a member of the Falmouth Board of Health.

In just two years, the test center has already developed into a national center for the gathering of information and evaluation of innovative and alternative wastewater treatment technologies, according to Dr. Costa.

The facility is the only third-party evaluation facility in the country that is testing as many different technologies for such extended time periods.

Dr. Costa added, "We have received requests for information from a dozen states. We are working with the EPA to develop national protocols for testing nutrients, and Barnstable County's virus monitoring program is being

Leg

TOWN OF FALMOUTH PUBLIC HEARING NOTI

The Falmouth Board of Selectmen will hold a public hearing under Section 240-77 (Welland Regulations) of the Zoning Bylaws of the Town of Falmouth, MA, on Wednesday, August 20, 2001 at 8:15 p.m. in the Selectmen's Meeting Room, Falmouth Town Hall on the application of Robert Schroeder, to reconstruct and license a timber pier, ramp and float in the Green Pond located at 270 Acapesket Falmouth. Area affected is Green Pond. Parties may review the file on this hearing at the Selectmen's Office.

August 7 & 14, 2001

Pa
Board

TOWN OF FALMOUTH NOTICE OF PUBLIC HEAR

APPLICANT: Francisco Tavares, Inc. Meetinghouse Road, East Falmouth, MA 01936
LOCATION: East Falmouth - 69 Meetinghouse House Road, Map 28 Section 016 Lots 06C & 02A
PROPOSAL: Special Permit under Section 240-77 of the Zoning By-laws for approval of a container yard for the storage of vehicles, and storage & sales of supplies located at 69 and 75 Old Meeting House Farm, East Falmouth, MA. 01936
TIME: Tuesday, August 21, 2001 at 7:30 p.m.
LOCATION: Town Hall, 59 Town Hall Street, Falmouth, MA. 02540

August 3, 7, 14, 2001

By order of the Pl

Cl

TOWN OF FALMOUTH PUBLIC HEARING NOT

Notice is hereby given of a PUBLIC HEARING on the application of James LaFalce, Jr. for a Special Permit under Section 240-68 of the Code of Falmouth to allow the use of a garage located at 8 Lake Leaman Road in Falmouth, MA. The hearing will be held on Wednesday, August 29, 2001 at 7:30 p.m. in the Selectmen's Meeting Room, Falmouth Town Hall. Parties may review the file on this application at the Selectmen's Office.
APPEAL NO: 119-01 - James LaFalce, Jr. Falmouth, MA has applied to the Zoning Board of Appeals for a Special Permit under Section 240-68 of the Code of Falmouth to allow the use of a garage located at 8 Lake Leaman Road in Falmouth, MA.
APPEAL NO: 120-01 - James LaFalce, Jr. Falmouth, MA has applied to the Zoning Board of Appeals for a Variance under Section 240-77 of the Code of Falmouth to allow the use of a garage located at 270 Acapesket Falmouth, MA.

Ontario, Canada, and as close as Falmouth, are participating in the test program.

The Septic System Test Center was constructed by the Buzzards Bay Project in partnership with the Massachusetts Department of Environmental Protection, the Barnstable County Department of

ventional Title V septic system widely used throughout Massachusetts. Two technologies did very well compared to the Title V system.

"One of the innovative technologies tested was an experimental design that failed to operate as expected, and the system

The Massachusetts Department of Environmental Protection also thought the project was a good idea and not only joined the effort, but agreed to waive certain permitting requirements if companies agreed to test their systems at the test center.

John Higgins, Director of Municipal Assistance for DEP's Bureau of Resource Protection, has been a major advocate of the test center and its importance in helping the state evaluate the performance of innovative and alternative wastewater treatment systems.

Once funding was secured for the Septic System Test Center, the Massachusetts Military Reservation location was identified as the best location for the facility.

According to Dr. Costa, the involvement of Congressman William D. Delahunt was pivotal in securing federal approvals for the use of the site, which is under lease by the US Air Force.

The Buzzards Bay Project oversaw and operated the facility until the end of 2000 after all the original planned technologies were installed and testing had begun.

Thereafter, the Buzzards Bay Project transferred to Barnstable

used to evaluate government virus transport models.

"We are now testing some technologies new to the US, including a unit developed in Latvia. We have also become a research and development platform for companies to test out new ideas."

Dr. Costa said that by the end of the year, the Buzzards Bay Project will have met its original goals with the construction of the facility and evaluation of the first eight technologies.

In the coming months, the Buzzards Bay Project will be working to transfer all the operation and administrative responsibilities associated with the facility to Barnstable County and DEP.

The Buzzards Bay Project will continue to be involved with the test center and will remain on the technical review committee for the facility.

Vacation Bible School At Baptist Church

Falmouth Baptist Church will sponsor its "Polar Expedition" Vacation Bible School Program, which continues this evening through Friday from 6 to 8:30 P.M.

The program is for all children from four years of age through sixth grade. There will be games, crafts, music, stories, and snacks.

Join Moraine Trail Hike With 300 Committee

The public is invited to join a 300 Committee hike on the Moraine Trail on Saturday at 10 A.M.

The hike will take approximately 90 minutes and cover about four miles.

Hikers will come to understand the trail's name as they hike north of Thomas Landers Road through the Anna Gordon Moraine Trail and Conservation Land, continuing onto recently purchased town conservation land near Ballymeade.

The pace will be relaxed and suitable for hikers of all ages. The footing can be uneven and the terrain is hilly, so sturdy walking shoes are suggested, as are long

pants and a water bottle.

Ann Preisig will lead the hike. A former lawyer, she is a professional triathlete and the newly named head coach of the Falmouth High School girls' cross-country team.

Parking for the hike will be along the side of Research Road at the Falmouth Tech Park entrance off Thomas Landers.

Take Route 28 to the Thomas Landers Road exit, head east on Thomas Landers' Road, take a right at the first entrance to Falmouth Technology Park onto Research Road.

For more information, residents may contact The 300 Committee at 508-540-0876.

the front yard less than fifty (50) feet from the property is located at 8 Lake Leaman
APPEAL NO: 121-01 - Jacqueline Addis
McCorkle have applied to the Zoning Board for a Special Permit under Section 240-3, 240-22C of the Code of Falmouth pre-existing nonconforming garage to be a new garage and home office. The applicant is seeking permission to use a portion of it for a home occupation. The property is Pleasantview Avenue in Falmouth, MA.
APPEAL NO: 122-01 - Allen and Art Wellealy, MA have applied to the Zoning Board for a Special Permit under Section 240-3, 240-22C of the Code of Falmouth alterations to the pre-existing nonconforming (residence) with no change in the house. The applicant is also seeking to construct a new garage to be attached and the applicant seeks the approval of a front yard, if deemed applicable. The property is located at 436 Acapesket Road in East Falmouth, MA.
APPEAL NO: 123-01 - William Huyett of has applied to the Zoning Board of Falmouth to allow modifications to the nonconforming house and garage. The applicant is also proposing small additions to the deck. In addition, the applicant wishes to construct a new garage and construct a new on the property is located at 6 located at 6 East Falmouth, MA.

Michael F
ZONING BOARD

August 14, 21, 2001

TOWN OF FALMOUTH PUBLIC HEARING NOTICE

Notice is hereby given of PUBLIC HEARING of Appeals' Hearing Room, To Wednesday, August 22, 2001 at 7:30 following applications:

APPEAL NO: 114-01 Falmouth Hospital Inc. has applied to the Zoning Board to modify existing Variances and Special P Section 240-3 and any other applicable section of Code of Falmouth to allow the construction of a floor addition for a cardiac catheterization. The property is located at 100 Ter Hill Falmouth, MA.

APPEAL NO: 115-01 Richard Sperduto Falmouth Academy has applied to the Zoning Board for a Special Permit under Section

Septic test site: Where good ideas go to waste

■ Innovative designs that remove more nitrogen than Title 5 systems have the potential to keep the groundwater clean.

By **JOHN LEANING**
STAFF WRITER

FALMOUTH – At the state's only experimental test center for innovative septic system designs, the operators finally had to buy a power lawn mower.

The reason? Humorist Erma Bombeck, author of "The Grass Is Always Greener Over The Septic Tank," could've guessed.

The grass above most of the in-ground wastewater treatment systems was growing so lushly and so quickly that hand mowers couldn't cut it anymore.

That's not the only success at the center, which received \$500,000 in startup funding from the federal Environmental Protection Agency, and is now supported by the state and the Massachusetts Environmental Trust.

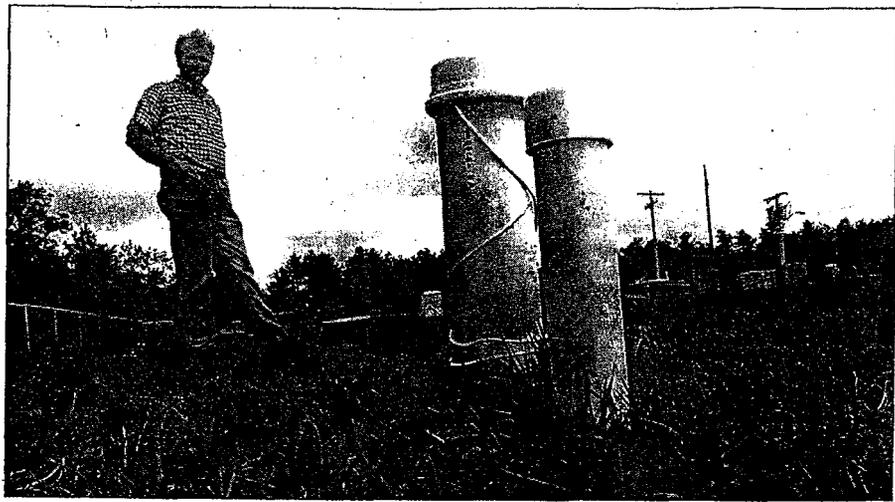
Started in 1999, the Massachusetts Septic System Test Center, on the Massachusetts Military Reservation near the Falmouth gate, is about to release the second tabulation of performance ratings for new wastewater technologies specifically suited for individual homes or cluster developments.

Last summer the first round of test results were released, with two new systems showing twice as much nitrogen removal as a standard Title 5 system.

State-approved Title 5 systems remove only 22 percent to 25 percent of nitrogen.

On Cape Cod, where the sole-source aquifer is below every septic system, and where septic systems serve more than 80 percent of all homes, contamination of drinking water and coastal embayments is becoming an increasingly serious problem.

Joseph Costa, director of the Buzzards Bay Project and a leader in the creation of the test center, said the use of innovative septic systems should increase as local health boards and builders become more familiar with them.



STEVE HEASLIP/Cape Cod Times

George Heufelder, operations manager for the Massachusetts Septic System Test Center, in the lush grass that has grown up around a drip irrigation septic treatment system. The center, at the Massachusetts Military Reservation, tests innovative septic systems before they are approved for homeowner use.

WebLink

www.buzzardsbay.org

The Buzzards Bay Project Web site has information on Title 5 and alternative septic systems and funding sources.

Some examples of innovative systems are those involving recirculating sand filters, modifications in leach trench design to improve soil absorption, or aerobic biofilters that spray effluent over a foam media.

Right now the new systems can cost from \$3,000 to \$10,000 more than a traditional Title 5 system. The range for a Title 5 system is \$8,000 to \$16,000 or even higher, depending on location, lot size and soil conditions.

Costs may decline

But Costa predicted the cost for innovative systems may decline as more systems are produced and put into use.

That's where the test center comes in. Its purpose is to make sure new systems have a good performance track record for at least one year at the center before they are allowed to be installed in the state.

The test center also aims to assist vendors in getting their technologies approved for use in Massachusetts more quickly and at a lower cost.

Along with the state Department of Environmental Protection and Costa's Buzzards Bay Project, the center operates under the review of University of Massachusetts at Dartmouth scientists and the Barnstable County Department of Health and the Environment.

"Outside the trailer it looks like you are in Massachusetts. But once you're inside, you're in Missouri," said George Heufelder, operations manager for the test center.

Heufelder, also the environmental

program manager with the Barnstable County Department of Health and the Environment, was referring to Missouri's state slogan – the "Show Me" state.

Within the test center grounds, nine different systems, many with two or three identical systems in operation to provide additional performance checks, are put through their paces for a year or more. The center also works with nitrogen removal and a virus analysis program.

The entire ground area is lined, so no effluent leaches into the groundwater. Instead, it is all captured and sent to the base's sewer treatment plant.

Good performance records

As the systems post good performance records, the state allows them to be used in the open market. Those that don't perform up to standards are yanked out of the ground for fine-tuning by manufacturers.

Heufelder said past experience with some new systems at private homes has convinced county health officials to look for a comprehensive management scheme of inspection, maintenance and monitoring of innovative systems to ensure proper operation and performance.

So far, Heufelder said six towns – Sandwich, Chatham, Orleans, Wellfleet, Eastham and Provincetown – that are in the process of developing wastewater facility plans have asked about creating townwide management districts just for that purpose.

By guaranteeing proper and timely inspection and maintenance, these new units will perform up to snuff, and more manufacturers will want to get into the market, Heufelder predicted.

The center is now seeing more interest from manufacturers.

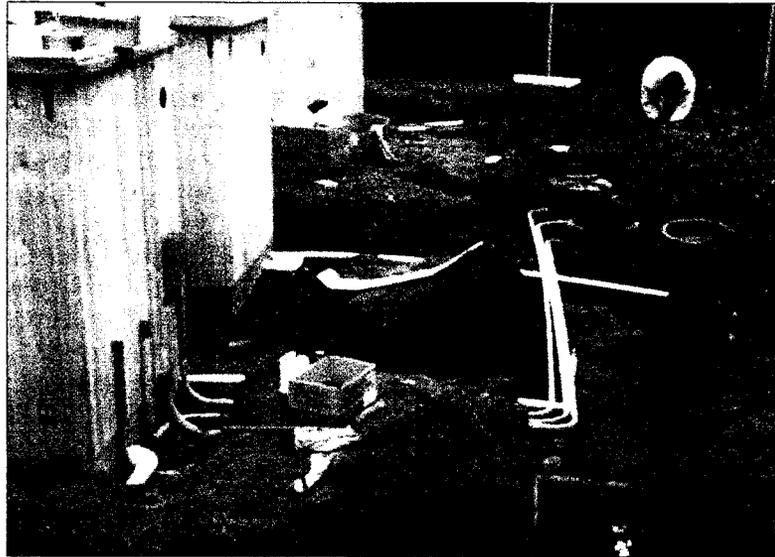
"It's finally getting to the point where people are knocking on the door to get in, rather than saying, 'Aw, do we have to?'" Heufelder said.

Septic System Test Center Results Released By Dr. Joe Costa, BBP

The first results from the Massachusetts Alternative Septic System Test Center are in and four factsheets are hot off the presses. This July, Environmental Affairs Secretary Bob Durand mailed the fact sheets, which detail the results for four different septic system technologies, to Boards of Health throughout Massachusetts. Reviews of three additional technologies are expected to be released this September.

The Septic System Test Center was constructed at the Massachusetts Military Reservation on Cape Cod by the Buzzards Bay Project National Estuary Program (BBP), a unit of the Massachusetts Office of Coastal Zone Management, in collaboration with Massachusetts Department of Environmental Protection (DEP), Barnstable County Department of Health and the Environment (BCHED), and UMass Dartmouth's School for Marine Science and Technology. The Test Center provides independent, rigorous testing to measure the performance of on-site wastewater treatment technologies (septic systems) to help facilitate approval of cost-effective alternatives for Massachusetts homeowners. The Center's mission is to: 1) evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner and provide this information to regulators and consumers; and 2) assist vendors in getting their technologies approved for use in Massachusetts more quickly and at a lesser cost. The Test Center was completed in 1998, with the first technologies installed in 1999. Three replicates of each technology are installed at the facility, and tested for two years.

The idea for the Test Center originated in the mid-1990s. Both BBP and Barnstable County were evaluating innovative wastewater treatment technologies at a number of residences and promoting their use in the region. We recognized that we would have more success by combining our efforts and



photos by Joe Costa

establishing a centralized testing facility. We also recognized that the success of the Test Center would be improved if DEP were a partner, and was willing to reduce certain permit testing requirements for vendors participating in the program. With BCHED, DEP, and UMass Dartmouth on board, BBP secured a half million dollars in grant funds from the U.S. Environmental Protection Agency to construct and operate the facility. Later, additional funds were received from DEP and the Massachusetts Environmental Trust.

Both Boards of Health and residents will find the results from the Test Center interesting. The first four fact sheets cover three innovative treatment technologies and one conventional system, which was designed to meet the state sewage disposal system regulations known as Title 5. One of the innovative technologies tested was an experimental design

Installation of the Waterloo Biofilter® at the Massachusetts Alternative Septic System Test Center.

that failed to operate as expected, and the system was withdrawn after one year of testing. A special focus of BBP is the improved nitrogen removal efficiencies of innovative technologies, a need identified in the Buzzards Bay Comprehensive Conservation and Management Plan. Two of the technologies tested, the Waterloo Biofilter® and the BioMicrobic's MicroFast® System, discharged less than half the nitrogen of a conventional Title 5 system. These

results will help planners evaluate the use of innovative wastewater technologies to protect nitrogen-sensitive coastal waters and other areas from the cumulative impacts of septic systems.

The fact sheets represent interim results of the first year of testing. The fact sheets, as well as information on other alternative wastewater treatment and disposal technologies usable in Massachusetts, can be found at the BBP Web site, www.buzzardsbay.org. These systems are not the only innovative technologies approved for use in Massachusetts, and a full listing of permitted technologies can be found at the DEP Web site at www.state.ma.us/dep/brp/wwm/t5pubs.htm#it.

Joe Costa, BBP's Executive Director, led the effort to create and fund the Alternative Septic System Test Center and develop the system performance fact sheets.

Collaboration Leads to Restoration at Little Neck Road Salt Marsh

By Emilie Cademartori, 8T&B

Through the cooperative efforts of the Town of Ipswich, the Massachusetts Wetlands Restoration Program (MWRP), and the Massachusetts Bays Program's Eight Towns and the Bay Committee (8T&B), regular tidal flow has been restored to

Without sufficient tidal exchange, the marsh also was unable to discharge floodwater and stormwater runoff, often causing the roadway to flood. To make matters worse, the undersized culvert collapsed in the spring of

North Shore Volunteers Make a Splash with Tidepool Monitoring

By Karen Young, Salem Sound 2000

Volunteers on the North Shore are pulling on their Wellies and sloshing out to coastal tidepools to take part in the Adopt-a-Tidepool project. Last year, with support from the Bruce J. Anderson Foundation, the Massachusetts Audubon Society's

- ◆ A favorite past time of many people is feeding the ducks. Fecal matter from waterfowl contains nitrogen as well as bacteria that can contribute to shellfish bed closures. It may also be harmful to the animals to feed them food they would not normally find in the wild. Do the bay and the birds a favor and don't feed the waterfowl.



- ◆ Preserving open space and developing stricter controls on new development are excellent methods for controlling future nitrogen problems in the bay. Several Buzzards Bay towns have already adopted new zoning regulations that control growth in sensitive areas. In addition to having a positive impact on water quality, land preservation can also protect plant and wildlife habitats, wetlands, forests, scenic vistas and historic sites.

- ◆ Private landowners have the power to protect open space with several conservation tools available today. Many offer substantial financial benefits and tax incentives, such as reductions in estate and property taxes. One of the most flexible is a conservation restriction, which can be tailored to fit the needs of each individual and property. You can continue to live on the land and pass it to heirs, all while protecting its natural resource values. Your local land conservation organization can assist you in determining the best options for you.

Summary

Increased development and the gradual loss of forests and wetlands are contributing to more nitrogen entering Buzzards Bay. Excessive nitrogen can have detrimental effects on bay water quality by stimulating the growth of algae, which affects not only the health of the bay but the public's enjoyment of it. You can minimize nitrogen sources from your property in several ways, including maintaining your septic system, using natural landscapes, not feeding the waterfowl, and protecting open spaces. Your actions can help ensure that the healthy coastal waters we all enjoy today will still exist for future generations.

What is the Buzzards Bay Project?

The Buzzards Bay Project is one of 28 National Estuary Programs in the United States, and is jointly administered by the Massachusetts Office of Coastal Zone Management and the U.S. Environmental Protection Agency. The primary role of the Project is to provide technical assistance to municipalities, environmental organizations, and citizens surrounding the bay to facilitate implementation of the recommendations contained in the Buzzards Bay Comprehensive Conservation and Management Plan. The Management Plan outlines research findings and identifies management strategies to protect and restore water quality and living resources in the bay and its surrounding 432 square mile watershed.

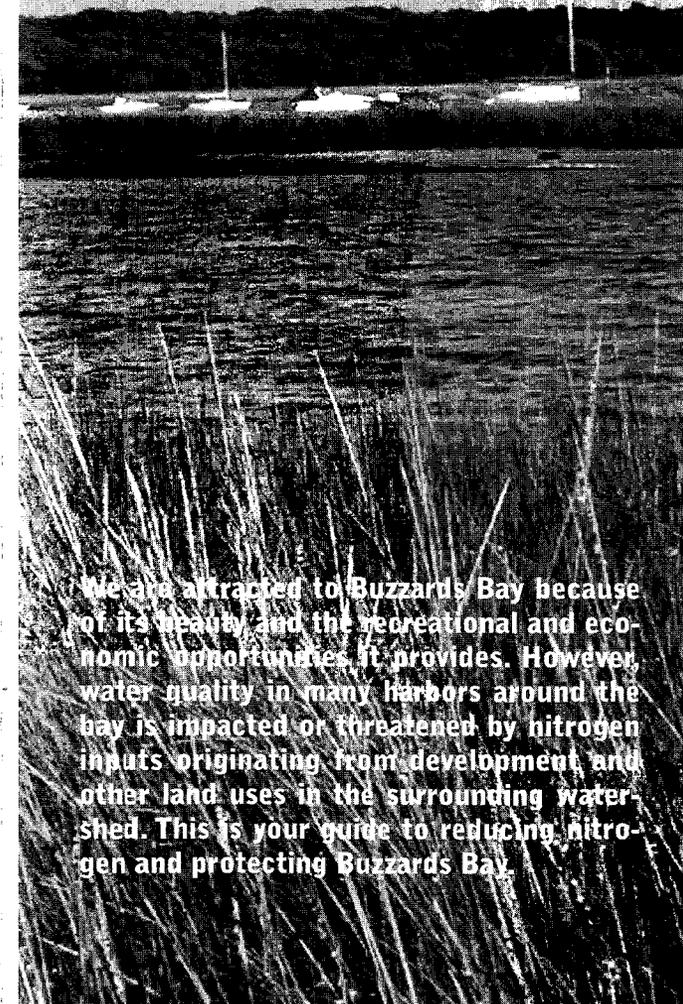


Buzzards Bay Project
 2870 Cranberry Highway
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 (508) 291-3625
www.buzzardsbay.org

This project has been financed partially with federal funds from the U.S. Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (the Department) under a s.319 Nonpoint Source Competitive Grant #97-07/319 "Protecting Nitrogen Sensitive Embayments Through Land Conservation". The contents do not necessarily reflect the views and policies of the EPA or of the Department, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

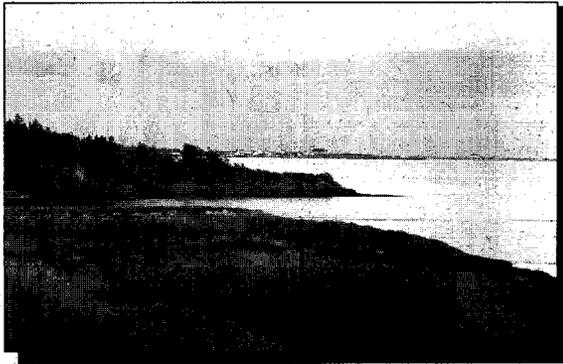
Coastal Water Quality and Land Use

A Watershed Resident's Guide to the Effects of Nitrogen in Buzzards Bay



We are attracted to Buzzards Bay because of its beauty and the recreational and economic opportunities it provides. However, water quality in many harbors around the bay is impacted or threatened by nitrogen inputs originating from development and other land uses in the surrounding watershed. This is your guide to reducing nitrogen and protecting Buzzards Bay.

The Problem with Nitrogen?



Nitrogen is a natural and essential part of both marine and terrestrial environments. In marine environments, the growth of algae is directly influenced by the amount of nitrogen in the water. Algae, which include seaweed and microscopic plants called phytoplankton, are the basis of aquatic food webs. Increased supplies of nitrogen can cause the rapid growth and accumulation of algae.

While aquatic plants are an important part of a healthy bay ecosystem, an overabundance of algae can have several detrimental effects. In large quantities, algae can decrease light transmission through water. Inadequate light can stress and eventually cause the death of eelgrass beds, which act as important nursery habitat for many fish and shellfish species. Excessive amounts of algae can also decrease oxygen levels in the water, as both living and dying algae consume oxygen. In the most severe cases, oxygen levels can become so low that fish kills occur. Algae can also sink to the bottom where it accumulates in shallow bays, smothering shellfish and destroying valuable habitat.

These negative impacts resulting in poor water clarity, loss of habitat, and low oxygen levels are referred to as *eutrophication*.

Where Does Nitrogen Come From?

Nitrogen is transported into Buzzards Bay by various water sources, including groundwater, stormwater, rivers, and streams. The majority of nitrogen entering the bay originates from on-site septic systems, sewage treatment facilities, stormwater runoff, waterfowl, and fertilizers added to lawns, golf courses and agricultural land.

The way the land surrounding Buzzards Bay is used can have a significant impact on water quality. Oftentimes, activities that are viewed as a way to stimulate the local economy, such as increasing the amount of development, can result in long-term ecosystem impacts if not carefully planned. Increased



population growth and the tendency for dense development to occur on the coast have affected water quality in Buzzards Bay. Excessive nitrogen from residential communities has increased dramatically as summer homes built close to the water and in dense clusters are rapidly being converted into year-round homes.

The gradual replacement of forests and wetlands with residential homes, commercial buildings, roads, and other paved surfaces affects many ecological processes that are critical to the natural absorption of nitrogen in the environment. Undeveloped forest and wetland areas filter out and consume nitrogen before it ever has the chance to reach the bay. As

unaltered vegetated areas continue to disappear, and the amount of nitrogen reaching Buzzards Bay increases, more harbors and shallow bays will begin showing signs of eutrophication.

How Can YOU Make a Difference?

There are many simple things that you can do to control nitrogen in your own backyard.

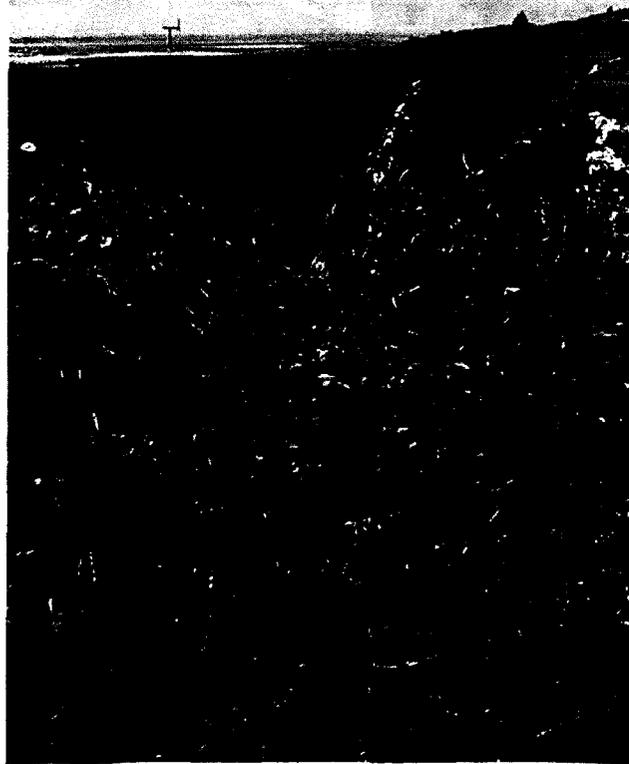
- ♦ Septic systems are a major source of nitrogen entering our local bays and harbors. Conventional septic systems (both properly operating and failing) release large amounts of nitrogen to the groundwater. These septic systems are designed to remove bacteria and are not very effective at reducing nitrogen in residential wastewater. If you own a septic system you should have the tank pumped every 2 years. When your system needs replacing, consider installing one of the new innovative septic systems that are specifically designed to remove nitrogen from wastewater. If you are connected to municipal sewer, support your town's efforts to reduce nitrogen in their wastewater facility's discharge.

- ♦ Lawns and paved surfaces increase nitrogen loads to coastal waters. Rainwater runoff carries nitrogen from these sources directly into the bay. You can reduce these nitrogen loads by maintaining a buffer strip of native vegetation that is at least 15 feet wide abutting the edge of any waterbody or wetland. Additionally, converting some of your lawn to a more naturalized landscape, stabilizing any areas that may be prone to erosion, and not using fertilizers will also help. Watering your grass in the early morning and late evening will keep it green without fertilizers because you'll be avoiding water loss caused by evaporation. It also helps if you cut your grass long (at least 2") to encourage strong roots. However, if you feel you must use fertilizer, apply it only when necessary and always according to the manufacturer's directions.

Buzzards Bay Project National Estuary Program
2870 Cranberry Highway
East Wareham, MA 02538

RESTORING SALT MARSHES IN BUZZARDS BAY

TAKING ACTION AT WINSEGANSETT MARSH



A Message from Massachusetts Environmental Affairs Secretary Bob Durand

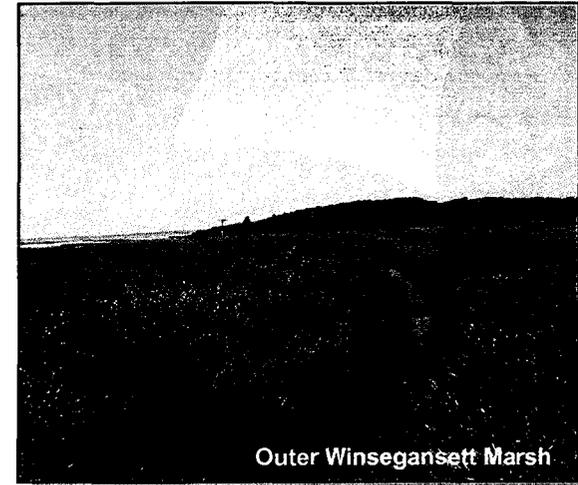
We are all familiar with the salt marshes along our shores. They are wonderful places to watch birds or to walk alongside to view nature's beauty. Salt marshes are diverse in marine life and are a habitat and nursery for birds, mammals, turtles, finfish, shellfish, and crustaceans. They help reduce coastal pollution by filtering and removing pollutants from upland activities as water flows through the marsh vegetation. Salt marshes also minimize the damage of coastal floods and reduce coastal erosion.

It is for these reasons that salt marshes are our most valued and protected coastal resources. It is also why the Executive Office of Environmental Affairs has been making efforts to restore tidally restricted salt marshes around the state. The construction of roads and paths in the past has blocked or restricted the flow of salt water into these ecosystems, which has led to unhealthy habitat and the loss of some salt marshes.

Several salt marsh restoration projects have been initiated in Buzzards Bay. In the Town of Fairhaven, the Buzzards Bay Project National Estuary Program teamed up with local residents and municipal officials to improve tidal flushing into the Winsegansett Salt Marsh system. This work was accomplished with funding from the Massachusetts DEP Nonpoint Source Pollution Program, Massachusetts Environmental Trust, the Town of Fairhaven, and the US EPA Five Star Restoration Challenge Grant Program. Private land owners were generous enough to allow access to their properties for culvert replacement. I applaud this collaborative effort and the team that brought this project together. It is my hope this will serve as a model and inspire similar initiatives around the Commonwealth.

WHAT IS A SALT MARSH?

Salt marshes are transitional areas between land and the sea. A salt marsh is a coastal wetland that extends up to the highest high tide line and is characterized by plants that are adapted to, or prefer, living in saline soils. A salt marsh may contain tidal creeks, ditches, and pools. Subjected to the daily rise and fall of the sea, the salt marsh environment is constantly moving and changing. In salt marshes, incoming freshwater from rivers, streams and wetlands mixes with the tidal salt-water, resulting in frequent and rapid changes in salinity, temperature, and water depth within the marsh system.



Outer Winsegansett Marsh

Salt marshes are typically divided into two sections; the lowest portion or "low marsh" is submerged twice daily at high tide. Vegetation in the low marsh consists primarily of salt marsh cordgrass (*Spartina alterniflora*). The "high marsh" section is flooded infrequently, only during storms and unusually high tides. Dominated by salt meadow cordgrass (*Spartina patens*), the high marsh serves as a nesting area for marsh birds. Both the salt marsh and salt meadow cordgrasses survive in this salt flooded environment by excreting unneeded salt on their leaf edges. In addition, cordgrasses possess air passages in the stem that allow oxygen to reach the roots.

WHAT IS A TIDALLY RESTRICTED SALT MARSH?

Many salt marshes have been adversely impacted by human activities. Usually these activities are transportation related, such as the construction of roads, bridges, railroads, and footpaths. Bridges and culverts are commonly installed during construction to allow movement of tidal waters. However, these structures are often too small to allow full tidal flows necessary to maintain natural salt marsh vegetation upstream. Structures that restrict the normal tidal flow of a salt marsh are referred to as "tidal restrictions."



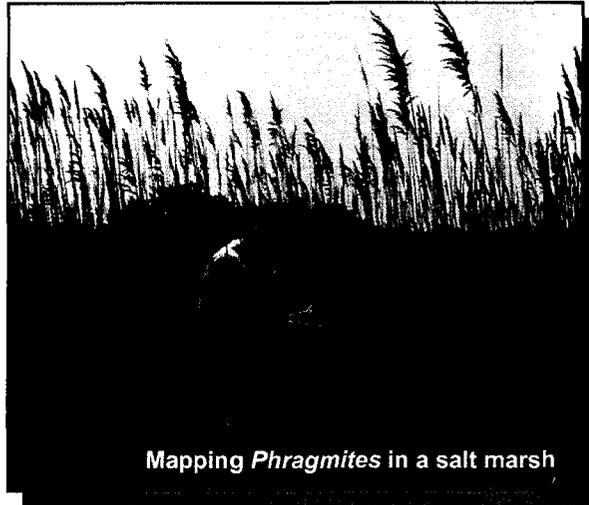
Old culvert under Winsegansett Ave.

Restricting the tidal flow of a salt marsh can result in significant changes in its ecology. The strongly saline environment can change to one that is brackish or freshwater when seawater is unable to reach the restricted areas. This change in marsh hydrology enables plants able to tolerate lower salinities, such as the common reed *Phragmites australis*, to invade the marsh and replace the natural salt marsh plants. This in turn leads to the displacement of wildlife species dependent on salt marsh vegetation.

IDENTIFYING TIDALLY RESTRICTED SALT MARSHES IN BUZZARDS BAY

In the winter of 1998, the Buzzards Bay Project, in partnership with the Massachusetts Wetlands Restoration Program, began locating areas of im-

paired salt marsh vegetation along the coast of Buzzards Bay. Of particular concern were salt marshes impacted by human activity.



Mapping *Phragmites* in a salt marsh

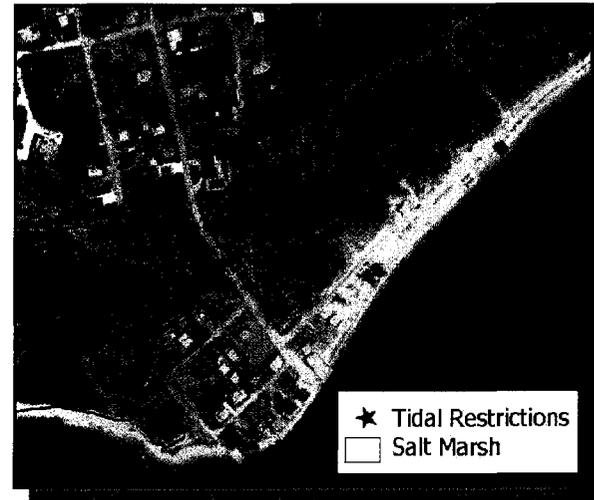
Maps of degraded habitat, along with information on the potential causes of degradation (tidal restrictions, fill placement, etc.), were compiled into *The Atlas of Tidally Restricted Salt Marshes – Buzzards Bay Watershed*. This document has been made available for use by municipalities, state agencies, and other organizations to initiate salt marsh restoration activities at these sites when appropriate. Utilizing information from the atlas, the Buzzards Bay Project selected Winsegansett Marsh as the first demonstration project for salt marsh restoration.

RESTORING WINSEGANSETT MARSH

The Winsegansett Salt Marsh system is a 30-acre coastal wetland on Sciticut Neck in the Town of Fairhaven. Located behind a barrier beach, the marsh is connected to the waters of Outer New Bedford Harbor and Buzzards Bay through a series of tidal creeks. The upper portion of Winsegansett has been separated from the rest of the marsh by the construction of Winsegansett Avenue. An insufficiently sized 18-inch culvert used to exist under the road. Also restricting tidal flow were three privately owned culverts placed under footpaths that cross over the marsh. As a result of

the restricted tidal flow, the salt marsh vegetation was gradually being replaced with nuisance, non-native species. Today, nearly half of the upper marsh has been converted to common reed.

As part of the Winsegansett Salt Marsh restoration process, these four culverts were replaced with larger culverts that allow more of an adequate tidal flow. It is expected that the increase in tidal flow will permit the recolonization of naturally occurring plant communities and effectively restore the salt marsh habitat in the upper six acres of the marsh. The Buzzards Bay Project will monitor the marsh for the next several years to document its progress. It is hoped that the restoration of Winsegansett Salt Marsh will serve as a model for future salt marsh restoration efforts throughout the Buzzards Bay watershed and beyond.



HOW CAN YOU HELP?

If you believe you know of a salt marsh that is tidally restricted or if you would like more information on how to restore tidally restricted salt marshes in your community, please contact us. Additional information about the Winsegansett Salt Marsh Restoration Project and the *Atlas of Tidally Restricted Salt Marshes – Buzzards Bay Watershed* can be obtained by calling (508) 291-3625 or visiting www.buzzardsbay.org.

WHAT IS THE BUZZARDS BAY PROJECT?

The Buzzards Bay Project (BBP), established in 1985, is one of 28 National Estuary Programs in the United States. The BBP is a unit of the Massachusetts Office of Coastal Zone Management and receives funding from the U.S. Environmental Protection Agency. The mission of the BBP is to provide technical assistance and funding opportunities to municipalities surrounding the Bay to facilitate implementation of the recommendations contained in the Buzzards Bay Comprehensive Conservation Management Plan (CCMP). The CCMP, which was completed by the BBP in 1991, outlines research conclusions and management strategies for the protection and restoration of water quality and living resources in the Bay and its surrounding 432 square mile watershed.

Commonwealth of Massachusetts

Jane Swift, Governor

Executive Office of Environmental Affairs

Bob Durand, Secretary

Buzzards Bay Project

Dr. Joe Costa, Executive Director

2870 Cranberry Highway

East Wareham, MA 02538

508.291.3625



Buzzards Bay Project

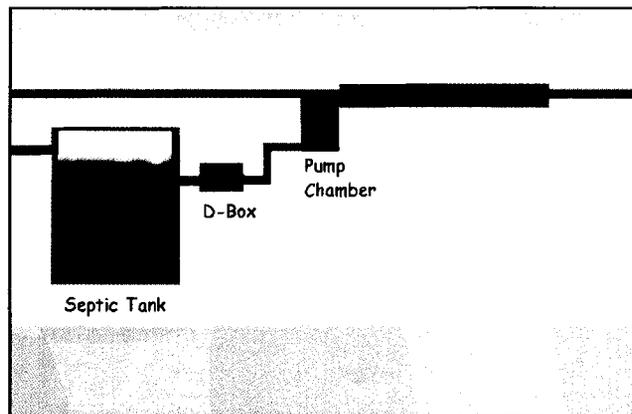
This project was partially financed with Federal Funds from EPA to the Massachusetts Department of Environmental Protection under a s.319 Nonpoint Source Competitive Grant #99/04-319 entitled "Winsegansett Salt Marsh Restoration Project". Additional funding was provided through a Five Star Restoration Challenge Grant (NFWF & EPA), a FishAmerica Foundation Grant, and Massachusetts Environmental Trust. The contents of this document do not necessarily reflect the views and policies of the U.S. Government or the Commonwealth of Massachusetts, nor does the mention of trade names or commercial products constitute endorsement by the U.S. Government or the Commonwealth.

Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

Geoflow Wasteflow Drip Line with Rootguard

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

Technology Name: Wasteflow Drip Line with Rootguard.
Technology Type: Subsurface drip disposal of septic tank effluent or wastewater.
Manufacturer: Geoflow Inc.
307-0 W. Tremont Avenue
Charlotte NC 28203
(704) 347-3476
Contact: Suzanne Dill
Company Website: www.geoflow.com
Performance & Permitting info at MA DEP and BCHED Websites:
www.state.ma.us/dep/brp/wwm/t5pubs.htm#it
www.capecod.net/alternativesepptic
Testing Objectives: Nitrogen removal capability.
Testing Period: Results shown for 3/00 to 2/01, testing is ongoing.
Test Loadings: System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.



Generalized design of Geoflow Wasteflow Drip Line.



Drip Lines shown during installation.

Siting Considerations and Installation Notes

As configured at the Test Center, the GeoFlow System consists of a septic tank, pump chamber and drip irrigation soil absorption system. It is critical that all effluent distribution lines are self-draining. All valve boxes and risers for pressure relief valves should be insulated against cold and easily accessible. High level of installation oversight by manufacturer or distributor is recommended. Recommend avoiding installation in areas where vehicle loads are even occasionally possible. Effluent tee filter should be installed in the septic tank. The only above ground component is an electrical control panel with audible and visual alarm. The electrical panel contains programmable logic controllers (PLC) for control and sequencing of backflushing and dosing. Lush lawn requires additional mowing, or alternative vegetation can be considered. Possibly suitable for high groundwater elevation or shallow bedrock sites.

Actual and Manufacturer's Estimated Costs (3-bedroom home) and Labor

Non-Title 5 Components: \$1,000. (manufacturer's claim).
Components + Installation: \$2,000 more than conventional (claim).
Electrical: \$62 per year actual (local rates, KWh= 565).
O&M: Quarterly inspection of motors, air flow, effluent and sludge. A service contract is required in Massachusetts (Approximately \$400 per year minimum, but varies). Septic tank pumping averages \$60 per year.
Other Costs: Quarterly effluent quality monitoring is required for some permits (\$300 or more annually). Design and permitting costs vary with site.
Replacement: Pumps (\$300) have one-year manufacturers warranty, dripline claimed to have 30 year lifetime.

Theory of Operation

This technology uses the biological activity in the upper soil layer to achieve a stabilization of the wastewater at least comparable to a standard soil absorption system. It is presumed that the wastewater has some of the nutrients removed by plant uptake. Some water is undoubtedly evaporated by the overlying grasses.

Permitting and Use in Massachusetts (as of June 2001)

Certification for General Use: No approval in this category. **Remedial Use Approval:** No approval in this category. **Provisional Use Approval:** No approval in this category. **Piloting Approval:** currently under review for approval, several systems have been installed on a site-specific pilot basis. All installations in Massachusetts include I/A pretreatment, including disinfection in advance of the drip irrigation component.

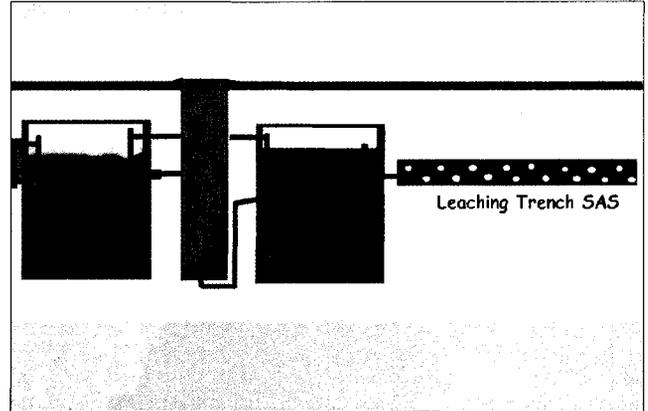


Massachusetts Alternative Septic System Test Center Technology Fact Sheet -Interim Findings

Amphidrome

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

Technology Name: Amphidrome
Technology Type: Sequencing batch reactor.
Manufacturer: F.R. Mahony & Associates, Inc.
273 Weymouth Street
Rockland, MA 02370
(781) 982-9300
Contact: Keith Dobie, President
Company Website: www.frmahony.com
Performance & Permitting info at MA DEP and BCHED Websites:
www.state.ma.us/dep/brp/www/t5pubs.htm#it
www.capecod.net/alternativesepic
Testing Objectives: Nitrogen sensitive areas, suitable for retrofits, use for reduced separation to groundwater and small SAS size.
Testing Period: Testing started 3/00 and is ongoing. Results shown for 3/00 to 2/01.
Testing loadings: System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.



Generalized design of Amphidrome System.

Siting Considerations and Installation Notes

The system consists of a septic tank, reactor vessel, and "clear well" or pump chamber. Relative component elevations are critical to proper system performance. Height of the reactor vessel may complicate shallow-to-groundwater installations. Installation requires significant training and/or oversight by manufacturer. Above ground components include a blower with housing (variously sized), and an electrical control with an audio and visual alarm. The control panel contains programmable logic controllers (PLC) that require manufacturer's adjustments. Designer should consider siting the blower to minimize possibility for noise disturbance.

Actual and Manufacturer's Estimated Costs (3-bedroom home) and Labor

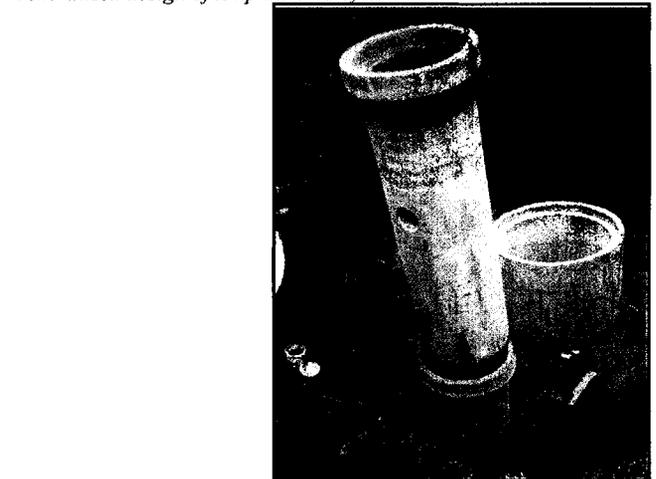
Non-Title 5 Components: \$8,000 (with clearwell, claim).
Components + Installation: \$10,000 more than conventional (claim).
Electrical: \$91 per year actual (local rates, annual KWh= 823)
O&M: Quarterly inspection of motors, air flow, effluent and sludge. A service contract is required in Massachusetts (Approximately \$400 per year minimum, but varies). Septic tank pumping averages \$60 per year.
Other Costs: Quarterly effluent quality monitoring is required for some permits (\$300 or more annually). Design and permitting costs vary.
Replacement: Pumps and blowers (\$300) have a one-year warranty by Amphidrome?

Theory of Operation

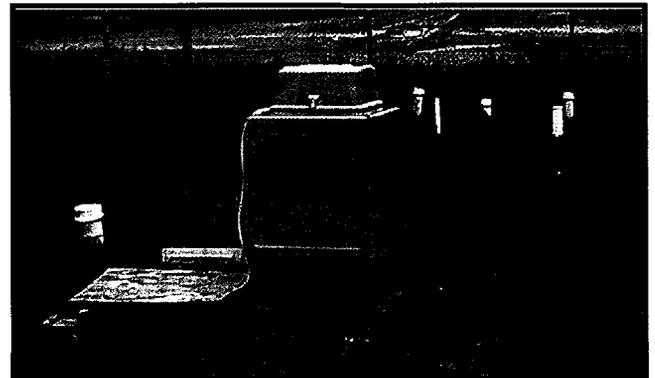
This system directs wastewater back and forth between the septic tank (anoxic tank) and the "clear well," passing it through an aggressively aerated reactor vessel. During this aeration part of the cycle, the effluent is nitrified (ammonium is converted to nitrate). At preset intervals, the air to the reactor vessel is shut off, allowing anoxic conditions to develop, enabling denitrification (i.e., conversion of nitrate to nitrogen gas) to occur. When the wastewater "batch" is adequately treated (cycled a number of times), it is discharged to the Soil Absorption System (SAS) at predetermined intervals.

Permitting and Use in Massachusetts (as of June 2001)

Certification for General Use: No approval in this category. **Remedial Use Approval:** Amphidrome has approval in remedial situations where a system is failed, failing or nonconforming where relief is sought to construct an SAS within two feet (or three feet for percolation rates exceeding two minutes per inch) of the high groundwater elevation, to construct an SAS reduced in size by up to 50 percent or in areas where at least 2 feet of suitable material is available beneath the SAS. **Provisional Use:**



Installation of Amphidrome Unit.



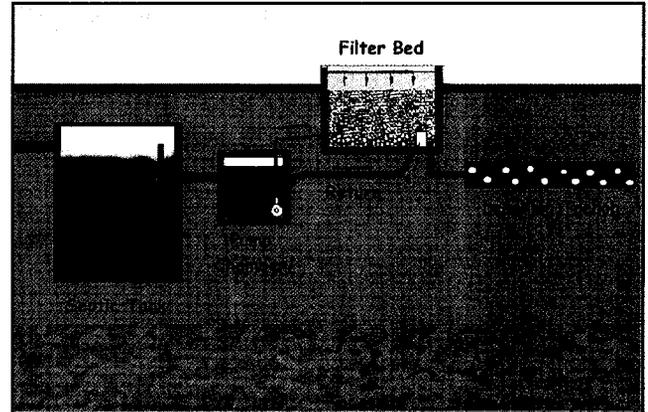
No approval in this category, application currently under review. **Piloting Approval:** Approved for use in nitrogen-sensitive areas. For design flow of less than 2000 GPD, for residential systems up to 660 gpd per acre, for nonresidential systems up to 550 gpd per acre. For systems 2000 gpd or larger approved for 440 gpd per acre.

Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

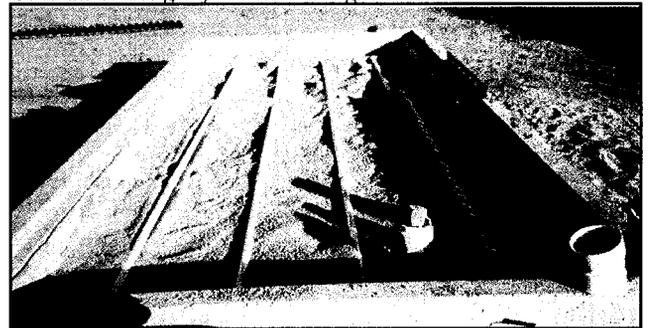
Recirculating Sand Filter

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

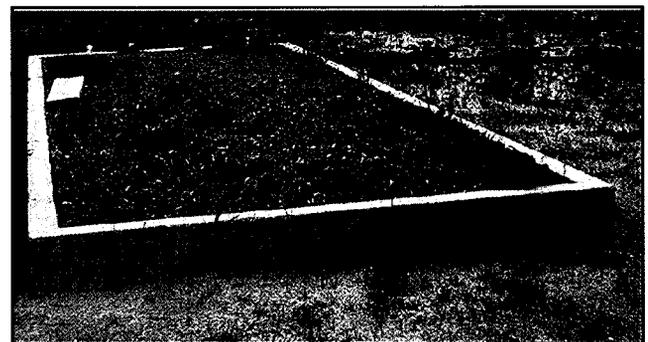
Technology Name:	Recirculating Sand Filter.
Technology Type:	Recirculating Sand Filter- Return design for nitrogen removal.
Manufacturer:	Non-proprietary, many manufacturers
Contact:	Massachusetts DEP
Company Website:	Not applicable.
Performance & Permitting info at MA DEP and BCHED Websites:	www.state.ma.us/dep/brp/www/t5pubs.htm#it www.capecod.net/alternativeseptic
Testing Objectives:	Evaluate nitrogen removal.
Testing Period:	Testing began 2/00 and is ongoing. Results shown for 2/00 to 3/01.
Test Loadings:	System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.



Generalized design of a Recirculating Sand Filter.



Sand Filter Bed during installation.



Sand filter bed after 6 months.

Siting Considerations and Installation Notes

RSF systems generally consist of a septic tank, sand filter and pump chamber, although some variations do not require a separate pump chamber. Systems vary widely in design characteristics. Care should be taken in selection of filter media. Provide free access to the recirculation valve or box. Clean-out sweeps are recommended for pressure distribution laterals atop the sand filter. Designer should consider inspection and maintenance access for all critical components. Designer should consult Massachusetts Guidelines for Recirculating Sand Filters. Designers specifying open-access filter beds should consider placement of filter component where occasional odors will not be a nuisance. Designers specifying covered filter beds should consider the difficulties that a cover may present if the media surface must be serviced. Above ground components include a portion of the filter and an electrical control panel with a visual and audible alarm. Dosing to the filter is controlled by a timer in the control panel. Event counters and run-time meters are recommended for all pumps. At the Test Center, only two RSF replicates were installed. One RSF was covered with wood chips, the other with insulated plywood. In Massachusetts, the RSF flows to an SAS, but no SAS were used or evaluated in this study.

Actual and Estimated Costs (3-bedroom home) and Labor

Non-Title 5 Components: \$2,800. (Test Center estimate).

Components + Installation: \$4,800 more than conventional.

Electrical: \$100 per year actual (local rates, KWh= 909).

O&M: Quarterly inspection of motors, effluent and sludge. A service contract is required in Massachusetts (Approximately \$400 per year minimum, but varies). Septic tank pumping averages \$60 per year.

Other Costs: Quarterly effluent quality monitoring is required for some permits (\$300 or more annually). Design permitting costs vary with site.

Replacement: Pumps (\$300) generally have 1-year manufacturer's warranty, sand filter (\$500) expected to last 30 years.

Theory of Operation

This technology is a trickling filter using passage over variously-textured sand on which an active community of bacteria develops to achieve the nitrification of septic tank effluent (the conversion of ammonium to nitrate). After passing through the filter (sometimes at the bottom of the filter), the flow is split to return a portion of the nitrified effluent back to the anoxic "recirculation tank" or pump chamber for denitrification (conversion of nitrate to nitrogen gas). Some additional pollution removal likely occurs in the SAS.

Permitting and Use in Massachusetts (as of June 2001)

Certification for General Use: Title 5 requires utilization of an RSF or "equivalent alternative technology" in nitrogen sensitive areas that are limited to 440 gpd. For residential systems less than 2000 gpd an RSF can be installed to treat and dispose of up to 550 gpd per acre where the allowable density for residential use is limited to 440 gpd per acre for a conventional Title 5 system. RSFs or equivalent alternative technologies are required for all systems with design flows of 2000 gpd or greater in nitrogen sensitive areas. **Remedial Use:** RSFs are approved in remedial situations where a system is failed, failing or nonconforming where relief is sought to construct an SAS within two feet (or three feet for percolation rates exceeding two minutes per inch) of the high groundwater elevation, to construct an SAS reduced in size by up to 50 percent or in areas where at least 2 feet of suitable material is available beneath the SAS.

Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

Recirculating Sand Filter

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

Technology Name:	Recirculating Sand Filter.
Technology Type:	Recirculating Sand Filter- Return design for nitrogen removal.
Manufacturer:	Non-proprietary, many manufacturers
Contact:	Massachusetts DEP
Company Website:	Not applicable.
Performance & Permitting info at MA DEP and BCHED Websites:	www.state.ma.us/dep/brp/www/t5pubs.htm#it www.capecod.net/alternativesepptic
Testing Objectives:	Evaluate nitrogen removal.
Testing Period:	Testing began 2/00 and is ongoing. Results shown for 2/00 to 3/01.
Test Loadings:	System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.

Siting Considerations and Installation Notes

RSF systems generally consist of a septic tank, sand filter and pump chamber, although some variations do not require a separate pump chamber. Systems vary widely in design characteristics. Care should be taken in selection of filter media. Provide free access to the recirculation valve or box. Clean-out sweeps are recommended for pressure distribution laterals atop the sand filter. Designer should consider inspection and maintenance access for all critical components. Designer should consult Massachusetts Guidelines for Recirculating Sand Filters. Designers specifying open-access filter beds should consider placement of filter component where occasional odors will not be a nuisance. Designers specifying covered filter beds should consider the difficulties that a cover may present if the media surface must be serviced. Above ground components include a portion of the filter and an electrical control panel with a visual and audible alarm. Dosing to the filter is controlled by a timer in the control panel. Event counters and run-time meters are recommended for all pumps. At the Test Center, only two RSF replicates were installed. One RSF was covered with wood chips, the other with insulated plywood. In Massachusetts, the RSF flows to an SAS, but no SAS were used or evaluated in this study.

Actual and Estimated Costs (3-bedroom home) and Labor

Non-Title 5 Components: \$2,800. (Test Center estimate).

Components + Installation: \$4,800 more than conventional.

Electrical: \$100 per year actual (local rates, KWh= 909).

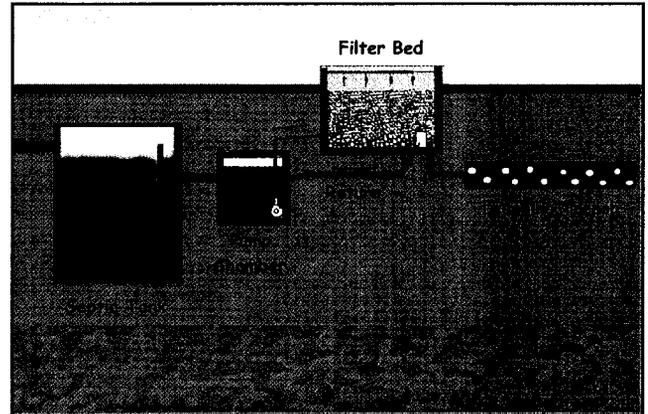
O&M: Quarterly inspection of motors, effluent and sludge. A service contract is required in Massachusetts (Approximately \$400 per year minimum, but varies). Septic tank pumping averages \$60 per year.

Other Costs: Quarterly effluent quality monitoring is required for some permits (\$300 or more annually). Design permitting costs vary with site.

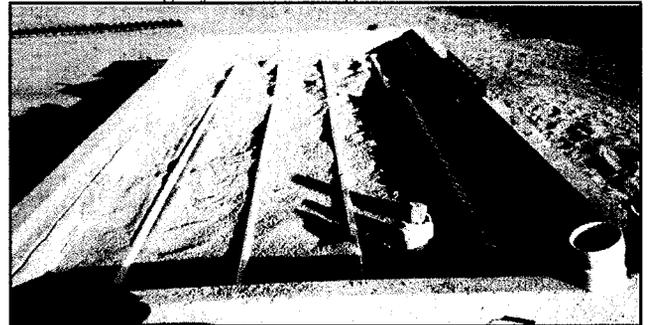
Replacement: Pumps (\$300) generally have 1-year manufacturer's warranty, sand filter (\$500) expected to last 30 years.

Theory of Operation

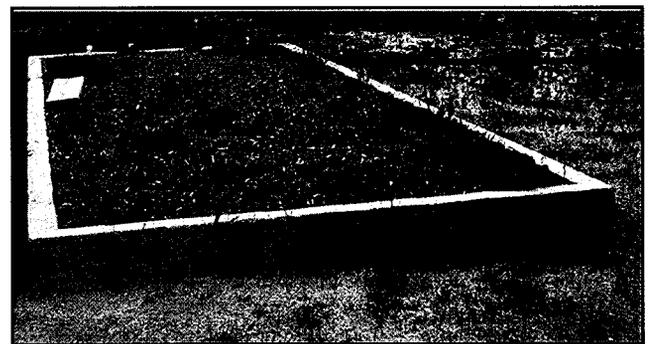
This technology is a trickling filter using passage over variously-textured sand on which an active community of bacteria develops to achieve the nitrification of septic tank effluent (the conversion of ammonium to nitrate). After passing through the filter (sometimes at the bottom of the filter), the flow is split to return a portion of the nitrified effluent back to the anoxic "recirculation tank" or pump chamber for denitrification (conversion of nitrate to nitrogen gas). Some additional pollution removal likely occurs in the SAS.



Generalized design of a Recirculating Sand Filter.



Sand Filter Bed during installation.



Sand filter bed after 6 months.

Permitting and Use in Massachusetts (as of June 2001)

Certification for General Use: Title 5 requires utilization of an RSF or "equivalent alternative technology" in nitrogen sensitive areas that are limited to 440 gpd. For residential systems less than 2000 gpd an RSF can be installed to treat and dispose of up to 550 gpd per acre where the allowable density for residential use is limited to 440 gpd per acre for a conventional Title 5 system. RSFs or equivalent alternative technologies are required for all systems with design flows of 2000 gpd or greater in nitrogen sensitive areas. **Remedial Use:** RSFs are approved in remedial situations where a system is failed, failing or nonconforming where relief is sought to construct an SAS within two feet (or three feet for percolation rates exceeding two minutes per inch) of the high groundwater elevation, to construct an SAS reduced in size by up to 50 percent or in areas where at least 2 feet of suitable material is available beneath the SAS.

Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

Explanation of Fact Sheets

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

Technology Name:

The specific model and technology tested at the Test Center. It is important to recognize that other models may be produced by the company. Also, variations of installation may include different configurations, sizes, pump and blower power, and Soil Absorption System (SAS) area. These differences may result in performances different from those reported here.

Technology Type:

This section describes the general class of technology as commonly identified by those in the industry.

Manufacturer:

Address and phone number of the manufacturer participating in the Massachusetts Alternative Septic System Test Center.

Contact:

The spokesperson to contact on performance of the technology.

Company Website:

Website of the manufacturer participating in the Test Center.

Additional Performance & Permitting information:

Detailed information is available from the Massachusetts Department of Environmental Protection (DEP) and Barnstable County Websites: www.state.ma.us/dep/brp/wwm/t5pubs.htm#it and www.capecod.net/alternativesepctic.

Testing Objectives:

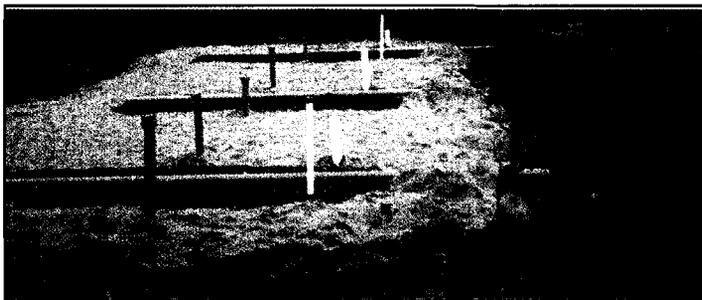
The specific performance the vendor sought to evaluate at the Septic System Test Center.

Testing Period:

The fact sheets indicate both the start of the testing period for the technology, and the period during which data was evaluated as summarized in the fact sheet. "Ongoing" indicates that testing continues, and the final performance evaluation summary may differ from the Interim Findings fact sheets. Vendors had an optional 90-day start-up period of testing in which they could optimize the operation and performance of the system before the evaluation period began, thus the reporting data period is not necessarily equivalent to the testing period.

Testing loadings:

Generally all systems were identically loaded at 330 gpd unless specified. This loading was made in 15 daily doses, concentrated in the early morning and late afternoon to simulate typical septic system usage. SAS loadings were 0.74 gallons per sq. foot per day.



An SAS during construction. Each trench receives a fourth of the discharge from each test replicate. Dosage is 0.74 gallons per sq. ft. per day.

Siting Considerations and Installation Notes

Depending on the skill of the installer, actual installation elevations and layout may differ slightly from engineering plans approved by municipal Boards of Health. The performance of some technologies is more sensitive than others to variations or elevations, tightness of seals, and other factors. Installers should have had training and be familiar with the installation of the technology. Oversight by manufacturer or designer during installation of the waste disposal system is recommended. Some technologies are more complicated and difficult

to install than others. Difficulty of installation has relevance to installers and inspectors. For each technology, a visual description was given of what may typically be observed above grade on a property where the technology is employed. It should be kept in mind that more or less of the components may be visible depending upon which components the engineer has placed below grade. Because pumps and air blowers of some systems are audible, decibel output of the system will be reported in the final report. Odors were difficult to quantify due to proximity of various sources and will not be evaluated.

Actual & Manufacturer's Estimated Costs (3-bedroom home) and Labor Non-Title 5 Components:

The cost of Title 5 components (septic tank, D-box, and SAS) are about \$2,000. Innovative systems typically have these components and additional ones. This section lists costs above those of a conventional system. These estimates are claims by the manufacturer and have not been verified.

Components + Installation:

The cost for a conventional Title 5 septic system for a 3-bedroom home in Massachusetts ranges from \$3,500 for a best case in new construction to up to \$60,000 for difficult lots as retrofits (mounding, replacement of soils, pumps required, etc.). More typically, these systems range between \$8,000 and \$16,000. This section shows non-Title 5 component costs with associated additional minimum installation costs above a conventional septic system. These estimates are claims by the manufacturer and have not been verified.

Electrical:

Any system with air blowers or water pumps uses electricity. Electrical use depends on the wattage or horsepower of the pump, and the period of time a pump operates. Electrical use was reported as both annual kilowatt hours (KWh) and average annual cost based on Cape Cod electricity rates. It should be kept in mind that costs of electricity on Cape Cod (11 cents per kWh) are somewhat higher than other areas.

O&M:

(Operation and Maintenance) All septic tanks should be inspected every three years and pumped if necessary. This may cost \$180 or more. Thus, a conventional septic system and all other technologies are assumed to average \$60 per year in septic tank pumping costs. Other technologies may also have required operation and maintenance agreements, which in general represents a \$400 per year minimum cost over the life of the system, in addition to the \$60 per year tank pumping costs.

Other costs:

All installations have design and permitting costs associated with their installation that vary considerably with the site and installer. If effluent monitoring is required, this may cost an additional \$300 annually or more.

Replacements:

A conventional SAS is expected to last a minimum of 30 years if properly designed. Other technologies may have parts, media, and pumps that may need more frequent replacement. Generally pumps have manufacturer warranties of one to three years, although in practical terms, their duty cycle may typically be longer, sometimes to 10 years. We report only the specific model name and either manufacturer or installer's warranty for replacement.

Inspections:

Septic tanks for all technologies should be inspected once every three years and pumped if necessary. Other technologies may have parts or components that may need to be inspected more frequently. Alarms or indicator lights for indicating proper pump functioning are often required.

Explanation of Fact Sheets

Theory of Operation

This section includes a brief summary of the physical and biochemical theory of how the technology works or claimed to work.

Permitting and Use in MA

This section includes a summary of what permits the technology has for Massachusetts. A technology may be certified for these uses:

Certification for General Use: Technology can be installed anywhere a conventional Title 5 system may be used. In nitrogen sensitive areas, RSFs can be installed for residential use for sites where the design flow is less than 2000 gpd at a density of 550 gpd per acre.

Remedial Use Approval: To replace a failed, failing or nonconforming system. Can be installed with only 2 feet (3 feet in areas with percolation rates of two minutes per inch or higher) to high groundwater elevation, or with up to a 50 percent reduction in SAS size, or with only 2 feet (3 feet in rapid percolation areas, see above) of naturally occurring suitable material below the SAS.

Provisional Approval: To evaluate alternative systems that appear technically capable of providing levels of protection at least equivalent to those of a standard on-site disposal system and to determine under field conditions whether the system can obtain general use. All systems currently with Provisional Use are attempting to demonstrate a higher nitrogen reduction capability than an RSF.

Piloting: Intended to provide a technical demonstration that a technology can meet a specific performance limit under field testing conditions.

Operation and Maintenance Issues

This section was not completed in the interim fact sheets, but will include a summary of problems observed, or issues anticipated.

Explanation of the Graphs

The ability of a technology to remove pollutants was evaluated against pollutant concentrations in the influent during the period for which they were tested. Thus, if the technology was tested between July 1, 1999 and July 1, 2000, the effluent quality of the discharge was compared to the influent concentrations during the same period to account for changes that may have resulted from changes in operation of the facility, equipment replacement, or other factors. The graphs show the mean of all data from the three replicates for each parameter over the testing period, compared to Title 5 performance and influent, measured in parallel samples during the same period. Fecal coliform results are expressed as geometric means. In the nitrogen graph, NH₄ represents ammonia, NO_x represents nitrate+nitrite, DON is dissolved organic nitrogen, and PON is particulate organic nitrogen. Total nitrogen is the sum of these four parameters.

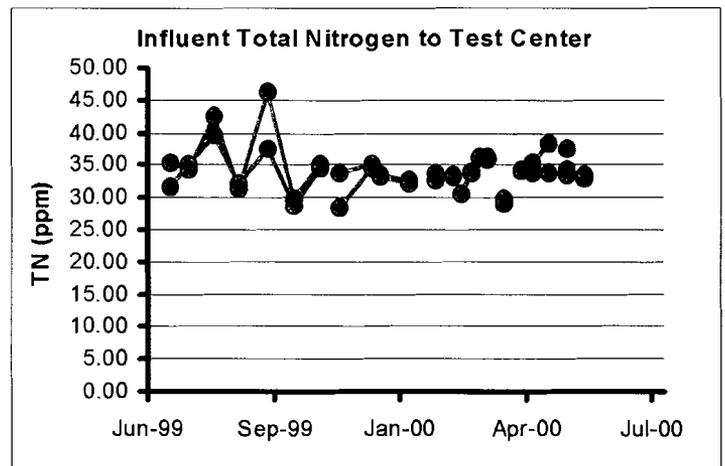
SAS samples include wastewater system effluent and precipitation. The recharge of precipitation to groundwater is estimated to be between 8 and 16 percent of effluent discharge based on local rainfall, estimated groundwater recharge rates, SAS size and dosage rates. For all technologies, an interim dilution rate of 10 percent was employed based on precipitation and theoretical and measured dosage rates at the Test Center. The results for nitrogen removal include this estimated dilution factor (note bars labeled "SAS adj.") Results shown for, and fecal coliforms were not adjusted for dilution by precipitation, because the adjustment was negligible in evaluating overall performance. This interim approach, is being compared to specific conductivity, chlorides, and bromide tracer data to better refine this estimate, and develop system-specific dilution factors. **Thus, the "SAS adjusted" values reported here for nitrogen discharge to groundwater should be considered preliminary.**

Summary of Interim Findings

This section includes brief summary statements by the Review Committee as to how the system performed in the tests. Typically, the performance of the technology before and after the SAS was compared to the septic tank effluent, and effluent under the SAS of a conventional septic system. This comparison of BOD and TSS at the D-boxes (technology or septic tank effluent) is important because reductions of BOD and TSS in alternative technologies are the basis of proposed reduced SAS size or reduced depth to groundwater under the SAS. However, it is important to recognize that in a conventional septic system, some pollutants, such as bacteria and nitrogen, receive additional treatment in the SAS, which typically has a "bio-mat" layer that forms in the soil in the SAS. The SAS of advanced treatment

septic systems may lack this biological mat. It is for these reasons that the Test Center compares pollutant removal performance of the innovative technology discharges to septic tank effluent (D-Box) of a conventional septic system, and at the base of the SAS, which both must employ. For all systems, BOD and TSS data at the base of the SAS are based on a very small sample size, and small differences among the technologies may not be significant.

Because of the difficulties in capture of SAS effluent in lysimeters, concentrations were made in the collection liner drain ("sump") under each SAS. Concentrations were adjusted by an interim dilution factor of 10% to account for infiltration of rainwater in the SAS. Actual dilutions may vary among the systems, and system specific dilution rates will be based on bromide and chloride tracer data in the year two reports. Samples collected under the SAS are taken less frequently than in other components. These issues and details of system performance will be discussed in greatly detail in a forthcoming performance review report. The fact sheets are meant only to provide a thumbnail view of overall system performance.



Funding for the Massachusetts Septic System Test Center was provided by the US EPA, through Cooperative Agreements x991657 and x981007, the Massachusetts Department of Environmental Protection (319-99-01, 319-00-02), Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Trust, Barnstable County Department of Health and Environment, UMass Dartmouth SMAST, and other organizations. Other information on this initiative can be found at www.buzzardsbay.org. These fact sheets were reviewed by a multi-agency work group. The views or opinions expressed are not necessarily those of the Commonwealth of Massachusetts, the US EPA, or any of the funding organizations and agencies. The information presented here represents the technical findings of the Massachusetts Septic System Test Center after at least one year of system testing. Manufacturer claims of cost and longevity, warranties, or stated costs have not been verified. Modifications to system designs from those tested, or installation under other soil or climate conditions may result in different system performance. This fact sheet was prepared and printed by the Buzzards Bay Project.



Commonwealth of Massachusetts
Jane Swift, Governor
Executive Office of Environmental Affairs
Bob Durand, Secretary
Buzzards Bay Project



Dr. Joe Costa, Executive Director
2870 Cranberry Highway East Wareham, MA 02538
508.291.3625



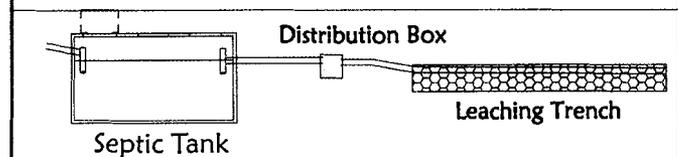
Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

Conventional Title 5 System D-box and leaching trench design

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Technology Name:	Massachusetts Title 5 Onsite Disposal System, D-box and leach trench SAS
Technology Type:	Conventional: 1500 gallon septic tank with leaching trench SAS
Manufacturer:	Non-proprietary, many manufacturers
Contact:	Massachusetts DEP
Company Website:	Not applicable.
Performance & Permitting info at MA DEP and BCHED Websites:	www.state.ma.us/dep/brp/www/t5pubs.htm#it www.capecod.net/alternativeseptic
Testing Objectives:	Evaluate pollutant removal for technology comparisons, pathogen removals at different depths in SAS, performance under stress conditions, and maintenance frequency recommendations.
Testing Period:	Testing began 5/99 and is ongoing, results shown for 7/99 to 7/00.
Test Loadings:	System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.

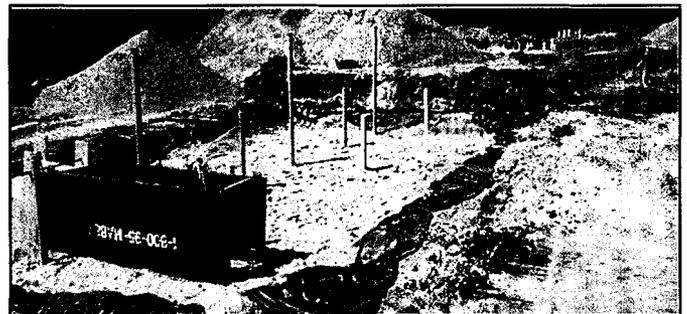
Standard Septic Tank-Leach Trench Design



Conventional Title 5 system with leaching trench SAS.



Septic tanks during installation.



SAS trench with sampling wells at construction.

Siting Considerations and Installation Notes

A conventional septic tank-consists of a septic tank and a soil absorption system (SAS) of various configurations. The design may include a pump chamber where required by land elevations. The SAS can consist of perforated pipe laid in stone aggregate (such as the unit tested and reported on here), or consist of concrete and plastic chambers of various designs. A separation between the bottom of the soil absorption system and high groundwater elevation of five or four feet is normally required; the separation distance is dependent on the soil type.

Actual and Estimated Costs (3-bedroom home) and Labor

System Parts: \$2,000.

With Installation: \$3,500 best case for new construction, up to \$60,000 for lots with low permeable soils, high groundwater elevations, or other features requiring SAS mounding, replacement of soils, use of pumps, etc. However, most typical range of cost is \$8,000 to \$16,000.

Electrical: \$0 per year typical, but pumps sometimes used if tank is downslope of SAS.

O&M: \$60 per year average cost for inspection and pumping, assuming inspection/pumping every three years.

Inspections: DEP recommends that the tank be inspected once every three years and pumped if necessary.

Replacements: SAS expected to last typically 30 years.

Theory of Operation

This traditional and simple system has been the most common onsite wastewater disposal system used in the United States during the past several decades. The system uses a septic tank to clarify sewage and an SAS to dispose of the clarified effluent. Treatment in the septic tank consists of settling of solids, conversion of organic nitrogen to ammonium, and anaerobic digestion of settled solids. Treatment in the SAS includes: filtration and removal of remaining suspended solids, microbial utilization and reduction of organic contaminants; microbial oxidation of ammonium to nitrate (nitrification); removal of pathogens by the combined processes of mechanical filtration, oxidation, and biological grazing. Biological activity and filtration by soils reduce the discharge of pathogen organisms to groundwater. The Title 5 system is not specifically designed to remove either nitrogen or phosphorus. However, a small amount of nitrogen entering Title 5 systems is removed by settling in the tank, or possibly via

denitrification in the tank and SAS. Some phosphorus may chemically bind to soils in the SAS.

Permitting and Use in Massachusetts (as of June 2001)

The preferred onsite wastewater disposal method per 310 CMR 15.000 (Title 5).

Operation and Maintenance Issues

[This information will be included in the final report findings.]

Explanation of the Graphs

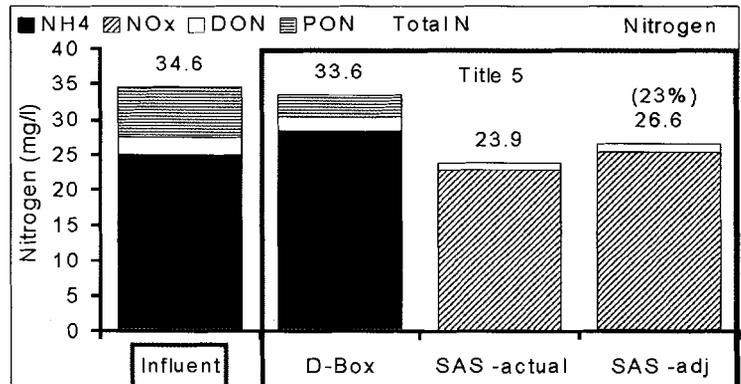
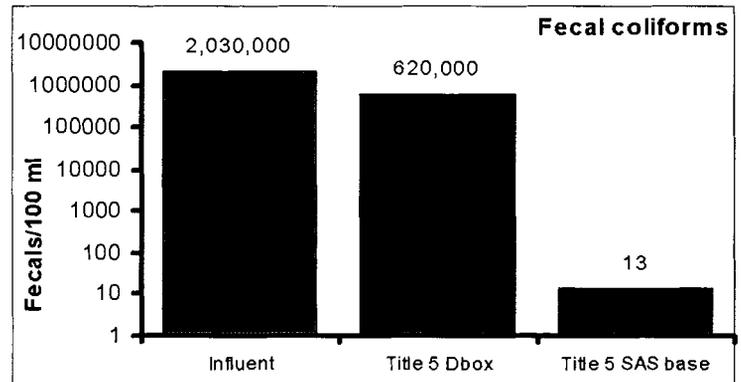
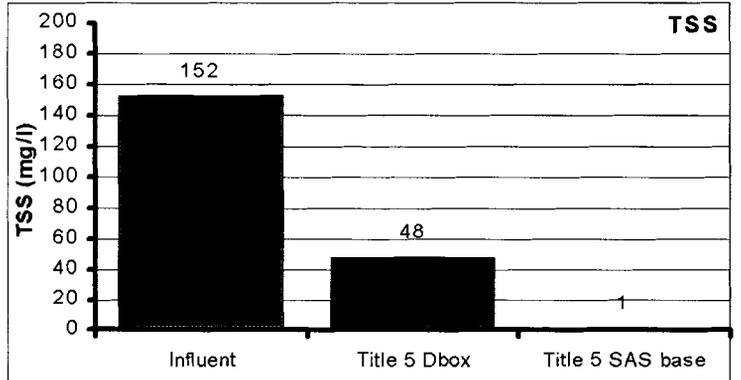
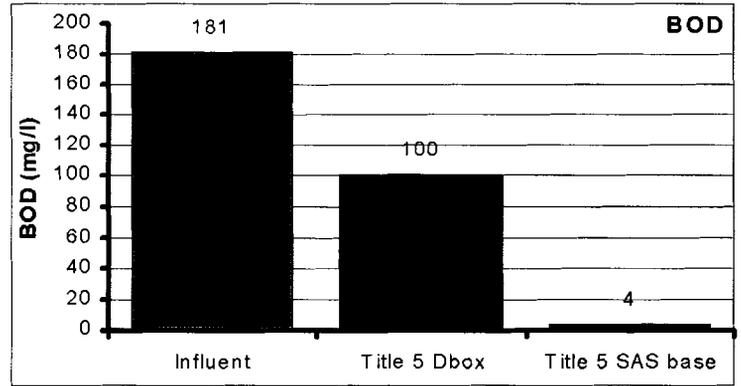
The graphs to the right show the mean of three replicates for each parameter over the testing period, compared to Title 5 performance and influent measured in parallel samples during the same period. Fecal coliform results are expressed as geometric means. In the nitrogen graph, NH₄ represents ammonia, NO_x represents nitrate + nitrite, DON is dissolved organic nitrogen, and PON is particulate organic nitrogen. Total nitrogen is the sum of these four parameters.

Soil absorption system samples include wastewater disposal system effluent and precipitation. The recharge of precipitation to groundwater is estimated to be between 8 and 16 percent of effluent discharge based on local rainfall, estimated groundwater recharge rates, SAS size and dosage rates. For all technologies, an interim dilution rate of 10 percent was employed based on precipitation and theoretical and measured dosage rates at the Test Center. The results for nitrogen removal include this estimated dilution factor (note bars labeled "SAS adj.") Results shown for biological oxygen demand (BOD), total suspended solids (TSS), and fecal coliforms were not adjusted for dilution by precipitation, because the adjustment was negligible in evaluating overall performance. This interim approach, is being compared to specific conductivity, chlorides, and bromide tracer to better refine this estimate, and develop system specific dilution factors. Thus, the "SAS adjusted" values reported here for nitrogen discharge to groundwater should be considered preliminary.

Summary of Interim Findings

The Septic System Test Center affirmed that conventional Massachusetts Title 5 systems remove BOD, TSS and fecal coliform bacteria to a sufficient degree necessary to protect public health. Although Title 5 systems are not designed to remove nitrogen, as a result of biological and chemical processes in the SAS, they were found to reduce nitrogen in the influent wastewater by approximately 19 to 22 percent depending upon the test period. The performance of the Title 5 systems in removing pollutants was used as the baseline to compare the performance of alternative technologies evaluated at the Septic System Test Center.

The Technical Review Committee does not recommend adoption of nitrogen loading ratings for this technology until the two-year testing period is complete. Differences in nitrogen removal among technologies tested are not necessarily significant. Nitrogen removal performance may vary with soil types and other site differences. The Buzzards Bay Project will recommend nitrogen loading rates for this technology for planning purposes and watershed loading evaluations at a later date.



Funding for the Massachusetts Septic System Test Center was provided by the US EPA, through Cooperative Agreements x991657 and x981007, the Massachusetts Department of Environmental Protection (319-99-01, 319-00-02), Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Trust, Barnstable County Department of Health and Environment, UMass Dartmouth SMAST, and other organizations. Other information on this initiative can be found at www.buzzardsbay.org. These fact sheets were reviewed by a multi-agency work group. The views or opinions expressed are not necessarily those of the Commonwealth of Massachusetts, the US EPA, or any of the funding organizations and agencies. The information presented here represents the technical findings of the Massachusetts Septic System Test Center after at least one year of system testing. Manufacturer claims of cost and longevity, warranties, or stated costs have not been verified. Modifications to system designs from those tested, or installation under other soil or climate conditions may result in different system performance. This fact sheet was prepared and printed by the Buzzards Bay Project.



Commonwealth of Massachusetts
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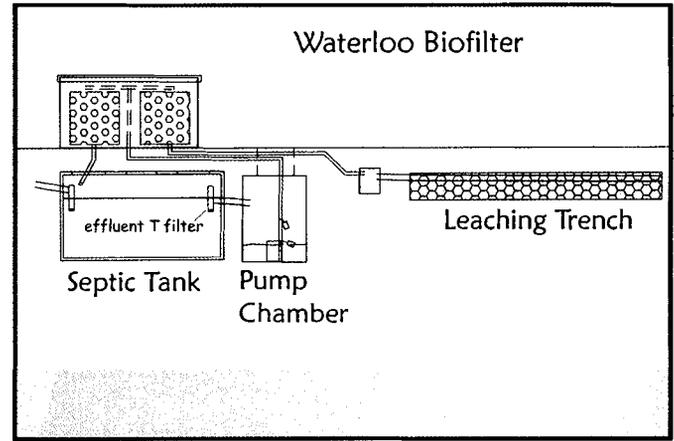



Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

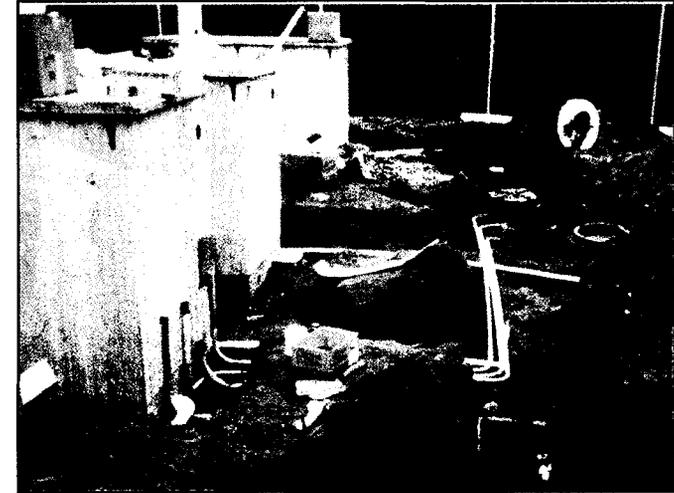
Waterloo Biofilter®

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

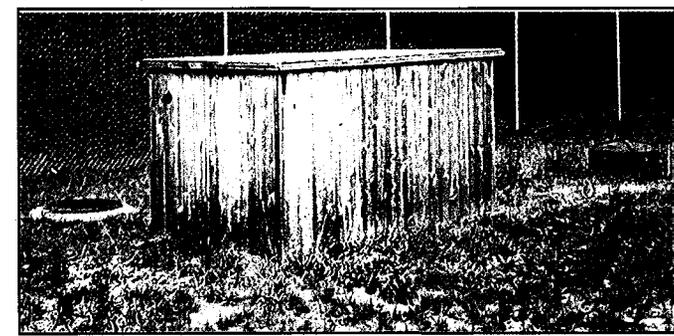
Technology Name:	Waterloo Biofilter®
Technology Type:	Trickling filter, aeration with foam media.
Manufacturer:	Waterloo Biofilter Systems, Inc. 143 Dennis Street Rockwood, ON N0B 2K0 Canada 519-856-0757
Contact:	Craig Jowett, Ph.D., P. Eng., President
Company Website:	www.waterloo-biofilter.com
Performance & Permitting info at MA DEP and BCHED Websites:	www.state.ma.us/dep/brp/www/t5pubs.htm#it www.capecod.net/alternativesepptic
Testing Objectives:	Demonstrate N removal for use in N-sensitive watersheds. Obtain approval for reductions in SAS size or high groundwater elevation separation distance.
Testing Period:	Testing began 6/99 and is ongoing, results shown for 9/99 to 9/00.
Test Loadings:	System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.



Generalized design of the Waterloo Biofilter System.



Waterloo Biofilter during installation (3 side by side installations)



One unit, after installation.

Siting Considerations and Installation Notes

System can be variously configured, but all installations include a septic tank, pump chamber and filter. The trickling filter may be installed flush to grade where gravity flow from the bottom of the filter can be directed back to the septic tank. Below ground installations may use concrete tanks with a proper access opening (5' x 4'). The pressure manifold atop filter media must be self-draining to prevent freezing. Above ground wooden enclosure installations (8' x 4' x 5') should consider treatment for carpenter ants and burrowing insects. An approved effluent tee filter should be installed in the septic tank. Above ground components include varying heights of the filter itself (dependent on topography) and an electrical control panel with a visual and audible alarm. Consult with the vendor for approved system configurations. Dosing to the filter can be controlled by demand (Test Center configuration) or alternately by timer.

Actual and Manufacturer's Estimated Costs (3-bedroom home) and Labor Non-Title 5 Components: \$7,000 (manufacturer's claim).

Components + Installation: \$7,350 more than conventional (claim).

Electrical: \$50 per year actual (local rates, annual KWh= 451).

O&M: Quarterly inspection of motors, air flow, effluent and filter media. A service contract is required in Massachusetts (Approximately \$400 per year minimum, but varies). Septic tank pumping averages \$60 per year.

Other Costs: Quarterly effluent quality monitoring is required for some permits (\$300 or more annually). Design, permitting costs vary with site.

Replacement: Pumps (\$300) have one-year manufacturers warranty, media claimed to last 30 years, but may require cleaning every 7-10 years. (\$100-\$300 to top-off the media compartment).

Theory of Operation

The Waterloo Biofilter is a trickling filter that uses an open-cell foam to achieve the nitrification (conversion of ammonium to nitrate) of septic tank effluent, and the anoxic environment of the septic tank to complete the denitrification (conversion of nitrate to nitrogen gas). Clarified septic tank effluent is first sprayed over a bed of foam. At the bottom of the filter housing, the filtered nitrified wastewater is split to return approximately one-half back to the anoxic septic tank for denitrification, with the remaining portion discharged to the soil absorption system (SAS).

Permitting and Use in Massachusetts (as of June 2001)

Certification for General Use: No approval in this category. Provisional Use Approval: No approval in this category. Remedial Use Approval:

Waterloo has approval in remedial situations where a system is failed, failing or nonconforming where relief is sought to construct an SAS within two feet (or three feet for percolation rates exceeding two minutes per inch) of the high groundwater elevation, or to construct an SAS reduced in size by up to 50 percent or in areas where at least 2 feet of suitable material is available beneath the SAS. Piloting Approval: Waterloo is attempting to demonstrate the System can be designed and operated at increased loading rates to the SAS and with a reduction in distance from the bottom of the SAS to the high groundwater elevation.

Operation and Maintenance Issues

[This information will be included in the final report findings.]

Explanation of the Graphs

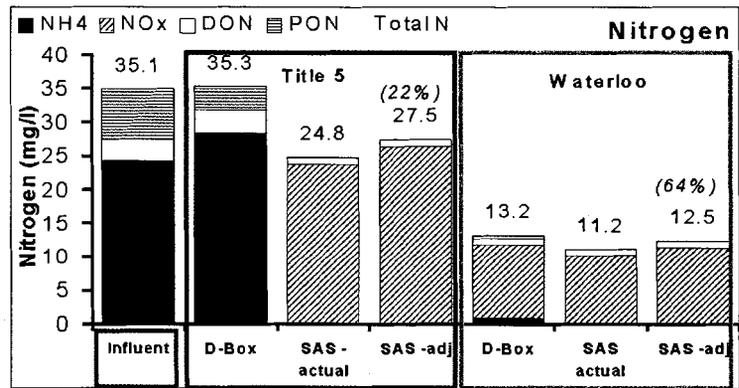
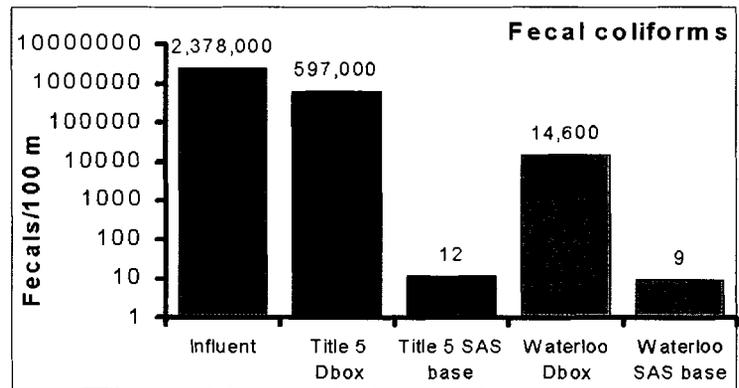
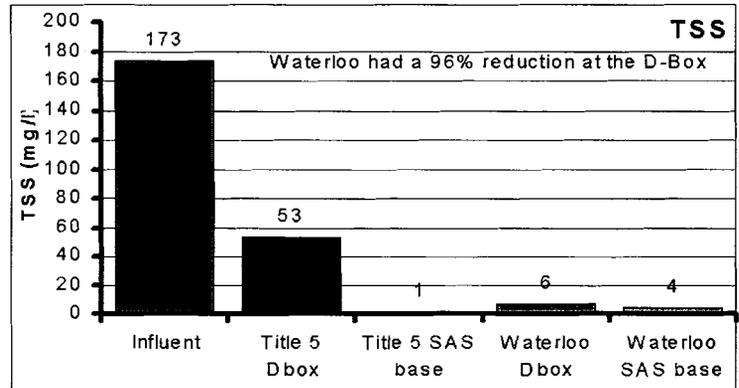
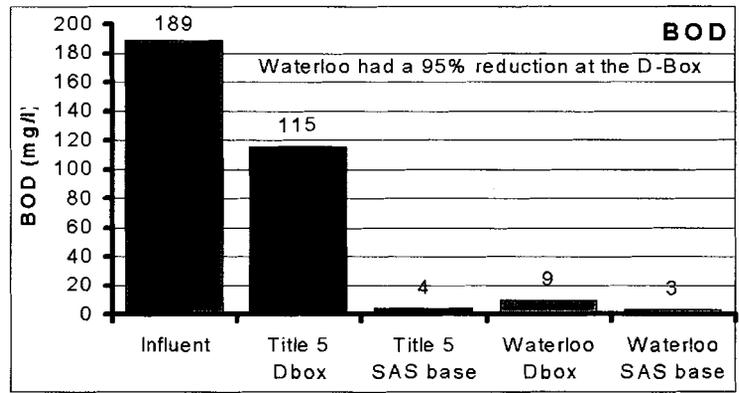
The graphs to the right show the mean of three replicates for each parameter over the testing period, compared to Title 5 performance and influent measured in parallel samples during the same period. Fecal coliform results are expressed as geometric means. In the nitrogen graph, NH4 represents ammonia, NOx represents nitrate + nitrite, DON is dissolved organic nitrogen, and PON is particulate organic nitrogen. Total nitrogen is the sum of these four parameters.

Soil absorption system samples include wastewater disposal system effluent and precipitation. The recharge of precipitation to groundwater is estimated to be between 8 percent-16 percent of effluent discharge based on local rainfall, estimated groundwater recharge rates, SAS size and dosage rates. For all technologies, an interim dilution rate of 10 percent was employed based on precipitation and theoretical and measured dosage rates at the Test Center. The results for nitrogen removal include this estimated dilution factor (note bars labeled "SAS adj.") Results shown for biological oxygen demand (BOD), total suspended solids (TSS), and fecal coliforms were not adjusted for dilution by precipitation, because the adjustment was negligible in evaluating overall performance. This interim approach, is being compared to specific conductivity, chlorides, and bromide tracer to better refine this estimate, and develop system specific dilution factors. Thus, the "SAS adjusted" values reported here for nitrogen discharge to groundwater should be considered preliminary.

Summary of Interim Findings

This technology exceeds secondary treatment (i.e., TSS and BOD less than 30 mg per liter) to allow for the reduced separation to groundwater, or reduced soil absorption system size. BOD and TSS concentrations at the base of the SAS for this technology and the Title 5 system are similar. This technology discharged below the regulatory standard of 19 mg/l TN to allow for use in nitrogen sensitive areas. At the SAS base, this system was estimated to remove 64 percent of nitrogen inputs compared to 20 percent for a Title 5 system during the same period. This system was not tested at the Test Center for seasonal or intermittent use or for high hydraulic loading conditions.

The Technical Review Committee does not recommend adoption of nitrogen loading ratings for this technology until the two-year testing period is complete. Differences in nitrogen removal among innovative technologies tested are not necessarily significant. Nitrogen removal performance may vary with soil types and other site differences. The Buzzards Bay Project will recommend nitrogen loading rates for this technology for planning purposes and watershed loading evaluations at a later date.



Funding for the Massachusetts Septic System Test Center was provided by the US EPA, through Cooperative Agreements x991657 and x981007, the Massachusetts Department of Environmental Protection (319-99-01, 319-00-02), Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Trust, Barnstable County Department of Health and Environment, UMass Dartmouth SMAST, and other organizations. Other information on this initiative can be found at www.buzzardsbay.org. These fact sheets were reviewed by a multi-agency work group. The views or opinions expressed are not necessarily those of the Commonwealth of Massachusetts, the US EPA, or any of the funding organizations and agencies. The information presented here represents the technical findings of the Massachusetts Septic System Test Center after at least one year of system testing. Manufacturer claims of cost and longevity, warranties, or stated costs have not been verified. Modifications to system designs from those tested, or installation under other soil or climate conditions may result in different system performance. This fact sheet was prepared and printed by the Buzzards Bay Project.



Commonwealth of Massachusetts

Jane Swift, Governor

Executive Office of Environmental Affairs

Bob Durand, Secretary

Buzzards Bay Project

Dr. Joe Costa, Executive Director

2870 Cranberry Highway East Wareham, MA 02538
508.291.3625



Massachusetts Alternative Septic System Test Center Technology Fact Sheet -Interim Findings

MicroFAST®
Model 0.5

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

Technology Name: MicroFAST®- residential unit, Model 0.5

Technology Type: Fixed Activated Sludge Treatment System

Manufacturer: Bio-Microbics Inc.
8450 Cole Parkway
Shawnee, KS 66227
913-422-0707 or 1-800-753-3278 (FAST)

Contact: Robert J. Rebori, President

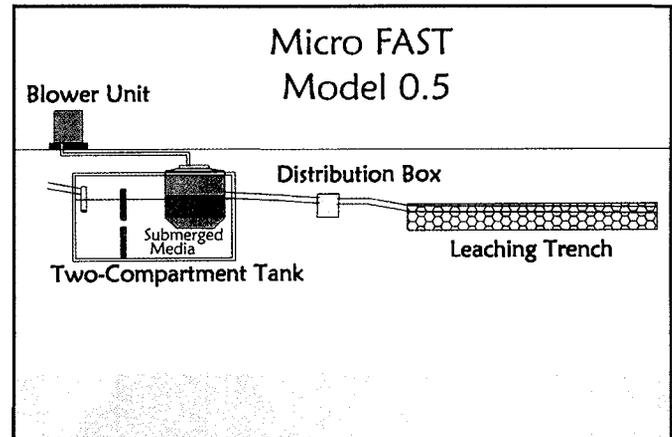
Company Website: www.biomicrobics.com

Performance & Permitting info at MA DEP and BCHED Websites:
www.state.ma.us/dep/brp/www/t5pubs.htm#it
www.capecod.net/alternativesepic

Testing Objectives: Demonstrate N removal for use in N-sensitive watersheds. Obtain approval for reductions in SAS size or high groundwater elevation separation distance.

Testing Period: Testing began 5/99 and is ongoing. Results shown for 7/99 to 7/00.

Test Loadings: System loading was 330 gpd, (in 15 doses AM/PM), SAS was 0.74 gallons per sq. ft per day.



Generalized schematic of the MicroFAST Model 0.5.



MicroFAST during construction.



MicroFAST after installation.

Siting Considerations and Installation Notes

MicroFAST system component installation is similar to a standard Title 5 system. Installers should have training and oversight from the manufacturer. Above ground components include a blower with housing (approximately 2' x 2' x 2'), and an electrical control panel with an audio and visual alarm. Designer should consider situating the blower to minimize possibility for noise disturbance. Alternately, the blower can be installed in a belowground vault. Alarm and panel box should be accessible for inspection and maintenance.

Actual and Manufacturer's Estimated Costs (3-bedroom home) and Labor Non-Title 5 Components: \$2,995 suggested retail, this model (claim).
Components + Installation: \$3,500 more than conventional (claim).
Electrical: \$337 per year actual (local rates, annual KWh= 3,273).
O&M: Quarterly inspection of motors, air flow, effluent and sludge. A service contract is required in Massachusetts (Approximately \$400 per year minimum, but varies). Septic tank pumping averages \$60 per year.
Other Costs: Quarterly effluent quality monitoring is required for some permits (\$300 or more annually). Design and permitting costs vary.
Replacement: Blowers (\$300) have a 2-year warranty by Bio-Microbics, extended 10 year warranty available, UL-CE-CSA certified electrical parts. No corrodible parts claimed to be in the unit.

Theory of Operation

The MicroFAST consists of a modified two-compartment 1500-gallon septic tank, where the first compartment of 500-gallon capacity is used for primary settling of the household wastewater. The second compartment contains the submerged plastic media around which air, supplied by a blower, is diffused. This technology uses both attached and suspended growth in the second chamber to achieve the nitrification of wastewater (i.e., conversion of ammonium to nitrate) entering from the primary settling chamber. The recycling of a portion of the nitrified effluent back to the anoxic settling chamber makes possible the denitrification step of the process (i.e., conversion of nitrate to nitrogen gas).

Permitting and Use in Massachusetts (as of June 2001)

Certification for General Use: MicroFAST is Certified for General Use and can be installed wherever a conventional Title 5 system can be installed. **Remedial Use Approval:** MicroFAST has approval in remedial

situations where a system is failed, failing or nonconforming where relief is sought to construct an SAS within two feet (or three feet for percolation rates exceeding two minutes per inch) of the high groundwater elevation, or to construct an SAS reduced in size by up to 50 percent or in areas where at least 2 feet of suitable material is available beneath the SAS. Model 0.5 is approved for up to 440 gpd or four bedrooms. **Provisional Use Approval:** MicroFAST is approved for use in nitrogen sensitive areas for new construction for systems designed for less than 2000 gpd. For residential systems up to 660 gpd per acre, for nonresidential systems up to 550 gpd per acre. Model 0.5 is only approved for up to 330 gpd or three bedrooms.

Note: In this study, the model tested employed a 1/3 hp blower that operated continuously. The manufacturer is currently testing a unit with the blower with an on-off cycle to reduce electrical consumption. These results will be reported in the 2-year performance summary. The manufacturer has other models available, and their performance may not be identical to the results reported here.

Operation and Maintenance Issues

[This information will be included in the final report findings.]

Explanation of the Graphs

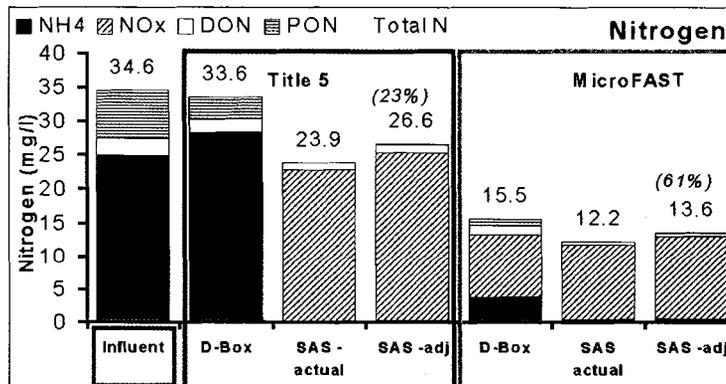
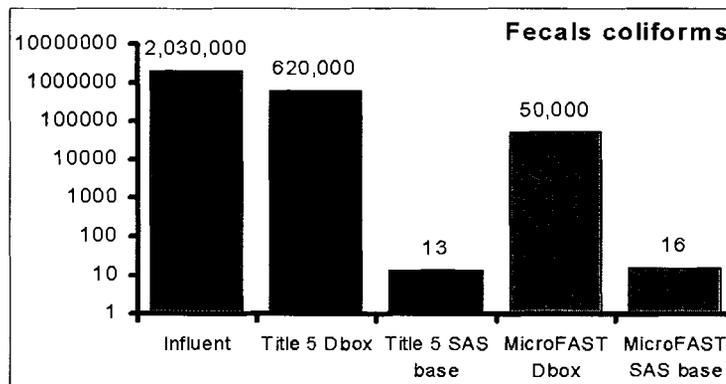
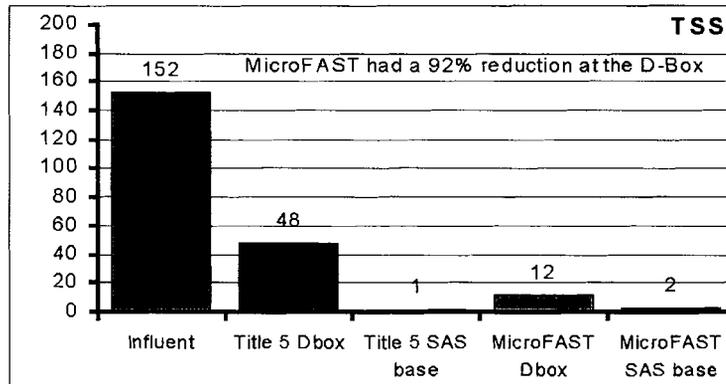
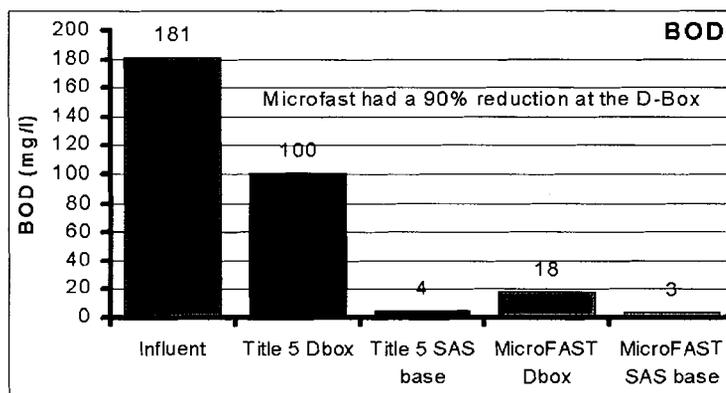
The graphs to the right show the mean of three replicates for each parameter over the testing period, compared to Title 5 performance and influent measured in parallel samples during the same period. Fecal coliform results are expressed as geometric means. In the nitrogen graph, NH₄ represents ammonia, NO_x represents nitrate + nitrite, DON is dissolved organic nitrogen, and PON is particulate organic nitrogen. Total nitrogen is the sum of these four parameters.

Soil absorption system samples include wastewater disposal system effluent and precipitation. The recharge of precipitation to groundwater is estimated to be between 8 and 16 percent of effluent discharge based on local rainfall, estimated groundwater recharge rates, SAS size and dosage rates. For all technologies, an interim dilution rate of 10 percent was employed based on precipitation and theoretical and measured dosage rates at the Test Center. The results for nitrogen removal include this estimated dilution factor (note bars labeled "SAS adj.") Results shown for biological oxygen demand (BOD), total suspended solids (TSS), and fecal coliforms were not adjusted for dilution by precipitation, because the adjustment was negligible in evaluating overall performance. This interim approach, is being compared to specific conductivity, chlorides, and bromide tracer to better refine this estimate, and develop system specific dilution factors. Thus, the "SAS adjusted" values reported here for nitrogen discharge to groundwater should be considered preliminary.

Summary of Interim Findings

This technology exceeds secondary treatment (i.e., TSS and BOD less than 30 mg per liter) to allow for the reduced separation to groundwater, or reduced soil absorption system size. BOD and TSS concentrations at the base of the SAS for this technology and the Title 5 system are similar. This technology discharged below the regulatory standard of 19 mg/l TN to allow for use in nitrogen sensitive areas. At the SAS base, this system was estimated to remove 60 percent of nitrogen inputs compared to 22 percent for a Title 5 system during the same period. This system was not tested at the Test Center for seasonal or intermittent use or for high hydraulic loading conditions.

The Technical Review Committee does not recommend adoption of nitrogen loading ratings for this technology until the two-year testing period is complete. Differences in nitrogen removal among technologies tested are not necessarily significant. Nitrogen removal performance may vary with soil types and other site differences. The Buzzards Bay Project will recommend nitrogen loading rates for this technology for planning purposes and watershed loading evaluations at a later date.



Funding for the Massachusetts Septic System Test Center was provided by the US EPA, through Cooperative Agreements x991657 and x981007, the Massachusetts Department of Environmental Protection (319-99-01, 319-00-02), Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Trust, Barnstable County Department of Health and Environment, UMass Dartmouth SMAST, and other organizations. Other information on this initiative can be found at www.buzzardsbay.org. These fact sheets were reviewed by a multi-agency work group. The views or opinions expressed are not necessarily those of the Commonwealth of Massachusetts, the US EPA, or any of the funding organizations and agencies. The information presented here represents the technical findings of the Massachusetts Septic System Test Center after at least one year of system testing. Manufacturer claims of cost and longevity, warranties, or stated costs have not been verified. Modifications to system designs from those tested, or installation under other soil or climate conditions may result in different system performance. This fact sheet was prepared and printed by the Buzzards Bay Project.



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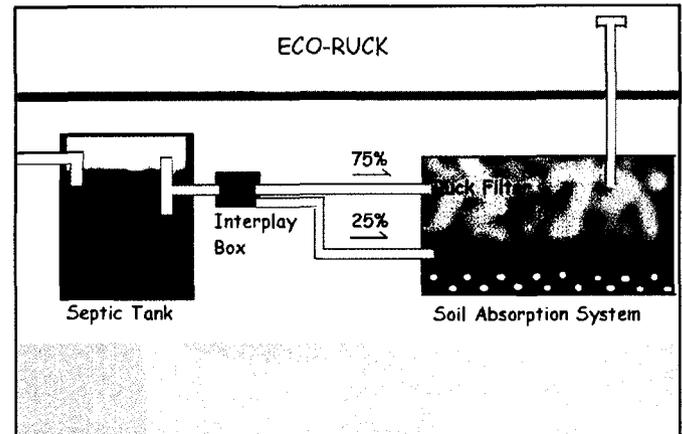


Massachusetts Alternative Septic System Test Center Technology Fact Sheet - Interim Findings

ECO-RUCK

The Massachusetts Alternative Septic System Test Center is a collaborative project of the Buzzards Bay Project National Estuary Program, the Massachusetts Office of Coastal Zone Management, Massachusetts Department of Environmental Protection, Barnstable County Department of Health and the Environment, and UMass Dartmouth School for Marine Science and Technology. The Test Center was established in recognition of the need in Massachusetts for cost-effective wastewater disposal systems suitable for sites with limited space, poor soils, high groundwater elevations, or where advanced pollutant removal is required. Its mission is twofold. First, to evaluate the performance and operation costs of new and innovative wastewater disposal technologies in a carefully controlled and unbiased manner, and provide this information to regulators and consumers. Second, to assist vendors in getting their technologies more quickly approved for use in Massachusetts, and at a lesser cost.

Technology Name:	ECO-RUCK
Technology Type:	In-ground passive treatment system using modifications to the soil absorption system.
Manufacturer:	Innovative Ruck Systems, Inc. 200 Main Street Falmouth, MA 02540 (508) 548-3564
Contact:	Michael B. McGrath, President
Company Website:	www.irucks.com
Performance & Permitting Info at MA DEP and BCHED Websites:	www.state.ma.us/dep/brp/wwm/t5pubs.htm#it www.capecod.net/alternativesepptic
Testing Objectives:	Demonstrate N removal for use in N-sensitive watersheds. Obtain approval for reductions in SAS size or high groundwater elevation separation distance.
Testing Period:	Testing conducted 6/99 to 7/00, results shown for 10/99 to 7/00. Testing completed.
Test Loadings:	System loading was 220 gpd, (in 15 doses AM/PM), SAS loading was 0.74 gallons per sq. ft per day.



Generalized design of ECO-RUCK System.



During installation, interplay box shown at right.



Final above ground view: aeration pipe and monitoring ports.

Siting Considerations and Installation Notes

No information is provided in this section because the technology was withdrawn from the program because of poor performance.

Actual & Manufacturer's Estimated Costs (3-bedroom home) and Labor

No information is provided in this section because the technology was withdrawn from the program because of poor performance.

Design Theory

The ECO-RUCK is a Soil Absorption System (SAS) treatment technology. Clarified effluent from a conventional septic tank enters the SAS, which was designed with upper and lower SAS separated by about three feet of medium sand. Seventy-five percent of the septic tank effluent was shunted to the upper SAS where treatment would be similar to that achieved in a conventional Title 5 SAS. The remaining 25 percent of septic tank effluent was shunted to the lower SAS identical in construction to the upper layer. When effluent was nitrified in the upper SAS, it would pass through the lower SAS zone, which was intended to remain anaerobic due to its distance from the surface. Denitrification was to occur as the nitrified liquid passed through a zone of anoxia, where additional carbon from the septic effluent would provide a source of food for bacterial denitrification.

Permitting and Use in Massachusetts (as of June 2001)

No permitting was obtained for the "ECO-RUCK," application withdrawn. (Note: The ECO-RUCK was an experimental design, different from the RUCK® system that has approval for use in Massachusetts. The standard RUCK® has both Certification for General Use and Remedial Use Approval in Massachusetts).

Operation and Maintenance Issues
Not Applicable.

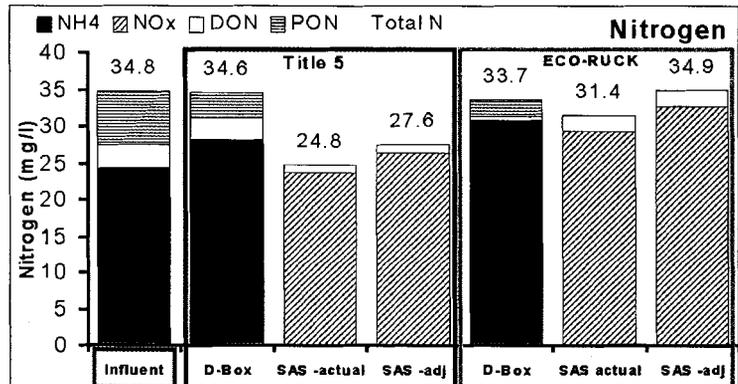
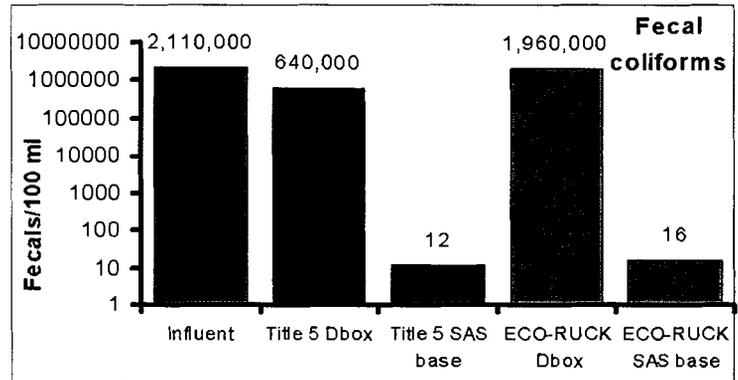
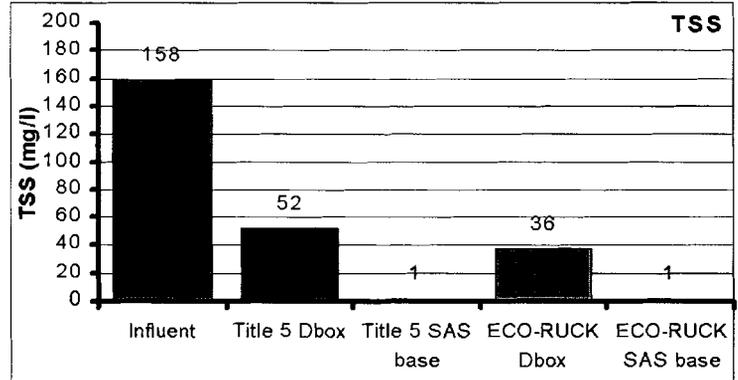
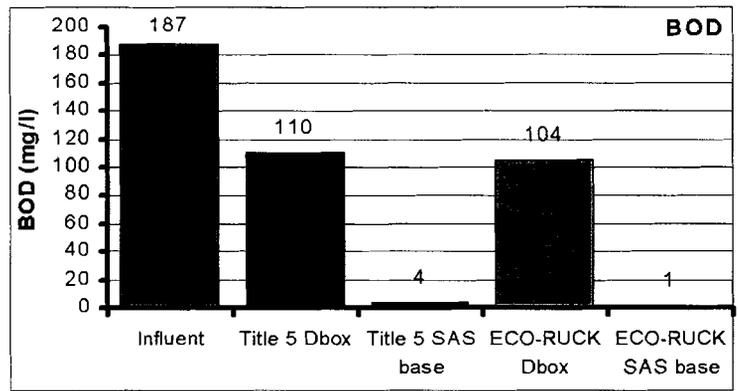
Explanation of the Graphs

The graphs to the right show the mean of three replicates for each parameter over the testing period, compared to Title 5 performance and influent measured in parallel samples during the same period. Fecal coliform results are expressed as geometric means. In the nitrogen graph, NH₄ represents ammonia, NO_x represents nitrate + nitrite, DON is dissolved organic nitrogen, and PON is particulate organic nitrogen. Total nitrogen is the sum of these four parameters.

Soil absorption system samples include wastewater disposal system effluent and precipitation. The recharge of precipitation to groundwater is estimated to be between 8 and 16 percent of effluent discharge based on local rainfall, estimated groundwater recharge rates, SAS size and dosage rates. For all technologies, an interim dilution rate of 10 percent was employed based on precipitation and theoretical and measured dosage rates at the Test Center. The results for nitrogen removal include this estimated dilution factor (note bars labeled "SAS adj.") Results shown for biological oxygen demand (BOD), total suspended solids (TSS), and fecal coliforms were not adjusted for dilution by precipitation, because the adjustment was negligible in evaluating overall performance. This interim approach, is being compared to specific conductivity, chlorides, and bromide tracer to better refine this estimate, and develop system specific dilution factors. **Thus, the "SAS adjusted" values reported here for nitrogen discharge to groundwater should be considered preliminary.**

Summary of Interim Findings

The ECO-RUCK, with the SAS does provide the equivalent of secondary treatment (i.e., TSS and BOD less than 30 mg per liter). However, it does allow for the reduced separation to groundwater, or reduced soil absorption system size because it incorporates the SAS in the design. This technology did not discharge below the regulatory standard of 19 mg/l TN to allow for use in nitrogen sensitive areas. This system was not tested at the Test Center for seasonal or intermittent use or for high hydraulic loading conditions. BOD and TSS concentrations at the base of the SAS for this technology and the Title 5 system are similar.



Funding for the Massachusetts Septic System Test Center was provided by the US EPA, through Cooperative Agreements x991657 and x981007, the Massachusetts Department of Environmental Protection (319-99-01, 319-00-02), Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Trust, Barnstable County Department of Health and Environment, UMass Dartmouth SMAST, and other organizations. Other information on this initiative can be found at www.buzzardsbay.org. These fact sheets were reviewed by a multi-agency work group. The views or opinions expressed are not necessarily those of the Commonwealth of Massachusetts, the US EPA, or any of the funding organizations and agencies. The information presented here represents the technical findings of the Massachusetts Septic System Test Center after at least one year of system testing. Manufacturer claims of cost and longevity, warranties, or stated costs have not been verified. Modifications to system designs from those tested, or installation under other soil or climate conditions may result in different system performance. This fact sheet was prepared and printed by the Buzzards Bay Project.



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**Buzzards Bay Action Committee Meeting
Wareham Multi-Service Center
July 21, 1999**

**The Buzzards Bay Action Committee held its meeting on Wednesday,
July 21, 1999 at the Wareham Multi-Service Building.**

**Attendance: Acushnet - Absent
Bourne - Thomas Barlow
Dartmouth - Mike Gagne
Fairhaven - Jeff Osuch
Falmouth - Chris Polloni
Gosnold - absent
Marion - Al Winters
Mattapoisett - Nick Nicholson
New Bedford - absent
Plymouth - absent
Rochester - Absent
Wareham - Joseph Murphy
Westport - Marjorie Holden
Coalition for Buzzards Bay- absent
Buzzards Bay Project- Joe Costa
Buzzards Bay Watershed Team- Karl Honkonen**

Others in attendance: Tom Skinner, Asst. Secy. Coastal and Marine Fisheries, EOE, Susan Snow-Cotter Assistant Director- CZM, Bruce Rosinoff, David Janik, Len Gonsalves.

The chairman opened the meeting at 12:30, welcomed those present, and introduced guests Tom Skinner and Susan Snow-Cotter to the board members in attendance. Tom had previously headed the Commonwealth's land acquisition program and is returning to the State after a year's service in Washington. Susan is the Assistant Director for Coastal Zone Management and coordinates the Ocean Management Program.

Chairman Winters thanked them for coming, expressed the hope that "we could anticipate a continuing close working relationship with each of these vital agencies, and introduced our featured speaker, Dr. Joseph Costa, Buzzards Bay Project Director for his review and presentation.

Joe updated the Board on the following :

- A) Completion and distribution of the Tidal Restriction Atlas for Buzzards Bay Communities with prioritization of sites for each community. A tour of several sites with Federal officials had already been conducted, was well received, and that the atlas would be a valuable asset to communities planning projects along**

this meeting, to bring that matter up at a subsequent meeting.

Chairman Winters also noted the need to schedule a discussion on funding and assessment formulas used to determine same as well as a committee report on staffing needs.

Chairman Winters again thanked our two visitors for their willingness to persevere through our meeting and invited them to share any thoughts with the group.

Mr. Skinner noted that he was glad to be back in the Commonwealth after an absence of nearly a year; that he had worked closely with our communities as Director of the State Land Aquisition Program and looked forward to working with us again, and that Secretary Durand had targeted the southeast coast as a focus for assistance and success.

Ms. Susan Snow-Cotter also reminded Board that there might be an opportunity to acquire surplus state owned lands for worthwhile environmental preservation and coastal access projects.

Upon recommendation from Tom Barlow, a motion was made, seconded by Mike Gagne and duly voted to forward the endorsement of the BBAC for the bill currently before the legislature seeking the acquisition of 15,000 acres of the Mass. Military Reservation formerly known as Otis, for use as an aquifer area.

Members were reminded that the next meeting would be August 25th at noon at the Wareham Multi- Service Building and hosted by Mike Gagne.

There being nothing more to come before the meeting Chairman Winters entertained a motion by Jeff Osuch, seconded by Tom Barlow to adjourn the meeting...unanimously voted.

Respectfully submitted,

Len Gonsalves
Len Gonsalves

**Buzzards Bay Action Committee Meeting
Wareham Multi-Service Center
Sept. 15, 1999**

**The Buzzards Bay Action Committee held its meeting on Wednesday,
Sept.15, 1999 at the Wareham Multi-Service Building.**

- Attendance: Acushnet - Absent**
- Bourne - Absent**
- Dartmouth - Mike Gagne**
- Fairhaven - Jeff Osuch**
- Falmouth - Chris Polloni**
- Gosnold - absent**
- Marion - Al Winters**
- Mattapoisett - Nick Nicholson**
- New Bedford - Scott Alfonse**
- Plymouth - absent**
- Rochester - Harry A. Brown**
- Wareham - Joseph Murphy**
- Westport - Absent**
- Coalition for Buzzards Bay- absent**
- Buzzards Bay Project- Joe Costa**
- Buzzards Bay Watershed Team- absent**
- Others in attendance: James Mulvey, Len Gonsalves.**

The chairman opened the meeting at 12:30 and recognized Mike Gagne for the report from the subcommittee for review of the executive director's job description and alternatives to the specific management model the BBAC is currently following. Mr. Gagne reported:

- a) That the subcommittee had met on three occasions and discussed current as well as future needs of the organization and the necessity to adjust staff responsibilities to ensure the maximum return for the financial and support commitment of each of our participating communities.**
- b) That the consensus was to consider a division of labor by separating community outreach and state lobbying responsibilities from grant writing and clerical administration.**
- c) That, in discussion with Joe Costa, it had been determined that the taking and preparation of minutes, filing, and other such responsibilities might be undertaken by staff at the Project office.**
- d) that the Board should complete the reevaluation and self assessment process that had been initiated with Alan Hankin.**

b) It was determined to hold nominations over to next meeting to allow more time for consideration of additional nominations.

On BBAC contribution to CPR Grant Application for Oil Absorbent Device distribution plan Jeff Osuch made a motion seconded by Joe Murphy, that \$5,000 be contributed to effort. Since the Board had previously discussed and approved this action, there was no further discussion and the motion passed unanimously.

Also Joe Costa suggested that signage design for this project should be initiated so that an appropriate time would be allowed for boater education and distribution as well as collection and disposal issues.

Chris Polloni suggested that town landings generally have bulliten boards and that these might be preferable to more signage.

Jeff Osuch suggested utilizing a portion of the \$5,000 just voted to fund that expense and it was generally agreed that even if grant were not successful, the boater education accomplished would be well worth the expense.

On commercial waste oil collection project, there was nothing new to report but Scott Alfonse did indicate that he would report next month.

On Mass Military Reservation Bill for designation and ownership as a municipal aquifer, it was felt that Gov. Cellucci's adoption of that issue had effectively removed it from the legislature's "radar screen" but that we should be prepared to discuss merits of that issue at next meeting.

Chairman Winters then introduced Jim Mulvey to the membership, thanked him for his patience in waiting to this point but cautioned that his comments and questions on oil spill precautions and procedures in the Canal as well as the Bay should be succinct and brief due to limited time remaining.

Jim Mulvey, who has been involved for years in conservation efforts for the Bay, shared his concerns that Oil Spill Response for the Canal and the Bay is not well coordinated; that there is limited communication between State agencies, Coast Guard and appropriate Town officials; and that it seems that money for implementation seems to be the source of all these concerns. He cited examples drawn from recent spill responses.

In discussion, members shared his concern and committed to seeking answers to the issues raised.

Joe Costa notified Board that No Discharge EPA Application was almost ready to be submitted and that there should be a letter drafted and signed by BBAC representatives to accompany it.

Dave Janik notified Board that:

1. There would be an oil spill response drill on September 21, 1999...a simulation...
2. That specific area community maps which highlight environmentally sensitive areas to be prioritized for protection are being completed by CZM and will be distributed to all Bay communities in near future.

Members were reminded that the next meeting would be October 20th at noon at the Wareham Multi-Service Building and hosted by Nick Nicholson.

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Buzzards Bay Action Committee
Wareham Multi-Service Center
November 17, 1999

The Buzzards Bay Action Committee held its meeting on Wednesday, November 17, 1999 at the Wareham Multi-Service Building:

In Attendance:

Bourne: Jim Mulvey
Dartmouth: Mike Gagne
Fairhaven: Jeff Osuch
Falmouth: Chris Polloni
Gosnold: Absent
Marion: Al Winters
Mattapoisett: Absent
New Bedford: Absent
Plymouth: Absent
Rochester: Harry Brown
Wareham: Chuck Gricus
Westport: Marjorie Holden
Coalition for Buzzards Bay: Absent
Buzzards Bay Project: Joe Costa
Buzzards Bay Watershed Team: Absent

Others in attendance: Len Gonsalves, BBAC Executive Director; Bruce Rosinoff, US EPA; Jason Burtner, MCZM; Peter Kortright, Horizon Planning Group; Dennis Luttrell, Fall River; Tracy Warncke, Administrative Assistant, Buzzards Bay Project.

Chairman Winters called the meeting to order at 12:35 p.m. Chairman Winters read the following motion: to fix the number of members and recognize, for the record, those individuals representing their communities as directors, to continue those community representatives as voting members for the coming years and to nominate for reelection the existing executive committee members. The Chair then asked for any objections. Seeing none he then asked for the clerk to cast one vote for each of the nominees. Mike Gagne moved, Harry Brown seconded, passed unanimously.

Chairman Winters then explained that the BBAC meeting would be suspended in order to allow the Executive Director to focus the discussion with the harbormasters that were invited, on the recently awarded CPR Grant (see meeting notes attached). Following said discussion Chairman Winters then resumed the regular BBAC meeting.

Jeff Osuch reported on the interview with Peter Kortright of Horizon Planning Group and asked Peter to review his proposal (see attached). Peter reviewed his proposal explaining that he feels the future of the BBAC can't be determined separately from the Coalition for Buzzards Bay and the Buzzards Bay Project so the BBAC needs to figure out it's niche.

Buzzards Bay Action Committee
Wareham Multi-Service Center
December 15, 1999

The Buzzards Bay Action Committee held its meeting on Wednesday, December 15, 1999 at the Wareham Multi-Service Building:

In Attendance:

Bourne: Tom Barlow	Alternate: Jim Mulvey
Dartmouth: Mike Gagne	
Fairhaven: Jeff Osuch	
Falmouth: Chris Polloni	
Gosnold: Absent	
Marion: Al Winters	
Mattapoisett: Absent	
New Bedford: Absent	
Plymouth: Absent	
Rochester: Harry Brown	
Wareham: Chuck Gricus	
Westport: Marjorie Holden	
Coalition for Buzzards Bay: Absent	
Buzzards Bay Project: Joe Costa	
Buzzards Bay Watershed Team: Absent	

Others in attendance: Len Gonsalves, BBAC Executive Director; Bruce Rosinoff, US EPA; Jason Burtner, MCZM; Peter Kortright, Horizon Planning Group; Dennis Luttrell, Fall River; Tracy Warncke, Administrative Assistant, Buzzards Bay Project.

Chairman Winters called the meeting to order at 12:20 and introduced Carol Reebenacker of RMR Associates. Ms. Reebenacker explained the benefits of Environ-Bond polymer hydrocarbon cleanup products and her associate conducted a demonstration.

Chairman Winters then commented on the revised proposal from Horizon Planning Group and asked for comments. Bruce Rosinoff, US EPA, offered his services, free of charge to perform the same tasks in the self-evaluation process. He commented that we would need more than the 7 towns who have already responded in order to fully complete the tasks. Tom Barlow feels that we can complete the task as the organization is small enough and agreed with Mr. Rosinoff that we do need to have all towns participate. Chairman Winters stressed that we need to focus on getting the completed surveys from the remainder of the towns. Chris Polloni noted that Falmouth voted to support the budget and that the check should have been received by the BBAC. He feels we need to produce an annual report to detail the success and agrees with Mr. Rosinoff that we need to get the completed surveys from the remaining towns. Mike Gagne feels that we can divide the remaining towns between the representatives of the towns that have completed the surveys and offer to help them. He will volunteer to help Westport. Mr. Barlow moved to accept Mr. Rosinoff's offer to complete the self-evaluation for the BBAC. Mr. Polloni seconded the motion. Passed unanimously. It was decided that the January 19th

Mr. Polloni mentioned that Waquoit Bay National Estuarine Research Reserve has a terrific hands on groundwater class and the BBAC should holding the class on the western side of the bay.

Mr. Barlow announced that Bourne and Falmouth participate in the Cape Cod Land Bank and asked if the BBAC would vote to support Home Rule for a Land Bank State-wide. Mr. Winters commented that towns may go forward without legislation. Mr. Gagne moved that the BBAC send a letter to our legislative delegation in support of land preservation. Mr. Barlow seconded. Passed unanimously.

Mr. Gonsalves reported that he gave the No-Discharge Zone application to Tom Skinner, Director of Mass. Coastal Zone Management. The Ernestina classrom project has now expanded and has set aside \$12,000 for the education of 600 sutdents from Falmouth through Westport. This is a BBAC program that is expanding. Mr. Gonsalves has donated his \$300 stipend and asked that it be added to the \$2000 that the BBAC is already giving. Mr. Winters would like to add an additional \$300 to the \$2000 that we are currently giving. Mr. Barlow so moved. Mr. Polloni seconded. Passed unanimously.

Mr. Gonsalves showed the members the Gulf of Maine Visionary award that he was presented with. Mr. Janik explained that when Mr. Skinner became Director of MCZM and met with the BBAC he was very, very impressed that the municipalities surrounding Buzzards Bay could come together in such a positive and meaningful manner. Mr. Skinner nominated Mr. Gonsalves for the award. Mr. Gagne accompanied Mr. Gonsalves to receive the award and told the members how proud he was to be a member of the BBAC and of all that the BBAC has accomplished to date.

Harry Brown made a motion to accept the minutes as published. Mr. Gagne seconded, passed unanimously.

Chairman Winters asked for a motion to adjourn the meeting at 2:15. Mr. Gagne so moved, Mr. Polloni seconded, approved unanimously.

Buzzards Bay Action Committee

Wareham Multi-Service Center

January 19, 2000

The Buzzards Bay Action Committee held its meeting on Wednesday, January 19, 2000 at the Wareham Multi-Service Building.

In Attendance:

Acushnet: Richard Settele, Alan Coutinho

Bourne: Jim Mulvey

Dartmouth: Mike Gagne

Fairhaven: Jeffrey Osuch

Falmouth: Chris Polloni, Bill Palm

Gosnold: Absent

Marion: Al Winters

Mattapoissett: Nick Nicholson

New Bedford: Scott Alphonse

Plymouth: Absent

Rochester: Harry Brown

Wareham: Joseph Murphy

Westport: Marge Holden

Coalition for Buzzards Bay:

Buzzards Bay Project: Sarah Wilkes

Buzzards Bay Watershed Team: Karl Honkonen

Others in attendance: Len Gonsalves, BBAC Executive Director; Bruce Rosinoff, US EPA; Tracy Warncke, Administrative Assistant, Buzzards Bay Project.

Chairman Winters called the meeting to order at 12:30.

Executive Director Len Gonsalves gave a brief update stating that:

There is a short list of things that need to be changed on the No-Discharge Zone Application. These changes should be completed shortly at which time the final application will be submitted to CZM. The Waste Oil RFP is nearly ready to go. Mr. Gonsalves passed out a financial report reviewing the last year's expenditures. An update on H.R. 4344 was also given. The next BBAC meeting will be March 3, 2000 and will be the Legislative Workshop. Mr. Gonsalves will prepare a tic list and update for presentation to the legislators.

Mr. Winters reviewed the previous year's topics and the lead speakers. It was decided that the previous year's speakers would give the updates then new items will be introduced. Mr. Gonsalves will prepare an outline of the BBAC's history for the Legislators.

Mr. Gonsalves would like to work with the Coalition for Buzzards Bay on a shared project that would help to create public awareness of Buzzards Bay. This project would entail enlisting local artists to paint various scenes of Buzzards Bay, which could be displayed, and available for sale

Buzzards Bay Action Committee

Wareham Multi-Service Center

April 26, 2000

The Buzzards Bay Action Committee held its meeting on Wednesday, April 26, 2000 at the Wareham Multi-Service Building:

In Attendance:

Acushnet: Al Coutinho
Bourne: Tom Barlow
Dartmouth: Mike Gagne
Fairhaven: Jeff Osuch
Falmouth: Chris Polloni
Gosnold: Absent
Marion: Absent
Mattapoisett: Nick Nicholson
New Bedford: absent
Plymouth: Absent
Rochester: Harry Brown
Wareham: Joe Murphy
Westport: Marjorie Holden
Coalition for Buzzards Bay: Absent
Buzzards Bay Project: Joe Costa
Buzzards Bay Watershed Team: absent

Others in attendance: Len Gonsalves, BBAC Executive Director; Bruce Rosinoff, US EPA; Dave Janik, CZM; Tracy Warncke, Administrative Assistant, Buzzards Bay Project.

Vice-Chairman Mike Gagne called the meeting to order at 12:15. Harry Brown moved and Chris Polloni seconded to approve the minutes as presented. Unanimously approved.

Mr. Gagne asked Dr. Joseph Costa for the Buzzards Bay Project report. Dr. Costa asked the BBAC for input on 3 issues: 1. What grant categories would the BBAC like to see funded in the coming year, 2. Were the towns satisfied with the noncompetitive disbursement for the last two grant awards, 3. Authorize a letter of support for a Buzzard Bay Project/New Bedford Harbor Development Commission 319 proposal for bilge oil recycling/reclamation in New Bedford.

Dr. Costa presented the membership with an outline of the Project's past and present grant categories (see attached). After discussion it was decided that funds need to be reserved/transferred to allow a) consistent. No-Discharge signage throughout the Bay, b)herring restoration, c) creating a brochure for lawn management techniques. Jeff Osuch moved and Marge Holden seconded to move \$5000 from the Coastal Wetland category to create a lawn management brochure. Unanimously approved.

The membership decided, by consensus, to stay with the noncompetitive disbursement of grant monies.

New Bedford have yet to use the program. Project Seal has incorporated \$8,000 into its regular funding.

New Business:

Mr. Gagne reported that the \$100,000,000 SRF passed at 0% - deferring the interest for one year. 2% interest will begin in calendar year 2000 (Hines/Provost amendment). Many legislators signed on at the meeting. Senators need to be sent letter to join with the house. If the Senate approved the House version there will be no conference committee when it goes to the budget committee.

The next meeting will be held May 17 at 12:00. Acushnet will be the host. Joe Murphy moved and Harry Brown seconded to adjourn the meeting. Unanimously approved at 1:45.

Buzzards Bay Action Committee
Wareham Multi-Service Center
June 21, 2000

The Buzzards Bay Action Committee held its meeting on Wednesday, June 21, 2000 at the Wareham Multi-Service Building:

In Attendance:

Acushnet: Alan Coutinho
Bourne: absent
Dartmouth: Mike Gagne
Fairhaven: Jeff Osuch
Falmouth: Chris Polloni
Gosnold: Absent
Marion: Al Winters
Mattapoisett: Jim Greene
New Bedford: Absent
Plymouth: Absent
Rochester: Absent
Wareham: Joe Murphy
Westport: Marge Holden
Coalition for Buzzards Bay: absent
Buzzards Bay Project: absent
Buzzards Bay Watershed Team: absent

Others in attendance: Len Gonsalves, BBAC Executive Director; Dave Janik, MCZM; Tracy Warncke, Administrative Assistant, Buzzards Bay Project

Chairman Winters called the meeting to order at 12:20. Ms. Holden motioned to approve the minutes of the April 26, meeting. Mr. Gagne seconded. Unanimously approved.

Executive Director Gonsalves explained that the Schooner Ernestina Commission has acquired full funding for their Dockside to the Bay educational program and has asked for permission to apply the BBAC's \$2400 towards making the program permanent. Mr. Gagne so moved. Mr. Osuch seconded. Unanimously approved.

Mr. Gonsalves updated the board on the distribution of the bilge socks that is going quite well. Most towns are reporting very positive comments. Mr. Gonsalves also explained the importance of using the "sign out" sheets that will be used for performance evaluation (ie. XX bilge socks returned = XX gallons of oil that did not enter the bay). Mr. Charles Bradley mentioned that the Sippican Sentinel ran a nice article on the bilge socks and that he is on is 5th sign out sheet. Public response in Marion is terrific. He hopes to have another article in the paper after July 4th and there is a need for the bilge socks in fresh water as well. Mr. Bradley is sending a box of bilge socks to Nantucket to distribute to his counterparts in other municipalities and requested 50 copies of the evaluation report done by the Buzzards Bay Project. Ms. Warncke will send the reports to him.

Buzzards Bay Action Committee

Wareham Multi-Service Center

September 20, 2000

The Buzzards Bay Action Committee held its meeting on Wednesday, September 20, 2000 at the Wareham Multi-Service Building:

In Attendance:

Acushnet: Absent

Bourne: Leo Locke

Dartmouth: Mike O'Reilly

Fairhaven: Jeff Osuch

Falmouth: Chris Polloni

Gosnold: Absent

Marion: Al Winters

Mattapoisett: Nick Nickolson

New Bedford: Absent

Plymouth: Absent

Rochester: Harry Brown

Wareham: Joe Murphy

Westport: Marjorie Holden

Coalition for Buzzards Bay: Mark Rasmussen

Buzzards Bay Project: Joe Costa

Buzzards Bay Watershed Team: Carl Honkonen

Others in attendance: Dave Janik, CZM; Tracy Warncke, Administrative Assistant, Buzzards Bay Project; Sarah Wilkes, Buzzards Bay Project.

Chairman Al Winters called the meeting to order at 12:30. He explained that this is the meeting that Nominations for the Executive Board are made. He asked each member to introduce themselves and state how long they had been a member. He also thanked each for giving of their time and effort.

Joe Murphy – 7 years

Al Winters – 7 years

Harry Brown – 13 years

Marjorie Holden – 5 years

Mike O'Reilly - 6 years

Nick Nicholson – 12 years

Leo Locke – this is his first meeting

Jeff Osuch – 13 years

Chris Polloni – 1-1/2 years

Mr. Winters also thanked Coalition for Buzzards Bay, The Buzzards Bay Project, The Buzzards Bay Watershed Team and Coastal Zone Management for all that they have done to help the BBAC through the years. Their help has been invaluable.

Three positions on the Executive Board need to be filled. They are Chairman, Vice Chairman and Clerk. The Chairman is elected for a 2- year term and there is a 2 consecutive term limit.

Mr. Winters moved to nominate Mike Gagne as Chairman. Mr. Osuch seconded.

Mr. Osuch moved to nominate Chris Polloni as Vice-Chair. Mr. Murphy seconded.

Ms. Holden moved to nominate Nick Nickolson as Clerk. Mr. Osuch seconded.

Buzzards Bay Action Committee

Wareham Multi-Service Center

November 15, 2000

The Buzzards Bay Action Committee held its meeting on Wednesday, October 25, 2000 at the Wareham Multi-Service Building:

In Attendance:

Acushnet: Al Coutinho

Bourne: Leo Locke

Dartmouth: Mike Gagne

Fairhaven: Jeff Osuch

Falmouth: Chris Polloni

Gosnold: Absent

Marion: absent

Mattapoisett: Nick Nicholson

New Bedford: Scott Alphonse

Plymouth: Absent

Rochester: Harry Brown

Wareham: Chuck Gricus

Westport: Marjorie Holden

Coalition for Buzzards Bay: Mark Rasmussen

Buzzards Bay Project: Joe Costa

Buzzards Bay Watershed Team/CZM: Dave Janik

Others in attendance: Len Gonsalves, BBAC Executive Director; Tracy Warncke, Administrative Assistant, Buzzards Bay Project; Bruce Rosinoff, EPA;

Chairman Mike Gagne called the meeting to order at 12:30. Jeff Osuch moved and Marge Holden seconded to approve the minutes of the last meeting. Passed unanimously.

Mr. Gagne read a thank you note from Coyle Cassidy. He reiterated the BBAC's desire to be involved in the funding raising in Joe Murphy's name.

Mr. Gagne asked that if the membership had a list of potential stormwater "hot spots" now might be the time to present them to Mass Highway for inclusion, not as part of the entire Transportation Bond but rather as a specific line item. We should have this list ready for the February legislator meeting as well as directing the list to those on the Transportation Subcommittee.

Mr. Rasmussen added that the Coalition has sampled 47 locations during the last two storms and the counts are very high. Paskamansett at Route 6, Route 140 at Route 6, Nasketucket at Route 6, Muddy Cove and Eel Pond are the hot spots. He would like to see the long-term goal be no direct discharge to a waterbody

Mr. Osuch commented that Mass Highway will need NPDES Permits and plans by 2002-2003. The towns need to get together with Mass Highway to discuss any potential remediation project that may be in the works.

Mr. Janik recommended that the towns look at the Mass Highway work schedule and coordinate the desires of the town with said schedule.

It was summarized that the BBAC will put together a listing of stormwater remediation priorities on state highways and work with Mass Highway. This list will include 5 priority projects to "fast track". This may be accomplished by contacting SRPEDD, Cape Cod Commission or Mass Highway District 5 and getting the Mass

Mr. Janik reported that the CZM co-sponsored Docks and Piers Workshop was very successful and gave each member an interactive CD that was created to help determine the effects of a dock on eelgrass beds.

The next meeting will be held on December 20, 2000. MCZM will make a presentation on their past accomplishments and future plans. The meeting will start at 1:30 and will be held in the cafeteria (downstairs) in the Wareham Multi-Services Building.

Mr. Polloni made a motion to adjourn the meeting. Mr. Osuch seconded. Passed unanimously.

Buzzards Bay Action Committee

Wareham Multi-Service Center

April 25, 2001

The Buzzards Bay Action Committee held its meeting on Wednesday, April 25, 2001 at the Wareham Multi-Service Building:

In Attendance:

Acushnet: Al Coutinho
Bourne: Clarence Merritt
Dartmouth: Mike Gagne
Fairhaven: Jeff Osuch
Falmouth: Chris Polloni
Gosnold: Absent
Marion: Al Winters, Julia Enroth Whitlock
Mattapoisett: Jim Greene
New Bedford: absent
Plymouth: Absent
Rochester: Absent
Wareham: Chuck Gricus
Westport: Marjorie Holden
Coalition for Buzzards Bay: Absent
Buzzards Bay Project: Joe Costa
Buzzards Bay Watershed Team/CZM: Dave Janik

Others in attendance: Len Gonsalves, BBAC Executive Director; Tony Wilbur, MCZM; Derrin Babb-Brott, MCZM; Bruce Rosinoff, EPA; Ray Valente, SAIC; Tracy Warncke, Administrative Assistant

Chairman Gagne called the meeting to order at 12:25. He introduced Julia Enroth-Witlock, the new executive secretary for Marion, who will be that town's new representative. Mr. Al Winters stated that he would be the alternate.

Chairman Gagne then turned the meeting over to Deerin Babb-Brott and Tony Wilbur of MCZM who presented the membership with a program on the MEPA Site Designation Process for a Buzzards Bay Disposal Site (see attached).

Following the presentation Chairman Gagne discussed updating the Mutual Aid Oil Spill Information Book. He feels this could best be done by a student/intern and stressed the need to coordinate with the Oil Spill Team. Jeff Osuch moved that the Chairman and the Director prepare a scope of services for a student/intern to update the Book. Seconded by Mr. Winters. Unanimously approved.

Dr. Costa then reported on Buzzards Bay Project activities (see attached). He also asked for the Committee's concurrence to give the town of Westport \$3500 to replace a herring ladder that washed away in a heavy storm. The funds will be taken from the herring run minigrant that is

Buzzards Bay Action Committee
Wareham Multi-Service Center
June 13, 2001

The Buzzards Bay Action Committee held its meeting on Wednesday, June 13, 2001 at the Wareham Multi-Service Building:

In Attendance:

Acushnet:	Al Coutinho	
Bourne:	Clarence Merritt	
Dartmouth:	Mike Gagne	mgagne@town.dartmouth.ma.us
Fairhaven:	Jeff Osuch	
Falmouth:	Chris Polloni	cpolloni@aol.com
Gosnold:	Absent	
Marion:	Julia Enroth-Whitlock	townadmin@townofmarion.org
Mattapoissett:	Nick Nicholson	nnichols@ma.ultranet.com
New Bedford:	Absent	
Plymouth:	Absent	
Rochester:	absent	
Wareham:	Chuck Gricus	charlesgricus@netscape.net
Westport:	absent	
Coalition for Buzzards Bay:	Mark Rasmussen	rasmussen@savebuzzardsbay.org
Buzzards Bay Project:	Joe Costa	joe.costa@state.ma.us
Buzzards Bay Watershed:	Dave Janik	dave.janik@state.ma.us
EPA:	Bruce Rosinoff	rosinoff.bruce@epa.gov

Others in Attendance:

Tracy Warncke	tracy.warncke@state.ma.us
Mike Labossiere, Bay Lands Center	labossiere@savebuzzardbay.org

Chairman Gagne called the meeting to order at 12:30. He asked if there were any changes to the minutes of the April 25, 2001 meeting. Ms. Enroth-Whitlock asked to have her title of executive secretary corrected to read town administrator. Chairman Gagne then asked for a motion to approve the minutes with the change. So moved by Al Coutinho and seconded by Jeff Osuch. Unanimously approved.

Chairman Gagne then asked the membership to approve the hiring of Heather Pierce as the BBAC Intern. She is working on a triple major at URI and is very flexible. Jeff Osuch moved to hire Heather for 30 hours a week at \$10.00. Seconded by Nick Nicholson. Unanimously approved.

Chairman Gagne then reported that the SRF with a 3-1 leverage has been favorably recommended. Two percent will be the recommended rate. Mattapoissett has an approved application for \$2,000,000 that will deal with 210 homes. Each community needs to stress the importance of this legislation to their legislators.

In Mr. Gonsalves' absence, Chairman Gagne read the Executive Director's report.

1. 500 bilge socks will go to Harwich to be given to Cape towns. An article on the sharing of bilge socks is being planned for the Cape Cod Times. Nantucket has purchased 400 socks and 200 will go to Martha's Vineyard. The balance of the socks will go to Buzzards Bay towns.

Buzzards Bay Action Committee
Wareham Multi-Service Center
July 15, 2001

The Buzzards Bay Action Committee held its meeting on Wednesday, July 15, 2001 at the Wareham Multi-Service Building:

In Attendance:

Acushnet:	Absent	
Bourne:	Matt Boulanger	mboulanger@townofbourne.com
Dartmouth:	Mike Gagne	mgagne@town.dartmouth.ma.us
Fairhaven:	Jeff Osuch	
Falmouth:	absent	cpolloni@aol.com
Gosnold:	Absent	
Marion:	Julia Enroth-Whitlock	townadmin@townofmarion.org
Mattapoissett:	Nick Nicholson	nnichols@ma.ultranet.com
New Bedford:	Absent	
Plymouth:	Absent	
Rochester:	absent	
Wareham:	Chuck Gricus	charlesgricus@netscape.net
Westport:	Marjorie Holden	
Coalition for Buzzards Bay:	absent	rasmussen@savebuzzardsbay.org
Buzzards Bay Project:	Joe Costa	joe.costa@state.ma.us
Buzzards Bay Watershed:	Absent	dave.janik@state.ma.us
EPA:	Bruce Rosinoff	rosinoff.bruce@epa.gov

Others in Attendance:

Tracy Warncke	tracy.warncke@state.ma.us
Heather Pierce	

Chairman Gagne called the meeting to order at 12:30 and introduced Heather Pierce, the new intern. Heather stated that she is almost done with the Oil Spill Plan for Buzzards Bay. The hardcopy will contain the emergency contact phone numbers, equipment list, maps and directions for all towns. The CD ROM version will contain everything else. The plan is to send copies to each fire chief, oil spill coordinator and town manager. Chairman Gagne thanked Heather for all her hard work.

Jeff Osuch made a motion to approve the minutes of the June 13 meeting. Julia Enroth-Whitlock seconded. Approved unanimously.

In the absence of Len Gonsalves, Chairman Gagne read the executive directors report in which he reports that he will be distributing bilge socks to the Cape and Nantucket upon his return from vacation.

Old Business

Chuck Gricus gave the membership an update on the status of the AD Makepeace property. A bylaw on the town meeting agenda for the AD Makepeace property. The Selectmen will be the 'special permitting authority' rather than the Planning Board. The sewerage will be private. The towns consultants are coming through SRPEDD. This is going to be a long and involved project.

Buzzards Bay Action Committee
Wareham Multi-Service Center
September 19, 2001

The Buzzards Bay Action Committee held it's meeting on Wednesday, July 15, 2001 at the Wareham Multi-Service Building:

In Attendance:

Acushnet:	Absent	
Bourne:	Matt Boulanger	mboulanger@townofbourne.com
Dartmouth:	Mike Gagne	mgagne@town.dartmouth.ma.us
Fairhaven:	Jeff Osuch	
Falmouth:	Chris Polloni	cpolloni@aol.com
Gosnold:	Absent	
Marion:	Julia Enroth-Whitlock	townadmin@townofmarion.org
Mattapoisett:	Jim Greene	nnichols@ma.ultranet.com
New Bedford:	Scott Alfonse	
Plymouth:	Absent	
Rochester:	absent	
Wareham:	Chuck Gricus	charlesgricus@netscape.net
Westport:	Marjorie Holden	
Coalition for Buzzards Bay:	Mark Rasmussen	rasmussen@savebuzzardsbay.org
Buzzards Bay Project:	Joe Costa	joe.costa@state.ma.us
Buzzards Bay Watershed:	Absent	dave.janik@state.ma.us
EPA:	Bruce Rosinoff	rosinoff.bruce@epa.gov

Others in Attendance:

Tracy Warncke		tracy.warncke@state.ma.us
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Chairman Gagne called the meeting to order at 12:25.

Executive Director Len Gonsalves presented the members with the Oil Spill Manual. The BBAC will cover the cost of making 50 copies and it will be distributed to all Buzzards Bay Fire Chiefs. Please look over pages 3, 4, & 5 and make sure that all the phone numbers are correct. Call Len with any corrections. Each copy will have a set of maps that show the environmentally sensitive areas. Len would like to commend Heather on a job well done. Chairman Gagne suggested that we include all beeper and cell phone numbers for the oil spill coordinators. It must be understood that the list with the phone numbers is not for public distribution and that it is for emergency use only. A disclaimer will be placed on the list so stating. This list should also be updated once a year.

Chairman Gagne announced that the September meeting will be the Annual Meeting and asked for nominations. Marge Holden nominated and Julia Enroth seconded Mike Gagne as Chair
Mike Gagne nominated and Chris Pollini seconded Nick Nicholson as Vice-Chair (pending Nick's approval)
Matt Boulanger nominated and Mike Gagne seconded Chuck Gricus as Secretary.

Chairman Gagne requested that each member check on the status of their alternate so that we may update our records.

Town	Member	Alternate
Acushnet	Al Coutinho	
Bourne	Matt Boulanger	Jim Mulvey
Dartmouth	Mike Gagne	Mike O'Reilly
Fairhaven:	Jeff Osuch	
Falmouth	Chris Polloni	

Buzzards Bay Action Committee
Wareham Multi-Service Center
October 24, 2001

The Buzzards Bay Action Committee held it's meeting on Wednesday, October 24, 2001 at the Wareham Multi-Service Building:

In Attendance:

Acushnet:	Al Coutinho	
Bourne:	Matt Boulanger	mboulanger@townofbourne.com
Dartmouth:	Mike Gagne	mgagne@town.dartmouth.ma.us
Fairhaven:	Jeff Osuch	
Falmouth:	Absent	cpolloni@aol.com
Gosnold:	Absent	
Marion:	Julia Enroth-Whitlock	townadmin@townofmarion.org
Mattapoissett:	Nick Nicholson	mnichols@ma.ultranet.com
New Bedford:	Absent	
Plymouth:	Absent	
Rochester:	Absent	
Wareham:	Chuck Gricus	charlesgricus@netscape.net
Westport:	Marjorie Holden	
Coalition for Buzzards Bay:	Absent	rasmussen@savebuzzardsbay.org
Buzzards Bay Project:	Absent	joe.costa@state.ma.us
Buzzards Bay Watershed:	Dave Janik	dave.janik@state.ma.us
EPA:	Absent	rosinoff.bruce@epa.gov

Others in Attendance:

Tracy Warncke tracy.warncke@state.ma.us
Len Gonsalves, BBAC Executive Director; Steve McKenna, CZM Cape and Island Assistant Regional Coordinator; Ken Pacheco, Dartmouth Shellfish Warden; Charlie Bradley, Marion Shellfish Warden; Mike Gratis, Ken Mullen, Bourne Department of Natural Resources; Dennis D'Matta, Wareham Selectman.

Chairman Gagne called the meeting to order at 12:20

Jeff Osuch moved to accept the minutes of the 9/19/01 meeting. Marge Holden seconded. Discussion: Nick Nicholson requested the minutes be corrected to list himself as the Mattapoissett representative and Jim Greene as the alternate. Tracy Warncke apologized for inadvertently leaving Mattapoissett off the list. Approved unanimously.

The corrected list of representatives and alternates is as follows:

Town	Member	Alternate
Acushnet	Al Coutinho	
Bourne	Matt Boulanger	Jim Mulvey
Dartmouth	Mike Gagne	Mike O'Reilly
Fairhaven:	Jeff Osuch	
Falmouth	Chris Polloni	
Marion	Julia Enroth-Whitlock	Al Winters
Mattapoissett	Nick Nicholson	Jim Greene
New Bedford	Scott Alfonse	John Simpson
Rochester		
Wareham	Chuck Gricus	
Westport	Marge Holden	

Member	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
Marge	X	X						X	X		X
Jeff	X	X			X	X		X	X		
Nick	X							X	X		
Chuck	X				X	X		X	X	X	
Al	X	X			X			X			
Matt	X	X						X	X		
Mike	X	X			X	X	X				X
Julia	X				X				X		X
TOTAL	8	5	0	0	5	3	1	6	6	1	3

Dave will take the membership's priority list back to the Watershed Team. He reminded the membership that the Watershed Team may make different recommendations to the Secretary but that the BBAC's input is very valuable.

The membership felt that a letter should be sent to Secretary Durand thanking him for taking the time to send a letter of opposition to H.R. #1730. H.R. #1730, if passed, would weaken the current laws regarding sensitive embayment and harbors by allowing some MSDS to be discharged into designated No Discharge Areas.

Executive Director Len Gonsalves reminded the membership that he needs the updated oil spill emergency contact numbers from each municipality. Once these numbers have been received the oil spill book will be updated and it will go to press.

Len also reported that the BBAC has approximately \$30,000 available for fund projects. He will present a financial report to the membership at the next meeting.

Nick Nicholson suggested that Sandy Keys might be a potential member for Rochester. Nick asked how the yearly assessments were determined. Len said the formula has not changed. Mike suggested that this be discussed in depth at the next meeting.

Mike will check with the legislature to see if coastal waterfront projects will be allowed under the CPA and will also include this as an agenda item for the next meeting.

There being no further business to come before the membership, Nick Nicholson moved to adjourn the meeting at 1:45. Seconded by Marge Holden. Approved unanimously.

Buzzards Bay Oil Spill Response Manual



compiled by:
Heather Pierce

Sponsored by:
Buzzards Bay Action Committee
P.O. Box 9399
Dartmouth, MA 02747
508-999-1131

with assistance from:
Buzzards Bay Project
2870 Cranberry Highway
E. Wareham, MA 02538
508-291-3625

Acushnet, Bourne, Dartmouth, Fairhaven, Falmouth, Marion Mattapoisett, New Bedford,
Rochester, Wareham and Westport.

Communities united to preserve and protect Buzzards Bay

BUZZARDS BAY OIL SPILL MUTUAL AID RESPONSE TEAM **STANDARD OPERATING PROCEDURE**

TITLE: SITUATION/CONDITION FOR RESPONSE

PURPOSE: The purpose of this standard operating procedure shall be to define the situation and/or conditions under which a municipality of the Buzzards Bay Action Committee (BBAC) may request the assistance of another BBAC municipality to address an oil spill in the former municipality.

A request for activation of the Buzzards Bay Regional Response Team will set into motion numerous personnel to the incident scene. These personnel will be required to respond from their respective responsibilities and may be required to travel relatively long distances. A request for response of the regional team to a locally manageable incident will both be costly and possibly dangerous for responding personnel. All requests should be made in light of these factors.

DEFINITIONS:

Team: One or more of the ten Buzzards Bay region municipalities, who shall train and respond to oil spill incidents with the required OSHA level of training.

Oil Spill Coordinator: The head of the respective individual municipal response team as appointed by the Board of Selectmen and/or Mayor.

TEAM ACTIVATION METHOD

PURPOSE: The purpose of this standard operating procedure shall be to define the method by which the Buzzards Bay regional response team(s) shall be activated.

PROCEDURES:

- 1.1 A control point shall be established for each team for the purpose of activation of the team(s).
- 1.2 The control point for each team shall be defined as the mutual aid dispatch center of the host municipality of the response equipment.
- 1.3 The control point shall receive and process all requests for activation of the team(s).
- 1.4 The team shall be activated at the request of the Oil Spill Coordinator or his authorized designee.
- 1.5 The team shall only respond to oil spill incidents which have been confirmed by an on scene Oil Spill Coordinator's designee.

1.6 For purposes of team activation only, an oil spill incident shall be defined as:

- a) Spills in excess of 50 gallons of petroleum products such as, but not limited to, diesel fuel, fuel oil, motor oil, heavy and light crude oils etc.; confirmed reports of spills, leaking containers, leaking vessels, or accidents producing environmentally hazardous conditions.
- b) Any incident that the Oil Spill Coordinator or his designee shall deem to pose an extreme condition which requires the use of specialized equipment and specifically trained personnel which are beyond the capability of the requesting team.

1.7 Each municipal team is expected to maintain an adequate response capability (equipment and personnel) for routine releases of oil, which may occur within their respective municipal jurisdictions.

1.8 The following activation procedure shall be performed upon determination by the Oil Spill Coordinator, or his designee, that activation of the Team is necessary:

- a) Contact the mutual aid dispatch center of his/her municipality and request the activation of the Team.
- b) Provide information as required in 1.9 below to the mutual aid dispatcher.

1.9 Upon receipt of a request for activation of the Team, the dispatcher shall accomplish the following:

- a) exact location of the incident, which is readily communicated to all parties, i.e. latitude and longitude per loran reading, NOAA charts, or other means to pin point the location.
- b) requesting department and call back number
- c) the requesting Oil Spill Coordinator and/or his designee
- d) the nature and extent of the incident
 1. size of spill and source, if known
 2. type of oil spilled
 3. weather conditions (wind speed, direction, viability, etc.)
 4. direction of currents and sea conditions (wave height, traffic in effected area, etc.)
 5. any actions already taken or to be immediately taken by requesting municipality (manpower, equipment deployment, etc.)
 6. assembly point/staging area for Team members
- e) notify the U.S. Coast Guard, Marine Safety Office, Providence, RI, as to d1-5 above 1-401-528-5335
- f) notify the Massachusetts Department of Environmental Protection, Southeast Regional Office in Lakeville, as to d 1-5 above 1-508- 792-7653
- g) if there is no response from the DEP, notify the Massachusetts State Police as to d 1-5 above 1-617-566-4500
- h) notify the National Response Center Hotline as to d 1-5 above 1-800-424-8802
- i) notify the Harbormaster as to d 1-5 above
- j) notify the Selectmen's or Mayor's office, as of d 1-5 above

- k) Contact the host municipality of the regional response team and or equipment requested by the Oil Spill Coordinator, who shall then dispatch the equipment and or personnel to the staging area. It is the intent of this section that the response to the incident be as soon as possible, i.e. prompt delivery of the equipment is not dependent on a team member, should one not be available.
- 2.0 Upon the requesting municipality's demand, the host municipality shall activate the page system to notify the Team member of Team activation.
- 2.1 For Buzzards Bay mutual aid municipalities that are not assigned regional response oil containment/clean up equipment, the following procedure shall apply:
- a) Upon receipt of a request for Team activation, the dispatcher shall contact the closest mutual aid dispatch center that has been assigned regional response equipment.
 - b) Provide the information received in 1.9 above to that mutual aid dispatch Center.
 - c) The mutual aid dispatch center of the team shall then perform procedure as indicated in 2.0 above.
- 2.2 The control point dispatch center shall call back the requesting community and inform them that the Team has been activated and shall request an update on the incident situation, which shall be transmitted to the Team.
- 2.3 Response team members, upon receipt of an activation page, shall contact the control point dispatcher for location and background information of the incident and shall indicate their intent to respond or not, and if so their estimated time of arrival to the staging area.

RESPONSE TEAM ASSIGNMENTS AND METHODS OF OPERATION

PURPOSE: Define and determine the team composition and operation.

DEFINITIONS:

Oil Spill Coordinator: Primary responsibility is to ensure that the maximum coordination among local, state, federal and private concerns is secured during a spill event and acts as the team leader. Responsible for the tactical operations involving the hazardous materials and activities of the response team.

Initial Response Team: The response team members assigned by the Oil Spill Coordinator, who shall have the responsibility to control the emergency situation using the methods devised by the oil spill coordinator or his designee.

Backup Team: A team of properly protected and equipped personnel, who shall be responsible to perform rescue operations if needed by the Entry team. The number of the backup team shall be equal to the number of the Entry Team.

Post Response Team: The team designated by the Oil Spill Coordinator, who shall be responsible for the actual decontamination of personnel, tools, and equipment.

Science Officer: The person designated by the Oil Spill Coordinator, who shall be responsible to supply all possible information to the Oil Spill Coordinator concerning the hazardous materials involved in the incident.

Logistics Officer: The person designated by the Oil Spill Coordinator, who shall be responsible for deploying any equipment that is needed but is not available to the response team.

Medical Officer: The person designated by the Oil Spill Coordinator, who shall be responsible to monitor the medical conditions of all entry team members before and after entering the Hot Zone.

Safety Officer: The person designated by the Oil Spill Coordinator, who shall be responsible of all personnel and actual operations at the incident scene.

2.4 Prior to the commencement of entry into the Hot Zone, the following personnel shall be on scene at minimum; subject to the incident needs and at the discretion of the Oil Spill Coordinator. He may take responsibility for fewer qualified personnel present for minor incidents:

- a) one qualified Safety Officer
- b) two qualified Entry personnel
- c) two qualified Entry personnel as back-up
- d) one qualified personnel as Decon Officer
- e) one qualified EMT as Medical Officer
- f) one qualified Science Officer
- g) four qualified Support personnel to be assigned by the Oil Spill Coordinator in support functions

2.5 Establish a Team incident command structure with the requesting Oil spill Coordinator in charge of the operation until relieved by the U.S. Coast Guard. Each team responding shall designate a Team Coordinator to the Oil Spill Coordinator.

2.6 Determine and define the site safety and set up procedures including but not limited to the following:

- a) proper staffing as in 2.4 above
- b) the site shall be well marked into zones appropriate to the incident
- c) a safety plan shall be initiated
- d) a contamination reduction line appropriate to the incident shall be operational

- e) training and information consistent with the mitigation of the incident, if an unfamiliar procedure is to be performed, then a "dry run" shall be practiced
- f) equipment necessary to the successful accomplishment of the incident objectives shall be on scene
- g) conservative methodology for protective clothing, decontamination and incident mitigation shall be employed, recognizing however that hazardous materials incidents may require unusual techniques as solutions
- h) the strategic goals and tactical objectives for the mitigation of the incident are the responsibility of the requesting Oil Spill Coordinator
- i) the Oil Spill Coordinator and/or the Safety Officer shall have the authority to suspend the operations of the Team and withdraw Team personnel to a safe location at any time due to situations which pose an immediate danger to the life and/or health of Team members

TERMINATION OF OPERATION

PURPOSE: To establish termination procedures

- 3.1 When in the view of the requesting Oil Spill Coordinator, the incident has been mitigated to the extent of the Team's capability, the Oil Spill Coordinator shall report the same to the U.S. Coast Guard's On-Scene Coordinator present. The Team shall not be utilized for clean-up of hazardous wastes on site. This shall not preclude, however, the use of bulking up procedures as an incident mitigation tool when public safety or prudently applied expediency are of interest. The Oil Spill Coordinator may request the continued presence of the Team only when an unstable threat continues to exist.
- 3.2 Records of the incident shall be complete before any member of the Team or the Team itself may depart the scene, excepting, of course, of emergency medical treatment. Forms to be completed shall include:
 - a) Site Safety Plan
 - b) Personnel Roster
 - c) Report of Exposure
 - d) Materials and Equipment Used from Host and Requesting Municipality Stores
 - e) Report of Incident Activities
- 3.3 The equipment shall be returned to service by a member of the requesting municipality as soon as possible after decontamination and clean-up.

TRAINING

PURPOSE: To establish requirements for recurring proficiency training of Team members.

- 4.1 Each municipal Team shall designate a Training Coordinator, who shall coordinate the team training activities with the other Buzzards Bay Response Teams and schedule training sessions.
- 4.2 Quarterly recurring proficiency training sessions shall be scheduled and conducted.
 - a) training sessions shall be of two consecutive hours duration
 - b) municipal Team members shall be required to attend a minimum of 3 training sessions each year, with one session to be with the Buzzards Bay Response Team, in order to retain member status
- 4.3 Subjects of training sessions shall be determined by the Training Coordinator.

REVIEW OF OPERATIONAL STANDARD OPERATING PROCEDURES

PURPOSE: To determine the compliance and consistency of operational S.O.P.s

- 5.1 All Team operational standard operating procedures shall be reviewed by the U.S. Coast Guard to assure that the content is consistent with U.S. Coast Guard policy and procedures.

MEDICAL SURVEILLANCE

PURPOSE: To ensure the health of Team members.

- 6.1 A baseline medical examination shall be provided to Team members. The examination content shall be consistent with OSHA guidelines.
- 6.2 Periodic medical examinations shall be provided such that all members be examined on an annual basis. The content is to be based on exposure experienced and the baseline examination.
- 6.3 A medical examination shall be provided to any member who experiences symptoms, or has experienced a confirmed or suspected unprotected exposure.
- 6.4 A medical examination consistent with the baseline physical and any past exposure or suspected exposures shall be provided to each member upon termination of Team membership.
- 6.5 All medical records, including exam results and exposure forms, shall be kept for thirty years after termination by the local Board of Health.

REIMBURSEMENT

PURPOSE: To define the procedure for reimbursement.

- 7.1 All personnel serve at no cost to the Buzzards Bay Action Committee municipalities, and there shall be no billing for services due to a response to assist other Team members.
- 7.2 The parties responsible for the spill are also responsible for all costs to contain and clean up the spill.
- 7.3 Upon Federalization of the incident by the U.S. Coast Guard, the municipalities will be reimbursed for all personnel and equipment involved with the response of the Buzzards Bay Regional Response Team, if such actions are deemed appropriate and necessary by the Federal OSC.
- 7.4 All Team members are to be covered by their respective municipality's Workmen's Compensation Insurance Policy.

RADIO FREQUENCIES

FIRE

Acushnet	453.875
Bourne	33.64
Dartmouth	453.5376, 458.5375
Fairhaven	453.025
Falmouth	33.78
Marion	483.425
Mattapoisett	458.075, 453.075
New Bedford channel 1-	471.0375
channel 2-	470.5125
Ply-County Fire Network	154.295
	33.90
Fire Marine Bands	33.52

POLICE

Achush/Fhvn/Matt	482.8125
Bourne	851.1625
Dartmouth	155.250
Fairhaven channel 2-	482.3875
Falmouth	855.4625
Marion	483.1125
New Bedford channel 1-	482.5875
channel 2-	482.9125
channel 3-	482.3875
State Police	855.8875
Westport	155.370
Environmental Police	31.46

DEPARTMENT OF PUBLIC WORKS

Bourne	150.995	
Dartmouth	853.7625	859.4875
Fairhaven	452.325	
Marion	45.44	
New Bedford	151.01	
	151.115	
Wareham	45.66	

OTHERS

Dartmouth Emergency Management	155.025	STAT Ambulance	155.205
New Bedford Regional Airport	39.64	Acushnet EMS	39.50
New Bedford Water Department	155.145	St. Lukes MED	463.00
New Bedford Emergency Management	154.34		468.00
	39.46		
Boston Weather	162.475		

OIL SPILL RESPONSE PLAN

OIL SPILL COORDINATOR

The town Oil Spill Coordinator's primary responsibility is to ensure that maximum coordination among local, state, federal, and private concerns are secured during a spill.

1. Notify the United States Coast Guard (MSO Providence) and the Massachusetts DEP- Emergency Response Section, giving details and arranging to meet their personnel either on-scene or at a convenient staging location.
2. Alert town officials, particularly the Selectmen, Police and Highway Dept. of the spill. Request proper town departments to place their equipment on alert status.
3. Determine if the spill poses a serious health or environmental hazard and so warrants immediate containment measures. Factors such as weather, time of day, and safety of the town's response crew must be considered before a decision to clean-up is made.
4. Continue to monitor the spill situation until either a USCG or state DEP official or their representative arrives on-scene.
5. Act as an authorized advisor to the federal OSC or state agent when they arrive on-scene. Once the federal OSC or the local DEP official arrives on-scene, the town Oil Spill Coordinator shall surrender all responsibility for the spill to the arriving official.
6. If a decision is made for the town coordinator to begin initial response, permission must first be secured from the MA DEP in order to eliminate the town from financial responsibility for the clean-up costs. If a decision is made not to begin initial response, the town coordinator must remain available to state and federal officials when they arrive on-scene.
7. To deploy equipment and personnel to protect any highly vulnerable areas in the spill's path and then allocate the remainder of the boom and sorbents to other areas that may be affected. If more than one highly vulnerable area is threatened, the area with the highest priority ranking should receive attention first.
8. Provide a temporary disposal site for oily debris. Before a site is chosen, the Board of Health should be consulted.
9. Arrange a permanent disposal site with the MA DEP, Solid Waste Section.
10. Keep detailed records of equipment used, manpower involved (number of crew X hours worked) and all other costs so that the expenses can be recovered by the town after the spill.
11. Provide the MA DEP with a record of clean-up expenses incurred for reimbursement to the town.
12. Consult with Selectmen and Town Council to determine if compensation for spill-related damage to public property and/or resources should be pursued through legal proceedings.

RESPONSE, CONTAINMENT, AND CLEAN-UP

The Response Team's objectives are:

1. Prevent the continued entry of oil into the water at the source of the spill. When responding to a spill, the continued entry of oil into the water should be stopped first. This action may require plugging or patching holes, simply turning off a valve, or transferring cargo (oil) from the damaged tank to a sound tank or holding tank.

2. Contain the spill immediately.

When personnel arrive on scene, after stopping the flow of oil, the next immediate action should be to contain the oil in the water and herd it toward less vulnerable areas. The primary method for containing a spill is the use of a boom. There are a few factors that can hamper the efforts of containment. These include:

- a. water current
- b. wind direction and speed
- c. physical and chemical properties of the oil
- d. water and air temperature

The circumstances of a particular spill dictate the way the boom is deployed and the type of boom that should be used. In areas having little or no current, the boom may be used in a stationary configuration. When a spill occurs in an area having a slow current, the boom may be towed in a "U" configuration. Alternately, the boom may be placed at an angle from the shore toward the proper area to channel the oil toward shore, past vulnerable areas, where it can be cleaned up more easily. The boom can also be used to divert a spill away from environmentally sensitive areas.

Gasoline and other volatile products are so explosive that containment is often considered dangerous. In such cases containment or deflection actions are used to prevent the products from reaching areas where explosions are likely. Containment or deflective actions are only considered in special situations and are never to be used if containment becomes more dangerous than the immediate vapor or evaporating effects of these products.

3. Removal of the oil.

Once the oil has been contained, removal can begin. There are a number of methods for removing oil, each having their own benefits and limitations depending on the location and size of the spill.

EQUIPMENT AND MATERIALS

1. Skimmers

A skimmer device can be used on a contained spill near a pier or dock. There are two types of skimmers, suction units and oleophilic units. Suction units vary greatly in design and purpose, all require some type of suction device to remove oil. Oleophilic units use a type of material to which oil will stick. All oleophilic skimmers operate on the principle that oil, not water, will stick to the oleophilic material when it is submerged in an oil spill. The oleophilic portion is then removed from the oil and wiped, scraped, or squeezed to remove the oil.

2. Sorbents

Sorbents can be used on small spills when it is not feasible to use a skimmer. Sorbents are composed of both oleophilic and hydrophobic material with a large capacity for oil absorption. Sorbents are spread on the water, allowed to soak up the oil, and then removed from the water. The three classifications of sorbents are mineral, natural, and manufactured products. Mineral sorbents include material such as volcanic ash, vermiculite, and some chalks. Natural products include various types of straw, rice, oat and wheat, hay or cottonseed hulls. Synthetic products are generally manufactured from high molecular weight polymers, such as polypropylene. Some common types of synthetic sorbents are sorbent pads, sorbent booms, and sorbent mops.

3. Vacuum Trucks

Vacuum trucks are another device commonly used in the removal of small contained spills. These units consist of a vacuum unit and a storage tank mounted on a truck. In small spills, septic tank pump-out trucks may be used for this purpose.

TYPES OF SPILLS

1. Small Contained Spills

These are usually found around a dock or pier and can be cleaned up with a small skimmer, sorbent or a vacuum truck. Small contained spills found on dry ground can be cleaned up in numerous ways. First, it must be contained. This can be achieved using a dike made out of sand. Any catch basins that are found in the area should be covered with a non-porous cover and then diked around. Catch basins with out-flow pipes should be diked and boomed if any oil may have entered the system. Clean-up can be done with a sorbent such as Speedy Dry, sorbent pads, or boom.

2. Off Shore Spills

After containing these spills with boom, clean-up can be accomplished with large skimmers or sorbents depending on the type of material spilled. Off shore spills that penetrate beaches require different clean-up methods. Lighter oils, such as #2 fuel oil and kerosene are much more water soluble and penetrate beach sediment more rapidly than heavier substances. Once light oils reach a shoreline, they penetrate all porous spaces. On sandy surfaces, deep penetration is immediate. In such circumstances, it is usually not practical to remove large amounts of sand and rocks. Instead, the oil should be exposed to evaporation through wind and weather. To accelerate the evaporation and dissipation of #2 fuel oil from sandy beaches, a mat of straw at least one inch thick should be laid on the beach. A disk-harrow should then be used to work the straw into the sand so that the straw can absorb as much of the sand as possible. A beach cleaning machine should be used to retrieve the oil soaked straw. The beach should then be harrowed or immediately raked to hasten the dissipation of the remaining oil trapped on the sands' surface. In severe cases, it may be necessary to dig trenches near the water line to collect oil as it seeps from the upper beach area. This collected product can then be recovered with skimming devices or sorbents or burned in place, if other recovery methods are impractical. When light oils come ashore on rocky coasts, the most practical method of clean-up may be to mop up the pockets of oil collected in rock pools with sorbent material. When access to hand carried material is limited, trenches dug below rocky ledges may collect significant quantities of oil. As with sandy areas, the oil may be recovered, or burned on site.

ADDITIONAL INFORMATION

1. Final Cleaning

Final cleaning of a spill may require the restoration of beaches, rocky areas, and/or marshes. When beaches are only lightly oiled, they can be cleaned by spreading sorbent in the area and raking it up. If the response is slow and deep penetration occurs, it may be necessary to physically remove the oiled sand and replace it.

2. Cleaning of Rocky Areas

Cleaning of rocky areas is tedious and expensive. If not done properly, it can damage marine life in the area and also require repeat cleaning, which can lead to even more damage. Additional cleaning may be done with low pressure water hoses. Secondary cleaning, if necessary, can be done with high pressure hoses, high pressure steam or chemical high pressure wash.

3. Disposal Sites

Short term disposal sites are areas where contaminated rocks, sand and debris can be stored for a short period of time. These sites are set-up so that further contamination will not occur during a long clean-up process. Short term sites should be paved, and all catch basins should be covered to prevent further contamination. Short term sites should never be relied on as final disposal sites. Final disposal sites will be identified by the DEP.

4. Oil Spill Reports

One of the most important tasks during a clean-up is to accurately record the history of the oil spill. The purpose of documentation is to protect the environment, minimize expenses, and as a basis for critiquing the spill prevention and clean-up methods. It is important to record the extent of the spill, orders received from the government on-scene coordinator, and the extent of each day's clean-up activities. Oil sampling is very important in documenting a spill. The government on-scene coordinator will sample the oil, and the party that is presumed responsible will want to verify the analysis by also taking samples. An oil spill can result in a lawsuit, so all the facts of a spill should be available from the beginning of a spill to the completion of its clean-up.

OIL SPILL RESPONSE CONTACTS

	Name	Phone Number	Pager/Cell Number
<u>ACUSHNET</u>			
Oil Spill Coordinator	Dave Makuch	508-998-0250	
	Fax Number	508-998-5889	
Contact Location	Fire Station	508-998-0250	
Harbor Master	Alfred Braley	508-995-2710	
Police Chief	Mike Poitras	508-998-0240	
Fire Chief	Paul Cote	508-998-0250	
Selectmen	Al Coutinho	508-998-0200	
Dept. of Public Works	Ray Barlow	508-998-0290	
Health Director	Tom Fantozzi	508-998-0275	
Civil Defense Director	Gerard Bergeron	508-998-0295	
<u>BOURNE</u>			
Oil Spill Coordinator	Lt. Martin Greene	508-759-9178	
	Fax Number	508-759-9585	
Contact Location	Fire Department	508-759-4411	
Harbor Master	Michael Gratis	508-759-0621 ext. 312	
Police Chief	John Ford	508-759-4453	
Fire Chief	Charles Klueber	508-759-0634	
Selectmen		508-759-0600 ext. 302	
Dept. of Public Works	Rick Tellier	508-759-0640	
Health Director	Cindy Coffin	508-759-0615	
Emergency Management	Joel Gould	508-759-4453	
<u>DARTMOUTH</u>			
Oil Spill Coordinator	Arthur Dias	508-994-3007	508-971-0884
	Fax Number	508-990-7759	
Contact Location	Police Station	508-910-1731	
Harbor Master	Arthur Dias	508-971-0884	
Police Chief	Randall Medeiros	508-910-1726	
Fire Chief	John Alcaidintro, Dist. 1	508-996-1596	
	Allen Manley, Dist. 2	508-636-2441	
	John McNamara, Dist. 3	508-994-6761	
Selectmen	Michael Gagne	508-910-1813	
Dept. of Public Works	David Bernier	508-999-0740	
Health Director	Wendy Henderson	508-999-0704	
<u>FAIRHAVEN</u>			
Oil Spill Coordinator	Chief Timothy Francis	508-994-1428	
	Fax Number	508-994-1515	
Contact Location	Fire Department	508-994-1428	
Harbor Master	Gary Golas	508-984-4529	
Police Chief	Ted Silva	508-997-7421	
Fire Chief	Timothy Francis	508-994-1428	
Selectmen	Jeff Osuch	508-979-4023	
Dept. of Public Works	Alfred Raphael	508-979-4030	
Health Director	Patricia Fowle	508-979-4022	
Civil Defense Director	Mark Jodoin	508-979-4023	

FALMOUTH

Oil Spill Coordinator	Paul Brodeur	508-548-2325
	Fax Number	508-457-2525
Contact Location	Fire Department	508-548-2323
Harbor Master	Gregg Fraiser	508-457-2550
Police Chief	David Cusolito	508-457-2537
Fire Chief	Paul Brodeur	508-457-2538
Selectmen	Peter Boyer	508-548-7611 ext. 320
Dept. of Public Works	Bill Owen	508-548-7611 ext. 420
Health Director	David Carigan	508-548-7611 ext. 485
Civil Defense Director	Shardell Newton	508-548-7611

GOSNOLD

Oil Spill Coordinator	Seth Garfield	508-990-7408	508-990-3318
	Fax Number	508-990-1317	
Contact Location	Fire Department	508-990-7408	
Harbor Master	Asa Lombard	508-990-7408	
Police Chief			
Fire Chief	Seth Garfield	508-971-1120	
Selectmen, chairman	Donald Lynch	508-990-7408	
Dept. of Public Works	Jonathan Camara	508-990-7408	
Health Director	Donald Lynch	508-990-7408	

MARION

Oil Spill Coordinator	Richard Guerzoni	508-748-3595	508-483-4614
	Fax Number	508-748-0786	
Contact Location	Fire Department	508-748-1177	
Harbor Master	Charles Bradley	508-748-3535	
Police Chief	Lincoln Miller	508-748-1212	
Fire Chief	Robert Davis	508-748-3595	
Selectmen	Julia Enroth	508-748-3550	
Dept. of Public Works	Rob Zora	508-748-3540	
Health Director	Karen Waleaga	508-748-3530	
Civil Defense Director	W. Dale Jones	508-748-3595	

MATTAPOISETT

Oil Spill Coordinator	Chief Ronald Scott	508-758-4150
	Fax Number	508-758-4443
Contact Location	Control Center	508-758-4141
Harbor Master	Steve Mach	508-758-4191
Police Chief	Mary Lyons	508-758-4141
Fire Chief	Ronald Scott	508-758-4105
Selectmen	Carol Adams	508-758-4100
Dept. of Public Works	Wesley Bowman	508-758-4181
Health Director	Dale Barrows	508-758-4112
Civil Defense Director	Bill Simpson	508-758-2995

NEW BEDFORD

Oil Spill Coordinator	Captain Stephen Chmiel	508-991-6105	508-595-7712
	Fax Number	508-979-1697	
Contact Location	Fire Department	508-991-6104	
Harbor Master	John Simpson	508-961-3000	
Police Chief	Arthur Kelly	508-991-6330	
Fire Chief	Warren L. Ide	508-991-6104	
Mayor	Frederick Kalisz	508-979-1410	
Dept. of Public Works	Lawrence Worden	508-979-1520	
Health Director	Raymond Belanger	508-991-6290	
Civil Defense Director	Mark Mahoney	508-991-6386	

ROCHESTER

Oil Spill Coordinator	Jeffrey Eldridge	508-763-4336	978-547-2433
	Fax Number	508-763-9565	
Contact Location	Fire Department	508-763-2611	
Harbor Master			
Police Chief	Walter Denham	508-763-5112	
Fire Chief	Scott Ashworth	508-763-2611	
Selectmen	Jim Huntoon	508-763-3871	
Dept. of Public Works	Jeffrey Eldridge	508-763-4336	
Health Director	Karen Walega	508-763-3871	
Civil Defense Director	Paul Ciaburi	508-763-5203	

WAREHAM

Oil Spill Coordinator	Chief Howard Anderson	508-295-2973	
	Fax Number	508-295-5930	
Contact Location	Fire Department	508-295-2973	
Harbor Master	Michael Parola	508-291-3100 ext. 3185	
Police Chief	Thomas Joyce	508-295-3180	
Fire Chief	Howard Anderson, Onset	508-295-2973	
	Robert McDuffy, Wareham	508-295-2973	
Selectmen	Dennis Damata	508-291-3100	
Dept. of Public Works	Mark Gifford	508-295-5300	
Health Director	Carl Wakefield	508-291-3100 ext. 3198	

WESTPORT

Oil Spill Coordinator	Gary Sherman	508-636-1105	
	Fax Number	508-636-1147	
Contact Location	Police Department	508-636-1122	
Harbor Master	Richard Earle	508-636-1105	
Police Chief	Micheal Healy	508-636-1122	
Fire Chief	William Tripp	508-636-1110	
Selectmen	John Dolan	508-636-1150	
Dept. of Public Works	Paul Pereira	508-636-1020	
Health Director	Ralph Urban	508-636-1015	
Civil Defense Director	Mike McCarthy	508-636-2470	

EQUIPMENT LISTS

Acushnet

- 1 14 ft. boat
 - 4 bundles of sausage boom
 - 4 bundles of pads
- Sand available from the Highway Dept.
Speedy Dry available at the Titliest Plant

Bourne

All requests for equipment should go through the Chief of the Bourne Fire Department at 508-759-9178 or 508-759-0634.

Available from the Bourne Fire Dept.:

- 11 bags of 4 X 50 absorbent booms
- 4 85 gallon over-pack barrels
- 6 bags of 14" X 14" absorbent pads
- 3 boxes of absorbent pillows
- 7 50 lb. bags of Speedy Dry
- 2 3' X 150' rolls of absorbent sheeting
- 1 24" X36" magnetic drain mat
- 5 100 foot sections of 18" open water boom
- 3 5gallon buckets of Enviro-Bond 403
- 3 boxes of 4" X 8' flexible boom
- 2 40 gallon barrels of "Super Oil Sponge"
- 60 3" X 24" absorbent socks
- 1 24 ft. Boston Whaler with a 50 HP motor
- 1 Dept. of Fire Services Hazardous Materials Response Vehicle- The town has 3 certified Haz/Mat Technicians and 3 support people which can be activated through the local fire chief or State Fire Marshal. The vehicle contains equipment to respond to large oil spill incidents, such as radios, accountability equip. and Tyvek suits.

Available from the Army Corp. of Engineers:

- 1 130 ft. tugboat
- 2 50 ft. workboats

Available from the Town of Bourne Dept. of Natural Resources:

- 1 22 ft. boat
- 2 20 ft. boats used as pump-out boats
- 1 18 ft. Carolina skiff

Available from the Town of Bourne DPW:

- bulldozers
- 6, 8 and 10 wheel tractor-trailers

Dartmouth

Available from the Harbor Master at 508-994-3007 or 508-999-0759:

- 1 20 ft. Sea Ox boat
- 3 22 ft. Tripp Angler boats
- 500' oil spill containment boom

Available from the Fire Department at 508-971-7475:

- Boats
- Generators
- Command Center truck
- Skilled man power
- Lighting equipment

Available from the Dept. of Public Works at 508-999-0740:

- Trucks and trailers
- Front-end loaders

Fairhaven

Available from the Fire Department at 508-994-1428 or 508-992-9717:

- 1 100' line
- 1 75' line
- 2 50' lines
- 3 100' lines with buoys and anchors
- 5 large anchors
- 3 large buoys
- 1 36' X 150' roll of absorbent material
- 2 bags small sausage boom
- 10 10/20 absorbent pillows
- 10 bags 18" X 18" absorbent pads
- 10 yellow Tyvek suits
- 1 box of white Tyvek suits
- 1 roll orange patch material for orange boom
- 4 bags large white sausage boom
- 800 ft. large orange floating boom
- 2 cold water suits for in-water operations
- 2 mustang suits for boat operations
- 2 sets of rain gear
- 1 16' Boston Whaler with 60 HP outboard
- 1 5' fiberglass ice sled
- 1 25' Boston Whaler with twin 200 HP outboards
- 1 16' enclosed Coast Guard trailer
- 1 10' enclosed Coast Guard trailer

Equipment located in cargo trailer in rear of Station:

- 3 bags large white sausage boom
- 200' medium orange floating boom
- 200' small orange floating boom

Falmouth

Available from the Harbor Master Boom Trailer at 508-457-2550:

- 11 packages of Jet Absorbent Pads
- 9 bags 18 X 18 absorbent pads
- 4 5 lb. ABC Dry- Chem.
- 5 Poly Balls
- 5 anchors
- 2 100 ft. 8 X 16 boom
- 2 100 ft. 6 X 9 boom
- 3 50 ft. 6 X9 boom
- 18 10 ft. absorbent boom

Gosnold

Available from Oil Spill Coordinator at 508-990-7408:

- 3 100 ft. 18" booms
assorted anchors, lines and chains
- 1 Pig Brand Oil Spill Duffle Recovery Kit

Available from the Ralph Packer Co.- contact Allen Wilder at 508-992-7712:

- 3 55 gallon drums of oil absorbent pads

Marion

Available from the Fire Department at 508-748-3595:

- 400 ft. 18" containment boom
- 200 ft. 6" absorbent boom
- 1 18" boom adaptor
- 2 boxes of large absorbent pads
- 2 boxes of small absorbent pads
- 3 pails of Enviro-Bond absorbent
- 5 Danforth anchors
- 1 15 lb. Door-Moor Anchor
- 1 spool of 5/16" Polypropylene Rope
- 1 bag of assorted wooden plugs and bungs
- 6 bags of Speedy Dry
- 6 sets Tyvek splash suits
- 3 sets heavy protective gloves
- 4 helmets with face shields
- latex gloves
- 1 25' patrol boat
- 1 20' open work boat
- 2 13' open work boats
- 1 14' lightweight boat
- 1 22' open work boat

New Bedford

Available from the Fire Department at 508-991-6104 or contact Mayor Kalisz's office at 508-979-1410:

- 300' floatation boom
- 400' fence boom
- absorbent booms
- absorbent pads
- anchors, floats, lines
- 1 25' Parker Boat with twin OBs
- 3 inflatable 8' boats with motors
- chemical protective clothing, suits, boots, gloves
- 2 4 gas meters
- portable radios
- GPS handheld
- Decon equipment (pools, brushes, buckets, wands, hoses, decon solution)

Available from the DPW:

- Loaders
- Trucks
- Sweepers
- Vacuums

Rochester

- 200' 18" containment boom
- 14 bales of absorbent pads
- 6 bags absorbent boom
- 1 ton Speedy Dry
- 1 Boston Whaler- rope, portable marine radio, lights, suits
- 1 Rescue Truck- dive gear, cascade system, air bags
- 2 10 gallon stainless steal sanders
- 2 10 gallon dump trucks
- 1 20 ton trailer
- 1 2 1/2 loader
- 1 4 X 4 backhoe
- 1 street sweeper
- 2 trash pumps
- 1 4 X 4 Haz. Mat. Vechicle- portable tank, Tyvek suits, pads, boots, absorbent boom, Speedy Dry, pitch forks, catch basin covers
- 1 4 X 4 platform dump with portable welder and fuel tank

Wareham

Available from the Town of Wareham:

- 4 bags, 100 ct., 18" X 18" absorbent pads
- 4 bags 8" X 10' absorbent boom, 4 sections per bag
- 3 rolls 36" X 150' absorbent
- 2 100' X 18" containment boom
- 1 boom connection adapter
- 2 bags Speedy dry
- 2 36" X 36" storm drain covers
- 2 10' sections, storm drain dikes with connectors
- 1 storm drain dike connector
- 4 bags, 25 ct., Tyvek boot covers
- 3 Stearns flotation work suits

Available from the Onset Fire Department at 508-295-3180:

- 10 boxes, 50 ct., vinyl gloves
- 10 safety goggles
- 30 Tyvek suits
- 4 life jackets
- 4 rolls duck tape
- 6 bags 8" X 10' absorbent booms, 4 sections per bag
- 1 bag 3" X 48" absorbent booms, 10 sections
- 10 bags, 100 ct., 18" X 18" absorbent pads
- 2 rolls 36" X 150' absorbent
- 6 containers Speedy Dry
- 2 boxes large trash bags
- 26 24" orange safety cones
- 2 rolls Haz. Mat. Tape
- 4 Poly Tarps.
- 3 shovels
- 1 broom
- 1 drop spreader
- 1 D.O.T. Emergency Response Guide
- 1 Niosh Pocket Guide to Chemical Hazards
- 1 18' boat, equipment and trailer

Available from the U.S. Coast Guard Response Trailer:

- 275' 4" Bantam containment boom
- 7 bags absorbent boom
- 7 bags absorbent pads
- various other supplies

OIL SPILL ACCESS POINTS

Bourne

Buttermilk Bay
Monument Beach
Pocasset River (Town Dock, ramp on
Barlows Landing Rd., ramp on
Circuit Ave.)
Cataumet (dock/ramp on County Rd.)

Dartmouth

Little Beach
Demarest Lloyd State Park
Roundhill Point
Padanaram Harbor
Jones Beach

Fairhaven

Waterfront Area
Fort Phoenix State Beach
Sconticut Neck
West Island
Little Bay (mouth of Nasketucket River)
Shaw's Cove

Falmouth

Wild Harbor (i.e. Silver Beach)
West Falmouth Harbor (Old Dock Rd.,
Chapaquoit Rd.)
Great Sippewisset Marsh (Woodneck Beach)
Quisset Harbor (Eldred Town Landing)
Woods Hole
Great Harbor Woods Hole
Megansett Harbor

Marion

Aucoot Cove
Silver Shell Beach
Sippican Harbor
Planting Island
Wing's Harbor

Mattapoissett

Brandt Island Cove
Mattapoissett River Reservation
Mattapoissett Harbor
Mattapoissett Boatyard
Crescent Beach
Angelica Point
Hiller's Cove

New Bedford

West Beach
Billy Wood's Wharf
New Bedford Harbor
Frederick St.
Gifford St.
Sawyer St.

Wareham

Cromeset Beach
Swifts Beach
Hamilton Beach
Warr Marine
Onset Pier

Westport

Westport Point Landing
Horseneck Beach
East Beach
The Nubble (Acoaxet)
Tripp's Boatyard

DIRECTIONS: OIL SPILL ACCESS POINTS

Bourne

BUTTERMILK BAY (public access ramp- Electric Ave.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E-Cape Cod/Islands)- Exit 2 (Bourne/Sagamore)- stay straight onto Rt. 6 W- turn right onto St. Margarets St.- left onto Center Ave.- take left on Lafayette Ave.- take right on Eldridge Ave.- turn right onto Washington Ave.- take left on Electric Ave.- follow to ramp

NOTE: wide paved ramp; lighted; fixed dock and floating finger docks; 20 car paved parking; small supervised beach adjacent

MONUMENT BEACH:

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take 2nd exit (Trowbridge Rd.)- turn left onto Shore Rd.- take right on Emmons Rd.- follow to beach

NOTE: large public beach; water and electricity available; 100+ car paved lot; town owned marina; long fixed dock; numerous floating finger docks; excellent paved ramp; railroad unerpas restriction; 10' clearance

POCASSET RIVER (Town Dock- Shore Rd.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto Trowbridge Rd.- turn left onto Shore Rd.- follow to dock

NOTE: floating docks; lighted; 35 car paved parking and dirt parking area

POCASSET RIVER (ramp on Barlows Landing Rd.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E-Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto MA-28 S/General Macarthur Blvd.- turn right onto Barlows Landing Rd.- follow to ramp

NOTE: excellent double-wide paved ramp; solid drive-on dock; supervised beach adjacent; 30 car paved parking

POCASSET RIVER (ramp on Pocasset Heights Beach, Circuit Ave.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E-Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto MA-28 S/General Macarthur Blvd.- turn right onto Barlows Landing Rd.- turn left onto Shore Rd.- take right on Island Dr.- right on Circuit Ave.-follow to beach/ramp

NOTE: double-wide paved beach ramp; 50 car paved parking; public beach

CATAUMET (dock/ramp on County Rd., N. Falmouth):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto Ma-28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- take the Rt-151 exit (No. Falmouth/Maspee/Old Silver Beach)- keep left at fork in ramp- turn left onto Rt-151- Rt-151 become County Rd.- follow to dock/ramp

NOTE: excellent paved ramp; sturdy drive-on dock; lighted; 50 car paved parking at adjacent supervised beach

Dartmouth

LITTLE BEACH:

Prov./Boston Rt. I-195- Exit 11 (Reed Road- Dartmouth)- 2 miles South- make left on Beeden Road- first right on Old Westport Road- first left on Fisher Road- first right on Gidley Town Road- first left on Division Road (3.5 miles)- make right on Old Horseneck Road- left on Horseneck Road- follow for 1 1/2 miles South to Little Beach

DEMAREST LLOYD STATE PARK (DEEPWATER POINT):

Prov./Boston Rt. I-195- Exit 12- South on Faunce Corner Road- across Rt. 6- 4 miles South on Chace Road- make right on Russells Mills Road- through Dartmouth Center- South on Horseneck Road (3 miles)- make left on Barney's Joy Road- first left onto Demarest Lloyd State Park Road to Deepwater Point

ROUNDHILL POINT:

Prov./Boston Rt. I-195- Exit 12 (Faunce Corner Road)- left onto Rt. 6- first right onto Tucker Road (4 miles South)- straight onto Bakersville (1 1/4 miles)- take left on O'Dundee Road- make right on Smith Neck Road- third left onto Hetty Green St.- to Roundhill Point

PADANARAM HARBOR:

Prov./Boston Rt. I-195- Exit 13 (Route 140 South)- across Rt. 6- South on Brownell Avenue to the end- make right on Hawthorne Street, follow to the end- left on Slocum Road- follow Slocum for 1 1/2 miles South- make right at Russells Mill Rd.- first left on Elm Street- follow Elm Street South to Padanaram

JONES BEACH:

Prov./Boston Rt. I-195- Exit 13 (Route 140 South)- cross Rt. 6- follow Brownell Ave. South- take left on Hawthorne St.- 4th right onto Rockdale Ave.- follow Rockdale Ave. one mile- right on Dartmouth St.- follow Dartmouth St. South- take 7th left onto Rogers St. and follow to Jones Beach

Fairhaven

FAIRHAVEN WATERFRONT:

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 South)- make a right on Bridge St.-follow Bridge West- make a left on Middle Street- follow for 7 blocks to the Middle Street Boat Ramp- to waterfront

FORT PHOENIX STATE BEACH:

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 S)- first right on Bridge St.- follow Bridge St. for 1 mile due West- make left onto Middle Street- follow Middle St. South to the end- take a left onto South St.- right on Main St.- left on Church St.- take first right on Fort St.- follow South to Fort Phoenix State Beach

POPE'S BEACH:

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 S)- follow for 1 1/4 miles- across Rt. 6 onto Scoticut Neck Rd.- fourth right on Manhattan St.- follow to Pope's Beach

SCONTICUT NECK:

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 S)- follow for 1 1/4 miles- across Rt. 6 onto Scoticut Neck Rd.- follow for 4 1/2 miles- to Scoticut Neck

WEST ISLAND (Round Cove):

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 S)- follow for 1 1/4 miles- across Rt. 6 onto Scoticut Neck Rd.- make a left onto Causewy Road out to West Island- take 2nd left on Bolsom St.- follow to Round Cove

LITTLE BAY (Mouth of Nasketucket River):

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 SW)- follow for 1 1/4 miles- across Rt. 6 onto Scoticut Neck Rd.- make 6th left onto Little Bay Rd.- follow to end

SHAW'S COVE:

Prov./Boston Rt. I-195- Exit 18 (Rt. 240 S)- follow for 1 1/4 miles- take a left onto Rt. 6- follow Rt. 6 for 1 3/4 miles- take a right onto Shaw Rd.- follow to end

Falmouth

WILD HARBOR (Silver Beach, Moses Rd.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- take the Rt-151 exit towards No. Falmouth/Maspee/Old Silver Beach- keep left at fork in ramp- turn left onto Rt-151- take left onto Pine St.- turn left onto Old Main Rd.- take right on Wild Harbor Rd.- turn left onto Arlington St.- take right on Crystal Spring Ave.- turn right on Silver Beach Ave.- take right on Moses Rd- follow to end

NOTE: launch difficult over loose sand; adjacent stone jetty; 10 car paved private parking; wooden bulkhead inside harbor

WILD HARBOR (Silver Beach Harbor ramp, Grove. St.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- take the Rt-151 exit towards No. Falmouth/Maspee/Old Silver Beach- keep left at fork in ramp- turn left onto Rt-151- take left onto Pine St.- turn left onto Old Main Rd.- take right on Wild Harbor Rd.- turn left onto Ocean View Ave.- right onto Grove St.- follow to end

NOTE: paved ramp; small beach area; 2 car parking on roadside; congested anchorage

WEST FALMOUTH HARBOR (dock/ramp on Old Dock Rd.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)-stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- take the Brick Kiln Rd. exit towards W. Falmouth/E. Falmouth- turn right onto Brick Kiln Rd.- turn right onto MA 28A/W. Falmouth Hwy.- turn left onto Chapoquoit Rd.- turn right onto Old Dock Rd.- follow to dock/ramp

NOTE: paved ramp; large, fixed wooden dock; floating docks; small boom lift; 10 car paved parking

WEST FALMOUTH (Chapoquoit Beach):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)-stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- take the Brick Kiln Rd. exit towards W. Falmouth/E. Falmouth- turn right onto Brick Kiln Rd.- turn right onto MA 28A/W. Falmouth Hwy.- turn left onto Chapoquoit Rd

NOTE: launch difficult over loose sand; 200 car paved parking; no facilities; adjacent private beach club

GREAT SIPPEWISSET MARSH (Woodneck Beach):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)-stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- turn right onto MA 28A/ W/W Falmouth Hwy.- take a sharp left onto Palmer Ave.- right on Sippewissett Rd.- take a slight right onto Woodneck Rd.- follow to beach

NOTE: launch difficult over loose sand; supervised beach; 50 car dirt parking; stone rip-rap around mouth of the Little Sip. Marsh

QUISSET HARBOR (Elfred Town Landing, Oyster Pond Rd.):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)-stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- stay straight onto Locust St.- Locust St. becomes Woods Hole Rd.- take slight left onto Elm Rd.- take right on Surf Dr.- Surf Dr. becomes Oyster Pond Rd.

NOTE: 30' long bulkhead; no launch except at adjacent marina; 10 car paved parking behind bulkhead

WOODS HOLE (Public Access Way and Coast Guard Station):

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)-stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- stay straight onto Locust St.- Locust St. becomes Woods Hole Rd.- turn right onto Quissett Harbor Rd.- turn left on Quissett Ave.- Quissett Ave. becomes School St.- turn left on Water St.- take right onto Crane St.- turn left on Cowdry Rd.- take right onto Little Harbor Rd.

NOTE: public access way with no launch due to seawall, narrow beach and street parking only; adjacent Coast Guard Station with four cutters berthed and pollution equipment

GREAT HARBOR WOODS HOLE:

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)-stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- stay straight onto Locust St.- Locust St. becomes Woods Hole Rd- Woods Hole Rd. turns into Water St.- Continue down Water St. and turn right onto Albatross St.- the Town Landing will be on the left, approx. 300 ft., just past Aquarium

NOTE: There is very limited parking in Woods Hole.

MEGANSETT HARBOR:

Prov./Boston Rt. I-195 East- Exit 22A (Rt. 25 E- Cape Cod/Islands)- stay straight over Bourne Bridge- at rotary, take exit onto MA 28 S/General Macarthur Blvd.- stay straight until next rotary, take exit onto MA 28 S- follow to intersection with Rt-151 - at the traffic light, take right onto County Rd.- follow County Rd., bear right as the road divides and continue on County Rd. for 1/4 mile- landing is to the right of the beach

Marion

AUCOOT COVE:

Prov./Boston Rt. I-195- Exit 20 (Rt. 105 South)- take right at the lights onto Rt. 6- follow Rt. 6 for 2 1/4 miles- take a left on Indian Cove Rd.- follow to Aucoot Cove

SILVER SHELL BEACH:

Prov./Boston Rt. I-195- Exit 20 (Rt. 105 S)- across Rt. 6 onto Front St.- follow for 1 1/2 miles to end

SIPPICAN HARBOR (Town Wharf):

Prov./Boston Rt. I-195- Exit 20 (Rt. 105 S)- across Rt. 6 onto Front St.- left on Island Wharf Rd.- follow to the Town Wharf

PLANTING ISLAND:

Prov./Boston Rt. I-195- Exit 20 (Rt. 105 S)- left onto Rt. 6)- follow Rt. 6 for 1 1/4 miles- right on Point Rd.- follow for 4 miles South- take right onto Planting Island Rd.- follow to West Ave.

WING'S COVE:

Prov./Boston Rt. I-195- Exit 20 (Rt. 105 S)- left onto Rte. 6- follow Rt. 6 for 1 1/4 miles- right on Point Rd.- follow for 2 miles- left on Delano Rd.- first right to Wing's Cove

Mattapoisett

BRANDT ISLAND COVE:

Providence Rt. I-195 East- Exit 18 (Rt. 240 S)- follow for 1 1/4 miles- take left on Rt. 6- follow Rt. 6 for 2 miles into Mattapoisett- take right onto Brandt Island Rd.- follow for 2 miles to Brandt Island Cove

Boston Rt. I-195 West- Exit 19 (Mattapoisett- North Street South)- follow for 3/4 mile- take right onto Rt. 6 (County St.)- follow for 1 1/2 miles- make left on Brandt Island Rd.- follow to end

MATTAPOISETT RIVER RESERVATION:

Providence Rt. I-195 East- Exit 18 (rt. 240 S)- follow for 1 1/4 miles- take left onto Rt. 6- follow Rt. 6 for 3 miles- take a right on Reservation Road- follow to end

Boston Rt. I-195 West- Exit 19 (Mattapoisett- North Street South)- follow for 3/4 mile- right on Rt. 6- follow Rt. 6 for 1 mile- left on Reservation Rd.- follow to end

MATTAPOISETT HARBOR:

Prov./Boston Rt. I-195- Exit 19- across Rt. 6 onto North st.- follow North St. to waterfront- right on Water St.- follow for 3 blocks to Long Wharf

MATTAPOISETT BOATYARD:

Prov./Boston Rt. I-195- Exit 19- across Rt. 6 onto North St.- take 2nd left onto Water St.- follow to end- take right on Ned's Point Rd.- follow to Mattapoisett Boatyard

CRESENT BEACH:

Prov./Boston Rt. I-195- Exit 19- take a right onto Rt. 6- follow Rt. 6 for about 1 1/2 miles- take right on Pine Island Rd.- follow to Crescent Beach

ANGELICA POINT:

Prov./Boston Rt. I-195- Exit 19- take a right onto Rt. 6- follow Rt. 6 for about 1 1/2 miles- take right on Pine Island Rd.- follow to Crescent Beach Rd.- follow to unpaved Cove Rd.

HILLER'S COVE:

Providence Rt. I-195 East- Exit 19- take a left onto Rt. 6- follow Rt. 6 for 1 3/4 miles- take a right on Aucoot Rd.- follow to Shore Drive- follow to Joe's Point (Harbor Beach)

Boston Rt. I-195 West- Exit 20 (Marion- Rt. 105 S)- at lights, take a right onto Rt. 6- follow Rt. 6 for 2 3/4 miles- take a left on Aucoot Rd.- follow to Shore Drive- follow to Joe's Point (Harbor Beach)

New Bedford

WEST BEACH (Boat Launch):

Prov./Boston Rt. 195- Exit 15 (Rt. 18 South)- follow to end- take First St. (south)- follow for 6 or 7 blocks- take a left onto Cove Rd.- take first right on Rodney French Boulevard- follow to the West Beach Boat Launch

BILLY WOOD'S WHARF (Boat Launch):

Prov./Boston Rt. 195- Exit 15 (Rt. 18 South)- follow to end- take First St. (south)- follow for 6 or 7 blocks- take a left onto Cove Rd.- take first right on Rodney French Boulevard- follow to Billy Wood's Wharf

NEW BEDFORD HARBOR (State Pier):

Prov./Boston Rt. 195- Exit 15 (Rt. 18 South)- take the Downtown/Elm St. exit- continue straight on cobblestone Water St.- take a left onto Union Street at the first stop sign- follow Union St. for one block to a traffic signal- the State Pier will be directly in front of you- go straight through the intersection and into gate

FREDERICK ST. (Boat Launch Site):

Prov./Boston Rt. 195- Exit 15 (Rt. 18 South)- follow to end- take First St. (south)- follow for 6 or 7 blocks- take a left onto Cove Rd.- take first right on Rodney French Boulevard- left onto Brock Ave.- left on Frederick St.- boat launch site at end of street

GIFFORD ST. (Boat Ramp):

Prov./Boston Rt. 195- Exit 15 (Rt. 18 South)- follow to end- take First St. (south)- follow for 6 or 7 blocks- take a left onto Cove Rd.- left on Morton Ct.- right on Gifford Street- follow to boat ramp, north of the Hurricane Barrier

SAWYER ST. RAMP:

Prov./Boston Rt. 195 East- Exit 16 Washburn St.- keep right at the fork in the ramp- merge onto Washburn St.- take right on Belleville Ave.- take right onto Sawyer Street- follow to ramp

Cape Cod Rt. 195 West- Exit 17 Coggeshall St.- stay left at the fork in the ramp- take left onto Coggeshall St.- take right on Mitchell St.- right onto Sawyer St.- follow to ramp

NOTE: This ramp is located at a Superfund Site. It is a secure area, the EPA and US Army Corp. of Engineers will allow access in emergency.

Wareham

CROMESET NECK (Weweantic River):

Providence Rt. I-195 East- Exit 20 (Rt. 105 S)- take left onto Rt. 6- follow Rt. 6 for 2 1/2 miles to the Wareham line (Weweantic River)- continue on for 1 mile- take right on Cromeset Rd.- follow to end

Boston Rt. I-195 West- Exit 21 (Wareham/Rt. 28)- follow Rt. 28 (Tremont Rd.) South- take 2nd right on Tihonet St.- take 1st right over RR tracks onto Main St.- take 1st left after the Town Green onto Gibb's Ave.- follow to Rt. 6- take a right onto Rt. 6- take left onto Cromeset Rd.- follow to end

SWIFTS BEACH:

Prov./Boston Rt. I-195- Exit 21- take 2nd right onto Tihonet St.- then first right onto Main St.- 1st left after the Town Green onto Gibb's Ave.- follow to Rt. 6- take a right onto Rt. 6- take third left onto Swifts Beach Rd.- follow to Swifts Beach

HAMILTON BEACH:

Prov./Boston Rt. I-195- Exit 21- take 2nd right onto Tihonet St.- then first right onto Main St.- take 1st left after the Town Green onto Gibb's Ave.- follow to Rt. 6- take a right onto Rt. 6- take third left onto Swifts Beach Rd.- take left on Shore Beach Rd.- take left onto Pilgrim Ave.- follow to Hamilton Beach

WARR MARINE:

Prov./Boston Rt. I-195- Exit 21- take a right at the RR tracks- take immediate left onto Main St.- go through Wareham Center- follow until end- left at Warr Marine

ONSET PIER:

Providence Rt. I-195 East- to Rt. 28 South- take 2nd right onto Depot Street- take third left on Onset Ave.- follow for 1 1/2 miles into Onset Center- follow Onset Ave.- follow through village to Onset Pier on right

Boston Rt. 24 South- to Rt. 25 South- to Rt. 28 S- take 2nd right onto Depot St.- take third left on Onset Ave.- follow for 1 1/2 miles into Onset Center- follow through Village to Onset Pier on right

Westport

WESTPORT POINT LANDING (Westport Harbor):

Prov./Boston Rt. I-195- Exit 10 (Rt. 88 S)- follow Rt. 88 for 10 miles South- take a right onto Drift Rd. at lights- take a left at the 1st intersection onto Main Rd.- follow for 3/4 mile to Westport Point Landing

HORSENECK BEACH RESERVATION:

Prov./Boston Rt. I-195- Exit 10 (Rt. 88 S)- follow Rt. 88 for about 10 miles, over the Westport Harbor Bridge- take right into Horseneck Beach Reservation

EAST BEACH:

Prov./Boston Rt. I-195- Exit 10 (Rt. 88 S)- follow Rt. 88 to John Reed Rd.- follow to end- make a left onto East Beach Rd.- follow to East Beach

THE NUBBLE (Acoaxet):

Providence Rt. I-195 East- Exit 8A (Rt. 24 South)- at first interchange, head South on Canning Boulevard- follow over the RI State line- follow for 1/2 mile- take a right onto Rt. 81 (Stafford Rd.)- follow Rt. 81 South for 7 1/2 miles into Little Compton- take a left onto Old Harbor Rd. (Adamsville, RI)- follow into Massachusetts- follow for 1/2 mile South to old Harbor Rd.- take left on River Rd.- follow for 3 miles to end- take a left onto Beach Ave.- follow to Acoaxet

Boston Rt. I-195 West- Exit 10- South on Rt. 88- follow for 7 1/2 miles- take right on Hix Bridge Rd.- take next right onto Main Rd.- take first left onto Adamsville Rd.- follow for 2 1/2 miles- take left on Old Harbor Rd.- take first left onto River rd.- follow to end- left on Beach Ave.- follow to Acoaxet

TRIPP'S BOATYARD:

Prov./Boston Rt. I-195- Exit 10 (Rt. 88 S)- follow to end- take right after the Westport Harbor Bridge- take left onto Cherry and Webb Lane- follow to Boatyard

**For information concerning
Celebrate Buzzards Bay 2001:
Swim**

Bob Rocha, 508/ 999-6363, ext. 202

Pull

Lucy Iannotti, Whaling City Rowing
Club, 508/ 997-4393

Bake

Marysarah Riggs, 508/ 999-6363, ext. 205

See our website at

www.savebuzzardsbay.org

**for registration materials and
more information.**

Celebrate Buzzards Bay 2001
highlights the role a clean and healthy
Buzzards Bay plays in all of our lives.
Join us in celebrating this irreplaceable
natural treasure. All proceeds from
Celebrate Buzzards Bay 2001 benefit
The Coalition for Buzzards Bay.

Call for Volunteers: Those of you who want to be part of a great event, we could use your help! Volunteers are needed to assist with boat inspection, parking cars, finish line coordination and other set up tasks. Call The Coalition for Buzzards Bay 508/ 999-6363.

Directions to Fort Taber:

- From Route 195 to Exit 15 (Route 18 South), go straight to fourth set of lights and turn left onto Cove Street.
- Continue on Cove Street until it becomes East Rodney French Blvd.
- Follow the hurricane wall along E. Rodney French Blvd. to the end.
- Proceed through the gates of Fort Taber and follow the signs to party.

Corporate Sponsors of the Coalition for Buzzards Bay:



COMPASS PRIVATE BANKING
Stay close to go far



- Buzzards Bay Brewing Co. ■ Cape Cod Life Publications
- Cuttyhunk Shellfish ■ Endeco-YSI ■ Fox 64/CBS 12
- Marshall Marine ■ Monaghan Printing
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- American Seafoods ■ Frank Corp. Environmental Services
- Keeper Springs ■ R&W Enterprises ■ Seattle's Best Coffee
- Acushnet Rubber Company, Inc. ■ Camp Dresser & McKee, Inc.
- Fiber Optic Center, Inc. ■ NStar ■ P.S.G./US Filter



**Celebrate
Buzzards Bay 2001
Swim, Pull and Bake**

Saturday, August 18, 2001



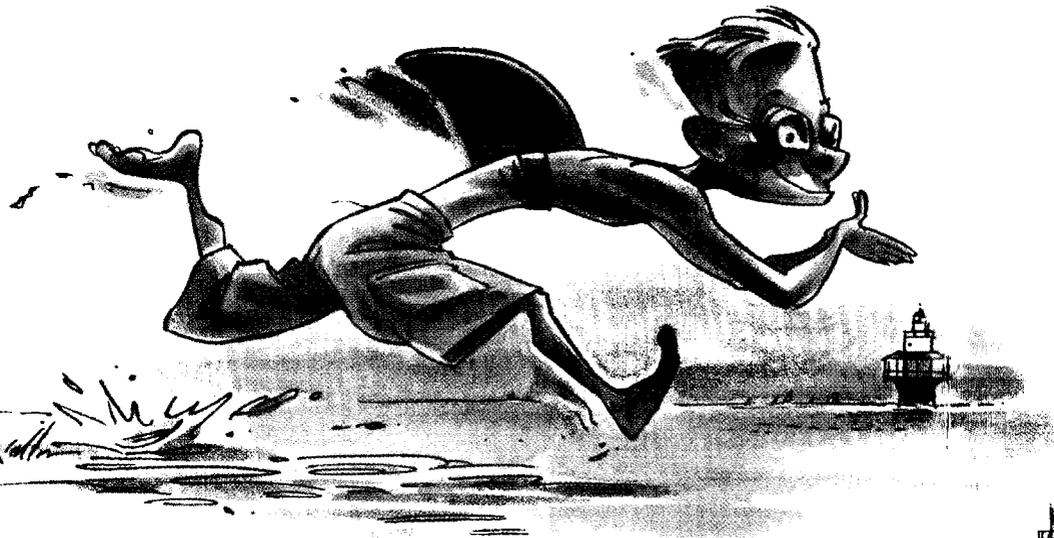
THE COALITION FOR BUZZARDS BAY

Swim Buzzards Bay

7:20 a.m. ■ Davy's Locker Beach

8th Annual 1.2 mile open water swim across outer New Bedford Harbor.

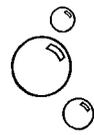
The open water swim starts at Davy's Locker Beach, New Bedford and finishes at Fort Phoenix State Beach in Fairhaven. Registered swimmers collect a minimum of \$125 in pledges and make the swim with the assistance of the local Coast Guard Auxiliary, police and fire departments, state safety officials, harbormaster and volunteer rowers and kayakers. All swimmers receive a medal after they cross the finish line. The swim concludes with an awards ceremony.



Registration Fee:

\$15 per swimmer by August 4, \$25 per swimmer after August 4.

Sponsorship: All pledges must be collected and returned by August 18 to be eligible for prizes.



Pull for the Bay

11:30 a.m. ■ Clark's Cove

Rowing and paddling boat race on Buzzards Bay

The Whaling City Rowing Club and Buzzards Bay Kayak are teaming up to sponsor a 3.5 mile, multi-class boat race on Buzzards Bay. The second annual Pull for the Bay leaves from Clark's Cove off the western shore of Clark's Point, moves around the point, turns north, passes around the Butler Flats Lighthouse, and returns around the point. The event is open to boats under oar or paddle.

Registration fee: \$25

11:30 a.m. Pull for the Bay departs from Clark's Cove

2:30 p.m. Awards ceremony



Bake for the Bay

5 p.m. - 10 p.m.

An evening celebration of food and fun on the shores of Buzzards Bay.

Our day of celebrating Buzzards Bay at the southern tip of New Bedford.

Bake for the Bay. The event features a variety of local businesses, traditional

ness, traditional

Bake includes

local beer and

The Blue

Join us for a

and dance under

out under the stars

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Tickets

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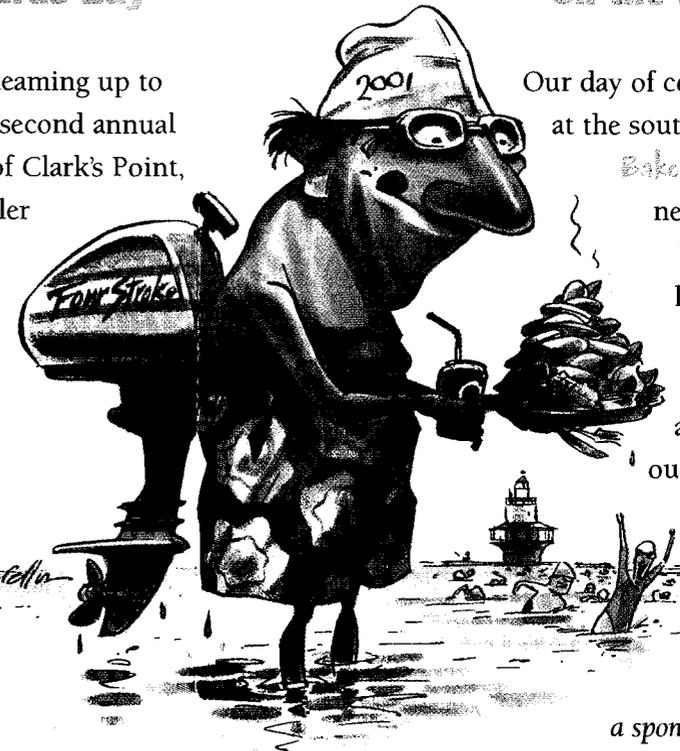
a sponsor of the Bake

tickets at any level above \$

receive prominent

To purchase tickets

enclosed c



BUZZARDS BAY *Current*

Volume 11, Number 2 Fall 1999

Buzzards BayKeeper **CBB to Launch On-the-Bay Advocacy Program**

The Coalition for Buzzards Bay is gearing up to launch the Buzzards BayKeeper in the Spring of 2000. The BayKeeper program will provide a full-time advocate to respond, investigate and take action to protect and restore the health and resources of Buzzards Bay and to help the public identify emerging environmental problems and their solutions. To accomplish these goals, the BayKeeper program will employ a specially-equipped boat to maintain an on-the-Bay presence.

The Buzzards BayKeeper will ultimately be able to access all the Bay's waterways to investigate and provide appropriate cleanup of pollution sources, enhance the Coalition's on-going water quality monitoring program and on-the-water educational efforts, perform habitat restoration, and provide a platform from which to educate and involve legislators, policy makers, and media in preserving Buzzards Bay.

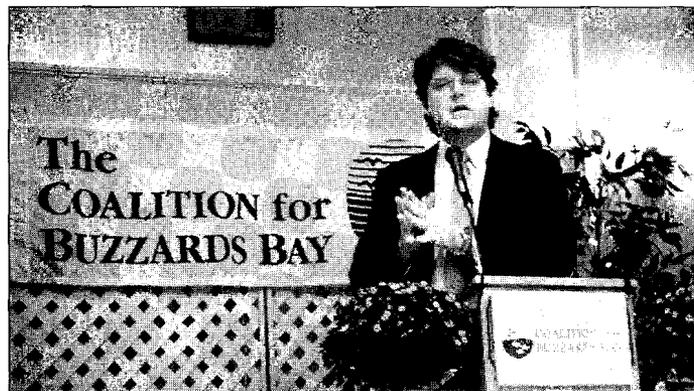
The GOALS of the Buzzards BayKeeper Program are:

- To protect the Bay from pollution and habitat degradation by rapidly investigating, documenting, and reporting these activities and provide appropriate follow-up action;
- To improve the health of the Bay by strengthening the role of The Coalition for Buzzards Bay and government agencies in preventing pollution and improving water quality;
- To expand and diversify the constituency of The Coalition for Buzzards Bay by raising public awareness and understanding of the health of the Bay;
- To provide support for existing and future ecological monitoring, environmental education, and habitat restoration efforts by The Coalition for Buzzards Bay.

Modeled on established 'Keeper' programs in nearly all of the nation's major waterways, the Buzzards BayKeeper will serve as the public's eyes and ears on the water and a visible presence

promoting stewardship and sustainable use of the Bay's resources. The Coalition for Buzzards Bay was admitted to the national Water Keepers Alliance and granted license to create the Buzzards BayKeeper in April 1999.

Hudson RiverKeeper John Cronin officially announced the start of the BayKeeper program at the Coalition for Buzzards Bay's



Hudson RiverKeeper John Cronin announced the approval of the Buzzards BayKeeper to the national Water Keeper's Alliance at The Coalition for Buzzards Bay's Annual Meeting

Annual Meeting at the Seaport Inn in Fairhaven in April. Referring to the growth of Keeper programs throughout the nation, John and Robert Kennedy, Jr., President of the Water Keepers Alliance and Chief Prosecuting Attorney for Hudson RiverKeeper, write in their 1997 book *The RiverKeepers*, "Each time a new Keeper program started, the public embraced the idea because people understood that watching a river, sound or bay should be the job of

someone in the community whose phone number was only as far away as directory assistance or a magnet on the

refrigerator door. The Riverkeeper philosophy is based on the notion that the protection and enjoyment of a community's natural resources requires the daily vigilance of its citizens." ➔

Fundraising Report: Buzzards Baykeeper

A five year start-up budget of \$496,500 including acquisition of a custom built boat, hiring of full-time staff, and support costs is needed to launch the Buzzards BayKeeper program by next Spring. With the exception of a \$45,000 grant secured from the federal Clean Vessel Act program to equip our boat with a portable boat pumpout, all funds for the Keeper will need to be raised privately. Our special thanks to the following donors from Quissett and Woods Hole who have generously contributed to the Keeper effort to date: Benjamin Beale, Mr. & Mrs. Darryl Buckingham,

continued on page 2

Our Bay Needs a Keeper

Mark Rasmussen, Executive Director

Consider these issues: a tanker cruising through the Bay cleans its hold discharging sewage, oil, and debris into the Bay, fouling our beaches and threatening marine life; wastewater treatment plants dump millions of gallons of inadequately treated sewage and toxics into the Bay each year; septic systems, agricultural wastes, road and other runoff pollute more than 8,000 acres of productive Bay shellfish beds; stormwater discharges to the Bay from roadways reveal neglect and mismanagement by town and state officials. Today, the Coalition for Buzzards Bay does not have the staff or resources available to respond effectively to these many, real threats to Bay health.

The launch of a full-time Buzzards BayKeeper represents a recommitment to putting a halt to harmful pollution in our Bay and reversing the documented decline in more than half of the Bay's harbors and coves. In the last issue of this newsletter we presented the initial findings of seven years of water quality monitoring work by The Coalition for Buzzards Bay. The results: many of Buzzards Bay's most important and sensitive areas are suffering from nutrient overloading caused by thousands of small and large pollution sources in the Bay's watershed.

Informed by this data and a better understanding of the Bay's problems and needs, we realized that The Coalition must elevate advocacy and follow-through on cleanup and enforcement of

environmental laws to as high a role in our organization as our existing research, education, and conservation work. We regard the launch of the BayKeeper program as a statement that the current state of much of the Bay is unacceptable and that the solutions to so many of our problems are going to take more resources to remedy than currently available.

In the coming months The Coalition will move forward on hiring a full-time staff person to lead the Keeper program and to construct a vessel capable of providing the on-the-water presence needed to properly monitor and investigate known and expected sources of pollution to the Bay. We are mindful of the unique person needed to head up this new effort. The Buzzards BayKeeper must be able to discuss Bay problems and solutions with shellfishermen as well as corporate attorneys and the media, be respected on the water as a skilled mariner and on land as a knowledgeable advocate, be an organized and careful investigator, have a keen understanding of the tools available to prevent and halt polluters, and be a strong, convincing advocate before permit or legislative hearings.

Finally, the support, knowledge and strength available from our fellow River, Bay and Sound Keepers throughout the country will ensure that our Buzzards BayKeeper has the tools needed to accomplish the job. This is an exciting step for our organization and the Bay. We are grateful for the vision and support of our members who have brought us to this point. ➤

BayKeeper Fundraising, from page 1

Mrs. George Clowes, Mr. & Mrs. Norman Cross, Mrs. Eleanor Garfield, Mr. & Mrs. Michael Garfield, Mr. & Mrs. Charles Goodwin, Mr. Jamie Hollis, Fred & Louise Makrauer, Mr. & Mrs. Jonathan O'Herron, and Mrs. Anne Sawyer. To make a year-end gift or pledge to support the Buzzards BayKeeper please contact Fred Makrauer, CBB Development Committee Chair at (617)965-3574 or Mark Rasmussen, Executive Director at (508)999-6363. ➤

Coming this Fall: Baywatchers II - Water Quality Monitoring Report

The long-awaited report of the Buzzards Bay Citizens Water Quality Monitoring Program will be completed later this Fall and mailed to all Coalition members. Expanding on the data presented on our 1992-98 poster released this past spring, the Report will provide detailed information regarding the health of each of the Bay's harbors and coves. Thanks to all our 1999 summer volunteers for a great season. ➤

The Coalition for Buzzards Bay

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Mark Rasmussen, Executive Director
Robert Foster, Education Coordinator
John Williams, Water Quality Coordinator
Michael Johnson, Land Pollution Specialist
Doree Lavoie, Administrative Assistant

Board of Directors

Patricia Bannell, Chairman, Buzzards Bay
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Brian Howard, Chairman, Mattapoisett
Gladys Lee, Chairman, Mattapoisett
Francis Makrauer, Chairman, Mattapoisett
Carl Merial, Chairman, Mattapoisett
Cathy Roberts, Chairman, Mattapoisett
Richard Rabin, Chairman, Mattapoisett
David Wall, Chairman, Mattapoisett

Dedicated to the restoration, protection and sustainable use and enjoyment of our irreplaceable Bay and its watershed. The Coalition works to improve the health of the Bay ecosystem for all through education, conservation, research and advocacy.

Swim Buzzards Bay Day '99

This year's Swim Buzzards Bay Day will certainly be remembered, not so much for the cancellation due to foul weather (the first such cancellation in the event's 6 year history), but the incredible support and good sportsmanship from all of the swimmers, sponsors, and volunteers who help us make the Swim the largest, outdoor environmental awareness event in southeastern Massachusetts.

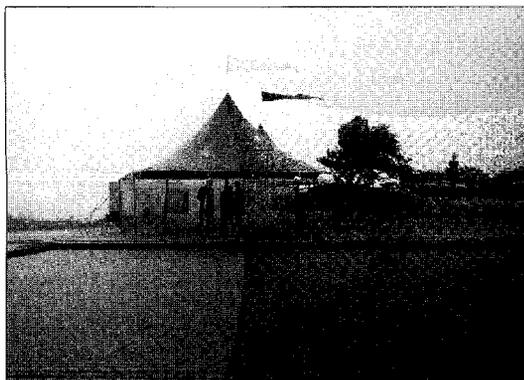
60 Swimmers broke our fundraising record this year by raising a total of \$19,000. Corporate giving also reached a new high of \$35,000 in cash and in-kind services. The Coalition for Buzzards Bay is pleased to recognize the following businesses for their major support of Swim Buzzards Bay Day 1999: Baker Books, Buzzards Bay Body Coaching, Buzzards Bay Brewing Company, Cuttyhunk Shellfish Farms, Fairhaven Shipyard, Monaghan Printing, Rodney Metals, The Standard Times and WFHN. Supporting Sponsors were BankBoston, Compass Bank, Edson International, Greater New Bedford YMCA, Logistics Management, MacLean's Seafood, Marshall Marine, Nantucket Nectars, Nye Lubricants, Schooners Ernestina & Larinda, Shannon Yacht and Tremblay Bus.

Our most sincere thanks to the 60 people who stood ready to take the plunge for the Bay. Your good nature and support throughout the morning was inspiring for us all. You not only make Swim Buzzards Bay possible, you make it a lot of fun.

We can't wait to see you all next year!

1999 saw more Buzzards Bay Swimmers than any year before:

Judith Archer, Jesse Archer, Jean Bennett, Peter Berthiaume, Andrea DesJardins, Sarah DiMare, Steven Finger, Joe Finnerty, Richard Flood, Deborah Gabriel, Jim Gammans, Philip Gaudet, George Hampson, Paul Henderson, Gregory Hickey,



Joshua Hoaglund, Jim Holden, Karl Honkonen, Gail Isaksen, Scott Jason, Elizabeth Kalife, Karen Kappes, Martin Kelley, Elizabeth Klim, Jack Lee, Cynthia Loranger, Daniel Lowney, Katherine McAfee, Jane McCann, Lyn Metivier, Marinia Michalec, Ellen Moore, Bruce Novis, Mary O'Toole, Gerry Payette, Kendra Perry, Ashley Poteet, Nancy Prentiss, John Rider, Sarah Rodrigues, Scott Robertson, Susan Sakwa, Ted Sherman, Brett Silva, Sarah Stafford, David Sturtevant, Sean Sullivan, James Sullivan III, Rhea Teves, Dan Vasconcellos, Leonard Verville, Joe Vinagre, Christine Walen, Shaun Walsh, Elizabeth Ward, Alice Ward, David Ward, Steven Warner, Diane Wedge, Sharon Wood.



TOP RIGHT: Swim Chairperson Ashley Poteet, Registration Director Scott Alfonse, and CBB Water Quality Intern Betsy White enjoy some time drying out in the tents. BOTTOM RIGHT: Swim volunteer Arthur Bennett serves up hot chowder to swimmers and volunteers as the rain came down. TOP LEFT: The record holders: David Ward of Fairhaven, 83, and Jean Bennett, 65, stood ready to take the plunge for the Bay at the Starting Line as the oldest participating swimmers. FAR LEFT: The Year We Swam the Streets — a few volunteers huddle beneath the tents at the Swim finish line at Fort Phoenix. NEAR LEFT: Seth Garfield, owner of Cuttyhunk Shellfish Farms and past CBB President, piles on the fixins' for CBB Board Member Craig Lindell at the Saturday night, pre-swim Bake for the Bay at Fort Rodman.

Permits in Wareham and Westport Seek to End Long-Standing Pollution Sources

The U.S. Environmental Protection Agency issued the first-ever pollution discharge permit for a dairy feed-lot in New England to the Pimental Farm in Westport in October. The permit allows "zero-discharge" of pollutants from the feed lot which houses up to 450 cows on 18 acres of riverfront land. Pollution and river habitat destruction caused by this animal feeding operation is unparalleled in the Bay area. The Coalition for Buzzards Bay joined with the Westport Fisherman's Association and others in criticizing the terms of the permit, which fell short in ensuring the halt of pollution from the property. We will continue to monitor the operation for violations of the Clean Water Act and other laws and pursue new approaches to stopping the discharge of waste into the Westport River if necessary.

In Wareham, the tidal reach of the Agawam River is one of the more heavily nitrogen-impacted regions within Buzzards Bay. Periodic fish kills, the loss of eelgrass habitats, bad odors, and the decline in oyster and other shellfish populations in the estuary affects everyone's ability to harvest shellfish, boat, swim and live near the river. To correct this problem, the EPA has proposed a revision to the discharge permit for the Wareham Wastewater Treatment Plant—the leading source of harmful nitrogen to the river system. The Coalition for Buzzards Bay has provided all of its water quality monitoring data documenting the pollution in the Agawam as well as detailed testimony in support of nitrogen removal for the Wareham Plant to the EPA. In the coming months, we intend to work cooperatively with the town and regulators to advance the timely cleanup of the Agawam.

F/V Cape Fear Salvage

After reports of a 2-mile wide oil sheen in Buzzards Bay on Thursday, August 5th, 1999 originating from the F/V Cape Fear salvage operation, the US Coast guard made a decision to permit the move of the salvage inshore to the mouth of Nasketucket Bay. Reports of smaller oil spills continued until the next day. Nasketucket is one of Buzzards Bay's most environmentally sensitive emplacements with a dense concentration of eelgrass habitat, extensive saltmarsh acreage and excellent shellfish resources. Fortunately, no serious spills or loss of natural resources occurred in Nasketucket. Most of the ship's 20,000 gallons of oil were released earlier in the Winter as the vessel sat on the bottom just off Cuttyhunk.

Serious concerns - compounded by a summer of barge accidents in and near the Canal - have been voiced by CBB members charging that decisions made by the Coast Guard and the Army Corps of Engineers in response to these incidents were ineffective in halting and managing real and potential at-sea pollution discharges in the Bay.

Over 8800 large vessels transit Buzzards Bay each year carrying an estimated 4 billion gallons of oil products. As a result of our investigation of the F/V Cape Fear salvage, The Coalition has been asked to participate in the southeastern New England Area Committee of the US Coast Guard where oil spill avoidance, preparedness and response issues are addressed.

Massachusetts Military Reservation

The Coalition for Buzzards Bay has joined with dozens of organizations on Cape Cod calling for the permanent protection of the northern 15,000 acres at the Massachusetts Military Reservation (MMR) as a Wildlife Refuge. In October, our efforts on this behalf took a giant leap as Governor Celluci announced the transfer of the Base to state environmental agencies. The Governor was joined in the announcement by past Coalition Executive Director Mimi McConnell who chaired the Community Working Group which developed the guiding principles for the future of the MMR.

The protection of the Upper Cape Cod Drinking Water Aquifer must be the single most important factor in managing land use at MMR. The northern, forested portions of the Base also contribute to the preservation of coastal water quality in eight Buzzards Bay harbors and coves from the Cape Cod Canal south to Falmouth. The geological characteristics of the Buzzards Bay Moraine running through this portion of the Massachusetts Military Reservation provide a rapid conduit for pollution entering groundwater to reach Buzzards Bay. We need only to look to the massive size and movement of the LF-1 groundwater plume to understand the nature of the aquifer's ability to deliver pollutants to the Bay.

In related news: The groundwater pollution Treatment Plant for the Landfill-1 groundwater plume emanating from the Base was officially "switched on" in September. The Plant will extract, treat, and replace most, but not all, of the contaminated groundwater flowing to Squeteague and Red Brook Harbors. Securing treatment for the plume was and continues to be a high priority for The Coalition.

Legislature: Community Preservation Act

The Massachusetts legislature passed the Community Preservation Act in early November making it possible for towns to adopt funding mechanisms to preserve open space. In letters and calls to watershed legislators in support of the bill, The Coalition urged representatives to act quickly to prevent the further loss of land to poorly planned development, writing, "Towns in the Buzzards Bay watershed are struggling to preserve scenic open space, farmland, parks and natural areas in the face of ever-increasing development pressures. The pattern and rate of growth in our area is also serving to deliver an excessive amount of pollutants to Buzzards Bay degrading water quality and marine habitat. There is a direct link between how and where development occurs in southeastern Massachusetts and Buzzards Bay water quality."

In the past decade, a number of Buzzards Bay towns have petitioned the legislature for approval to establish their own Community Preservation Funds or Land Banks. Bourne, Falmouth, Marion, Rochester, Dartmouth, Westport, and Gosnold have already expressed their desire to make proactive decisions about the preservation of open space. The Coalition for Buzzards Bay applauds these efforts (and the success of Marion and Cape Cod in passing such laws last year) as we move to adopt Community Preservation Funds in all of the Bay's towns.

The Coalition for Buzzards Bay

Help us Launch the Buzzards BayKeeper

The Coalition for Buzzards Bay is gearing up to launch the Buzzards BayKeeper in the Spring of 2000. The BayKeeper will be the Coalition's first On-The-Bay advocacy program working to respond, investigate and take action to protect and restore the health and resources of Buzzards Bay and to help the public identify environmental problems and their solutions. To accomplish these goals, the BayKeeper program will be centered around a specially-equipped boat. The Coalition for Buzzards Bay is looking to its membership and friends to identify the right boat. Please contact us if you have any information regarding new or high-quality used boats, engines or accessories that meet (or may meet) the needs outlined in this flyer.

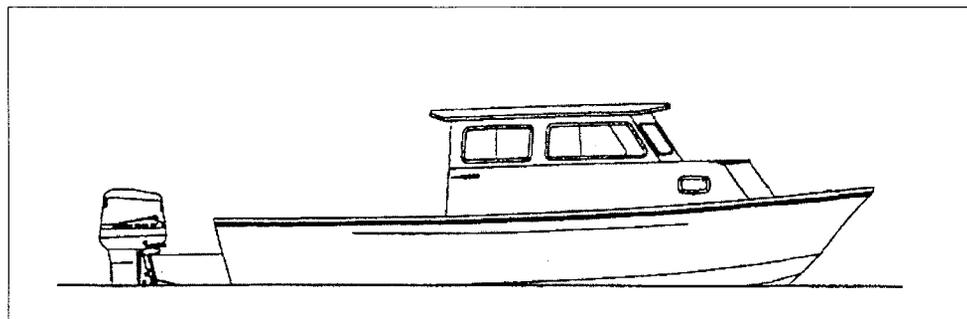
Background

The development of a Buzzards BayKeeper program fulfills a fundamental function of The Coalition for Buzzards Bay to restore, protect and provide for the sustainable use and enjoyment of Buzzards Bay and its watershed. We envision a program which will ultimately be able to access all the Bay's waterways, enhance the Coalition's on-going water quality monitoring program and educational efforts, perform habitat restoration, and provide a platform to educate and involve legislators, policy makers, and the media in preserving Buzzards Bay.

The Buzzards BayKeeper will serve as the public's eyes and ears on the water and a visible presence promoting stewardship and sustainable use of the Bay's resources. The program will be modeled on established 'Keeper' programs (ie. Hudson Riverkeeper, Long Island SoundKeeper) in nearly all of the nation's major waterways. The Coalition for Buzzards Bay was admitted to the national Water Keepers Alliance and granted license to create the Buzzards BayKeeper in April 1999.

The GOALS of the Buzzards BayKeeper Program are:

- To protect the Bay from pollution and habitat degradation by rapidly investigating, documenting, and reporting these activities and provide appropriate follow-up action;
- To improve the health of the Bay by strengthening the role of The Coalition for Buzzards Bay and government agencies in preventing pollution and improving water quality;
- To expand and diversify the constituency of The Coalition for Buzzards Bay by raising public awareness and understanding of the health of the Bay;
- To provide support for existing and future ecological monitoring, environmental education, and habitat restoration efforts at The Coalition for Buzzards Bay.



For more information or if you know of a boat that may meet the needs of the Buzzards BayKeeper, contact Mark Rasmussen, Executive Director, The Coalition for Buzzards Bay at (508) 999-6363.

Buzzards BayKeeper

Boat Needs & Target Specifications

1. Boat should be able to access all of the Bay's waterways
Shallow Draft for upper estuary and inner harbor monitoring, One hour travel time to all corners of the Bay from its home port in New Bedford Harbor.
Target Specs: maximum draft 24", <20" preferable, cruising speed of >20 knots
2. Boat should have large open deck
Wide beam to support passengers, monitoring equipment, and portable pumpout
Target Spec: >10' wide beam
3. Boat should be large enough and shaped to handle open Bay crossings
Large boat capable of making the Bay crossing to Cuttyhunk with full Pumpout tank and passengers in all seasons
**Target Spec: Commercial Quality vessel, 27'-28' centerline
Semi-V shaped fiberglass hull**
4. Boat should be able to comfortably transport people in all seasons
Target Spec: Forward trunk cabin with extension. Cabin heater.
5. Boat should have reliable engine which sets an example for clean boating
Target Spec: Twin 4-stroke outboard engines, Stern bracket-mounted with deck
6. Boat must be able to accommodate a portable pumpout tank for Marine Sanitary Wastes.
The Buzzards BayKeeper will be equipped to provide mobile pumpout service to boaters. When not doing pumpouts, the deck should not be restricted by any pumpout equipment.
Target Spec: 150-200 gallon, removable, plastic, washable tank & pump system

Additional Accessories (incomplete list)

Differential GPS Plotter with large screen, VHF Radio & Handheld, Cellular Phone, Depth Finder with water temperature reading, Radar, Safety Equipment, Spotlight, Marine Lap Top Computer, electrical outlets at stern & bridge.

Summary of Ideal Boat Specs for Buzzards BayKeeper

Length	Draft	Beam	Speed	Hull	Cabin	Engine
27-28	<24"	>10'	>20 knots	Semi-V	Forward trunk	4-stroke

Giant Bay Models Invade Watershed Classrooms

The Coalition for Buzzards Bay recently welcomed a new resident and teaching tool to the Buzzards Bay area, a 2 foot Bay Scallop. This soft-sculpture, anatomically correct, dissectible model was made for us by Bette Low of Westport. Coalition Education Coordinator Bob Rocha is working to develop classroom programs for various ages focusing on the animal's biology, life cycle, marine habitat, and threats to its well-being. Once it's ready, the scallop will become a key component of CBB's Bay education programs in watershed schools.

Following up on the Bay Scallop, the Coalition has commissioned two more Bay Life Models. With funding from the Massachusetts Environmental Trust, Bette will create a life size Harbor Seal and a Leatherback Turtle for us this winter. Each

species has a story that can be used to teach both kids and adults about marine biology, pollution, responsible bay use and habitat loss.

The Harbor Seal population in Buzzards Bay is among the fastest growing segments of bay wildlife. Less than a decade ago, a small winter population of a few dozen seals existed in the Bay, primarily along the western end of the Elizabeth Island chain. Today, the population has grown to 400-600+ seals.

Similarly, the Leatherback is the most common sea turtle found in Buzzards Bay, feeding principally on jellyfish. Leatherbacks can be seriously affected by marine debris, particularly floating plastics. Unable to distinguish inedible human litter and debris from natural food sources, many turtles die every year after eating floating plastic bags and other items which they mistake for jellyfish. Gentle giants, Leatherbacks are also slow to move in the water and are often injured or killed by speeding power boats.

If you would like to have this program brought to your child's school, please contact Bob at (508)999-6363. ➤

Buzzards Bay Scholarship Program Guidelines School Year 1999-2000

The Coalition for Buzzards Bay is offering a \$1,000 scholarship this year to a college-bound high school junior or senior in the Buzzards Bay watershed. The primary aims of this scholarship opportunity are to promote a greater understanding of the environmental health and wealth of Buzzards Bay and of the importance of protecting this resource. This program also provides us with the chance to reach high school students with bay education opportunities and publicly recognize students for outstanding achievement.

This year we will ask participants to focus on the smaller estuaries within Buzzards Bay. Scholarship candidates will be asked to choose two Bay estuaries and compare and contrast their natural and physical properties, watershed population and pollution sources, and current health. Full guidelines for the Scholarship are available by calling Bob Rocha, CBB Education Coordinator, at (508) 999-6363. ➤

We are pleased to welcome Crista Mellican as our new Education Assistant. Her teaching experiences include work at the Lloyd Center, Schooner Ernestina, and the New England Aquarium. She will be busy at CBB presenting our education programs in Bay-area schools.

ARE YOU GETTING BUZZWORDS?

The Coalition for Buzzards Bay publishes *Buzzwords*, a free, periodic newsletter for kids ages 6-13. *Buzzwords* features information and games about Buzzards Bay as well as articles written by Bay area kids. If you would like to be placed on the mailing list for *Buzzwords*, contact either Bob or Diane at the Coalition office.



CBB Education Coordinator Bob Rocha poses with Grade 4 students from the Winslow School in New Bedford at East Beach in the City's South End. The class had just completed CBB's week-long Shore to Shore Program which gets City students out to local beaches to study beach ecology, discover marine life, and clean up trash and debris.

THE COALITION FOR BUZZARDS BAY 1999 MEMBERSHIP INVITATION

Yes, I want to support a clean and healthy Buzzards Bay!

Name _____

Address _____

\$10 Student

\$25 Tern

\$50 Herring Gull

\$100 Cormorant

\$250 Great Blue Heron

\$500 Osprey

I would like to volunteer, please contact me.

Additional contribution \$ _____

The Coalition for Buzzards Bay is a membership-supported, 501(c)(3) nonprofit organization. All contributions are tax deductible. Please return this form with your contribution, payable to The Coalition for Buzzards Bay, 17 Hamilton St., New Bedford, MA 02740



CBB Elects Cape Cod Women to Board of Directors

At our Annual Meeting in May, Carolin Atchison and Tracey Crago joined the Coalition for Buzzards Bay's Board of Directors. CBB President Natalie Garfield noted, "We are extremely fortunate to have Carolin and Tracey on board at the Coalition. It is an exciting time for our organization and they both bring a wealth of knowledge of Bay issues and practical skills to our efforts."

CAROLIN H. ATCHISON — Carolin and her husband Sky Atchison live in the coastal village of Monument Beach in Bourne with their two dogs and one cat. She works as an aide to State Representative Eric T. Turkington (D-Falmouth) and serves on Bourne's Open Space Committee. Before moving to the Cape she was the Executive Director for Mulholland Tomorrow, a non-profit organization that protects the Scenic Corridor along Mulholland Drive and Highway in Los Angeles.

TRACEY I. CRAGO — Tracey is a Communicator for the Sea Grant Program at the Woods Hole Oceanographic Institution. In that capacity, she is involved in increasing public awareness and understanding of coastal and marine issues. Tracey is vice-chair of the Woods Hole Science and Technology Education Partnership (WHSTEP), a member of Governor Celucci's Coastal Resources Advisory Board (CRAB), and numerous marine educational organizations. She and her husband Ben reside in Quissett with their two children. ➤

Great Christmas Gift Idea! Save Buzzards Bay Baseball Caps



\$12 for CBB members
\$15 for non-members

Choose your favorite out of 22 Bay harbor or cove locations stitched on the back of this off-white baseball cap with blue stitching. Don't be caught without one! (We hear that Jimmy Buffett was seen wearing one of our Wareham River hats on stage this summer.) Call us at (508)999-6363 to place an order.

Position Available Development Director

The Coalition for Buzzards Bay is seeking candidates for the full-time position of Development Director. The Development Director will be responsible for the development and implementation of all aspects of fundraising in support of the Coalition's \$500,000+ annual budget and special projects. Strong people and communication skills and a passion for the Bay essential. 3 years fundraising experience preferred. Competitive Salary.

Send cover letter, resume & writing sample to:
Mark Rossmisen, 17 Hamilton St., New Bedford, MA 02740

Non-profit
U.S. Postage Paid
New Bedford, MA
Permit No. 375

Coalition for Buzzards Bay
17 Hamilton Street
New Bedford, MA 02740
(508) 999-6363
Address service requested

BUZZARDS BAY *Current*

Volume 13, Number 1 Fall 2001

Makepeace Withdraws Development Proposal; Conservation Alternative Available

Plans to construct the largest real estate development ever proposed in New England at the head of Buzzards Bay were defeated this month when the A.D. Makepeace Company withdrew their proposals from Town Meeting warrants in Plymouth, Carver and Wareham. The withdrawal came following a series of public meetings held by The Coalition for Buzzards Bay, town officials and concerned citizens to educate people about the negative impact the Company's plans would have on the environment and the quality of life in our communities.

The proposal would have allowed the Makepeace Company to develop up to 6,000 houses, 6 million square feet of commercial space, four golf courses, and a hotel/resort center on 6,000 of the Company's 9,700 acres in Plymouth, Wareham and Carver - densities of up to four times that allowed under current zoning laws. The land is currently home to globally rare habitats, such

as pine barren forests, cranberry bogs, ponds, rivers and streams, and one of the largest aquifers in New England that directly affects the quality of area drinking water.

Following the filing of rezoning articles in each of the towns, The Coalition for Buzzards Bay formed a partnership with the Wildlands Trust of Southeastern Massachusetts and the Conservation Law Foundation as well as local organizations, L.A.N.D. in Wareham and Plymouth for Smarter Growth, to create the Cranberry Country Coalition: Plymouth, Carver, and Wareham for Smarter Growth. Former Coalition Board member and President, Susan Peterson, was hired to coordinate the regional public outreach campaign aimed at defeating the Makepeace plans.

The Coalition's move to publicly oppose the Makepeace Company's plans marked an important shift in the organization's approach to the future of the Makepeace lands. Two years ago, the

Coalition worked to pull together the Southeastern Massachusetts Conservation Partnership to offer the Makepeace Company an alternative to the development of their lands. Recognizing the importance of the land for both water quality and biodiversity, The Nature Conservancy, Trust for Public Land, Massachusetts Audubon Society, The Trustees of Reservations, The Coalition for Buzzards Bay, Wildlands Trust of Southeastern Massachusetts, US Forest Service, US Fish & Wildlife Service, MA Division of Fisheries & Wildlife and the MA Department of Environmental Management all came together in an unprecedented partnership to offer to purchase the Makepeace property for permanent protection.

The Partnership offered to purchase the lands for conservation in May 2001 and was rejected by the Makepeace Company. Despite the rejection, discussions between

Continued on Page 3

Watershed Campaign to Preserve 10,000 acres of Bay lands



The 240 acre Beaton property in Marion is one of the areas to be protected as part of the Watershed Campaign. It comprises more than half of the watershed to Hammetts Cove at the head of Sippican Harbor.

The Buzzards Bay watershed is defined by its scenic shorelines, cranberry bogs, coastal farms, and large woodlands which provide a strong sense of place for the region's 360,000 inhabitants. These attractive - and ecologically important - landscapes are expected however to contribute to the doubling of the region's population within the coming decade. With less than ten percent of the Buzzards Bay watershed west of the Cape Cod Canal permanently protected from development, the projected population explosion and consequent loss of open space could forever alter the landscape and the health of the Bay.

To respond to this threat, The Coalition for Buzzards Bay has recently partnered with the The Trustees of Reservations and the Bay region's ten local land trusts to plan a regional land protection campaign: The Watershed Campaign. The Trustees of Reservations is the nation's oldest private, statewide conservation organization. Founded in 1891, The Trustees have protected over 44,000 acres of land in Massachusetts.

Continued on Page 3

Sprawl is Greatest Threat Our Bay Has Ever Faced

Mark Rasmussen, Executive Director

Buzzards Bay has the distinction of being one of the healthiest estuaries on the East Coast, having avoided the serious problems which have devastated Chesapeake Bay, Long Island Sound, and even Narragansett Bay next door.

It is not a coincidence that we are among the healthiest and have one of the least developed watersheds of any of these east coast estuaries. The health of the Bay is directly linked to watershed land development. Research in the Chesapeake Bay region, has shown that for every acre of forest lost to development, nitrogen pollution in the Bay increases. Even forests far inland, and particularly those along our rivers and streams, are important to preserving the health of the Bay. Amazingly, 65% of the lands in the Buzzards Bay watershed remain undeveloped, are largely forested, and today are threatened with development.

More land was developed in Bristol and Plymouth Counties in the past 30 years than in the previous 350 years since the Pilgrims landed at Plymouth. Our corner of New England has been discovered and more than 200,000 new people are forecasted to move into southeastern Massachusetts in the next 20 years. Moreover, trends show that these new Bay residents won't be moving into the region's cities, they'll be looking for new houses, in new subdivisions, in the most rural parts of our area and threatening the foundation of forests and wetlands that support the Bay watershed's natural resources, scenic beauty and overall quality of life.

Buzzards Bay is therefore being challenged with a new threat, one that is entirely different from only 20 years ago. Urbanized areas such as Clarks Cove in New Bedford have undergone an exciting restoration over the past decade, while areas once considered pristine such as the Slocums River, Padanaram Harbor, and the Weweantic River are in serious decline. The Bay's future challenges are no longer urban, they are suburban. As growth consumes the watershed, nitrogen pollution from thousands of septic systems, acres of lawns, and miles of new roads and driveways compounded by the loss of the Bay's natural filters - forests, wetlands, and open spaces - represents the greatest long term threat the Bay has ever seen.

The Watershed Campaign and the partnership that has been formed between The Coalition for Buzzards Bay, Trustees of Reservations and the Bay area's local land trusts (front page) represents an exciting opportunity to create a different future for our area. The problem of sprawl development is much bigger than any of our organizations or towns alone and requires a bold approach. Working together, we have the capacity to achieve land protection on a scale never before seen in Massachusetts and accelerate conservation efforts along Buzzards Bay in order to become more competitive with the region's development pressures. In the coming months, you will be hearing a lot more about our Baywide land protection efforts and we urge you to get involved in your town to preserve the special open spaces that define our region and the health of Buzzards Bay. ▶

As growth consumes the watershed, nitrogen pollution from thousands of septic systems, acres of lawns, and miles of new roads and driveways compounded by the loss of the Bay's natural filters - forests, wetlands, and open spaces - represents the greatest long term threat the Bay has ever seen.

The Coalition for Buzzards Bay

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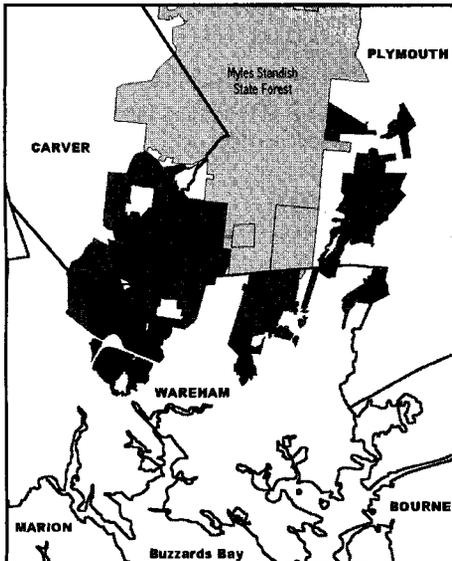
Dedicated to the restoration, protection and sustainable use and enjoyment of our irreplaceable Bay and its watershed. The Coalition works to improve the health of the Bay ecosystem for all through education, conservation, research and advocacy.

Makepeace Continued . . .

the Partnership and Makepeace have continued and local, state and national support for the purchase is strong and continues to gather support. In a recent poll conducted by WBZ/Boston Globe Pollster Gerry Chervinsky, the majority of people polled in Wareham and Plymouth said they supported permanent conservation of the Makepeace lands over any development.

Faced with the serious threat to the Bay posed by the Makepeace rezoning proposals, the Coalition for Buzzards Bay chose to leave the Partnership in order to actively oppose the project and educate citizens about the negative impact of the plans on our environment and communities.

"The Conservation Partnership represents a viable alternative to development and an opportunity for the Makepeace Company to create a wonderful legacy for the region" stated Coalition Executive Director Mark Rasmussen. "With such strong public opposition to the development of these lands, we truly hope that that the Company takes a step back and reconsiders conservation." ➤



The Makepeace property (dark grey) spans 9,700 acres in Carver, Plymouth and Wareham and includes nearly the entire length of two of Buzzards Bay's largest rivers - the Wankinco and the Agawam.

Makepeace: The Case for Conservation

The 9,700 acres of forests, wetlands, rivers, ponds and cranberry bogs owned by the A.D. Makepeace Company in Plymouth, Carver and Wareham comprise one of the largest and most biologically-rich blocks of land remaining in all of southern New England and lie entirely within the Buzzards Bay watershed. A few facts:

Water

- The Makepeace lands include nearly the entire length of both the Wankinco and Agawam Rivers as well as numerous streams which supply approximately 10% of all freshwater flow to Buzzards Bay through their confluence in the Wareham River Estuary. The health of these rivers directly affects the health of Buzzards Bay.

- The Makepeace lands sit on top of the Wareham-Carver Aquifer – the second largest, clean underground drinking water supply in the State – with large portions of the property lying within the "Zone II" for the Town of Wareham drinking water wells. A Zone II describes the land surrounding a public drinking water well identified by the State Department of Environmental Protection as the most critical for protecting drinking water quality. 7,200 homes and businesses in Wareham currently drink the water that flows under the Makepeace lands.

Land

- The Makepeace lands include the most pristine, and perhaps largest, unprotected pine barrens forest in North America and coastal plain ponds considered to be globally-significant for the protection of rare and endangered species and habitat types. The Makepeace property is home to plants and animals found almost nowhere else on the planet such as the Plymouth gentian and Plymouth redbelly turtle.

- By combining the Makepeace lands with the abutting Myles Standish State Forest, the result would be the largest contiguous block of protected open space in Massachusetts and the greatest conservation opportunity since the creation of the Cape Cod National Seashore in 1961.

Campaign Continued . . .

Andy Kendall, Executive Director of The Trustees of Reservations, calls it a natural partnership. "The Coalition began focusing on land preservation to protect the Bay's water quality in 1998. The Trustees' own 1999 statewide Land Protection Action Plan directed us to increase conservation efforts in Buzzards Bay, recognizing the growing threats to special places in the region."

Over the next three years, the Watershed Campaign seeks to the preserve more than 10,000 acres of important landscapes, habitats, and natural resources in the Buzzards Bay watershed. An education facility will also be established and newly protected open space will be available to the public for passive recreation. Finally, a revolving land conservation fund will be established to assist Bay area land trusts on future land protection projects.

The Coalition has become increasingly alarmed by the decline of many of the Bay's most important and pristine estuaries that we have been monitoring since 1992, areas such as the Westport River, Slocums River, Padanaram Harbor, Inner Sippican Harbor, the Weweantic River – estuaries defined by their rural character; their undeveloped shorelines and watersheds. Pollution along these estuaries is not coming from polluting industries or Sewage Plants. It's coming from land development in our watershed – from the sprawl development that is consuming our region's forests and farms and replacing them with new housing developments, roads, and shopping malls.

Mark Rasmussen, Executive Director of the Coalition for Buzzards Bay, says the Watershed Campaign offers a rare chance to accelerate land protection in the region at a critical time in the region's history. "With nearly 65% of the Bay's watershed still undeveloped, we have a great opportunity to preserve the natural resources, scenic beauty and quality of life we all cherish in the Buzzards Bay area before it is lost to urban sprawl." ➤

Consent Decree Signed

in Pimental Feed Lot Suit

The Coalition for Buzzards Bay and the Westport Fisherman's Association (WFA), signed a Consent Decree this past Spring in our pollution case with the Pimental Feed Lot in Westport. The Decree was filed as an order of the Bristol County Superior Court and the successful implementation of its terms will be overseen by the Court.

In our lawsuit, The Coalition and WFA presented water monitoring data and other evidence that the Pimental Feed Lot discharged excessive amounts of manure and other animal wastes into the Westport River and its tributaries resulting in pathogen and nutrient contamination of the river.

The parties released a joint press statement at the Court which stated, "The parties are gratified that fair and reasonable discussion has led to this cooperative effort and that a major positive step has been taken that is specifically designed to immediately alleviate pollution problems, and to look toward a total elimination of these problems within one year of this date."

The resolution of this complicated pollution lawsuit was negotiated between the Coalition, WFA and Mr. Pimental, and calls for the phased elimination of manure and agricultural runoff pollution into the Westport River and its tributaries by the Feed Lot operation. All parties agreed that the Consent Decree represented a "fair and equitable resolution of this lawsuit in a way that recognizes the value of responsible and reasonable dairy farming that does not damage or compromise valuable water resources such as the Westport River, Snell Creek and associated wetlands."

The Coalition for Buzzards Bay and Westport Fisherman's Association continue to monitor the Feed Lot's compliance with the terms of the court-ordered Agreement. We are thankful to our attorneys in the case, Philip N. Beauregard and Karen Augeri Benson, for their guidance, expertise and passion in addressing this significant pollution problem. ➤

Wareham Sewage Plant

takes Positive Step Forward

The Coalition for Buzzards Bay provided comments to the state Environmental Affairs Office expressing its support for the approach proposed by the Town of Wareham regarding necessary upgrades to their Wastewater Treatment Facility. Under the proposal, the Town responded to evidence provided by The Coalition for Buzzards Bay and their own consultants that the Plant is seriously impacting the health of the Agawam and Wareham Rivers by discharging excessive nitrogen and phosphorous pollution. The Coalition has been monitoring the health of the rivers since 1992 and often records the worst water quality in all of Buzzards Bay at the Route 6/Sandwich Road bridge just downstream of the Sewage Plant's discharge. To address the problem the town will undertake a \$25 million upgrade to the Sewer Plant to update old equipment, add nitrogen and phosphorous removal technology and eliminate the use of toxic chlorine for disinfection by replacing it with ultraviolet light. The upgrade will greatly improve water quality as well as the health and abundance of fish and shellfish in the rivers.

Despite our support for the improvements proposed for the Wastewater Treatment Plant, the Coalition for Buzzards Bay raised concerns that the Plan will promote new sprawl development by adding 21.8 miles of new sewer mains to the town, many in undeveloped areas, particularly on Indian and Great Necks. In response to this threat, the Coalition urged the state Secretary of Environmental Affairs to require the town to assess the full development build-out that the new sewer lines will encourage throughout the town and propose growth management measures to address it. Without a plan to manage growth, improvements made to water quality from the upgraded sewer plant will be diminished by runoff pollution from new development.

The Secretary recognized our concerns and has required that the Town evaluate the potential growth impacts of the new sewer extensions on the town in a full Environmental Impact Report. ➤

Turn The Tide - Restore Dartmouth's Estuaries!

The Partnership to Restore Dartmouth's Estuaries (formerly the Slocums/Paskamansett River Restoration Project) grew in scope and commitment over the summer with the addition of Apponagansett Bay to the project. Known as Padanaram Harbor to many, Apponagansett joins the Slocums, Little and Paskamansett River System and expands the project to include all of Dartmouth's degraded coastal estuaries.

With the support of Dartmouth town officials, The Coalition for Buzzards Bay, University of Massachusetts Dartmouth - School for Marine Science and Technology

(SMAST), and the Lloyd Center for Environmental Studies announced the addition of Apponagansett to the effort and renewed their commitment to developing a comprehensive strategy to guide the restoration of the health of these ecosystems at the Lloyd Center's annual clambake in July.

In all years (1992-present) of monitoring by The Coalition for Buzzards Bay's Baywatchers program, water quality in the Slocums and Little River Estuaries and Apponagansett Bay has exhibited signs of often severe pollution and species loss. These estuarine systems are among the

worst in all of Buzzards Bay - showing the greatest level of nutrient-related water quality impairment.

The Restore Dartmouth's Estuaries project seeks to evaluate the full range of pollution entering the rivers and bay and establish a clear strategy for restoring water quality, shellfish abundance and wildlife populations. The partners are currently pursuing private and government sources of funds to support the project's \$1.8 million, 4-year budget and look forward to a launch of intensive research activity next year. ➤

Wanted: A Pair of Osprey to Care for New Home on Palmer's Island

The Coalition for Buzzards Bay, Whaling City Rowing Club and the City of New Bedford teamed up on June 30, to tackle, once again, the trash problem on

for Buzzards Bay for its continuing efforts to not only raise awareness about the importance of a clean environment but to actually roll up their sleeves to help get that done."

The Coalition and the City of New Bedford also took another important step in installing the New Bedford Harbor Osprey Platform. An osprey platform was erected on Palmer's Island to encourage the return of Buzzards Bay's namesake birds to the harbor.

The platform was installed on the Palmer's Island by Coalition BayKeeper Captain Seth D. and the City Department of Public Works and was completed and dedicated by Mayor Frederick M. Kalisz, Jr. on June 30. It is the Coalition's and the City's hope that the platform will attract a nesting pair of ospreys next spring. The osprey platform, located at the harbor's entrance, will stand as a powerful symbol of the harbor's environmental restoration. "We hope this

nest and its eventual inhabitants will serve as a constant reminder of the work before us and the benefits to the entire community of a clean and healthy harbor," commented Mark Rasmussen, Executive Director of The Coalition for Buzzards Bay. ➤



Mayor Kalisz puts the finishing touches on New Bedford's first osprey nest.

Did you know that Ospreys...

- Plummet feet-first up to 120 feet toward a single fish in the water.
- Can snap their talons shut in 2/100 of a second.
- Catch and eat live fish only, with few exceptions.
- Generally pair for life, but might "divorce" if mating is unsuccessful.
- Females choose males on the basis of real estate (location, location, location and size).
- Can use hula hoops, rag dolls and toy boats as nesting materials.
- Will grow accustomed to repeated activities like cars driving by.

Do you remember what made you care about Buzzards Bay and its watershed's forests, rivers & open spaces? Are you concerned about a particular issue affecting the Bay? Please share your story with us so that we can share it with others, through our newsletter and other publications.

Vertical lines for a contact form.

If you need additional space, please include a separate sheet with your donation



ir bags of

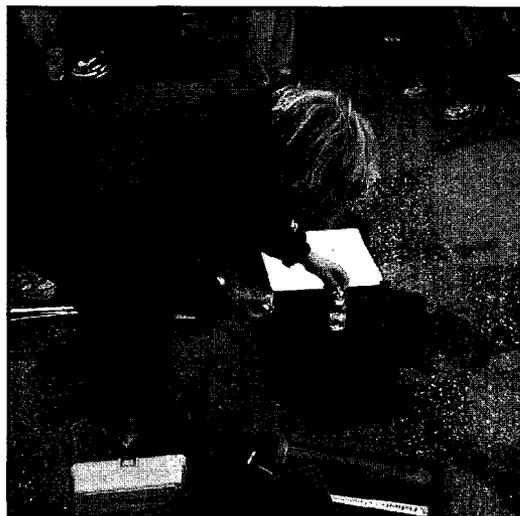
R/V BayKeeper Completes Second Season on the Bay

The 2nd summer season for our on-the-water Boat program was a busy one. CBB's vessel was heavily involved in collecting water quality samples, performing boat pump-outs, participating in public outreach, and acting on pollution sightings. With the aid of the R/V BayKeeper an increase in the number of water quality sampling sites was achieved. Water Quality Coordinator, Tony Williams, said, "The boat has allowed us to get to several more sites and will help investigate problem areas more efficiently." BayKeeper also removed 1800 gallons of boat pump-out waste at Cuttyhunk island this summer. Several local harbors are better informed with respect to clean boating practices, thanks to visits made by the BayKeeper. The boat also reported several pollution sightings to the appropriate agencies in order to correct the situations. The Coalition extends its gratitude to the Fairhaven Shipyard for its continued support of our program through their donation of a slip.

Thank You

Baywatchers

The tenth consecutive *Baywatchers* water monitoring season began in May and concluded on September 19, 2001. More than 75 volunteers continued to monitor the coves, inlets and harbors throughout Buzzards Bay from Woods Hole to Westport on a weekly basis to record information on water quality. Water Quality Monitoring Coordinator Tony Williams and CBB send a huge "Thank-you" to all of the great volunteers who made this yet another very successful season. In addition, we appreciate the access and assistance given by the marinas, waterfront homeowners, towns, local agency personnel, and many others who contributed to the 2001 sampling season. Finally CBB would like to thank YSI Massachusetts in Marion for donating a Model 600XL sonde and electronic Dissolved Oxygen/Temperature/Salinity/Depth display unit to assist us in collecting more detailed data, more quickly. ➤

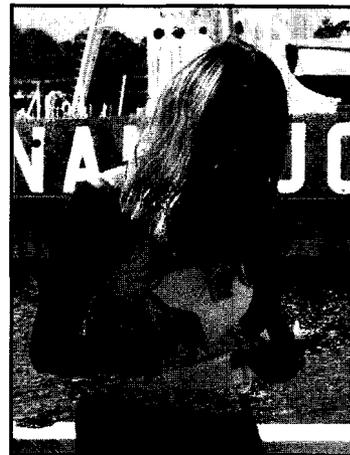


Peter Kulberg (top) and Louise Anthony (bottom) train to become Baywatch volunteers. Nicole San Juan (right) records data while sampling New Bedford Harbor.

Nicole San Juan

2001 Assistant Water Quality Monitoring Coordinator

Nicole San Juan, a recent graduate from Old Rochester Regional High School, started volunteering with the CBB back in November 2000 when she assisted Bob Rocha, Education Coordinator. In July, Nicole returned to work as the Assistant Water Quality Monitoring Coordinator under the direction of Tony Williams. Nicole has lived in the Buzzards Bay watershed all her life. She plans to attend Broward Community College, Fort Lauderdale, FL, in 2002. Subsequently, she plans to pursue interests in wildlife biology. "Working with Tony this summer was an interesting and valuable experience that will undoubtedly have a great benefit on my studies. I was so lucky to have such a 'hands on' opportunity and to be able to work in the field so soon after high school," said Nicole. The Coalition staff would like to wish Nicole all the best in her future endeavors and thank her for all she's done. ➤



A Call for Volunteers

If you'd like to help your local community gain a better understanding of the short and long-term changes occurring in Buzzards Bay then we encourage you to join CBB's *Baywatchers* Team. For more information on volunteering contact Tony Williams at 508-999-6363, ext. 203.

Quality of CBB Data Receives Seal of Approval

On June 25, 2001, for what is believed to be the first time by a citizens monitoring group in New England, CBB's citizens volunteer water quality monitoring program, *Baywatchers*, was reviewed by a panel of outside experts. The panel focused on the program's effectiveness, program implementation and areas for improvements.

The review panel recently submitted its comments which highly praised the program and its volunteers. Comments included: "the Peer Review Team is very impressed with the effectiveness of the *Baywatchers* Pro-

gram and believes that it unquestionably supports the overall goals and mission of the Coalition for Buzzards Bay".

The Coalition wishes to thank the Peer Review Team members for their time and input to the monitoring program: Virginia Lee-Rhode Island Sea Grant Extension Leader, Peter Milholland-Friends of Casco Bay Water Quality Monitoring Coordinator, Bruce Rosinoff-U.S. Environmental Protection Agency, and John Waterbury, PhD-Woods Hole Oceanographic Institution.

In addition to this review, program co-

ordinator Tony Williams, and Dr. Brian L. Howes of SMAST recently updated the *Baywatchers* monitoring program's 1996 Quality Assurance Project Plan (QAPP). The plan ensures that the volunteer monitoring program and the resulting data has U.S. Environmental Protection Agency (EPA) acceptance for a known and suitable quality and quantity. The revised QAPP was approved by the EPA and the Massachusetts Department of Environmental Protection in August 2001. ➤

CBB Goes to School

The past school year was the busiest in CBB's history. Our three Marine Life Series programs, *Blue Eyes and Blue Water*, *The Deal with Seals* and *Do We Sea Turtles in Buzzards Bay?* proved to be very popular with students and teachers alike and were offered at no cost to schools throughout the watershed. In addition, 25 teachers attended a 2-part workshop offered by Education Coordinator Bob Rocha, via the *Newspaper in Education* program sponsored by The Standard-Times. ➤



CBB Education Assistant, Pam Ellis, teaches Westport Elementary students about sea turtles in the Bay using our life sized leatherback turtle model.

2000-2001 School Year by the Numbers

Students Taught:	7304
Teachers Participating:	286
Schools visited:	39
Watershed Towns Represented:	11

2001 Spotlight on Buzzards Bay Art Contest

Thursday, May 31 proved to be a fun evening for CBB and several talented young artists. An award ceremony was held at the Marion Art Center for the 2nd bay-wide *Spotlight on Buzzards Bay* art contest. This contest is open to all grade six students throughout the watershed. Our Education and Outreach Committee had the difficult task of choosing 12 winners out of over 800 entries. ➤



2001 Art Contest participants (from left to right): Lauren Barber, 1st Place; Chelsea Skipwith, Honorable Mention; Sarah Mulvey, 5th Place; Caitlin Hogan, Honorable Mention; Marcel Plante, 2nd Place; Jeremy Lambalot, Honorable Mention.

Marine Models

The Coalition for Buzzards Bay is now the proud owner of three unique and engaging teaching tools. These resources, created by Third Realm Productions of Dartmouth, are anatomically correct, soft-sculpture, dissectible models of animals found locally. "Argo" is a 26-inch diameter Bay Scallop, "Lucille" is a life-sized Harbor Seal and "Lettie" is a life-sized Leatherback Turtle. These models are featured in programs created by CBB that focus on each animal's role in the bay, its relationship to humans and ways we can minimize our impacts on each animal and ultimately Buzzards Bay. Response to the models and the accompanying programs has been very positive. One watershed teacher commented, "This is a wonderful program for our students. I would like to see it continued and become part of our curriculum." Lucille and Lettie were funded through a grant from the Massachusetts Environmental Trust. ➤

Join Us for a Watershed Walk

Feel like taking a walk? Interested in seeing a bit more of the Buzzards Bay watershed? Want to learn about some of the local flora and fauna? Join Bob Rocha, CBB's Education Coordinator, on two walks this fall:

Sunday, November 18, 10:30 a.m. –12:30 p.m.
Flora B. Peirce Nature Trail, New Plainville Rd., New Bedford.

Sunday, November 25, 10:30 a.m.–12:30 p.m.
Winsegansett Marshes, Sconticut Neck Rd., Fairhaven.

Scavenger hunt sheets will be available for anyone who wants an extra challenge. Wear good walking shoes and dress accordingly. In case of torrential rain, the rain date will be the following Sunday. Please call Bob at the CBB office, 999-6363, ext. 202 for information and directions or to sign-up. Each walk is free to members, \$3 for non-members.



From top: As the R/V Baykeeper patrols the area, swimmers line up for the start of the 8th Swim Event; CBB's own Mike Labossiere prepares the field for the clambake; The Nautical Whalers Parrot Heads serve up the feast at the "Bake"; David Ward, 84, the oldest swimmer to compete, can still smile after 1.2 miles; George Correa keeps a watchful eye on swimmer Christine Walen.

A Day of *Celebration*

Sunny skies, light breezes, and a healthy Bay brought together more than 300 swimmers, oars-men and women, and Bay enthusiasts to "celebrate" Buzzards Bay at the *Celebrate Buzzards Bay 2001* event. August 18th proved to be an action packed day of sportsmanship, teamwork, friendship, music, and great food! *Swim Buzzards Bay* kicked off the day as the sun was rising over New Bedford Harbor. As the swimmers were toweling off from their 1.2 mile swim, oars and paddles were set to start the 2nd Pull

for the Bay multi-class boat race. These swimming and boating aficionados then had a chance to unwind and tell of their successes at the *Bake for the Bay*. In addition to raising money for CBB's education, conservation, research, and advocacy programs this day of celebration served as an important reminder of the role a clean and healthy Bay plays in all of our lives and in the life of our region. Out deepest thanks to the hundreds of participants and dedicated volunteers who made this event a great success! ➤

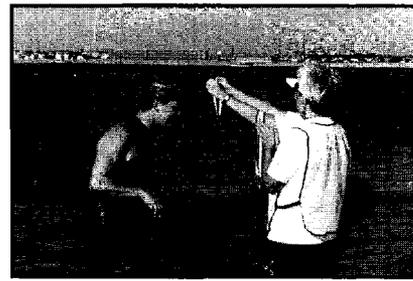
Swim Buzzards Bay

Celebrate Buzzards Bay 2001 was kicked off as the sun rose over New Bedford Harbor. Sixty swimmers showed their support for clean water and a healthy Bay, as they swam 1.2 miles from Davy's Locker Beach in New Bedford to Fort Phoenix State Beach in Fairhaven. As the horn sounded the start of the first of two waves at 7:20 am, swimmers, cheering fans, volunteers, and escort and spotter boats brought the clear and quiet morning to life.

The group of swimmers ranged in age from 15-84, with most residing in local watershed communities;

however, some swimmers came from as far as New Jersey. The swimmers showed their dedication to keeping Buzzards Bay clean and healthy not only by joining in the *Swim*, but also by raising over \$15,000 in individual contributions.

Weather conditions permitted a successful swim, even as winds picked up out of the Northwest later in the race, the swimmers found their way to the finish line. To keep swimmers safe and on target as they journeyed across the harbor, our own R/V *BayKeeper* in conjunction with other on-the-water support kept the area clear of boating traffic.



From top: Swim winner, Jim O'Rourke of Marion receives his finisher's medal and a round of applause; Top fundraiser, Sarah Twichell of Falmouth and Cuttyhunk Teammate, Ashley Eastman show off their finisher's medals.

Twenty-four minutes and thirty-five seconds after the sounding of the start, Jim O'Rourke of Marion crossed the finish line first as fans and volunteers cheered. Not far to follow, the first woman and second place finisher over-all, April Stimson of East Providence, finished with a time of 25:55. At the finish line an enthusiastic crowd cheered as volunteers placed gold finisher's medals around each swimmer's neck. Swimmers and spectators replenished themselves with food and drink donated by several local businesses.

Awards were presented to top finishers in all age categories as well as to participants who raised the most money in donations. For the second year in a row, Sarah Twichell of Falmouth brought in the largest amount in sponsor money, over \$1000. Rhea Teves of Fairhaven came in a not too distant second with over \$980 raised. Many thanks go out to these two dedicated women and all the swimmers who raised money for our programs.

The great success of the *Swim* would not have been possible without the incredible support given by volunteers, Corporate

Continued on next page



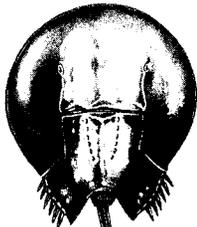
**Support a clean and healthy Bay
this Holiday season!**

Coalition For Buzzards Bay T-Shirts

A terrific gift for Bay-lovers everywhere!

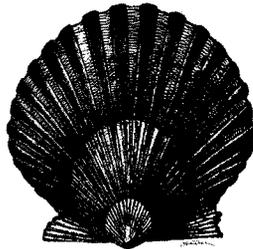
These beautifully detailed t-shirts were designed exclusively for CBB by Dartmouth artist Bill Shattuck. T-shirts are short-sleeved, 100% pre-shrunk white cotton printed in navy blue with your choice of four designs. Available in S, M, L, XL. **Members: \$15.00; Non-members: \$18.00**

Choose your favorite Buzzards Bay inhabitant: *Horseshoe Crab, Bay Scallop, Quahog, or Striped Bass.*



Horseshoe Crab
Limulus polydora

**THE COALITION FOR
BUZZARDS BAY**



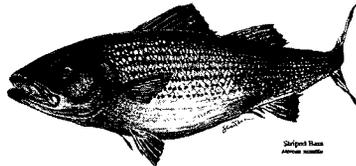
Bay Scallop
Argopecten irradians

**THE COALITION FOR
BUZZARDS BAY**



Quahog
Mercenaria mercenaria

**THE COALITION FOR
BUZZARDS BAY**



Striped Bass
Morone saxatilis

**THE COALITION FOR
BUZZARDS BAY**

Save Buzzards Bay Baseball Caps

Our popular *Save Buzzards Bay* baseball cap is available with your choice of one of 20 Bay harbor and cove locations embroidered on the back (see order form). Caps are off-white with blue stitching. **Members: \$12.00; Non-members: \$15.00**



Our special thanks to Ken Shwartz, CBB member and President of New Bedford-based Ahead Headgear, Inc., who manufactures our Save Buzzards Bay hats.



CBB Merchandise Order Form

New! Bill Shattuck T-Shirts

Horseshoe Crab _____ S _____ M _____ L _____ XL

Quahog _____ S _____ M _____ L _____ XL

Scallop _____ S _____ M _____ L _____ XL

Striped Bass _____ S _____ M _____ L _____ XL

Subtotal (T-Shirts) _____ @ \$15.00 (CBB member)
 _____ @ \$18.00 (non-member)

Save Buzzards Bay Baseball Caps

- | | |
|----------------------------|----------------------------|
| Plain (No Printing) _____ | Padanaram Harbor _____ |
| Acushnet River _____ | Phinneys Harbor _____ |
| Aucoot Cove _____ | Pocasset-Red Brook _____ |
| Buttermilk Bay _____ | Quissett Harbor _____ |
| Clarks Cove _____ | Sippican Harbor _____ |
| Cuttyhunk Island _____ | Slocums River _____ |
| Mattapoissett Harbor _____ | Wareham River _____ |
| Megansett Harbor _____ | West Falmouth Harbor _____ |
| Nasketucket Bay _____ | Westport Rivers _____ |
| New Bedford Harbor _____ | Woods Hole _____ |
| Onset Bay _____ | |

Subtotal (Caps) _____ @ \$12.00 (CBB member)
 _____ @ \$15.00 (non-member)

+ \$2.75 Shipping & Handling

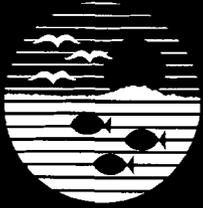
Total \$ _____

Name _____

Address _____

Please return this form along with
your check payable to:
The Coalition for Buzzards Bay
17 Hamilton Street
New Bedford, MA 02740

BUZZARDS BAY *Current*



Volume 13
Number 1
Fall 2001

Dedicated to the restoration,
protection and sustainable
use and enjoyment of our
irreplaceable Bay and its
watershed.

The Coalition for Buzzards Bay
17 Hamilton Street
New Bedford, Massachusetts
02740

Return Service Requested

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Paid
New Bedford, MA
Permit No. 375

Volunteer Honored

At this year's Annual Meeting, Water Quality Coordinator, Tony Williams, presented Jim Mulvey of Bourne with The Outstanding Volunteer Award. Jim has been donating his time to The Coalition for close



Jim Mulvey receives the Outstanding Volunteer Award from CBB's Tony Williams.

to 10 years now. He helped design and make the poles employed to collect water samples for water quality monitoring and is still an active participant in the Baywatchers program. Jim lives on Little Buttermilk Bay where he assists the town with marking shellfishing zones. He is also a member of the town's Local Pollution Task Force.

Bay Guardians Receive Public Recognition

Three Buzzards Bay Guardian Awards, the highest honor granted by The Coalition, were awarded at this year's Annual Meeting, held March 31st where Andy Kendall, Executive Director of The Trustees of Reservations, was the keynote speaker. The recipients of the 2001 Guardian Award were the Russell Family for their over 75 years of land protection in Dartmouth; Albert Lima, Everett Castro and Tim Bennett for their work in creating the state's first Bioreserve in Fall River; and Citizens United for MMR Watershed & Wildlife Refuge for pursuing the protection of 15,000 acres at the Massachusetts Military Reservation on Cape Cod. It is efforts like those displayed by these recipients that inspire all of us to make a difference.



From top: CBB Vice President, John Bullard, presents the Guardian Award to Angelica Russell and members of her family.



RESEARCH

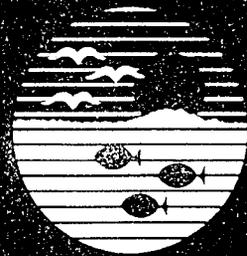
CONSERVATION

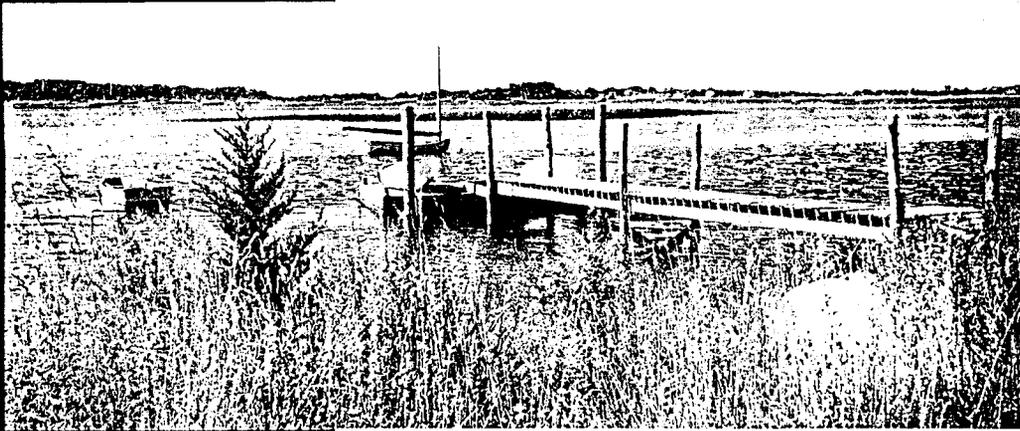
ADVOCACY

EDUCATION

THE COALITION FOR BUZZARDS BAY

1999 ANNUAL REPORT





Research, conservation, advocacy,
education—each is an essential
part of the Coalition's strategy to
protect Buzzards Bay and to foster
an ethic of stewardship toward the
Bay that will be part of our
collective culture long after
all of us are gone.

1999 ANNUAL REPORT

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FROM THE PRESIDENT

1999 was my first year as President of the Board of Directors, and I am privileged to be involved in the protection and restoration of this magnificent Bay where I grew up.

This is an exciting time of promise and potential at the Coalition. Just as the landscape of Southeastern Massachusetts is evolving, the Coalition is coming into its own as a mature and dynamic organization. In the last two years our staff has grown, our programs have become more ambitious, and our mission has come into crisp focus. We are poised for tremendous progress of which we will all be proud.

It is an honor for me to lead our Board at such a time. Our directors are hard-working and committed, with a wide range of skills and a deep love of the Bay. It is also a pleasure to work with the Coalition's staff. Their dedication and energy make our mission happen: they are on the front lines of our efforts and are the foundation of our success.

As we learn more about the value of the Bay watershed's natural systems, our work takes on a deeper meaning. We face challenges in our mission to improve the health of the Bay, and we take them on with enthusiasm. You, our members, are giving us the support necessary to move toward our goals and the clear signal to do so. We thank you.

Natalie Garfield
President

FROM THE EXECUTIVE DIRECTOR

There is a Chinese proverb contrasting action with words that says a lot about The Coalition for Buzzards Bay in the past year—Talk does not cook rice.

WHILE WE HAVE ACCOMPLISHED MUCH IN THE PAST DECADE, THE BAY TODAY IS EXPERIENCING WATER QUALITY DECLINE, HABITAT LOSS, AND WATERSHED LAND CONVERSION AT AN UNPRECEDENTED RATE.

Simply stated, we cannot talk the language of Bay protection, restoration, and sustainable growth—we must demonstrate it. And in doing so, we need to reach out beyond the traditional environmental community, to forge new relationships, and to foster new links of understanding about the Bay's role in our region's economy and quality of life.

While we have accomplished much in the past decade, the Bay today is experiencing water quality decline, habitat loss, and watershed land conversion at an unprecedented rate. Consider these statistics:

▶ *Nutrient overloading is destroying eelgrass beds, suffocating shellfish, and limiting the public's use and enjoyment in half of the Bay's major harbors and coves;*

- ▶ *The Bay watershed has lost one third of its open space in the past thirty years to poorly planned development, and this pattern is increasing;*
- ▶ *More than 8,000 acres of shellfish beds are closed to harvest due to bacteria contamination;*
- ▶ *Buzzards Bay rivers support less than 10% of their historical herring populations—impacting the Bay food chain and wildlife populations at their base.*

To address these alarming statistics, we expanded our programs and annual operating budget in 1999.

- ▶ *After ten years in Bourne, the Coalition moved its offices to New Bedford in May 1998. With 40% of the Bay area's population in greater New Bedford and nearly all of the Bay's major problems occurring on its western shore, we are now in the right place to effect change in our second decade.*
- ▶ *The Coalition launched the Bay Lands Center to accelerate land protection in the watershed. More than 1,000 acres of critical watershed lands were saved in 1999, thanks to the program.*
- ▶ *We conducted our seventh year of volunteer water quality sampling in the Bay's 28 major harbors and coves, providing accurate scientific data on the Bay's health.*
- ▶ *We developed new classroom educational programs to expand grade-school understanding and stewardship of the Bay and its resources.*
- ▶ *The Coalition also elevated advocacy for the Bay to a higher priority. In 2000 we will launch a full-time Buzzards BayKeeper, an on-the-Bay monitor who will investigate and work to clean up known and expected sources of Bay pollution.*

Supporting all of these and so many other programs has been the tremendous response from our members and supporters. In 1999, membership giving grew more than 310%, and individual support increased 110%. Thanks to you, The Coalition for Buzzards Bay will continue to work on your behalf in 2000 and beyond to preserve and restore our irreplaceable Bay.

SIMPLY STATED, WE CANNOT TALK THE LANGUAGE OF BAY PROTECTION, RESTORATION, AND SUSTAINABLE GROWTH—WE MUST DEMONSTRATE IT.



Mark Rasmussen
Executive Director

Baywatchers

WATER QUALITY MONITORING PROGRAM

Since 1992, the Buzzards Bay Citizens' Water Quality Monitoring Program has been measuring Bay water quality and the impacts of nitrogen loading. Each summer, 80 volunteers, known as "Baywatchers," collect water samples in 28 embayments from Westport to Woods Hole for on site analysis of dissolved oxygen, temperature, salinity, and water clarity; many stations also take samples for a series of nutrients and chlorophyll analyses. These measurements, taken almost simultaneously, portray a snapshot view of the Bay's health and allow evaluation of system-wide ecological changes over time.

Last winter, CBB Water Quality Monitoring Coordinator Tony Williams and Dr. Brian Howes, Director of the Coastal Systems Program at New Bedford's University of Massachusetts Center for

Marine Science and Technology, analyzed more than 123,000 individual data points and examined the implications for local waters.

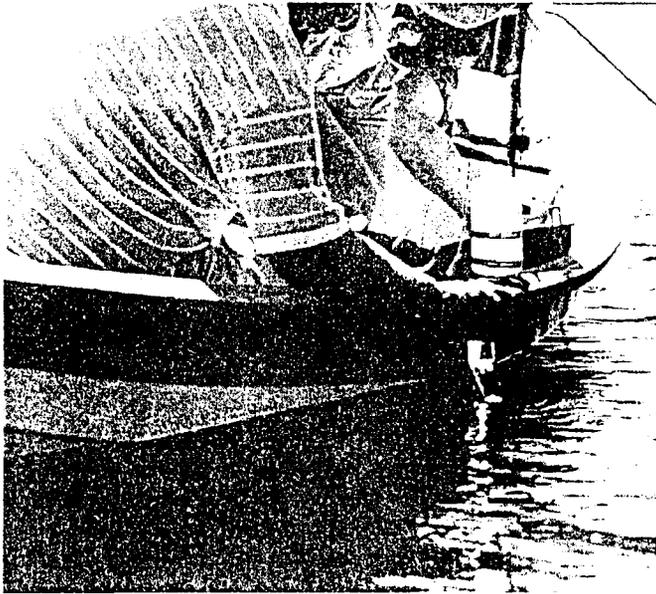
Their work yielded two important documents. In May, the Coalition released a poster detailing water quality trends and needed improvements in each of the Bay's harbors and coves.

In December, the Coalition published a full analysis entitled "Baywatchers II—Buzzards Bay Water Quality 1992-98," a 127 page report with comprehensive summaries for each of the Bay's 28 major embayments.

The data reveal that over half of all Buzzards Bay harbors and coves show signs of eutrophication—nutrient related water quality and habitat decline. All of the twelve major embayments on the western shore are suffering. Eight embayments—Eel Pond in Mattapoisett, the Slocums and Little Rivers, the East Branch of the Westport River, Padanaram and New Bedford Harbors, and the Weveantic and

Agawam Rivers—have conditions dangerous to shellfish, finfish, and other aquatic life.

We have presented this information to State legislators, environmental officials, and municipal planners. The report has already been put to work in the towns of



Volunteers collect water quality samples.

LEN KLUENSTEIN



Tom Stetson prepares to sample Quissett Harbor waters.

Dartmouth and Wareham, and with the US Environmental Protection Agency. It has served as the basis for a continuing series of articles about endangered embayments by the New Bedford *Standard Times*. And it serves as the blueprint for the Coalition's own work and advocacy in the coming year.

Baywatchers has built one of the most comprehensive, long term water quality databases for a coastal estuary in North America and is a nationally recognized model. Until the inception of the program, no comprehensive database existed on nutrient concentrations and the extent of eutrophication—nitrogen-related water quality degradation—in Buzzard's Bay's most sensitive areas. More than 300 citizen volunteers have contributed to the effort, sampling 180 different monitoring stations.

Perhaps there is no better measure of the program's value than the support it has received. The Massachusetts legislature awarded the Coalition a \$100,000 grant to support the program, thanks to Senator Therese Murray who sponsored the measure and the entire Buzzards Bay area legislative delegation.

In addition, Dartmouth, Fairhaven, Marion, Wareham, Bourne, Falmouth, and New Bedford have contributed toward the lab analysis of samples taken in those communities.

Support was also provided by the Dolphin Trust, the Cape Cod Commission, the Massachusetts Office of Coastal Zone Management, and the Community Foundation of Cape Cod.

With Baywatchers II, federal and state agencies, local communities, and citizens can make informed, scientifically-based decisions about the restoration and protection of Buzzards Bay.

And we are already taking the next step. This past summer, volunteers once more collected samples as part of Baywatchers III.

**BAYWATCHERS HAS
BUILT ONE OF THE MOST
COMPREHENSIVE, LONG
TERM WATER QUALITY
DATABASES FOR A
COASTAL ESTUARY IN
NORTH AMERICA.**



Russ Cookingham records data in Eel Pond, Bourne

Bay Lands Center

Southeastern Massachusetts is among the fastest growing regions in the Northeastern United States. Since 1950 we have consumed more land in Southeastern Massachusetts than we had since the Pilgrims landed at Plymouth in 1620. Yet, only 9.5% of the land between Westport and Wareham is permanently protected as open space. And 200,000 new people are forecasted to move here in the next 20 years. Clearly, in the face of such rapid growth, the permanent conservation of our most important watershed lands is a problem that our children will not have the opportunity to address.



SINCE 1950 WE HAVE
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IN 1620.

In 1998, the Coalition created the Bay Lands Center to address the sprawl occurring in our towns. The Center, under the direction of Coalition Land Protection Specialist Michael Labossiere, does not hold land itself, but assists local partners by strengthening and improving their capacity to save shoreline, forestlands, farmlands, and critical habitats in their own communities.

Our partners include the Greater Fall River Land Conservancy, Westport Land Conservation Trust, Dartmouth Natural Resources Trust, Fairhaven/Acushnet Land Preservation Trust, Mattapoissett Land Trust, Rochester Land Trust, Sippican Lands Trust, and the Wildlands Trust of Southeastern Massachusetts. The Bay Lands Center is also assisting the Massachusetts Audubon Society, Trustees of Reservations, State Department of Forests and Parks, State Division of Fisheries and Wildlife, and the State Department of Food and Agriculture with their activities in the Bay watershed.

In 1999, after just 15 months of existence, the Bay Lands Center achieved a number of critical successes. In May, the first five miles of the western end of the Buzzards Bay Greenway were dedicated and opened to the public. The Greenway is a prime example of the Center's regional, Bay-focused, land protection strategy. When complete, the Greenway will connect 25,000 continuous acres of state-protected forestlands from Fall River to Plymouth. Our partners in this project include the

National Park Service, State Department of Environmental Management, and local land trusts.

In October, the Center helped the Fairhaven/Acushnet Land Preservation Trust and the Mattapoissett Land Trust secure a \$30,000 grant from the National Fish & Wildlife Foundation. The funds helped the Department of



Land Protection Specialist, Mike Labossiere, addresses the crowd at the BLC launching in September, 1998. Back row (l-r): State Representative David Sullivan (D-Fall River), CBB Executive Director Mark Rasmussen, Assistant Secretary of Environmental Affairs George Crombie, Representative John Quinn (D-Dartmouth).

Environmental Management's \$8.15 million acquisition of Mattapoisett's Brant Point, the Bay's largest privately owned undeveloped coastal property.

Throughout the year, the Center worked with three landowners in the Mattapoisett River Valley to develop long-term strategies to protect nearly 1,000 acres of family forest and farmlands.

The Center coordinated the Town of Dartmouth's acquisition of the Szymanski Scenic Vista/Canoe Launch on the Paskamansett River. The protection and coming restoration of this highly visible Route-6 site came after Center representatives assisted with grant proposals and attended seven town committee hearings, which culminated in a dramatic 180-8 Town Meeting vote to approve the measure.

The Center became an important contributor to the Acushnet River Valley Lands Protection Project, a watershed-wide strategic planning initiative. The Center will provide mapping, data research, and landowner contacts in pursuit of land-purchase options and a \$1 million grant.

These are just the highlights. Since its creation, the Bay Lands Center has—

- ▶ Helped establish the first State Reservation on the Bay in 13 years on Nasketucket Bay. In honor of the CBB's work, Governor Paul Celluci awarded Executive Director Mark Rasmussen the Governor's Award for Open Space Protection.
- ▶ Assisted farmers in Rochester, Fairhaven, and Westport in preparing applications for Agricultural Preservation Restrictions.
- ▶ Facilitated the Massachusetts Division of Fisheries & Wildlife's addition of 200 acres to the Haskell Swamp Wildlife Management Area in Mattapoisett and Rochester.
- ▶ Prepared Conservation Restrictions for farmland in Rochester, shorefront in Marion, and the first-ever use of this protection tool in the City of New Bedford.
- ▶ Built a foundation for future land conservation successes by sending *Watershed*—our land conservation newsletter for landowners—to everyone in the Bay watershed who owns ten or more acres of land.



Greenway Planning 101: (l-r) Chris Chisholm, DEM; Jennifer Howard, DEM; Charles Tracey, National Park Service; Michael Labossiere, Coalition for Buzzards Bay; Joan Pierce, Dept. of Fisheries and Wildlife; Steve Bates, Freetown/Fall River State Forest; Leslie Badbam, Dartmouth Natural Resources Trust.



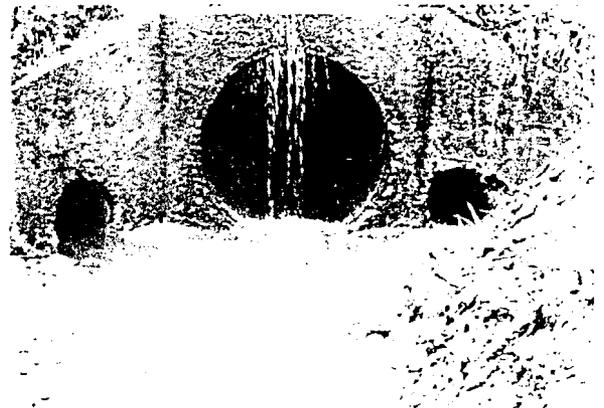
The Paskamansett River at Smith Mills, a forgotten river to be restored.

Federal, State, and Municipal Action

The Bay's future will not be secure without the promotion of sound public policy and law. This year, the Coalition's Public Policy Committee and staff—



- ▶ Played a leading role in the reversal of the Air Force's decision to allow a contaminated groundwater plume at the Massachusetts Military Reservation (MMR) to discharge untreated into Megansett and Squeteague Harbors in the Upper Bay. The Coalition's position was heard, and the Air Force will pump and treat the contaminated groundwater.
- ▶ Also at the Base, the Coalition joined the Barnstable County Commissioners, Cape Cod Chamber of Commerce, and other environmental groups in supporting the permanent protection of MMR's northern two-thirds as open space.
- ▶ Criticized the EPA's inadequate proposal to landfill contaminated soils on the shores of Priests Cove in Fairhaven at the Atlas Tack Superfund Site. Working with the town and concerned citizens, we are hopeful that the EPA will do a proper cleanup.
- ▶ Continued to track and participate in discussions over the expansion of the New Bedford Regional Airport to minimize wetland destruction and water quality impacts.
- ▶ Distributed pamphlets and sent mailings to support passage of the Bourne and Marion Land Banks.
- ▶ Assisted the town of Dartmouth with zoning amendments to require minimum upland acreage in new development.
- ▶ Worked with the EPA to ensure that the Wareham Wastewater Treatment Plant will minimize nitrogen pollution to the Wareham River.
- ▶ Helped the Fairhaven Department of Public Works pursue a grant for upgrading nitrogen treatment and eliminating the use of chlorine at the Fairhaven Waste Water Treatment Plant.
- ▶ Worked with Westport officials, shellfishermen, and activists to monitor pollution from the Pimental feed lot on the Westport River.
- ▶ Lobbied with the United States Coast Guard to improve oil spill response, salvage operations, and remediation efforts in the wake of the sinking of the scalloper *Cape Fear*.



Stormwater outfall

Reaching Out

This year, Coalition Education Coordinator Bob Rocha brought Bay Education programs to 3,800 students and 122 teachers in 22 Bay schools. Bob reached lower, middle, and high school students in the classroom with our Inflatable Submersible and Wetlands Exhibits, and on beaches, in forests, and on the piers of New Bedford with classes in a variety of subjects. As part of our Watershed Education program, Bob trained seventeen New Bedford teachers.

The Coalition also completed the first academic year of "Eelgrass in the Class." This innovative program provides high school students in Fairhaven and New Bedford with the opportunity to study and grow eelgrass in school and participate in eelgrass restoration projects in New Bedford Harbor. Eelgrass is the most important species of submerged vegetation in nearshore Buzzards Bay, providing essential habitat for fish and shellfish. Students were responsible for planting and all water quality monitoring of the tanks including temperature, salinity, growth, and nutrient levels. The transplanting will give new insight into optimal growing conditions for hand-raised eelgrass.

This year, Bob also began using an anatomically correct, dissectible, two-foot wide soft model of a Bay Scallop in classroom programs. The Coalition has also commissioned a life size Harbor Seal and a Leatherback Turtle for use this winter.

The Coalition initiated a new \$1,000 Environmental College Scholarship Program. Interested high school students in the Buzzards Bay watershed will be asked to choose two Bay estuaries and compare and contrast their natural and physical properties, watershed population and pollution sources, and current health.

The Coalition distributed *Buzzwords*, a free, periodic newsletter written by and for kids that features information and games about Buzzards Bay.



CBB Education Coordinator Bob Rocha poses with Grade 4 students from the Winslow School in New Bedford. The class had just completed CBB's week-long Shore to Shore Program, which gets city students out to local beaches to study beach ecology, discover marine life, and clean up trash and debris.

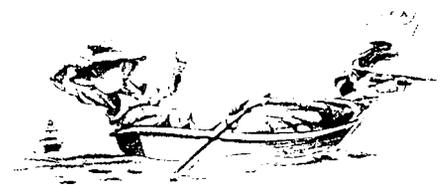
Swim Buzzards Bay Day '99

This year's Swim Buzzards Bay Day will certainly be remembered, not so much for the cancellation due to foul weather (the first such cancellation in the event's six year history), but the incredible support and good sportsmanship of all the swimmers, sponsors, and

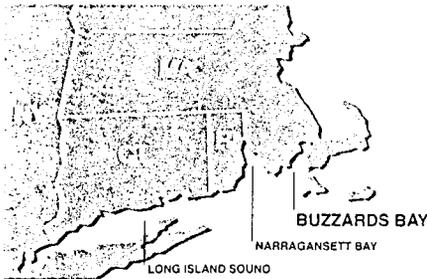
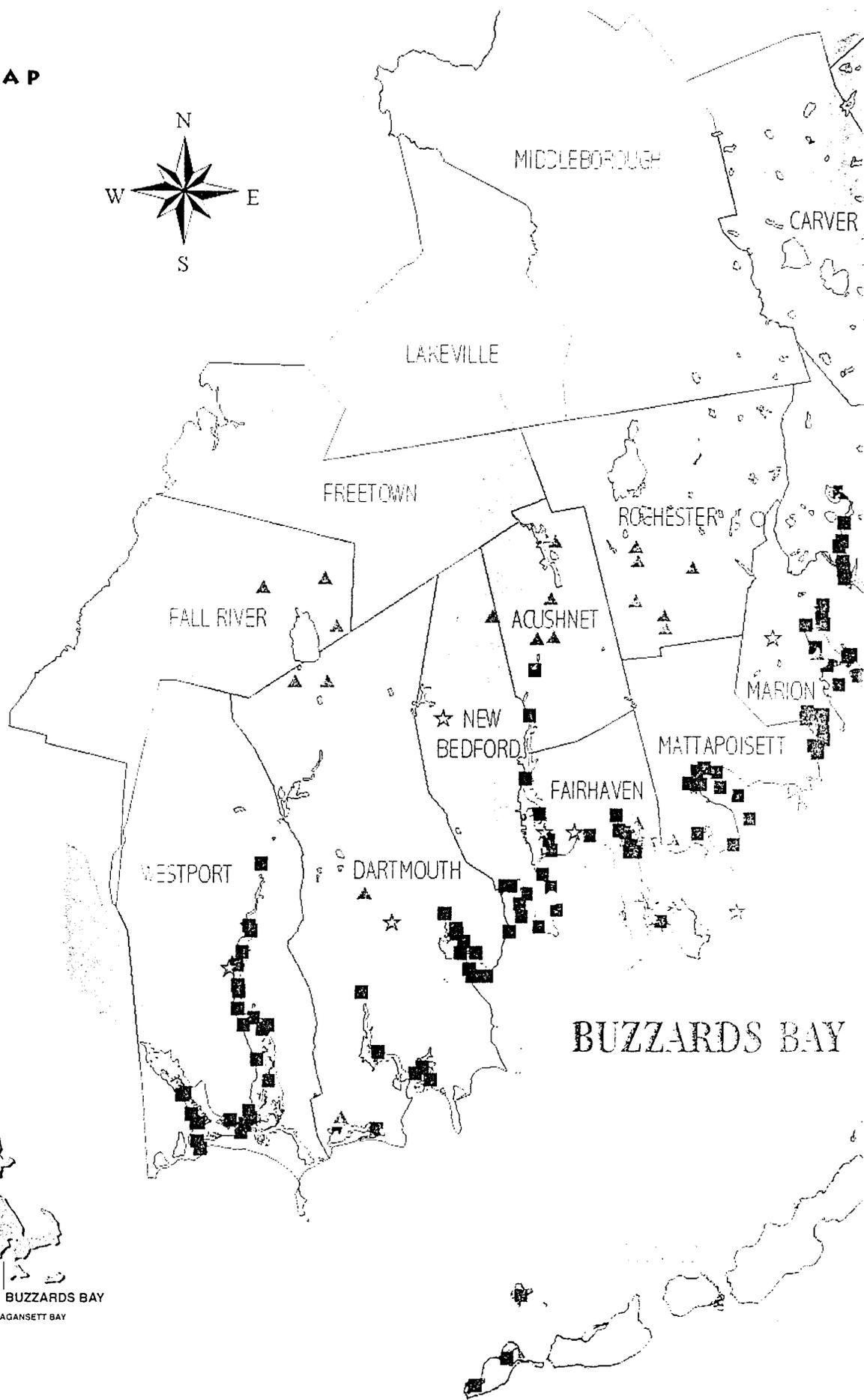
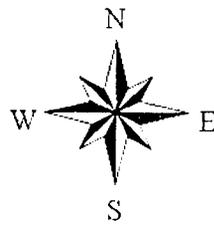


Record holders, David Ward of Fairhaven and Jean Bennett of New Bedford stood ready to take the plunge for the Bay at the starting line.

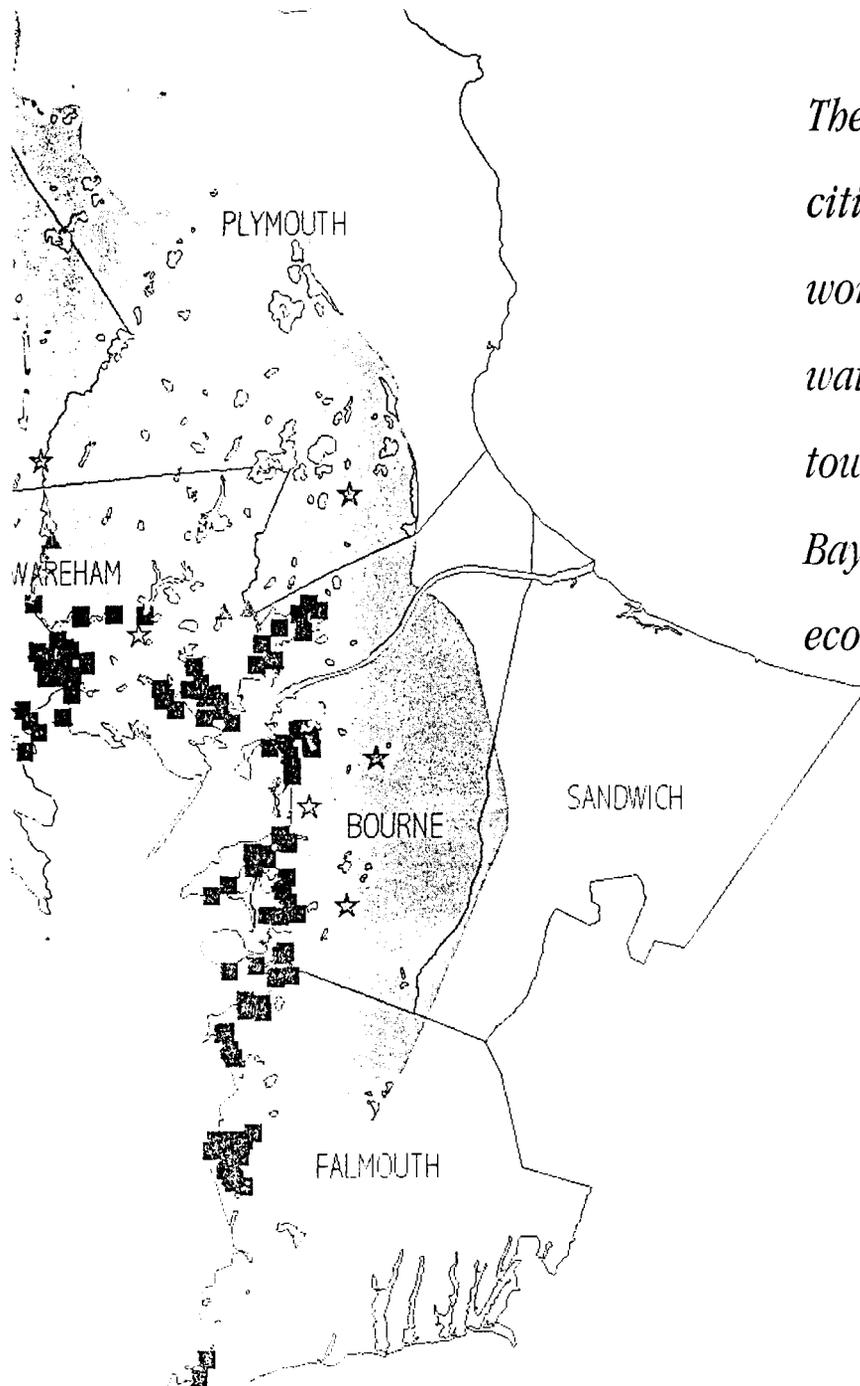
volunteers who help us make the Swim the largest outdoor environmental awareness event in Southeastern Massachusetts. Sixty swimmers broke our fundraising record this year by raising a total of \$19,000. Corporate giving also reached a new high of \$35,000 in cash and in-kind services.



PROJECT SITE MAP

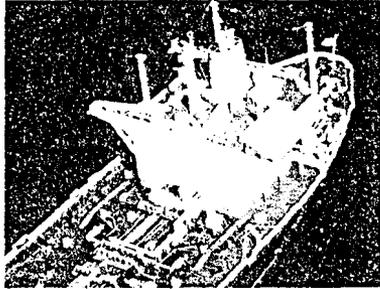


The Coalition is the only citizens-based organization working in each of the watershed's seventeen towns to protect the Bay's fragile ecosystem.



- ☆ Advocacy Projects
- Bay Lands Center Projects
- Education Projects
- M Baywatchers Sampling Stations
- Swim Buzzards Bay
- Town Boundaries
- Buzzards Bay Watershed

Buzzards BayKeeper



Consider these issues: a tanker cruising through Buzzards Bay cleans its hold, discharging sewage, oil, and debris into the Bay, fouling our beaches and threatening marine life; wastewater treatment plants dump millions of gallons of inadequately treated sewage and toxics into the Bay each year; septic systems, agricultural wastes, road and other runoff pollute more than 8,000 acres of productive Bay shellfish beds; stormwater discharges to the Bay from roadways reveal neglect and mismanagement by town and state officials. Today, The Coalition for Buzzards Bay does not have the staff or resources available to respond effectively to these many, real threats to Bay health—but this is about to change.

In April, the Coalition was admitted to the national Water Keepers Alliance and granted a license to create the Buzzards BayKeeper. Set to launch this June, the BayKeeper will be the Coalition's eyes and ears on the water, providing a full-time advocate to respond to citizen concerns and help the public identify emerging environmental problems and their solutions. Hudson RiverKeeper, John Cronin, officially announced the start of the Buzzards BayKeeper program at the Coalition's Annual Meeting at the Seaport Inn in Fairhaven in April.

The Buzzards BayKeeper program is rooted in the dramatically successful national model of River, Bay and Sound Keepers on waterways throughout the country. Cronin and Robert Kennedy, Jr., President of the Water Keepers Alliance and Chief Prosecuting Attorney for Hudson RiverKeeper, refer to the growth of Keeper programs throughout the nation in their 1997 book *The RiverKeepers*:

"Each time a new Keeper program started, the public embraced the idea because people understood that watching a river, sound or bay should be the job of someone in the community whose phone number was only as far away as directory assistance or a magnet on the refrigerator door. The Riverkeeper philosophy is based on the notion that the protection and enjoyment of a community's natural resources requires the daily vigilance of its citizens..."

The Buzzards BayKeeper will access all of the Bay's waterways to investigate, document, pursue appropriate cleanup of pollution sources, and provide appropriate follow-up action. The BayKeeper will also enhance the Coalition's on-going water quality monitoring program and on-the-water educational efforts, perform habitat restoration, and provide a platform to educate and involve legislators, policy makers, and the media in preserving Buzzards Bay.

The Coalition has begun a search for someone to fill the BayKeeper position. In September, the Coalition's BayKeeper Boat Committee, comprised of Seth Garfield, Chair; Peter Burlinson; Robert Cunningham; and Henry Roberts, developed specifications for the BayKeeper boat, and is searching for an appropriate craft. We are also working to establish a highly-visible, central dock location to house the BayKeeper boat and secure the donation of boat maintenance and repair services.

The BayKeeper requires a five-year start-up budget of \$496,500, including purchase of a custom built boat, hiring of full-time staff, and support costs. With the exception of a \$45,000 grant secured from the federal Clean Vessel Act program to equip our boat with a portable boat pumpout, all funds for the Keeper will need to be raised privately.

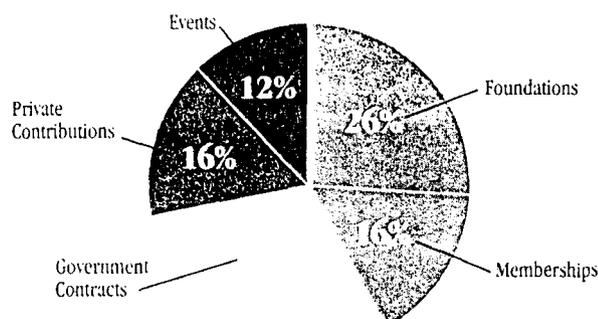
Treasurer's Report

Fiscal 1999 was a year of major financial growth for the Coalition. The table below shows significant increases in income, operating budget, and net assets in FY99, ending June 30, 1999.

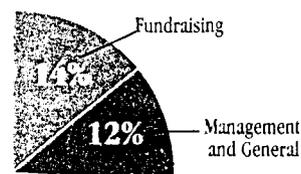
	Fiscal 1998	Fiscal 1999	Increase (%)
Income	\$185,000	\$439,000	137
Expenses	\$187,000	\$302,000	61
Net Assets	\$ 42,000	\$179,000	326

The Executive Committee and Board of Directors placed a premium on controlled growth with an emphasis on prudent fiscal planning and management during this period.

SUPPORT AND REVENUE



EXPENSES



OPERATING RESULTS

SUPPORT AND REVENUE	
Foundations and Grants	\$ 113,077
Contributions	70,189
Government Contracts	135,465
Memberships	68,493
Fundraising	
Special Events	46,698
Donated Materials	1,372
	<hr/>
TOTAL SUPPORT AND REVENUE	439,504
EXPENSES	
Program Services	223,419
Management and General	36,010
Fundraising	43,240
	<hr/>
TOTAL EXPENSES	302,669
CHANGE IN NET ASSETS	136,835
NET ASSETS, Beginning of Year	42,037
NET ASSETS, End of Year	<u><u>\$ 178,872</u></u>

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SUPPORTING A CLEAN AND HEALTHY BUZZARDS BAY FOR ALL

The accomplishments featured in this Annual Report are made possible through the generous support of more than 2,000 members, businesses, organizations, and volunteers. We extend our deepest appreciation to everyone who supported the work of The Coalition for Buzzards Bay in 1998-99.

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Every effort has been made to ensure the correct listing of names. Please contact Gina Rullo at (508) 999-6363 if we omitted or made an error with the listing of your name. Thank you.

THE COALITION FOR BUZZARDS BAY

*Dedicated to the restoration,
protection, and sustainable
use and enjoyment of our
irreplaceable Bay and its
watershed, The Coalition
works to improve the health
of the Bay ecosystem for
all through education,
conservation, research,
and advocacy.*

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THE COALITION FOR BUZZARDS BAY
Waterfront Historic District
17 Hamilton Street
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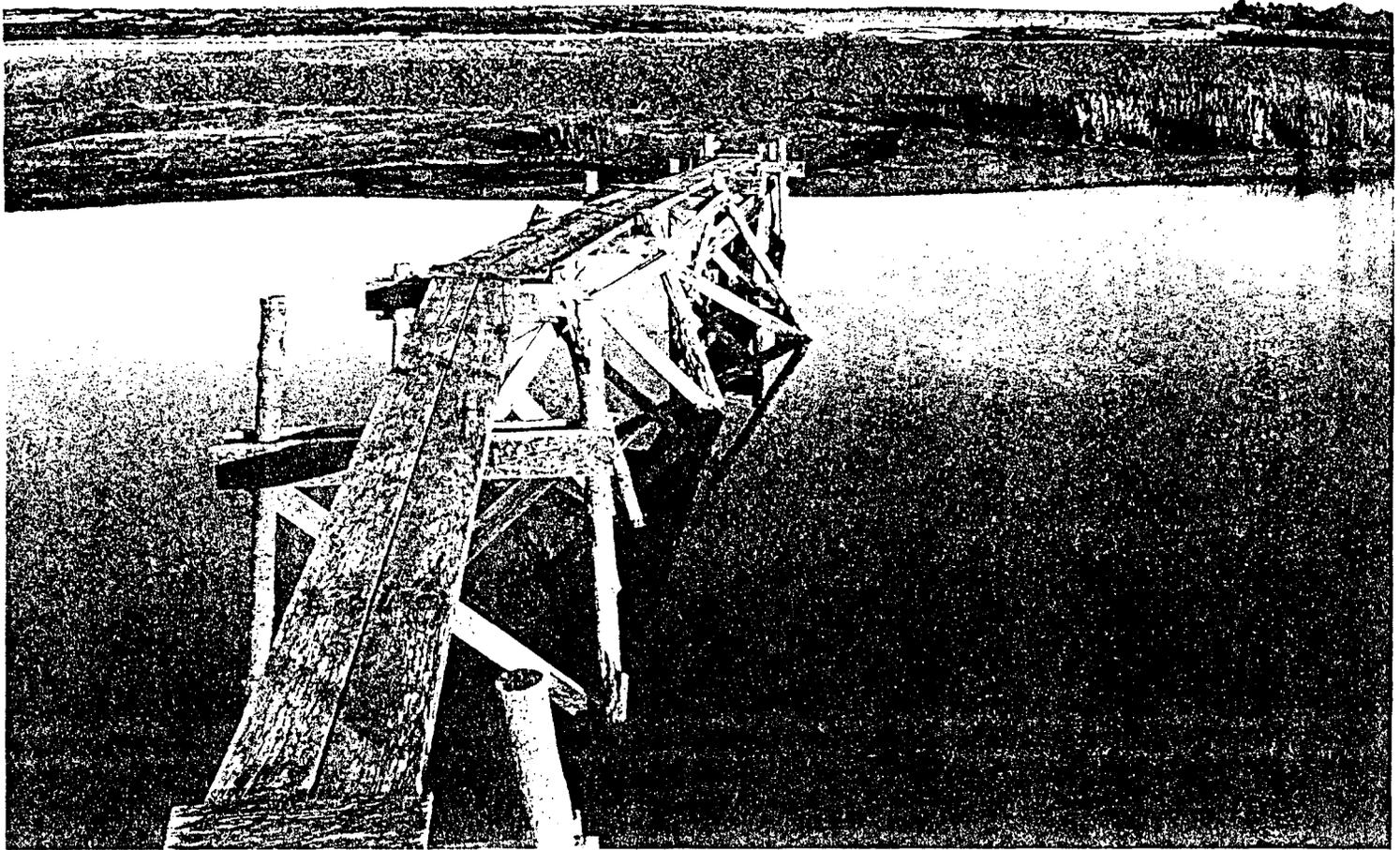


CONSERVATION

ADVOCACY

EDUCATION

ANNUAL REPORT • 2000



2000 ANNUAL REPORT

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Cover photo: Landing at Russells Mills, Slocum's River.
 Inside cover page: Misbaum Bridge.

The Coalition thanks Tim Sylvia, New Bedford-based professional photographer and member, for his generous use of these photos.

Thanks also to member Bill Shattuck for his distinctive illustrations of the horseshoe crab, striped bass, and quahog shell used in this report and on our T-shirts.

We extend our appreciation to member Dan Vasconcellos for his cartoons that always capture the spirit of our Celebrate Buzzards Bay events.

TO OUR MEMBERS AND FRIENDS

Nearly 360,000 people enjoy the privilege of living with the natural wealth of Buzzards Bay and its watershed. As a community, we have and continue to make great strides in taking better care of our common backyard. You've seen it—returning eelgrass beds, improved water clarity, reopened shellfish beds, increased numbers of Bay wildlife—the benefits of our care and work are visible throughout the Bay in very tangible ways.

The improvements have lulled many into thinking that the restoration of this Bay's coves, bays, coves, and rivers—is inevitable. In the contrary, trends in the health of Buzzards Bay over the past decade continually affirm that we are growing in areas that threaten the Bay. Most of what we have achieved. With more than 200,000 people coming into our area in the next decade, we are in danger of loving it to death.

Consider that just ten years ago more than 75% of the Bay watershed was undeveloped—wetland, wetlands, and open fields. Tucked between New York City and Boston, a fortunate miracle avoided the suburban sprawl that has consumed most of the northern Connecticut coast. Correspondingly, Buzzards Bay has remained one of the healthiest coastal ecosystems on the east coast. The data collected each year by our Baywatchers consistently shows that the danger of losing this distinction as we fall prey to the same forces of development, population, and pollution that has devastated places like the Chesapeake Bay, Island Sound, and Narragansett Bay.

In 2000, The Coalition for Buzzards Bay stepped up its program and advocacy to respond to these new challenges and to protect and restore the lands and water quality of Buzzards Bay.

- We expanded our role as an advocate for the Bay by officially launching the Buzzards Baykeeper Program and our new vessel, the *KV Buzzards Baykeeper*.

- ▶ Our Bay Lands Center worked with local and statewide land trusts, towns, and government agencies to permanently protect nearly 10,000 acres of land in the Bay watershed from development.
- ▶ The Buzzards Bay Citizens' Water Quality Monitoring Program completed its ninth season of testing Bay waters, providing the only long-term source of data assessing the health of the Bay's harbors and coves and setting a course for action to restore areas degraded by excessive nitrogen pollution.
- ▶ Coalition education programs reached over 6,000 students and 270 teachers at 38 schools in 11 Bay watershed towns, including first-time presentations in Falmouth, Plymouth, and Carver schools.
- ▶ We filed a lawsuit in state court, in partnership with the Westport Fishermen's Association, to halt the pollution of the Westport River by a Feed Lot operation.
- ▶ We provided, in most cases, the only public comment to the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection on the renewal of pollution discharge permits for eight Bay wastewater treatment plants and industrial discharges.
- ▶ We launched a partnership with the the University of Massachusetts Dartmouth—School for Marine Science and Technology and The Lloyd Center for Environmental Studies to restore the health of the Slocums, Little, and Paskamansett river system in Dartmouth. Translating data into action, the partnership proposes to undertake the first comprehensive coastal restoration project ever in Buzzards Bay and provide a national model for estuary restoration.

We are very excited about the future of The Coalition for Buzzards Bay. We are forming the partnerships with landowners and putting the deals together that protect the most sensitive lands from development; we are developing the scientific data needed to restore the Bay's damaged areas; we are taking action on the water and in the watershed to eliminate pollution sources; and we are reaching more children every day with education programs about Buzzards Bay.

We want to recognize the contributions of outgoing board members Fred Makrauer, Phil Beauregard, and Laurell Farinon who have each been with the Coalition for more than six years. Their leadership and vision has helped transform this organization. Fred's positive energy and passion for this Bay has been infectious. When we needed to take on new challenges, Fred has always been there to assure us that our bold action would yield the support of our members and funders. He was always right. Phil is more responsible than anyone for the Coalition's move to New Bedford in 1998. With 40% of the Bay area's population in greater New Bedford and nearly all of the Bay's major problems occurring on its western shore, he knew that to truly improve the health of the Bay, we needed to be at the center of the region. He was right. Laurell has never allowed us to forget that nearly all positive change in the Bay's present and future health will happen at the local level. She has and will continue to keep us truly committed to focusing our energy on the grassroots and town hall level. It's the town boards, land trusts, and citizen advocates in each of our 16 small towns who hold the future of the Bay watershed in their hands. She's right.

Fortunately for the Coalition, we are not actually losing any of them as each will continue to serve on board Committees. They underscore the fact that all of our work is about people—our members who provide the encouragement and financial support we need to become more effective, our volunteers who dedicate their time and talents to making the Bay area a better place, and the 360,000 individuals and families who call our watershed home and benefit from a clean and healthy Buzzards Bay.



Natalie Garfield
President, Board of Directors



Mark Rasmussen
Executive Director

Buzzards BayKeeper

In June, The Coalition for Buzzards Bay officially launched the Buzzards BayKeeper Program and our new vessel, the *R/V Buzzards BayKeeper*. As part of the international Water Keeper Alliance, the Buzzards BayKeeper joins River, Bay, and Sound Keepers throughout North and Central America in their work to preserve the public's right to clean and healthy natural resources. Through the initiation of the BayKeeper program, the Coalition has expanded its role as an advocate for the protection and restoration of Buzzards Bay.

The pollution sources that threaten the Bay's health stem not only from the thousands of tankers and barges that travel through the Bay each year, but also from inadequate wastewater treatment plants, failing septic systems, and mismanaged roadways. The advocacy work critical to the effective management of these threats is addressed by the BayKeeper Program under the direction of the Coalition's Executive Director, Mark Rasmussen. To support these efforts, the Coalition has partnered with the Southern New England School of Law, whose students work as externs for the Coalition, researching existing case law or reviewing alternative legal routes for dealing with pollution cleanup.

The June launching of the BayKeeper Program and the christening of the *R/V Buzzards BayKeeper* was an important milestone for The Coalition for Buzzards Bay. The new program not only represents the Coalition's renewed commitment to advocacy, but, for the first time, the organization has an on-the-water presence on Buzzards Bay. In its first months of operation, Seth Garfield, captain of the *R/V Buzzards BayKeeper* and coordinator of all on-the-water efforts of the BayKeeper Program, introduced the vessel and the Program to harbor masters, boaters, and shellfishermen throughout Buzzards Bay, getting the word out to the public that the BayKeeper is a resource available to respond to pollution threats.

During its first six months on the water, the Buzzards BayKeeper Program:

- ▶ Removed over 1,300 gallons of sewage from boats on Cuttyhunk Island through its mobile pumpout unit in support of the new Baywide No Discharge Designation by the EPA.
- ▶ Facilitated the education of recreational boaters on clean boating practices and distributed free oil absorbent bilge socks and our new *Guide to Clean Boating on Buzzards Bay* publication.
- ▶ Worked with the U.S. Coast Guard on improving oil spill prevention and response.
- ▶ Began to focus on cleaning up state highway discharges of polluted runoff to shellfish beds and rivers, conducting the first-ever sampling of highway discharge pipes from Westport to Wareham. The data revealed that nearly all road runoff pipes are contributing pollution to the Bay.
- ▶ Played a vital role in supporting the Coalition's water quality monitoring work, allowing us to access areas of the Bay previously unavailable due to lack of boat access.
- ▶ Responded to citizen calls regarding pollution concerns.
- ▶ Participated in several on-the-water events such as *Celebrate Buzzards Bay* and the *Buzzards Bay Regatta*.

Natalie Garfield



Robert F. Kennedy, Jr. prepares to christen the R/V Buzzards BayKeeper at the June launch ceremony in New Bedford.

R/V Buzzards BayKeeper

BOAT STATISTICS

THE BOAT

The boat, a 27' Merrimac with an open pilot-house and forward cabin, was purchased from the U.S. Coast Guard Auxiliary Flotilla 72 in New York, CT where it had been used for the past 15 years as a safety and rescue patrol boat.

THE ENGINES

The *BayKeeper* is a model for clean boating. The boat's polluting 2-stroke outboard engines were replaced with twin 130 horsepower Honda 4-stroke outboard engines. These engines are defined by their low fuel consumption, low noise, low engine emission, and lack of oil spills. In fact, 4-stroke engine technology is now recognized as the best way to reduce outboard exhaust emissions.

THE EQUIPMENT

The *BayKeeper* is equipped with a portable pumpout for boat sewage and a full set of modern electronics to support environmental research aboard the vessel and safety measures for passengers.

Launching the Buzzards BayKeeper

The \$500,000 start up budget for the BayKeeper Program was raised over the last year, with \$305,000 coming from private individuals, families, foundations, and businesses from around the Bay and \$195,000 received through public sources. The Coalition for Buzzards Bay would like to extend our deepest and most sincere thanks to the following individuals, foundations, businesses, and government agencies whose support helped launch the Buzzards BayKeeper Program.

INDIVIDUALS

Mr. & Mrs. Michael Andrews
 Anonymous
 Mr. & Mrs. Charles E. Bascom
 Mr. & Mrs. Benjamin Beale
 Mr. Charles Bradley
 Mr. Daniel Briggs
 Mr. & Mrs. Darryl A. Buckingham
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 Mr. & Mrs. John K. Bullard
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 Mr. & Mrs. John B. Coffin
 Mr. John Cronin, Hudson Riverkeeper
 Mr. & Mrs. Norman Cross
 Mr. & Mrs. Robert Cunningham
 Rev. & Mrs. John Douhan
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 Robert V. Ward, Esq.
 Mr. James Ware, Jr. & Ms. Sharon McCarthy
 Ms. Marian M. Ware
 Mr. & Mrs. Raynor Warner
 Mr. & Mrs. Stephen S. Weinstein
 Mr. & Mrs. William Whelan
 Dr. & Mrs. George Woodwell

FOUNDATIONS

Community Foundation of Cape Cod
 Jessie B. Cox Charitable Trust
 Henry H. Crapo Charitable Foundation
 Dolphin Trust
 Enable Hope Foundation
 The Roy A. Hunt Foundation
 Norcross Wildlife Foundation
 Jonathan & Shirley O'Herron Foundation
 The Pennyghael Foundation
 QLF/Atlantic Center for the Environment
 Sounds Conservancy Grants Program

BUSINESSES

Barden's Boat Yard
 Burr Brothers Boats
 COMMAR Sales
 Edson International

Fairhaven Shipyard
 Freestone's City Grill
 Raytheon Company
 Seattle's Best Coffee

GOVERNMENT AGENCIES

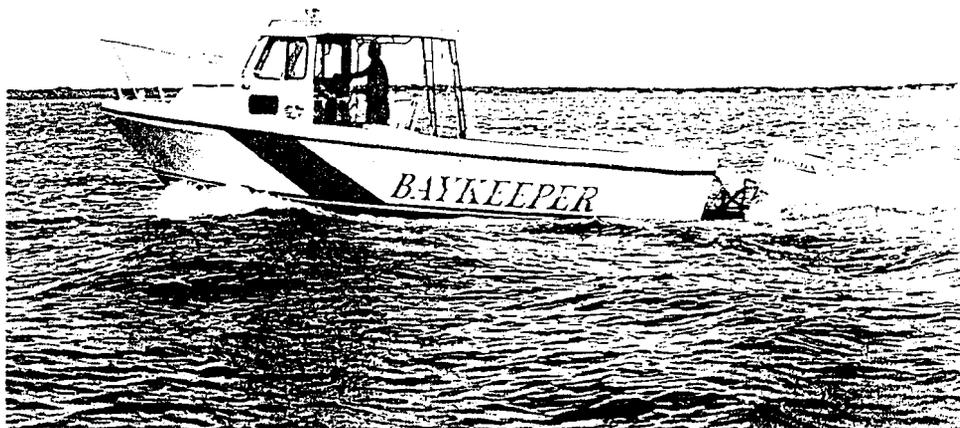
Massachusetts Clean Vessel Act Program
 New Bedford Harbor Trustees Council

BUZZARDS BAYKEEPER STUDY COMMITTEE

Philip Beauregard
 Peter Burlinson
 Seth Garfield
 Lee Hayes
 Fred Makrauer
 Carl Pimentel

R/V BUZZARDS BAYKEEPER BOAT COMMITTEE

Peter Burlinson
 Robert Cunningham
 Henry Roberts



Carl Pimentel

Bay Lands Center

We cannot save Buzzards Bay water quality and resources only on the water, but rather we must care for the Bay on land—in its watershed. With development occurring at such a rapid pace here in our corner of southeastern Massachusetts, the push to preserve the most important forests, river corridors, Bay shoreline, and other open spaces throughout the Bay watershed is the most important job before us today. Nothing preserves Bay, river, and drinking water quality better than buffering forested land.

The Bay Lands Center works to advance the conservation of private land by providing direct, hands-on technical assistance to landowners, local land trusts, and communities struggling to preserve watershed lands. Our partners in this effort continue to include the Bay area's local land trusts as well as exciting new partnerships with statewide organizations such as The Trustees of Reservations.

Unique to our approach to local land conservation is the emphasis placed on strategic acquisitions that serve to protect and restore Bay health and natural resources. As a watershed organization involved with land conservation, we work to bring together recent science regarding Bay health with land conservation planning and acquisition.

In 2000, the Center facilitated the permanent protection of more than 10,000 acres of watershed lands. Highlighting the Center's accomplishments, we—

- ▶ Advocated successfully for the protection of 8,500 acres of forestland surrounding the Copicut Reservoir at the head of the Westport River. The acquisition of the land by the Commonwealth of Massachusetts and The Trustees of Reservations will result in the creation of a 14,000 acre Southeastern Massachusetts Bioserve in Fall River and Freetown.
- ▶ Secured nearly \$1 million for the acquisition of land and conservation restrictions on forests, wetlands, and farmland along the Acushnet River.
- ▶ Worked to broker an innovative agreement to protect 275 acres of cranberry lands in the Hammetts Cove and Sippican River watersheds in Marion. In partnership with the Cape Cod Cranberry Growers Association, the deal is creating the first-ever model for the protection of forestlands surrounding a cranberry bog.
- ▶ Supported the creation of the Wareham Land Trust. Until this year, Wareham was the only Bay coastal community without a local land trust.
- ▶ Collaborated with regional, statewide, and international conservation groups to monitor the proposed development of 9,600 acres of land in Wareham, Carver, and Plymouth by the A.D. Makepeace Cranberry Company and propose conservation alternatives.
- ▶ Hosted *Big Walk IV* in Rochester and Mattapoisett to raise public awareness about the potential to permanently protect a band of open space spanning the watershed from Fall River to Plymouth called the Buzzards Bay Greenway.
- ▶ The Coalition's Land Protection Specialist, Michael Labossiere, received awards from the Sippican Lands Trust and the Fairhaven-Acushnet Land Preservation Trust for our assistance on local land protection projects.

“The Copicut region would not have been saved from development without the hard work and persistent advocacy of The Coalition for Buzzards Bay.”

—Secretary Robert Durand
*Massachusetts Executive Office of
 Environmental Affairs
 Cellucci-Swift Administration*



Bay Education

In the classroom and on the Bay, the 1999-2000 school year was a record breaking one for the Coalition's education programs, which reached over 6,000 students and 270 teachers at 38 Bay schools. Under the direction of Education Coordinator Bob Rocha, and with assistance from Education Assistants Crista Mellican and Pam Ellis, the Coalition visited classrooms in 11 Bay watershed towns, including first-time presentations in Falmouth, Plymouth, and Carver schools. With an expansion of geographical scope and variety of curriculum, the Coalition's free educational programs are providing a vital resource for more lower, middle, and high school students and teachers than ever before.

In March, we enhanced our educational repertoire with the addition of a life size, dissectible Harbor Seal model—and its accompanying curriculum, *The Deal with Seals*. Joining the popular *Blue Eyes and Blue Water* program which features the Bay Scallop, *The Deal with Seals* teaches students about the biology and habits of this marine mammal as well as threats to marine mammal health due to marine debris and human interactions.

These are only some of the highlights. In 2000, the Coalition's education program:

- ▶ Received an "Excellence in Environmental Education" award from the Massachusetts Executive Office of Environmental Affairs.
- ▶ Removed over 6,000 pounds of trash from New Bedford and Fairhaven beaches with the help of Coalition members and volunteers.
- ▶ Initiated the Buzzards Bay Winter Lecture Series hosting three community lectures about the Bay in Woods Hole, Bourne, and Marion.
- ▶ Awarded the first Buzzards Bay Stewardship Scholarship to a college-bound senior at Bishop Stang High School in Dartmouth.
- ▶ Expanded the Spotlight on Buzzards Bay art contest to schools throughout the watershed receiving 796 submittals from grade six students. Winning entries were published in a 2001 Calendar.
- ▶ Collaborated with local and regional groups to upgrade New Bedford's Flora B. Peirce Trail on the Paskamansett River.
- ▶ Published and distributed the free *Buzzwords* newsletter for kids.
- ▶ Presented *Blue Eyes and Blue Water* curriculum at the National Marine Educators Association conference and the Massachusetts High School Marine Science Symposium.



The Coalition's Education Coordinator Bob Rocha introduces our life-size Harbor Seal model to grade three students at the Center School in Mattapoisett.

Baywatchers

WATER QUALITY MONITORING PROGRAM

With 90 trained volunteers monitoring more than 150 sites, the Buzzards Bay Citizens' Water Quality Monitoring Program, known as "Baywatchers," completed its ninth season of testing waters throughout the Bay during the summer of 2000. This dedicated group provides the only long-term source of water quality data assessing the health of the Bay's harbors and coves and continues to set a course for action to restore areas of the Bay degraded by excessive nitrogen pollution.

Their findings: Over half of our Bay's harbors and coves are showing signs of eutrophication, or nitrogen-related water quality degradation. In fact, all of the 12 major embayments on the western shore of Buzzards Bay are exhibiting some signs of eutrophication—eight of these (East Branch of Westport River, Slocums River, Apponagansett Bay, New Bedford Harbor, Eel Pond, Hammetts Cove, Weweantic River, and Agawam River) actually drop to levels where shellfish, finfish, and other aquatic life are damaged. Poor water clarity, bad odors, eelgrass loss, suffocating algae growth, stressed marine organisms, and even fish kills are all symptoms of this decline.



Ken Robinson



Ken Robinson

Under the guidance of the Coalition's Water Quality Monitoring Coordinator Tony Williams, this sobering information was summarized for the first time in December 1999 when The Coalition for Buzzards Bay and the University of Massachusetts School for Marine Science and Technology (SMST) released the compilation of seven years of Bay water quality monitoring data documenting water quality trends and needed improvements in each of the Bay's 28 major harbors and coves in a report entitled, *Baywatchers II - Nutrient related Water Quality of Buzzards Bay Embayments 1992-98*.

The data collected through the Baywatchers program continues to serve as the foundation for the Coalition's conservation, advocacy, and education work throughout the year.

Putting Our Data To Work

SLOCUMS/PASKAMANSETT RIVER RESTORATION PROJECT

The magnificent scenic beauty of the Slocums, Little, and Paskamansett Rivers hides the crisis occurring beneath their calm waters. In all years (1992-present) of monitoring by The Coalition for Buzzards Bay's Baywatchers program, water quality in the Slocums and Little River Estuaries has exhibited signs of often severe pollution and species loss. Indeed, this estuarine complex is among those showing the greatest level of nutrient related water quality impairment in all of Buzzards Bay.

The University of Massachusetts Dartmouth—School for Marine Science and Technology (SMAST), The Coalition for Buzzards Bay, and The Lloyd Center for Environmental Studies have come together to combine their resources to restore these rivers. Translating data to action, the partnership proposes to undertake the first comprehensive coastal restoration project ever in Buzzards Bay and provide a national model for estuary restoration. The project will commence with a full research season during the summer of 2001.

RESEARCH Despite nearly a decade of water quality monitoring data documenting the decline in the rivers' health, there exists no clear quantification of pollutant inputs to the estuary. We know that the river receives more pollution than it can handle, but, with the exception of a few obvious sources, we do not know from where and in what relative quantities. In addition, key questions remain unanswered: the full scale of present habitat destruction; and what impacts reduced freshwater flows and restricted tidal flushing may be having on the health of the estuary. This applied research approach will provide a firm foundation from which to implement pollution remediation efforts.

EDUCATION Using the River as a classroom and scientific model, a Slocums River Curriculum will be developed and implemented in area schools to raise the awareness of both students and their parents to the serious condition of the Slocums River.

ADVOCACY The advocacy component of the project will focus on educating Town and City Hall officials in Dartmouth and New Bedford as well as the general public about the Slocums River, its condition, and challenges. The purpose of these outreach efforts will be to develop a broad-based constituency for restoring the River. Second, the project will set out immediately to tackle one of the largest pollution sources in the watershed—stormwater runoff from the Faunce Corner commercial district.



The Lloyd Center for Environmental Studies

BAY DISCHARGE PERMITS

Commented on pollution permits for eight Buzzards Bay Wastewater Treatment Plants (WWTP) and Industrial discharges.

Forty million gallons of sewage and industrial wastewater are permitted by the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) for discharge to Buzzards Bay each day through a dozen outfalls. Over the course of the year, permit renewals for eight Buzzards Bay Wastewater Treatment Plants (WWTP) and industrial discharges were released for public comment. In nearly all cases, The Coalition for Buzzards Bay was the only commenter raising issues about Bay health. The Coalition also provided detailed water quality data from our Baywatchers program to assist in the establishment of appropriate discharge levels. Key issues raised by the Coalition for each permit include:

- New Bedford WWTP: Reductions in Combined Sewer Overflows, pretreatment of industrial wastes, elimination of chlorine discharge.
- Fairhaven WWTP: Nitrogen overloading to Inner New Bedford Harbor, elimination of chlorine discharge.
- Wareham WWTP: Nitrogen overloading to the Agawam River, elimination of chlorine discharge.
- West Falmouth WWTP: Nitrogen overloading to West Falmouth Harbor.
- Massachusetts Maritime Academy WWTP (Bourne): Elimination of chlorine discharge.
- Revere Copper Products (New Bedford): Establishment of discharge levels that continue to reduce Harbor metal contamination concentrations.
- Aerovox (New Bedford): Monitoring of PCB levels in stormwater.
- Cornell-Dubilier (New Bedford): Monitoring of PCB levels in stormwater.

◆ Indicates discharge permits.

MIDDLEBOROUGH

LAKEVILLE

FREETOWN

ROCHI

NEW BEDFORD HARBOR - NEW BEDFORD/FAIRHAVEN
Advocated against increases in nitrogen discharges to New Bedford Harbor by the towns of Mattapoissett and Fairhaven.

In 2000, the Coalition's Board of Directors voted to oppose increases in nitrogen pollution to New Bedford Harbor through either the Fairhaven Wastewater Treatment Plant or the New Bedford Combined Sewer Overflow (CSO) system until these facilities are upgraded to properly treat the sewage before discharge. The position (published on our website) calls on large sewer expansion projects in Fairhaven and Mattapoissett to be planned to coincide with necessary upgrades to the nitrogen removal capacity of the Fairhaven sewer system.

The Coalition for Buzzards Bay acted on this position when the Town of Mattapoissett proposed to connect 470 homes to the Fairhaven Wastewater Treatment Plant and when the Town of Fairhaven proposed to discharge new effluent associated with sewer sludge to the Harbor. The Coalition continues to track both issues closely and will push for improvements to the pollutant-removal capacity of the Fairhaven Wastewater Treatment Plant throughout 2001.

FALL RIVER

ACUSHNET

WESTPORT

DARTMOUTH

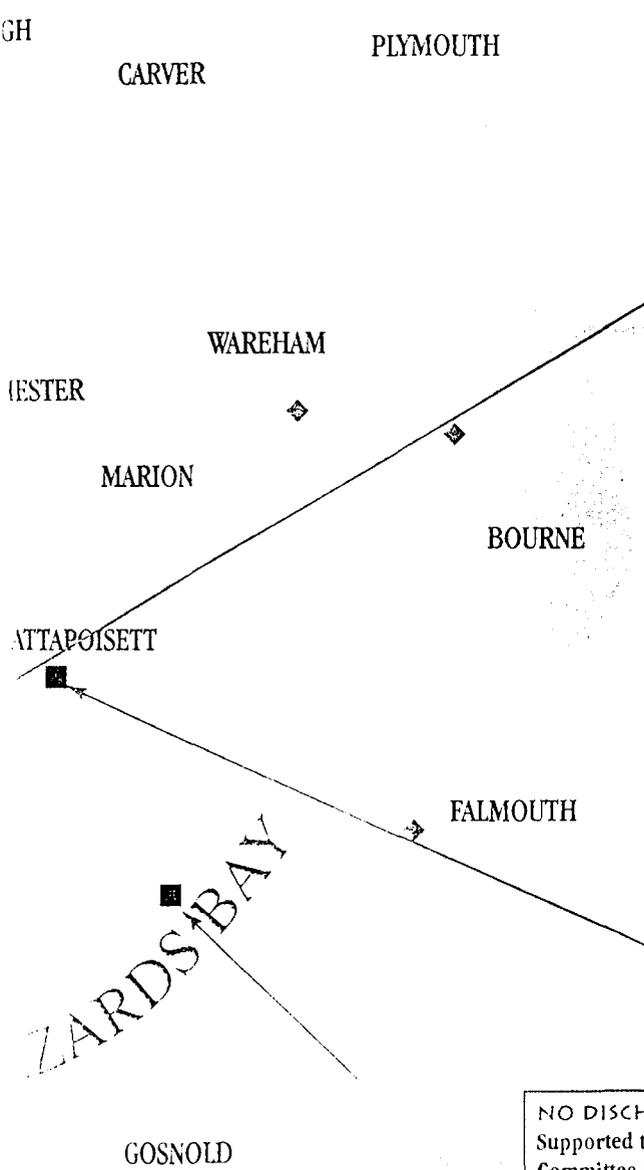
NEW BEDFORD
 FAIRHAVEN
 MA

PIMENTAL FEED LOT - WESTPORT

Filed Suit To Halt Pollution of the Westport River by a Feed Lot.

On June 26th, The Coalition for Buzzards Bay in partnership with the Westport Fishermen's Association filed suit in state court to stop the Pimental Feed Lot from continuing to pollute the Westport River.

The Feed Lot discharges excessive amounts of manure and other animal wastes into the Westport River resulting in bacteria contamination of the river 6,350 times the safe level for swimming and 85,000 times the safe level for shellfish consumption. In addition to bacteria pollution, Coalition technical expert in the case, Dr. Brian Howes, Manager of the Coastal Systems Program at the UMass School for Marine Science and Technology, equates the volume of nitrogen pollution flowing off the Pimental lot to the same as would be generated by more than 1,000 houses. The case is scheduled for trial in early 2001.



ATLAS TACK SUPERFUND SITE - FAIRHAVEN
 Rejected the U.S. Environmental Protection Agency's proposal to dispose of contaminants near Priests Cove.
 The Coalition for Buzzards Bay joined forces with concerned citizens and town officials to oppose the EPA's Proposed Cleanup Plan for the Atlas Tack Superfund Site in Fairhaven. Located on Priests Cove, the largest saltmarsh ecosystem in New Bedford Harbor, the Atlas Tack Corporation produced nails and tacks until closing down in 1985. Past dumping practices at the site left large volumes of toxic heavy metals and industrial solvents such as Toluene in the soil, groundwater, saltmarsh, and tidal creeks at the site.
 In a reversal of their proposed plan, the EPA issued a Record of Decision in March 2000 which agreed with the Coalition's position that all contaminated soil, marine sediments, and other material should be excavated and disposed of off-site and requires the cleanup of Priests Coves's saltmarsh and tidal creeks.

EEL POND - MATTAPOISETT
 Secured the strongest environmental controls ever placed on a Mattapoissett development to protect Eel Pond from the construction of a residential subdivision on its shores.
 Eel Pond ranks among the most pollutant-overloaded salt ponds in all of Buzzards Bay. Coalition for Buzzards Bay advocacy resulted in requirements for the developer to install innovative nitrogen-removing septic systems and an advanced stormwater treatment system to filter pollutants. Limits on lawn sizes and establishment of a permanent buffer zone along the pond were also secured to protect Eel Pond from the pollutants generated by the development.

NO DISCHARGE AREA DESIGNATION - BAYWIDE
 Supported the Bay's coastal communities and the Buzzards Bay Action Committee (BBAC) in a successful effort to receive federal designation for Buzzards Bay as a No Discharge Area for boat waste.

BUZZARDS BAY WATERSHED

Sailors, rowers, swimmers,

and Bay enthusiasts from across the watershed came together in July to "celebrate" Buzzards Bay during the Coalition's *Celebrate Buzzards Bay* weekend, July 28–30th.

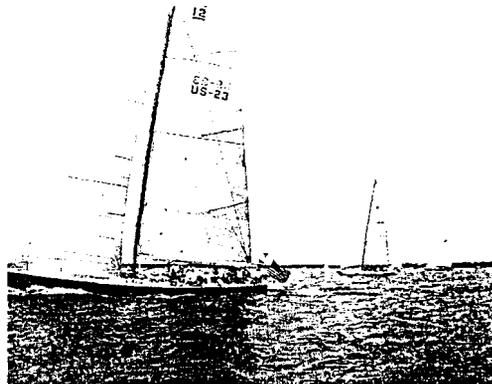
With our annual *Swim Buzzards Bay Day* and the *Bake for the Bay* lobsterbake serving as anchor events, the Coalition expanded the weekend this year to include 12-meter America's Cup Yacht races, and our first *Pull for the Bay* multi-class boat race. In addition to raising \$30,000 for the Coalition's education, conservation, research, and advocacy programs, *Celebrate Buzzards Bay 2000* events served as important reminders of the role a clean and healthy Bay plays in all of our lives.

Celebrate Buzzards Bay 2000 would not have been possible without the incredible support of our corporate sponsors, town and city agencies, local businesses, and The Curmudgeons, a group of sailing enthusiasts. Our deepest thanks goes out to them as well as to the hundreds of participants and dedicated volunteers whose enthusiasm and energy made *Celebrate Buzzards Bay 2000* a great success.

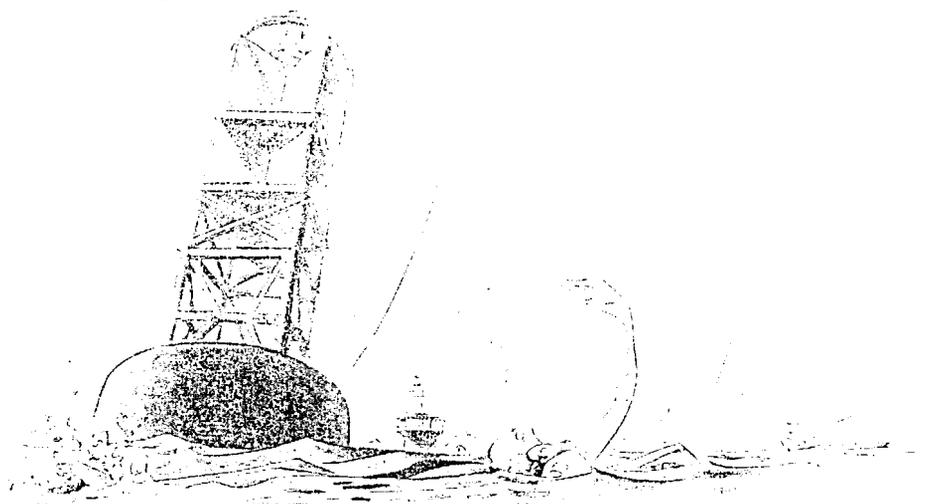
Tim Sylvia



Tim Sylvia



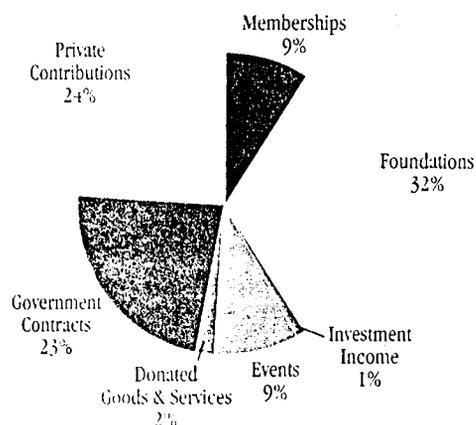
Tim Sylvia



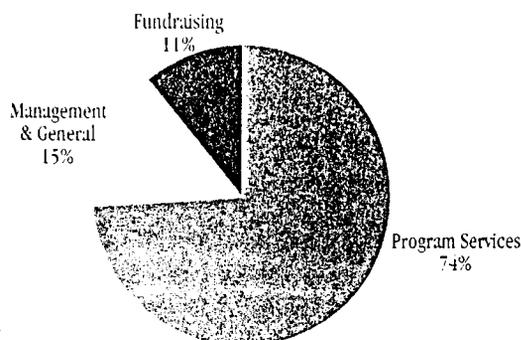
FY2000 Treasurer's Report

The Coalition for Buzzards Bay completed its thirteenth year with strong support from its members and funders. In addition, for the first time in the organization's history, we completed a fundraising campaign to fund our new Buzzards BayKeeper program for five years. The income raised over our expenses represents funds raised in FY2000 to be used in coming years for the BayKeeper and are restricted by the donors for that purpose. Additional excess income raised in FY1999 was designated by the Board of Directors for the beginning of an endowment fund.

SUPPORT AND REVENUE



EXPENSES



SUPPORT AND REVENUE

Private Contributions (Foundations & Individual)	\$335,135
Government Contracts	135,528
Events	59,095
Memberships	54,431
Donated Goods & Services	12,000
Investment Income	7,942
Total Support & Revenue	\$604,131*

EXPENSES

Program Services	\$331,550
Management & General	70,994
Fundraising	50,605
Total Expenses	\$453,149

Change in Net Assets	\$150,982
Net Assets, beginning of year	\$179,000
Net Assets, end of year	\$329,854

A. Lee Hayes
Treasurer, Board of Directors

*of this total, 65% was member-generated

FY2000 Audit and Financial Statements completed by the firm of Nardella & Taylor of Lexington, Massachusetts.

SUPPORTING A CLEAN AND HEALTHY BUZZARDS BAY FOR ALL

The accomplishments featured in this Annual Report are made possible through the generous support of more than 2,000 members, businesses, organizations, and volunteers. We extend our deepest appreciation to everyone who supported the work of The Coalition for Buzzards Bay in 2000.

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William & Lynda Ainslie
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*Dedicated to the restoration, protection,
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The Coalition works to improve the
health of the Bay ecosystem for all
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A report of Implementation Activities
Relating to the Implementation of the
Buzzards Bay
Comprehensive Conservation and Management Plan
in accordance with the
Government Performance and Results Act

for the period
January 8, 2000 to January 11, 2001.

prepared by the
Buzzards Bay Project National Estuary Program
April 30, 2001

Background

The US Environmental Protection Agency (EPA), is required to conform with the Government Performance and Results Act (GPRA), which measures performance or progress towards established goals. The following goal and objective adopted by EPA relates to National Estuary Programs, including the Buzzards Bay Project:

Goal #2 is Clean and Safe Water.

Objective #2 under that goal is as follows: By 2005, conserve and enhance the ecological health of the nation's (state, interstate and tribal) waters and aquatic ecosystems - - rivers and streams, lakes, wetlands, estuaries, coastal areas, oceans and groundwaters - - so that 75% of waters support healthy aquatic communities.

Sub-objective 2.1 states: By 2005, restore and protect watersheds so that 75% of waters support healthy watersheds as shown by comprehensive assessment of the nation's watersheds.

One of EPA's Annual Planning Goals is to restore and protect estuaries through the implementation of Comprehensive Conservation and Management Plans. Success in meeting this Annual Planning Goal is measured through Annual Planning Measures. To conform with GPRA, the measures adopted by the EPA for FY 2001 are:

- 1) the number of priority actions initiated across the NEP, and
- 2) the acres of habitat protected and restored.

With respect to the habitat measure, NEPs have been asked to report those acres protected or restored during the reporting period whether the project has been completed or is on-going. We therefore have not reported previous years acreage. The baseline for this GPRA report is January 15, 2000.

CCMP Priority Actions Initiated and Completed

The Buzzards Bay Project has not revised the priorities in our CCMP or added any new actions during the past year. The summary in Table 1 for year 2000 accomplishments continues from where the Buzzards Bay Project Biennial Progress Report submitted in 1999 left off.

It is important to recognize that a summary like Table 1 cannot capture the essence of implementation activities in Buzzards Bay. For example, during the past 5 years, perhaps 25% of the Buzzards Bay Project's and Buzzards Bay municipal effort (dollars and manpower) relate directly or indirectly to the remediation of stormwater discharges contributing to beach or shellfish bed closures. This effort has paid off big dividends with the rehabilitation of hundreds of acres of shellfish beds (see Figure 1). This work on stormwater relates to only two or three Buzzards Bay CCMP recommendations that recommend remediation of problematic stormwater discharges.

Despite the success of these efforts however, we cannot claim that those CCMP recommendations have been completed because they imply the CCMP states all problematic discharges must be remediated. At the current level of effort, this work will take 20 years or

more for this to be achieved. All the while, more and more shellfish beds are rehabilitated and opened. This also means that it is possible to have great improvements in Buzzards Bay while Table 1 shows no change in the status of any recommended actions.

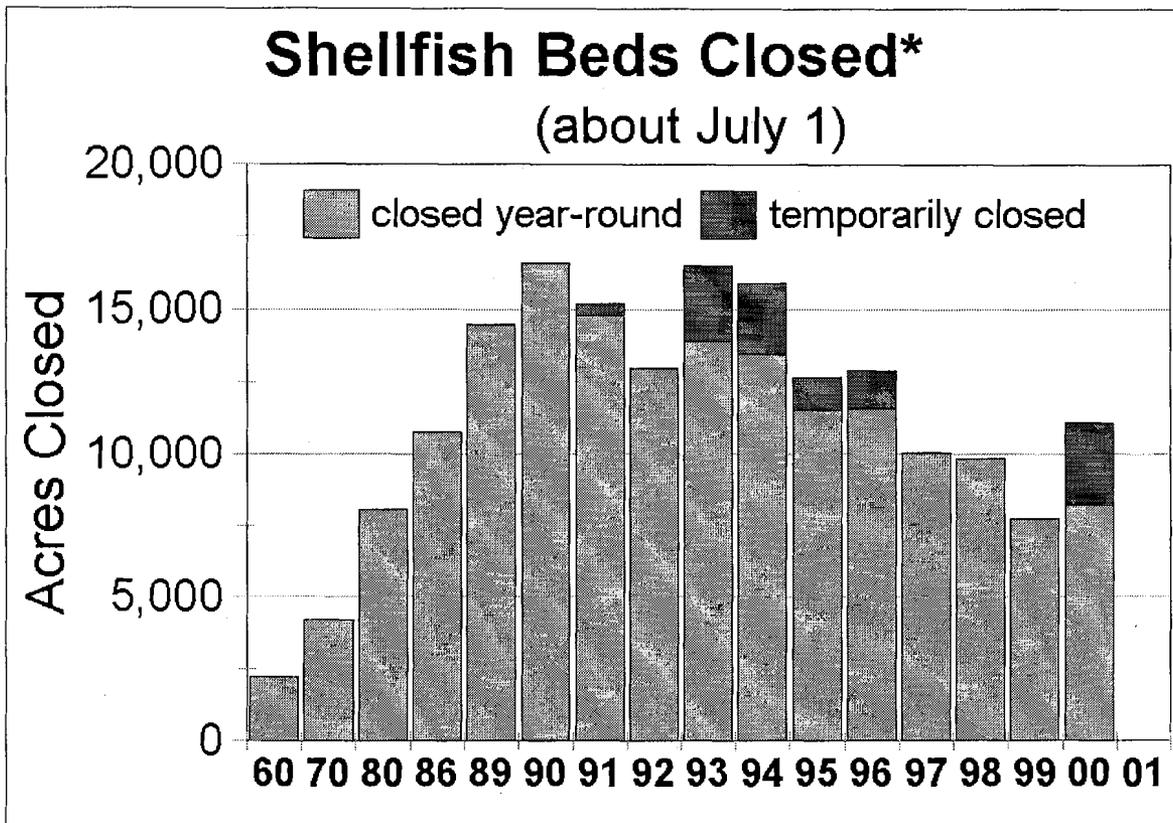


Figure 1. Shellfish beds closed in Buzzards Bay from draft Status and Trends report proposed for next workplan period. Temporarily closed beds for 1997 through 1999 are missing.

Habitat Protection and Restoration

With respect to the quantified amount of habitat protected and restored, we have included created areas, protected areas resulting from acquisition, conservation easement or deed restriction, submerged aquatic vegetation coverage increases, permanent shellfish bed openings, anadromous fish habitat increases, etc. If a shellfish bed was temporarily closed and then reopened, we did not count this acreage. Reported acreage is only for this reporting year (1/8/00 - 1/11/01). Because this category has been a major focus of the Buzzards Bay Project and other partners, many properties were permanently protected in the year 2000.

In the reporting table, we have employed the US EPA's recommended definitions for wetland types and implementation activity as follows:

Tidal Wetland (includes the term coastal salt marsh, coastal wetland, or tidal marsh) - occur along coastlines. Dominated by rooted plant which are covered by water at high tide and exposed at low tide. Characterized by salt-tolerant plants such as smooth cord-grass, saltgrass, and glasswort.

Tidal Freshwater Wetland - located upstream of estuaries. Tides influence water levels but the water is fresh. Cattail, wild rice, pickerelweed and arrowhead are common.

Freshwater Marsh - water table is at or near the surface of the soil and there is no tidal influence. They typically derive most of their water from surface waters, including floodwater and runoff, but do receive groundwater inputs. They are characterized by little or no peat deposition and mineral soils.

Establishment: The manipulation of the physical, chemical, or biological characteristics present to develop a habitat that did not previously exist on an upland or deepwater site. Establishment results in a gain in acres. Includes activities commonly associated with creation.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to former estuary habitat. Re-establishment results in rebuilding former estuary habitat and results in a gain in habitat acres.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions of degraded estuary habitat. Rehabilitation results in a gain in habitat function, but does not result in a gain in habitat acres.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of a undisturbed or degraded site to heighten, intensify, or improve specific functions or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for a purpose of such as water quality improvement, flood water retention or wildlife habitat. The term includes activities commonly associated with the terms enhancement, management, manipulation, and directed alteration.

Protection: The preservation of habitat by mechanisms such as land acquisition, conservation easements, deed restrictions, etc.

Table 1. CCMP Priority Actions Initiated and Completed January 8, 2000 to January 11, 2001. Because 103 of 119 recommended action plans have been initiated to some degree, but only 52 actions completed, no remaining new priorities will be initiated. Instead existing initiated priorities will remain the focus of implementation efforts.

Total Priority Actions in CCMP	Priority Actions Initiated Baseline (2000)	CCMP Priority Actions Initiated This Calendar Year (Number and Title)	Total Priority Actions Initiated This Calendar Year (Since last GPRA report)	Target of Priority Actions Initiated by 9/2002	Number of Total Priority Actions Completed This Calendar Year (Since last GPRA report)	Cumulative Number of Priority Actions Completed To Date
119	103	2 Boat Sewage CZM-municipalities #2-NDA designation of all BB Land Use Management: Buildout Analysis completed for all towns, workshops given	0	103	3 Boat Sewage CZM #1-adequate pumpouts Boat Sewage CZM-municipalities #2- NDA designation of all BB Land Use Management: Buildout Analysis completed for all towns, workshops given	52

Table 2 *Habitat Protection and Restoration January 8, 2000 to January 11, 2001.*

CCMP Action Plan	Project Name	Habitat* Type	Description of Project	Action/Activity**	Partners	Acreage or River Miles (as specified.) Protected or Restored	Total Project Cost (NEP Portion)	Project Duration and/or Completion Date
Boat Sewage	BB No Discharge Area	Open Water	Designate NDA for all of Buzzards Bay, prevent sewage dumping	Rehabilitation (calculation excludes previous designations)	BBAC Municipalities MCZM BBP	148,758 acres	\$25,000 (BBP: \$20,000 staff time)	8/13/2000
Wetlands and Habitat	Winsegan-sett Marsh restoration Phase 1	Tidal Wetland	Remove Tidal restriction, eliminate invasive species (Phragmites) and restore marsh	Re-establishment	Town, NOAA MA DEP, Residents, USFWS, MET, BBP	30 acres	\$28,000? (BBP: \$9,300 staff time + 8,400 grants from various grant)	Phase I complete 3/2000, Phase 2 ongoing
Wetlands and Habitat	Gracia Property, Town of Acushnet	Wetland-upland-habitat mix	Purchase an open parcel	Protection	Fairhaven-Acushnet Land Trust, CBB, Town of Acushnet	2.23 acres	\$44,000 (gift) (BBP: \$0)	2000
Wetlands and Habitat	Mahon Property, Town of Fairhaven	Wetland-upland-habitat mix	Purchase an open parcel	Protection	Fairhaven-Acushnet Land Trust, CBB, Town of Fairhaven	0.16 acres	\$3,200 (gift) (BBP: \$0)	2000
Wetlands and Habitat	Acushnet River BioReserve (Acushnet Sawmill Property)	Wetland-upland- Rare Endangered species habitat mix	Purchase an open parcel	Protection	State DEM principal, many partners including Coalition for Buzzards Bay, business owner	2,076	\$6,600,000 (BBP: \$0)	2000
Wetlands and Habitat	Nadeau Parcel, State Rd Westport	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel for conservation and open space	Protection	Westport Land Conservation Trust, Town of Westport	2 acres	\$41,000 gift (BBP: \$0)	12/2000

Wetlands and Habitat	Gray Parcel, Horseneck Rd Westport	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel for conservation and open space	Protection	Westport Land Conservation Trust, Town of Westport	8 acres	\$161,000 gift (BBP: \$0)	12/2000
Wetlands and Habitat	Brayton Conservation Restriction, Westport	Wetland-upland- Rare Endangered species habitat mix	Conservation Restriction for conservation and open space	Protection	Westport Land Conservation Trust, Town of Westport	22 acres	\$221,000 gift (BBP: \$0)	8/2000
Wetlands and Habitat	Sassafras Island Parcel, Westport	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel for conservation and open space	Protection	Westport Land Conservation Trust, Town of Westport	0.2 acres	\$21,000 gift (BBP: \$0)	12/2000
Wetlands and Habitat	Upper Spectacle Island Westport (East Branch)	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel for conservation and open space	Protection	Westport Land Conservation Trust, Town of Westport	3.69 acres	\$74,800 gift (BBP: \$0)	8/2000
Wetlands and Habitat	Copicut Reservoir area Westport (Acushnet Sawmill Property)	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel for conservation and open space	Protection	Division of Fish and Wildlife, business owner, Town, CBB	700 acres	\$1,900,000 (BBP: \$2,600 toward appraisals and fees)	2000
Wetlands and Habitat	Haskell Swamp additions (to larger protected area) purchase	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel for conservation and open space	Protection	Division of Fish and Wildlife, Town of Rochester, private owner	15.53 acres	\$155,300 (BBP: \$0)	7/2000

Wetlands and Habitat	Paskamansett River Herring Run ladder reconstruction	River-Herring Run	Replace Herring ladder	Enhancement	Town of Dartmouth, MA Division of Marine Fisheries	5 miles	\$7,100 (BBP: \$0)	7/2000
Wetlands and Habitat	Basset Property (Rochester) purchase	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel (Rounesville Property) for conservation and open space	Protection	Town of Rochester, private owner	13 acres	\$81,000 (BBP: \$0)	7/2000
Wetlands and Habitat	Haskell Swamp additions (Rochester) purchase	Wetland-upland- Rare Endangered species habitat mix	Purchase of parcel (Rounesville Property) for conservation and open space	Protection	Town of Rochester, Division of Fish and Wildlife, private owner	6.9 acres	\$70,000 (BBP: \$0)	7/2000
Wetlands and Habitat	Truran property Wareham Purchase	Wetland-upland-habitat mix	Purchase of parcel for conservation and open space,	Protection	Wildlands Trust of SE Mass, Town of Wareham, BBP, Private owner	13 acres	\$261,000 gift (BBP: \$1000 for appraisals, +\$3,000 of staff time)	2000
Wetlands and Habitat	Well Head Property Wareham Purchase	Wetland-upland-habitat mix	Purchase of parcel for conservation and open space, well head protection for drinking water	Protection	Town of Wareham, BBP, Private owner	3.43 acres	\$72,600 gift (BBP: \$1000 for appraisals and fees, \$1,000 of staff time)	2000
Wetlands and Habitat	Tuowitz property Marion Purchase	Wetland-upland-habitat mix	Purchase of parcel at Creek Road for conservation and open space	Protection	Sippican Lands Trust, private owner, Town of Marion	12 acres	\$241,000 gift (BBP: \$2,000 for appraisals)	2000
Wetlands and Habitat	Tuowitz property Marion Purchase	Wetland-upland-habitat mix	Purchase of parcel at Quails Crossing for conservation and open space	Protection	Sippican Lands Trust, private owner, Town of Marion	2 acres	\$41,000 gift (BBP: \$600 for appraisals)	2000

Wetlands and Habitat	Purchase of Destruction Brook Dartmouth property purchase	Wetland-upland-endangered species habitat mix	Purchase an old farmland parcel for conservation and open space	Protection	Dartmouth Natural Resources Trust, Town of Dartmouth, BBP	303 acres	\$2,115,000 (BBP: 700 for appraisals, 1,000 of staff time)	11/2000
Wetlands and Habitat	Purchase of Dartmoor Farm Dartmouth property	Wetland-upland-endangered species habitat mix	Purchase an old farmland parcel for conservation and open space	Protection	Dartmouth Natural Resources Trust, Town of Dartmouth, BBP, State Fish & Wildlife	641 acres	\$2,200,000 (BBP: 11,000 for appraisals, 2,000 of staff time)	1/2000
						TOTALS - 152,612.1 And 5 miles	NEP TOTALS- \$14,363,000 (BBP: \$62,900)	

Funding of National Estuary Programs through Section 320 of the
Clean Water Act in comparison to other funding sources

prepared by

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for the

Association of National Estuary Programs

final
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Introduction

In September of 1998, a funding information request was sent by Tiffany Lutterman, Director of the Charlotte Harbor National Estuary Program of Florida, to all 28 National Estuary Programs (NEPs). The purpose of this information request was to better understand the relative importance of EPA funding of NEPs through Section 320 of the Clean Water Act, in comparison to other sources, both public and private. This report summarizes the responses forwarded to the Buzzards Bay Project and subsequent follow-up questions

Methods

Each NEP was asked to provide an estimate of expenditures in each of the following funding categories:

- 1) EPA funding through Section 320,
- 2) EPA funding through non Section 320 funding (e.g., grants in 319, 104b3, 604 programs),
- 3) State funding,
- 4) Local funding (municipal, county, and regional entities),
- 5) Non-governmental.

The request for information was meant to cover amounts in both Fiscal Year 1998, and projections for Fiscal Year 1999. Because of differences in state and federal fiscal years, and the start of the state fiscal year varies from state to state, we left it up to the discretion of each contact with the NEP to report in either state or federal fiscal year totals, since the purpose of this exercise was to approximate relative contributions of various funding sources. Because FY99 expenditures were difficult for many NEPs to project, they were considered less reliable than FY98 values, so only the FY98 data are presented in this report.

In many instances, it was difficult or impossible to quantify CCMP implementation expenditures because the NEP was not directly involved with managing or directing these expenditures. Expenditures by local government and nonprofits were an especially difficult category for most NEPs to quantify. Out of necessity, \$0 dollars were included for NEPs when no response was given so that averages of funding calculations could be calculated. Therefore, the totals in these categories should be considered underestimates.

There were also differences in how comprehensive this evaluation should be. In some instances it appeared that the respondent only quantified funding directly received by or administered by the NEP. In other cases the respondent took a broader view of CCMP implementation related expenditures by other agencies. We made no attempt separate these different kinds of responses, and all responses were included in this draft report. A draft report was provided to each NEP for review which generated only a modest response.

Results

Twenty-three out of twenty-eight NEPs responded to the requests for information. A summary of FY98 for each NEP is included in Table 1 below. Actual amounts of each funding category were also converted to percent contributions in Table 2.

Table 1. Total funding reported by each NEP for each funding category related to NEP and CCMP implementation funding for Fiscal Year 1998. Notes in Appendix A.

Estuary Program FY 98	Priv/Non-Profit	Local	State	Non-EPA Federal	EPA-non 320	EPA- 320	Total
Albemarle-Pamlico			\$81,250		\$0	\$325,000	\$406,250
Barataria-Terrebonne	\$621,100		\$5,616,669	\$61,110,657	\$0	\$260,000	\$67,608,426
Barnegat Bay	\$214,100	\$28,200	\$862,250	\$617,000	\$80,000	\$401,000	\$2,202,550
Buzzards Bay	\$86,000	\$165,000	\$72,500	\$60,000	\$454,500	\$199,500	\$1,037,500
Casco Bay	\$75,993	\$21,000	\$209,277	\$5,000	\$98,740	\$199,500	\$609,510
Charlotte Harbor	\$48,851	\$134,292	\$200,638	\$24,750	\$0	\$485,000	\$893,531
Corpus Christi	\$165,472	\$53,000	\$264,667	\$369,667	\$0	\$860,000	\$1,712,806
Delaware							\$0
Delaware Inland Bay	\$50,000	\$5,000	\$67,500	\$0	\$279,950	\$234,500	\$636,950
Galveston Bay			\$750,000			\$260,000	\$1,010,000
Indian River Lagoon	\$403,700	\$15,465,000	\$4,856,000	\$0	\$320,000	\$260,000	\$21,304,700
Long Island Sound							\$0
Lower Columbia River			\$300,000	A		\$585,000	\$885,000
Maryland Coastal Bays	\$5,000	\$310,935	\$2,648,980	\$175,000	\$75,000	\$410,000	\$3,624,915
Massachusetts Bay	A	B	\$89,000	C		\$267,000	\$356,000
Mobile Bay	\$38,680	\$127,200	\$146,500	\$150,000	1 \$0	\$775,000	\$1,237,380
Morro Bay							\$0
Narragansett Bay		\$15,080,000	\$19,775,000	\$0	\$0	\$1,500,000	\$36,355,000
New Hampshire							\$0
New York/New Jersey							\$0
Peconic Bay	***	\$150,000	** \$12,000	\$10,000	\$0	** \$446,500	** \$618,500
Puget Sound	*	*	\$13,668,677	*	\$195,490	\$346,500	\$14,210,667
San Francisco	\$2,750,000	\$147,000	\$470,000	\$75,000	\$0	\$308,150	\$3,750,150
San Juan Bay							\$0
Santa Monica Bay	310,000	\$9,200,000	\$379,000	\$0	\$0	\$250,000	\$10,139,000
Sarasota Bay	\$750,000	\$39,997,166	** \$2,692,536	\$6,040,000	\$115,000	\$874,645	* \$50,469,347
Tampa Bay		\$333,873	1	\$0	2 \$70,000	2 \$346,500	\$750,373
Tillamook Bay							\$0
TOTALS	\$5,518,896	\$81,217,666	\$53,162,444	\$68,637,074	\$1,688,680	\$9,593,795	\$219,818,555

Table 2. Total funding as percent (%) by category reported by each NEP related to NEP and CCMP implementation funding for Fiscal Year 1998.

Estuary Program FY 98	Private/ NonProfit	Local	State	Non-EPA Federal	EPA-non 320	EPA- 320	EPA- % 320
Albemarle-Pamlico	0%	0%	20%	0%	0%	80%	100%
Barataria-Terrebonne	1%	0%	8%	90%	0%	0%	100%
Barnegat Bay	10%	1%	39%	28%	4%	18%	83%
Buzzards Bay	8%	16%	7%	6%	44%	19%	31%
Casco Bay	12%	3%	34%	1%	16%	33%	67%
Charlotte Harbor	5%	15%	22%	3%	0%	54%	100%
Corpus Christi	10%	3%	15%	22%	0%	50%	100%
Delaware							
Delaware Inland Bay	8%	1%	11%	0%	44%	37%	46%
Galveston Bay	0%	0%	74%	0%	0%	26%	100%
Indian River Lagoon	2%	73%	23%	0%	2%	1%	45%
Long Island Sound							
Lower Columbia River	0%	0%	34%	0%	0%	66%	100%
Maryland Coastal Bays	0%	9%	73%	5%	2%	11%	85%
Massachusetts Bay	0%	0%	25%	0%	0%	75%	100%
Mobile Bay	3%	10%	12%	12%	0%	63%	100%
Morro Bay							
Narragansett Bay	0%	41%	54%	0%	0%	4%	100%
New Hampshire							
New York/New Jersey							
Peconic Bay	0%	24%	2%	2%	0%	72%	100%
Puget Sound	0%	0%	96%	0%	1%	2%	64%
San Francisco	73%	4%	13%	2%	0%	8%	100%
San Juan Bay							
Santa Monica Bay	3%	91%	4%	0%	0%	2%	100%
Sarasota Bay	1%	79%	5%	12%	0%	2%	88%
Tampa Bay	0%	44%	0%	0%	9%	46%	83%
Tillamook Bay							
AVERAGE	7%	20%	27%	9%	6%	32%	85%
% based on national expenditures	3%	37%	24%	31%	1%	4%	85%

Conclusions

Total expenditures in FY98 toward CCMP implementation activities were more than \$212 million for the 23 reporting NEPs (Table 1). On a National level, the US EPA Section 320 funding represented only 5% of this total (Figure 1). This contribution of Section 320 funds is in fact an overestimate since NEPs were unable to adequately characterize funding in some funding categories.

Figure 1, however, is somewhat misleading in characterizing typical expenditures for individual NEPs since expenditures by partnering agencies in certain NEPs was sometimes quite large. For example, more than \$60 million of non-EPA federal dollars were reported by the Barrataria-Terrebone NEP for FY98, which alone represented more than 25% of the \$212 million national expenditure total.

To better characterize funding patterns, the average % contribution of Section 320 funds and other funding categories are shown in Figure 2. This figure shows the averages of all category funding percentages calculated from individual NEP program funding breakdowns as shown in Table 2. This representation of the data eliminates the skewing effect of large dollar expenditures in any one NEP.

As shown by Figure 2, US EPA Section 320 funds represented a minority of total implementation funding as a percent of all funding,

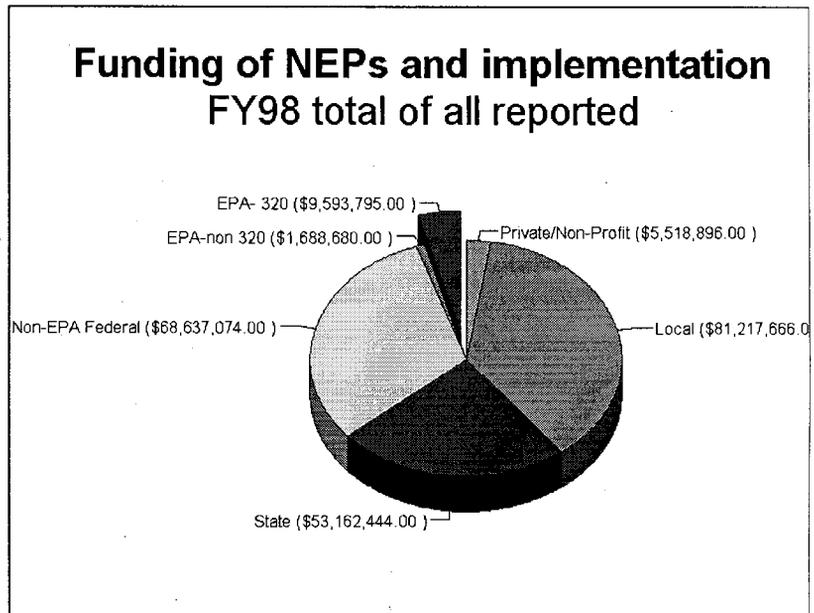


Figure 1. Total dollar expenditures for CCMP implementation, by funding category as reported by 23 NEPs for FY98.

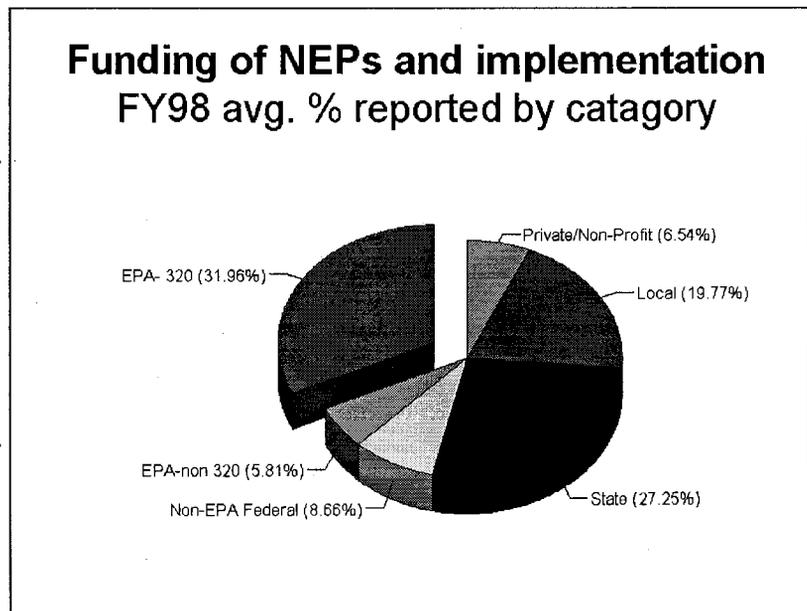


Figure 2. FY98 average percentages for each funding category per individual NEP for all CCMP implementation expenditures.

accounting for an average of 32% within each NEP for CCMP-related expenditures for FY98.

Although 32% may represent a national average of the contribution of Section 320 funds in relation to all FY98 expenditures, Figure 3 demonstrates that there is a great variation in the relative importance of Section 320 funds among individual estuary programs. For example, for 7 of the 23 respondents, Section 320 funds represented 20% or less of the total expenditures. As noted previously, because some sources of funding such as local and state expenditures may have been underestimated, section 320 contributions may also be overestimated in this figure.

Also of interest to some NEPs is the amount of EPA funding provided to the NEPs through other EPA programs other than Section 320 (e.g., 319, 104b3, 604, etc.), since these programs are viewed as important mechanisms for funding NEPs and CCMP implementation activities. As shown in Figure 4, there is also a considerable amount of variation in the amount of non-section 320 EPA funding that each NEP program receives, with Section 320 funds ranging from 31% to 100% of all EPA funds received, with the mean being 83%.

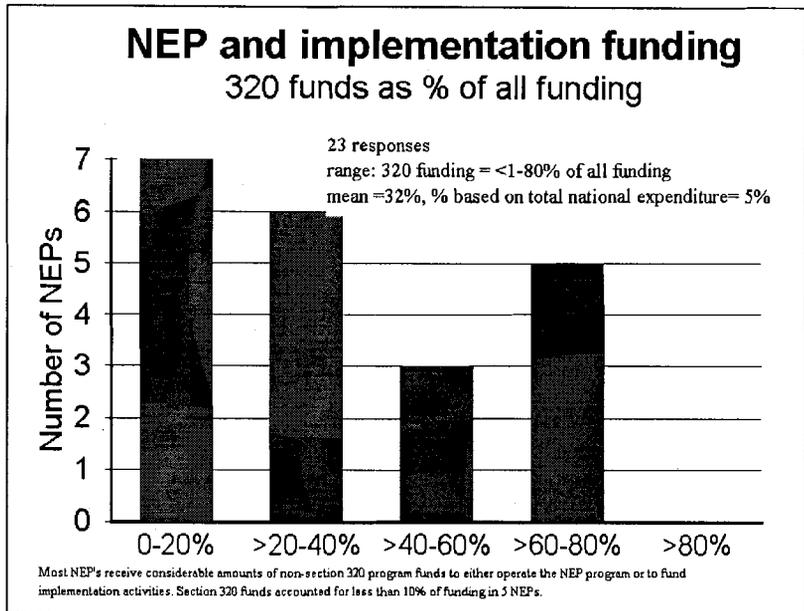


Figure 3. Frequency histogram showing range of funding EPA Section 320 as a percentage of all other sources.

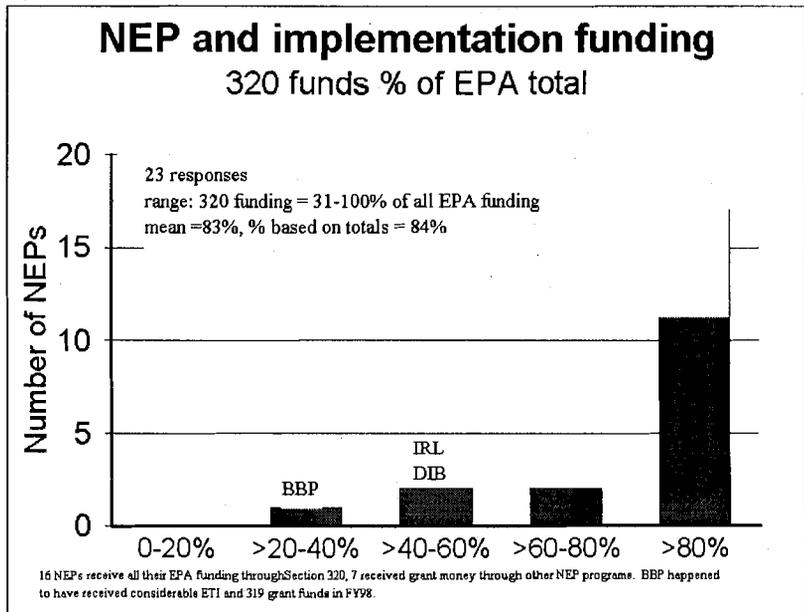


Figure 4. NEPs funding from the US EPA via section 320 as a percentage of other EPA grant programs.

Appendix A. Table 1 Funding Notes

INDIAN RIVER LAGOON:

NOTE: Table does not include the estimated >\$27,500,000 expended on land acquisition initiatives from state, local and private sources since 1995.

LOWER COLUMBIA RIVER: A: \$150,000 from Oregon, \$150,000 from Washington

MASS BAYS:

- A Implementation costs are so large that we depend on lots of sources, obviously. EPA funds are used just to support the core program.
- B MBP gets additional support that we don't really count in that the regional planning agencies that house our regional staff also pay part of their salaries. Essentially they are out doing MBP tasks all the time anyway.
- C Same as for B. There are many things that agencies are doing that we nudge along that we don't take financial credit for.

MOBILE BAY:

Note: \$290,000 carried over from previous year, 1= Gulf of Mexico Program

PECONIC:

- * Does not include implementation funding sources which are administered by entities other than the Peconic Estuary Program's Program Office. These include NYS Clean Water/Clean Air Bond Act Funding (\$1.3 million in 1998. Approx \$2.5 million in 1999) and Land Preservation partnership (\$15 million Town, \$15 million County of 3 years).
- ** Minimum commitment is shown. Actual contributions will be substantially higher.
- *** Value of services are substantial but unquantified.

PUGET SOUND:

- * Puget Sound Estuary Program does not track private non-profit, local or non-EPA Federal spending for implementation of the estuary program. However, we know that local and tribal governments are spending considerable sums to carry out actions called for in the CCMP. For example, about half of the local governments in the basin have established utilities to fund stormwater management programs; other local governments are upgrading combined sewer overflows and sewage treatment plants, implementing watershed plans, acquiring and restoring habitat, inspecting on-site sewage systems, enforcing environmental laws, educating the public, etc.---all of these activities would easily add up to \$50 to 100 million (and that is probably a very conservative estimate). State and federal agencies are providing additional funding from SRF, 319, transportation programs, and the state cigarette tax to local governments, tribes, ports, sewer and water districts, and conservation districts to help them fund the activities listed above and others which protect the Sound. In addition, there are a minimum of 200 private, nonprofit groups working to protect the Sound.

SARASOTA BAY:

- * Estimates \$274,645 carryover into FY 98, \$300k allocations for FY 98-9
- ** Assumes \$28 million wastewater re-use system is constructed in Manatee County, funds committed in FY 97; estimates for proposed reuse system expansions in Sarasota County not available; includes \$10 million for the completion of Phillippi Creek \$40 million stormwater retrofit project.

TAMPA BAY:

- 1 Includes cash contributions for operation of TBEP. Does not include expenditures by local governments and non-federal agencies for project contributing to implementation of CCMP.
- 2 Does not include potential federal grants to TBEP partners for projects contributing to implementation of CCMP.