Massachusetts Bays Comprehensive Conservation & Management Plan

AN EVOLVING PLAN FOR ACTION

MASSACHUSETTS BAYS PROGRAM
U.S. ENVIRONMENTAL PROTECTION AGENCY
MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

1996 FINAL CCMP

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 6 1996

THE ADMINISTRATOR

Honorable William F. Weld
Governor
The Commonwealth of Massachusetts
Boston, Massachusetts 02133

Dear Governor Weld:

It is my great pleasure to receive your concurrence and to approve the Comprehensive Conservation and Management Plan (CCMP) submitted for the Massachusetts and Cape Cod Bays. The Massachusetts Bays Program that developed this CCMP is truly a model for the intergovernmental relationships that I believe are fundamental to successful environmental protection. The steady support from the Massachusetts programs and staff during development of the CCMP has been crucial to its timely completion.

The enthusiasm and high quality work of staff at the Massachusetts Bays Program, Massachusetts Coastal Zone Office, and Urban Harbors Institute have been outstanding. This program is an exciting model for innovative collaboration with local communities and regional partners as they direct the protection of their resources. I am confident that we have strengthened and enhanced our relationships not only with each other, but also with citizens and local elected officials. I look forward to a continuing partnership with you and the Massachusetts Bays Program as we move ahead in implementation.

If you have any questions, please do not hesitate to contact me, or call Robert Perciasepe, Assistant Administrator for Water, at 202/260-5700.

Sincerely,

Carol M. Browner

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT
STATE HOUSE • BOSTON 02133

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT-GOVERNOR

HAND DELIVERED

April 3, 1996

Carol M. Browner
Administrator
U.S. Environmental Protection Agency
Washington, D.C. 20460

Dear ~~Administrator Browner~~: Carol,

On behalf of the Massachusetts Bays Program Management Conference, the Commonwealth proudly presents this ambitious Final Comprehensive Conservation and Management Plan (CCMP) for your consideration.

I have examined this Management Plan, and as Governor, approve it. The public and officials from all levels of government have had an opportunity to review and comment on the document. The Plan has also been reviewed by the Massachusetts Coastal Zone Management Office (MCZM). As a result of a formal request from Jane Downing (Manager, Massachusetts State Unit, EPA-New England) on January 16, 1996, MCZM commenced Federal Consistency Review of the Draft Final CCMP. While this Final CCMP reflects MCZM's initial review and input to ensure consistency between the CCMP and the Massachusetts Coastal Zone Management Plan, completion of this process will remain open until EPA-Headquarters is prepared to issue its approval of the Final CCMP. This proposed Federal Action will ultimately be the subject of MCZM's Federal Consistency determination.

You may be assured that my Office, with the support and assent of the Legislature, will aggressively identify and appropriate resources to implement the CCMP actions and recommendations contained herein. The Commonwealth is well aware of its partnership status with the Federal Government regarding the implementation of this Plan. As with other Federal programs, the Commonwealth is prepared to prioritize implementation based on the level of support from our Federal partners. Such prioritization will also be tempered by the myriad of commitments and limited fiscal resources available at the state level. As contributing partners, we can work together to provide meaningful environmental conservation initiatives as specified in this CCMP.

Sincerely,

Bill Weld

William F. Weld
Governor

MASSACHUSETTS BAYS

1996 COMPREHENSIVE CONSERVATION

AND MANAGEMENT

An Evolving Plan for Action

MASSACHUSETTS BAYS PROGRAM

U.S. Environmental Protection Agency

Massachusetts Executive Office of Environmental Affairs

1996 FINAL COMP

THE BAYS PROGRAM

The Massachusetts Bays Program is a joint effort of local, state, and federal governments, as well as citizens, scientists, educators, and businesses, to develop regional solutions to pollution problems in the Bays and their adjacent watersheds. The Program is funded under the Clean Water Act through the U.S. Environmental Protection Agency, and is administered by the Massachusetts Executive Office of Environmental Affairs' Coastal Zone Management Office. In addition to developing a long-term plan to improve water quality management, the Program offers information and technical assistance on innovative, locally-based pollution prevention and remediation projects, and sponsors a multi-faceted public outreach and education effort to heighten awareness of pollution problems and to enlist support for and participation in Bays protection.

For more information, call 1-800-447-BAYS or write Massachusetts Bays Program, 100 Cambridge Street, Room 2006, Boston, MA 02202.

ACKNOWLEDGEMENTS

The Massachusetts Bays Program **Comprehensive Conservation and Management Plan (CCMP)** is the work of many dedicated people. Many thanks to Secretary Trudy Coxe, Massachusetts Executive Office of Environmental Affairs (EOEA), and Regional Administrator John DeVillars, United States Environmental Protection Agency (EPA), for their ongoing involvement and support. The preparation of the CCMP was the result of an innovative contractual agreement with the Merrimack Valley Planning Commission and we would especially like to acknowledge Alan Macintosh, Environmental Program Manager for MVPC, who served with unflagging commitment and enthusiasm as CCMP planner and principal author, and Celine Bernier (MVPC), whose typing and formatting skills contributed to the preparation of this and previous iterations of the document. State staff from the Massachusetts Bays Program (MBP) who participated in the development of the document include Diane Gould, Betsy McEvoy, Dillon Scott, Marie Studer, Ruth Kuykendall, and Susan Schneider. Regional Planning Agency MBP staff participants included Lisa Nicol, MVPC; Nancy Goodman and Bill Clark, Metropolitan Area Planning Council (MAPC); and Patricia Hughes, Cape Cod Commission (CCC). Faith Burbank, U. Mass Extension, also assisted. The Environmental Protection Agency contributors included Tara Tracy, Matthew Liebman, and Carol Kilbride. Members of the Massachusetts Bays Program Steering Committee, including Peg Brady, Director, Massachusetts Coastal Zone Management (MCZM); Jane Downing, EPA; Russ Isaac and Larry Gil, DEP; Gaylord Burke, MVPC; Armando Carbonell, CCC; Martin Pillsbury, MAPC; Joan Foster, South Shore LGC; Peter LaPolla, Metro Boston LGC; Ted Tarr, 8 Towns and the Bay; Jim Povey, Salem Sound 2000; Jim Watson, Old Colony Planning Council; Judy Pederson, MIT Sea Grant; and William Robinson, U. Mass/Boston, helped to guide the development of the CCMP.

Many others made invaluable contributions throughout the five years of planning that led to this document. A list of current Massachusetts Bays Program Committee members is found as follows. We would like to thank each of these individuals for their assistance and ongoing commitment. We would especially like to thank our tireless committee chairs for their dedication. In addition to the current chairs, whose names are noted in the list, we would like to thank old friends who served in the past as chairs of Massachusetts Bays Program committees, including Alan Hankin, Gwen Ruta, Jack Pitman, Mark Norton, John Farrington, Gordon Wallace, Jay Kaufman, Dan Curll, Jack Clarke, and Jeff Benoit.

And finally, many thanks to all the local, regional, state, and federal officials, planners, scientists, and interested citizens who generously gave of their time and who have made the Massachusetts Bays Program and this CCMP a success.

ACKNOWLEDGEMENTS

Massachusetts Bays Program Committee Members and Staff

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NOTE: All committee members and staff are current as of March, 1996.

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CHAPTER I. INTRODUCTION

History of the Massachusetts Bays Program

The Massachusetts Bays Program (MBP) was launched in 1988 to actively address the mounting environmental threats to the health of Massachusetts and Cape Cod Bays (the Massachusetts Bays). Initial funding of $1.6 million from the Massachusetts Environmental Trust was the result of settlement fines from a suit filed by the U.S. Environmental Protection Agency (EPA) and the City of Quincy against the Commonwealth for violations of the Clean Water Act in Boston Harbor. The same year, Congressman Gerry Studds, acting on behalf of the Massachusetts Congressional Delegation, drafted an amendment to the Clean Water Act, giving priority consideration to Massachusetts and Cape Cod Bays to become part of the National Estuary Program (NEP). The NEP was established to identify nationally-significant estuaries threatened by pollution, development, or overuse, and to promote the preparation of comprehensive management plans to ensure their ecological integrity. In June 1989, Governor Michael Dukakis formally submitted the nomination package for Massachusetts Bays.

In April 1990, EPA Administrator William Reilly accepted the Massachusetts Bays into the National Estuary Program. On November 13, 1990, EPA and the Commonwealth of Massachusetts signed a Management Conference Agreement which set forth work to be accomplished over the next five years.

Today, the program is a federal, state, and local partnership funded by EPA, the Massachusetts Executive Office of Environmental Affairs (EOEA), and other sources. The MBP is administered by the Massachusetts Coastal Zone Management Office (CZM) - an agency within EOEA - with technical assistance and planning services provided by the Regional Planning Agencies through grants from the MBP. Grants administration is provided through the Urban Harbors Institute at the University of Massachusetts/ Boston.

Structure and Goals of the MBP

The first step in carrying out the estuary program was to establish a forum for open discussion and collaborative decision-making. This forum is called the Management Conference. The Management Conference oversees the activities of the estuary program and consists of over 300 dedicated individuals representing appropriate federal, state, and local government agencies, regional planning agencies, various user groups, public and private education institutions, and the general public.

The Massachusetts Bays Management Conference is organized into a network of committees: Policy Committee, Management Committee (MC), Technical Advisory Committee (TAC), Local Governance Committees (LGCs), and Public Participation Program Committees. The Policy Committee is comprised of the EPA Regional Administrator and the Massachusetts Secretary of Environmental Affairs. This committee approves the decisions of the Management Committee, the major decision-making committee in the Conference. The Management Committee is made up of representatives of state and federal government, the Technical Advisory Committee, the five regional Local Governance Committees, and the three Public Participation Program Committees (the Coastal Advocacy Network, Education Alliance, and Business and Resource Users Group). A list of current Massachusetts Bays Program Committee participants is provided in the **Acknowledgements** section at the front of this document.

The ultimate objective of the Massachusetts Bays Program is to institutionalize the water quality management planning process. This will ensure that a dynamic action agenda is implemented to meet our principal goal - ***the preservation and management of a healthy ecosystem of living resources, useable by the public***. Work under the program has been geared to:

- Improving the habitats of living resources in Massachusetts and Cape Cod Bays;
- Protecting public health by minimizing risk from environmental contaminants;
- Protecting and improving water and sediment quality;
- Enhancing the aesthetic quality of Massachusetts' coast and coastal waters;
- Encouraging pollution prevention and other environmentally and fiscally sound methods of treatment, cleanup, and restoration; and
- Improving access as well as educational and recreational opportunities in and around the waters of Massachusetts and Cape Cod Bays.

To accomplish these, the Massachusetts Bays Program Management Conference participants and their constituencies have worked together for the last five years to develop a **Comprehensive Conservation and Management Plan**

(CCMP) for Massachusetts and Cape Cod Bays. This plan will serve as a blueprint for coordinated action aimed at restoring and protecting water quality and the diverse natural resources of the Massachusetts Bays estuary.

Overview of the Comprehensive Conservation and Management Plan (CCMP)

Charting a New Course

The Massachusetts Bays Program charted an innovative course among the nation's 28 National Estuary Programs by producing an early version of the Comprehensive Conservation and Management Plan during the first year of the program's federal funding. Other similar national programs had typically completed several years of scientific research before recommending a course of action. The Management Conference believed that, while much remains to be learned about Massachusetts Bays even now, enough was known already to begin to take action to prevent further degradation and restore the integrity of the Bays' ecosystem.

Developing the 1991 Draft Management Plan

To help galvanize support and elicit ideas for developing this initial plan, the Massachusetts Bays Program hosted a "CCMP Development Workshop" in March 1991. This all-day meeting brought together environmental advocates, business leaders, citizens, and state, local, and federal officials to focus their diverse viewpoints and expertise on designing a challenging plan development process. Participants included members of the MBP committees and representatives from numerous coastal and inland communities.

A series of key recommendations emerged from the workshop:

- The 1991 Plan should be addressed to all members of the Management Conference and their constituencies (the research community, state/federal managers, local governments, and the public) through a public outreach strategy;
- The Priority Problems currently identified by the Massachusetts Bays Program should be redefined in terms of "uses" of the Bays and organized in a readable, "user-friendly" format;
- The Plan should summarize what is known about the Bays and what is being done from both a scientific and management perspective;
- The Plan should contain a list or menu of options that should or could be undertaken by local governments;
- The Plan should recommend a set of **ACTIONS** to be undertaken by the constituent groups and should serve as a guide to the activities of the Management Conference (Management Committee, Technical Advisory Committee, and Citizens Advisory Committee) between 1991 and 1993; and
- The Plan should contain appendices with the supporting technical information, a glossary of terms, and a bibliography.

Responding to these recommendations, a Working Group was formed to oversee the development of the 1991 draft CCMP. The resulting draft document was widely distributed for comment and served to guide the activities of the MBP as the Plan was refined and revised over the following four years.

Developing the 1996 Final CCMP

Peer Review

Several events helped to shape the CCMP during the period from 1991 through the present. In the fall of 1992, a peer review was undertaken to strengthen and focus the program. The recommendations of six outside advisors included holding a Visioning Workshop to clarify our priorities, setting measurable goals, defining a long-term regional implementation strategy, and exploring potential mechanisms and sources to fund our action agenda. Public comments on the draft 1991 CCMP emphasized the need for an expanded section on **projects of regional significance** (so-called "megaprojects"), and development of specific action recommendations for these megaprojects.

Visioning Workshop - Setting Priorities and Measurable Goals

The Visioning Workshop, held in June 1993, helped to set program priorities. These priorities include reduction of pathogen pollution of shellfish beds and beaches, improved habitat quality, and reduction of toxics and nutrients entering the ecosystem through point and nonpoint sources. Subsequent meetings of an Ad Hoc Committee resulted in the establishment of four measurable goals for the MBP, which will be incorporated into a Monitoring Plan that will track the progress of CCMP implementation. The following are the measurable goals for the MBP:

1. Set target percentages for increased acreage of open shellfish beds over time. Initially, the goal is to reopen the 12 beds identified under the interagency Shellfish Bed Restoration Program;
2. Identify embayments at risk of eutrophication;

3. Quantify reduction in loadings from targeted toxicant sources contributing to a specific habitat location and monitor improvement in selected biological indicators; and

4. Restore 12 coastal wetlands where restricted tidal flow has led to habitat degradation. Monitor and report the number of acres of coastal wetlands every five years to ensure no net loss.

Please refer to Chapter VIII for a full discussion on monitoring progress towards achieving these goals.

Focus Groups

To ensure that the CCMP provided accurate, informed discussions of the megaprojects in the Bays (see Chapter IV), a series of focus group discussions were held throughout 1994. Agency representatives and interested members of the advocacy community exchanged ideas and reached agreement on basic steps needed for protection of the Bays' environment. Project information was periodically updated to reflect new developments.

Regional Implementation Strategy

To ensure that the CCMP survives beyond the end of major National Estuary Program funding, a series of workshops beginning in January 1994 explored models for a regional approach to ensure future revision and implementation of the Plan. The resulting recommendation focused on institutionalizing the existing partnership between the MBP and the Regional Planning Agencies to provide technical and financial planning assistance and to promote watershed-based water quality planning. A retreat held in January, 1996, focused on the future role of the Local Governance Committees and reaffirmed their commitment to work towards local implementation of the CCMP. Massachusetts Bays Program staff will continue to provide guidance and technical assistance throughout the implementation phase, and will work closely with the Management Conference participants to monitor CCMP implementation progress. Chapter VI describes the implementation strategy and the future role of the Massachusetts Bays Program in more detail.

Financing the CCMP

In 1994, MBP produced a companion document to the CCMP (*Financing the Massachusetts Bays CCMP: Federal, State, and Local Funding Sources and Mechanisms*) which provides guidance on state and federal sources of funding for CCMP implementation, as well as potential local and private sources. Approximate costs related to implementation are included. A matrix cross references funding sources and CCMP action recommendations. Chapter VII provides a summary of this document.

Public Review Process

Throughout the four years since the release of the 1991 Draft, MBP committee members and their constituents have devoted many hundreds of hours to CCMP issues and to development and revision of the document. In addition, in December, 1995, the draft final CCMP was released to the general public for review and comment. (See Chapter XI for a discussion of this process.) The Final CCMP incorporates responses to comments received as part of the public review process, as well as comments on the draft final CCMP from numerous state and federal agencies. All comment letters and MBP responses are provided in Appendix G.

Agency and Community Commitment

The action recommendations in the CCMP represent five years of coordinated planning within and among the participating agencies and communities.

During the winter of 1995-96, participating state and federal agencies were asked to sign letters citing their willingness to implement the actions in the CCMP. These letters, presented in Appendix L, affirm their commitments as developed through meetings and discussions with the MBP staff and committees. In addition, all four coastal Regional Planning Agencies have signed a resolution of support for, and commitment to, implementation of the CCMP. These resolutions are included in Appendix L as well. During the same period, LGC community representatives and MBP/RPA/LGC technical assistance staff began a series of ongoing meetings with the chief elected officials of the Massachusetts Bays' coastal communities. As a result of these meetings, many of the coastal communities have signed a formal resolution of support for the CCMP, which includes a voluntary commitment to implement the municipal actions appropriate to each community. These community resolutions also are included in Appendix L.

These many written commitments attest to the broad agency and community support for the CCMP, and will help ensure that the CCMP will be implemented and will serve to guide the conservation and management of the Bays' resources into the next millennium.

State and Federal Approval

Following approval from the Governor in early spring, 1996, the CCMP was submitted to the EPA for a 3-month review and approval period. A celebration of "graduation" to the official CCMP implementation phase is planned for early fall, 1996.

Plan Organization

This 1996 final plan is organized in 11 chapters. Chapter I introduces the Massachusetts Bays Program and describes its evolving management plan. Chapter II includes a summary of the Characterization Report, a companion document to the CCMP which describes the major features of the Bays - physical, biological, and socioeconomic - and explores the impacts of toxic pollutants, pathogens, and nutrients on the Bays' resources. Chapter III presents specific information on the Bays' five coastal subregions, including important resource management issues. Chapter IV describes a number of the major construction projects ("megaprojects") in the Bays region. It offers an overview of the history of the projects, summarizes key environmental issues, and provides action recommendations for the major agencies and authorities involved. Chapter V, the centerpiece of the management plan, presents 15 major Action Plans for preserving and protecting the Bays' resources. Implementation of these plans is presented as a series of targeted steps to be taken by responsible federal, state, regional, and local agencies, with proposed costs and timelines for both immediate and long-term action. Chapter VI presents an overall strategy for implementing the CCMP on a regional (i.e., watershed / embayment) basis. Chapter VII provides information on CCMP financing sources and mechanisms. Chapter VIII describes the development of "scientific" and "management" monitoring programs that will be instituted to gauge progress on achieving MBP goals. Chapter IX describes an approach for developing a Management Characterization. Chapter X describes an approach for developing an effective and streamlined Federal Consistency analysis. Chapter XI describes the MBP's public participation program and the role the public, environmental advocates, and the business community have played in shaping the CCMP.

The CCMP concludes with a series of informative Appendices, as follows:

A. The Management Framework in Massachusetts Bays
B. Acronyms
C. Glossary
D. Bibliography
E. Management Characterization/Base Programs Analysis (available under separate cover)
F. Federal Consistency Analysis (available under separate cover)
G. Public Comments and MBP Responses
H. MBP - Funded Research Reports (1990 - 1996)
I. MBP Demonstration Projects (1990 - 1996)
J. Endangered Species Act
K. National Historic Preservation Act
L. Agency and Community Letters/Resolutions of Commitment

The loose-leaf format of this document, as provided to each of the 49 coastal communities in the Massachsuetts Bays region, underscores its development and purpose as a "living" document, subject to future review and revision. Additional copies, as well as companion documents such as the Financial Plan and the Characterization Report, will be made available through the MBP, CZM, and Regional Planning Agencies.

CHAPTER II. THE STATE OF THE BAYS

Introduction

This chapter identifies important natural resource and socioeconomic characteristics of the Massachusetts Bays region, and offers an assessment of the current status of the Bays ecosystem, focusing on the priority problems and risks to habitats, living resources, and human health. It includes discussions of the major physical and biological features of the Bays; the diverse habitats of the Bays, including the human habitat; toxic contamination of the Bays habitats and living resources; and pathogen contamination of the Bays' sustainable resources.

To characterize the pollution problems of the Massachusetts Bays and to develop management solutions, the MBP undertook a major research program. This program was conducted by a variety of academic institutions, agencies, and authorities. Included was an in-depth analysis of three diverse embayments: Plum Island Sound, Weymouth Fore River Estuary, and Wellfleet Harbor. The results of the MBP research program and related studies were incorporated into the CCMP planning process. In particular, the recommended actions described in Chapters IV and V reflect the technical data from the research and studies.

Major Natural Features of the Bays Region

Geography, Geology, and Water Movements

The Massachusetts Bays region, shown in Figure II-1, encompasses all of the coastal waters of Massachusetts Bay from the tip of Cape Cod to the New Hampshire border, an area of about 1,650 square miles with a shoreline of more than 800 miles. The Bays are located at the southern end of the Gulf of Maine, a large coastal sea characterized by relatively cool water and large tidal ranges. The land draining into Massachusetts and Cape Cod Bays covers more than 7,000 square miles. Half of this area is comprised of numerous watersheds within Massachusetts; the other half is the watershed of the Merrimack River in New Hampshire.

The Bays region has a diverse geological history. Its shoreline includes beaches comprised of sand and gravel deposited by the glaciers, as well as rocky shores with exposed preglacial bedrock. The underwater topography of the Bays is a patchwork of mud, sand, gravel, and boulders (Knebel *et al.*, 1991). In places, these different types of ocean bottom occur as a mosaic within a relatively small area, particularly where fine sediments are constantly being reworked by physical and biological forces. This geologic diversity explains to a large extent the distribution pattern of pollutants. Areas with muddy bottoms tend to be more prone to pollutant deposition, as their relatively sluggish water movement facilitates the settling of fine particles and attached pollutants. In contrast, erosional areas are places where relatively rapid water movement tends to scour the bottom free of fine sediments, leaving behind relatively clean coarse grained particles and rocks.

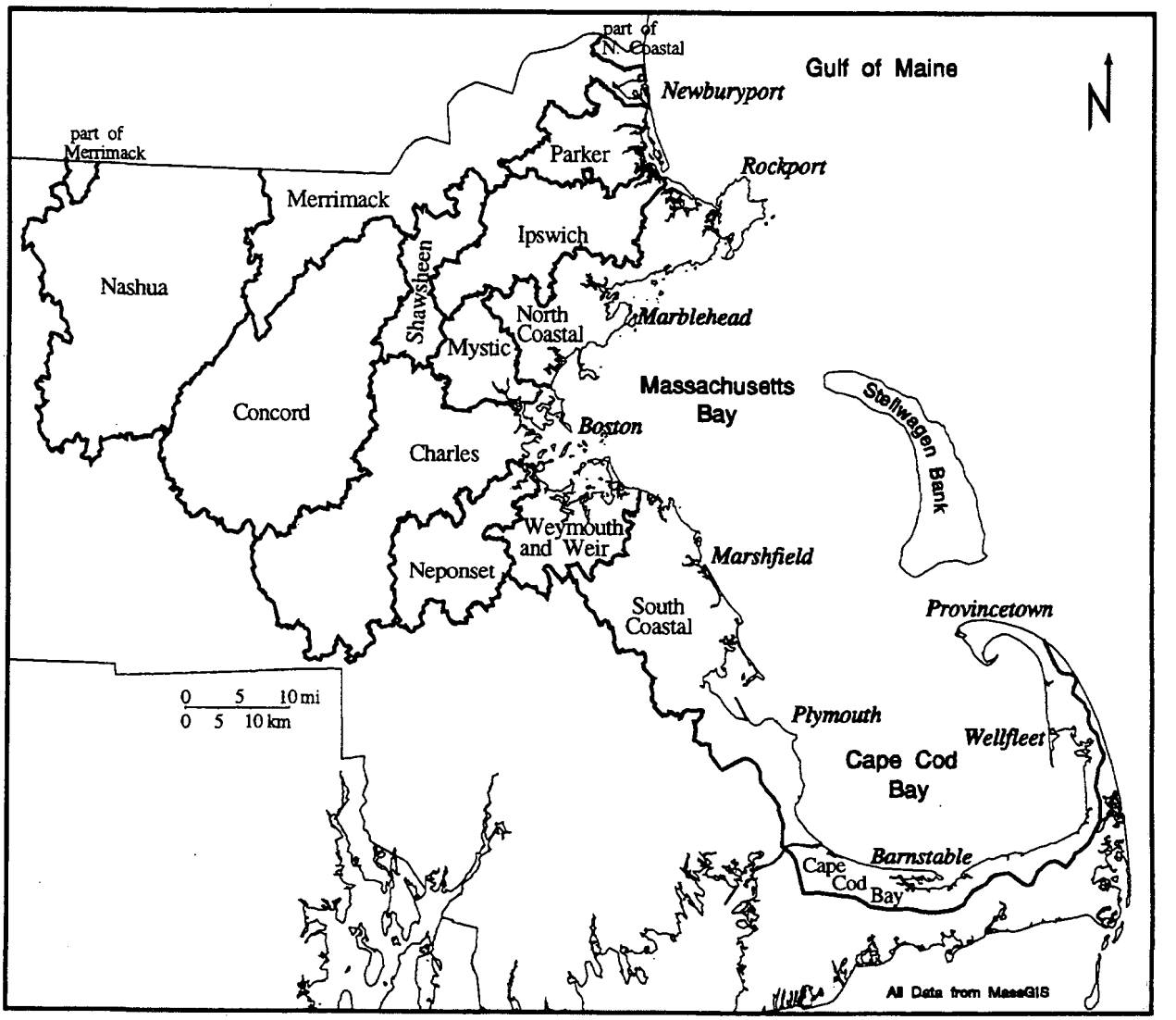
The MBP provided the funding for the first integrated study of the physical oceanography of the Massachusetts Bays (Geyer *et al.*, 1992). A key step in developing management solutions for the health of the Bays is understanding how pollutants move and are deposited throughout the region. Further, understanding the Bays' currents is essential in predicting how human activities (such as the major sewage outfall under construction in Massachusetts Bay) are likely to impact the marine environment.

In general, the Bays are strongly influenced by the southward flowing coastal current of the Gulf of Maine. This current, combined with the large flow of water from the Merrimack River, enters northern Massachusetts Bay between Stellwagen Bank and Cape Ann. The strength of this current varies with the season, running strongest during the spring when heavy spring rains and snowmelt result in high flows from the Merrimack River and the Maine rivers to the north. The water then flows from Massachusetts Bay into Cape Cod Bay, exiting the system around Provincetown. Water also enters Massachusetts Bays across Stellwagen Bank under the influence of strong tides. It should be understood that the overall counterclockwise circulation pattern in the Bays is a yearly average. This pattern may vary seasonally and even be reversed on any given day (Geyer *et al.*, 1992).

The residence time of water in different parts of the Bays varies from as little as a few days (Boston Harbor and other smaller embayments) to 20 - 45 days (Massachusetts Bays) to over six months (Stellwagen Basin). Particles are flushed more rapidly out of Massachusetts Bay than either Cape Cod Bay or Stellwagen Basin.

Compared to other east coast estuaries, the Massachusetts Bays do not contain a high volume of freshwater from rivers. Nonetheless, rivers may be important sources of selected pollutants to parts of the Bays since some pollutants, such as heavy metals and toxic organic compounds, are often adsorbed to particulate matter carried by rivers (Menzie-Cura, 1991; Menzie-Cura, 1995 a,b). Unlike

Figure II-1. The Massachusetts Bays and Their Watersheds



much of the rest of the Bays region, Cape Cod Bay receives almost all of its freshwater inputs from groundwater, since there are no large rivers discharging in that area.

The Massachusetts Bays undergo an annual cycle of stratification of water into distinct layers by depth. As the water warms in spring, it begins to stratify into a warmer, lighter surface layer, a narrow transitional layer called a pycnocline, and a colder, denser bottom layer. These layers become most pronounced in summer when there is little mixing between the surface and ocean bottom. Cooling temperatures and increasing winds during the fall season break down this stratification by mixing the water. The significance of this phenomenon for the biology of the Bays is that nutrients which support the growth of phytoplankton are used up in the surface waters during stratified periods and are eventually replenished when the waters mix again in the fall (Geyer *et al.*, 1992).

Biological Processes

The patterns of primary production by phytoplankton are related to the stratification cycle described above. As winter moves toward spring, the increased day length initiates a spring phytoplankton bloom, typically in February in Cape Cod Bay and in March in Massachusetts Bay. (Townsend *et al.*, 1990). Under the stratified conditions of summer, the phytoplankton, which must remain in the well lit surface waters, eventually deplete the nutrients, and their growth slows considerably. At the time of the fall turnover and breakdown of stratification, nutrients brought up from the bottom waters stimulate a fall bloom of phytoplankton. The particular species of phytoplankton present at any time also undergo seasonal changes, and can vary from year to year as well.

Productivity and chlorophyll estimates of Massachusetts and Cape Cod Bays are relatively low compared to other coastal regions. The annual productivity of Massachusetts Bay has been estimated at between 300-500 grams of carbon per square meter per year (Cura, 1991; Kelly, 1991; Kelly *et al.*, 1993). Chlorophyll concentrations, an indicator of the quantity of phytoplankton present, range from 1-4 mg per cubic meter per year in most of Massachusetts and Cape Cod Bays. Higher concentrations occur in some harbors and along eastern Cape Cod Bay (Kelly *et al.*, 1993).

Nutrients, particularly nitrogen, are required for the growth of phytoplankton, and hence provide a key to understanding patterns of productivity of the entire system. The largest single source of nitrogen to the Bays is water that enters the Bays from the Gulf of Maine (Cura and Freshman, 1992). The Massachusetts Water Resources Authority's (MWRA) treatment plant on Deer Island is the greatest single land-derived source of nitrogen to the Bays (Menzie-Cura *et al.*, 1991). About 20 percent of the local nitrogen loading to the Bays derives from the atmosphere (Zemba, 1996). In general, nitrogen concentrations in the Bays are highest in harbors and embayments, and then decrease with distance from shore. A study funded by the MBP is examining how the characteristics of Cape Cod Bay influence the physical and biological processes controlling the availability of nutrients, which can be a source of pollution when present in excess concentrations (Gardner *et al.*, in progress).

Cultural eutrophication, the excessive and deleterious growth of algae stimulated by artificially high nutrient inputs, has degraded a number of estuaries around the globe, including Chesapeake Bay and Long Island Sound. Symptoms of such eutrophication are not presently evident in Massachusetts and Cape Cod Bays. Most of the Bays waters are extremely well flushed, although the deep waters of Stellwagen Basin experience occasional depressions of dissolved oxygen in September and October (Geyer *et al.*, 1992). In general, eutrophication in the Bays system is considered a nearshore, localized condition that is limited to smaller embayments.

Most marine organisms depend directly or indirectly on the phytoplankton community. Zooplankton--most commonly microscopic animals related to shrimp and lobster or the larvae of fish and invertebrates--feed directly on phytoplankton as well as each other. The endangered right whale is attracted to Cape Cod Bay in late winter because of the high concentrations of copepods, the most abundant type of zooplankton in the Bays.

Blooms of nuisance algae are a major management concern. Red tide is caused by a dinoflagellate, *Alexandrium tamarense*. This organism produces a toxin that causes paralytic shellfish poisoning (PSP) in humans who ingest shellfish from waters where these organisms have bloomed. In recent years, red tides have been limited primarily to the Upper North Shore. One of the major concerns expressed by some about the new MWRA outfall (currently under construction) is that the nutrients it will release may stimulate blooms of the red tide organism transported south from Maine by the overall circulation patterns through the outfall area. Because the overall amount of nutrients will not change and the nutrients will be added below the zone where plankton can grow, most scientific evidence suggests it is unlikely that the new outfall will affect the frequency and extent of red tide blooms (US EPA, 1993). Nonetheless, it is a focus of monitoring efforts. (For more information on the MWRA project, please refer to the "Boston Harbor Project" discussion in Chapter IV.)

Other toxic algae occasionally identified in Massachusetts Bays include *Pseudonitzschia pungens*, which causes Amnesic Shellfish Poisoning (ASP) and *Dinophysis* sp., which induces diarrhetic shellfish poisoning. *Phaeocystis* (brown tide) is not toxic but is considered a nuisance algae because it fouls beaches, is odorous, clogs fishing nets, and can smother eelgrass and other marine life.

Living Resources Habitats of the Bays

Massachusetts and Cape Cod Bays are blessed with a diversity of estuarine and marine habitats. Protecting and enhancing these habitats is a priority of the Massachusetts Bays Program.

Salt Marshes

Salt marshes are intertidal grasslands and are among the world's most productive ecosystems. Currently, there are about 34,000 acres of salt marsh in Massachusetts and Cape Cod Bays (calculated by MBP from Mass GIS 1985 land use data). Almost half of this acreage is the wide expanse of marsh stretching from Plum Island Sound through Essex Bay on the Upper North Shore. Other large salt marshes are present in Scituate/Marshfield, Duxbury Bay, and Barnstable Harbor.

Over the years, many salt marshes in Massachusetts, particularly in the Metro Boston area, have been destroyed or degraded by filling for urban development. Adoption of the Massachusetts Wetlands Protection Act and accompanying Regulations in the 1970s has been instrumental in slowing this trend, as indicated by some recent estimates. These show only negligible losses since the 1970s in a relatively rural area (Plymouth County) and along the coast from Plum Island to Scituate. Another study, however, estimated an 8.8 percent loss of salt marsh over the same period in an urban marsh (Rumney Marsh in Saugus) that has been subject to encroachment and degradation.

Currently, the major threats to salt marshes are not the widespread filling witnessed in the past, but rather, small incremental losses and degradation due to commercial development, legal filling (e.g., public works projects), illegal filling, mosquito control, and pollution. Encroachment of salt marshes by the giant reed, *Phragmites australis*, has degraded numerous marshes where the natural flushing by seawater has become constrained. This aggressive and invasive plant can become the sole dominant species in a salt marsh, choking out other native flora and fauna that are dependent on the marsh environment. Sea level rise and the effects of development in the upland buffer zones adjacent to marshes present future challenges to the health of the Bays' salt marshes. MBP has provided funding to map potential coastal salt marsh restoration areas and to provide a socio-economic justification for restoration of these critical marshes (King *et al.*, in progress).

Tidal Flats

There are approximately 30,000-36,000 acres of tidal flats in Massachusetts and Cape Cod Bays. About 40 percent of this acreage occurs along Cape Cod Bay in Barnstable County. Duxbury and Plymouth Bays on the South Shore, and Ipswich Bay on the North Shore, also contain extensive tidal flats (Hankin *et al.*, 1985). In the past, tidal flats have been subjected to the same filling activities that have plagued salt marshes. In addition to outright loss, tidal flats are also prone to high levels of pollutants since they are areas of sediment accumulation. Tidal flats are especially important to human beings as they provide habitat for a number of commercially-important shellfish. They are also major feeding areas for migratory shorebirds, including several threatened and endangered species such as the piping plover and roseate tern.

Rocky Shores

Rocky shorelines constitute our most dramatic coastal scenery. They are most prevalent in the North Shore region extending from Nahant north through Cape Ann. Because they are well flushed by wave action, both the rocky intertidal shore and submerged kelp forests tend to be less affected by pollutants than other coastal habitats. Nonetheless, a recent study by Northeastern University indicated that even rocky shores can be degraded by severe pollution; in particular, oil spills constitute a potential threat (Witman, 1994).

Eelgrass Meadows

Eelgrass, *Zostera marina*, forms a rich underwater meadow that is a haven for a variety of fish and invertebrates (Buchsbaum, 1992). Because these meadows are subtidal (i.e., beneath the water surface), estimating their current acreage and health is a challenging proposition. Nevertheless, several initiatives have been launched in an effort to accomplish this.

Major threats to eelgrass are declines in water clarity, eutrophication, dredging, and boating activity (Orth and Moore, 1983; Costa, 1988 a,b). Eelgrass also is prone to natural population fluctuations resulting from intense coastal storms and a naturally occurring "wasting" disease.

Open Water

The nearshore open water of Massachusetts and Cape Cod Bays extends from the immediate shoreline to as deep as 100 meters in Stellwagen Basin. Much of this habitat is within the Commonwealth's Ocean Sanctuary Program or the Stellwagen Bank National Marine Sanctuary. A major management concern for this habitat is the protection of a number of endangered species, such as whales and sea turtles, that visit the area. Other concerns include fisheries management and maintenance of water quality and habitat integrity in the presence of a number of wastewater outfalls and dredge disposal sites.

Barrier Beaches and Coastal Dunes

Barrier beaches and coastal dunes encompass a complex of habitats, including intertidal areas, upper beach, wrack line, foredune, back dune, washouts, and interdunal swales and forests. These habitats are particularly important resting and feeding areas for migratory birds, and support a number of unique animals and plants, including various rare or endangered species, that can tolerate the desert-like conditions.

Barrier beaches are the coastal habitat used most intensively by people. As such, they present especially difficult management challenges. Conflicts commonly arise over balancing residential, commercial, and recreational interests with the preservation of natural values. In an effort to address this problem, the Commonwealth established a task force that brought diverse interest groups together to find areas of common ground and to reconcile differences. The result of their work is a guidance manual (*Guidelines for Barrier Beach Management in Massachusetts*, February 1994), which prescribes best management practices for a broad range of barrier beach activities and interests.

Estuaries as Fish and Waterfowl Habitat

Numerous coastal and offshore fish species spend at least part of their lives in estuaries. Although the number of commercially important "estuarine dependent" species is lower in New England than in other parts of the east coast, these habitats are important nursery areas to several species valued by humans, most notably populations of winter flounder. Pollution of some of the Bays' urban estuaries, such as Boston and Salem Harbors, has been associated with a high incidence of disease in this fish (Moore *et al.*, 1985).

Anadromous fish are those that migrate inland from marine habitats to spawn. In the Massachusetts Bays region, these include alewives, blueback herring, American shad, rainbow smelt, Atlantic salmon, and Atlantic and short-nosed sturgeon (Reback and Dicarlo, 1972; Chase, 1994). Over the years, these fish have suffered greatly from habitat degradation, particularly in the coastal rivers that are their spawning sites (Chase, 1994). The state's smelt fisheries, in particular, have declined sharply in recent years. Presently, Boston Harbor is one of the few regions where a viable smelt fishery still exists. (The top three rivers for smelt production in the Bays region are the Neponset River, Back River, and Fore River). Much of the decline in their populations can be attributed to the restricted access to these spawning sites caused by dams and other physical impediments. In addition, key spawning sites have been destroyed by siltation, excessive growth of algae, and other forms of pollution. The success of present anadromous fish runs requires a vigilant and effective stream management effort.

Large wintering populations of sea ducks, gulls, and alcids (penguin-like sea birds) use a variety of estuarine and nearshore habitats. In addition, gulls, terns, cormorants, herons, and egrets summer in the Bays region and depend on a number of offshore islands for nesting. The greatest threat to these birds is habitat degradation, both here in Massachusetts and in areas where they spend the rest of their migratory lives (Buchsbaum, 1992).

The Human Habitat

In 1992, a major socio-economic analysis of the Bays' resources (Bowen *et al.*, 1992) paved the way for CCMP priority setting.

Population Pressure

People are the ultimate source of most of the water quality problems and habitat degradation in Massachusetts and Cape Cod Bays. The coast of Massachusetts Bay is among the most densely populated of any estuary in the National Estuary Program (NOAA, 1990), and the population is expected to grow. Population projections for the United States as a whole indicate that there is a national trend toward living in the coastal zone. Two Massachusetts Bays counties in which significant future population growth is projected are Middlesex and Barnstable Counties. The primary environmental issue associated with population growth is new development that triggers increases in sewage effluent, stormwater runoff, and other nonpoint sources of pollution.

Shipping, Boating, and Dredging

Boston is the major shipping port in the Massachusetts Bays region, generating $1.858 billion in economic activity, based on 1992 figures from the Massport Authority (Massport, 1995). The recreational boating industry in Massachusetts employs nearly 9,000 workers who receive a total payroll of $187 million (Cavanaugh and Lewis, 1990). To maintain this shipping and boating activity, Boston and other harbors require periodic dredging. A major and ongoing management issue is the disposal of dredged materials, especially those that are contaminated. At present, there is no entirely satisfactory solution. Other management issues associated with maritime activity are chronic oil spills and bacterial pollution from marine sanitation devices.

Tourism

Tourists in Massachusetts coastal regions spend about $1.5 billion per year and support nearly 81,000 jobs. A major management issue associated with tourism is the conflicts that arise between recreational use and the protection of critical coastal resources, especially those on barrier beaches.

Whalewatching is one of the Bays' most popular tourist pastimes. About 1.25 million passengers per year visit Stellwagen Bank and Jefferies Ledge to view these spectacular cetaceans. Guidelines have been issued by the National Marine Fisheries Service (NMFS) to address concerns about the potential inadvertent harassment of whales by observation boats approaching too closely.

Cultural Resources

The Bays region has a long and rich cultural history, beginning with the first Native American inhabitants of approximately 12,000 years ago (when the continental shelf was exposed as a broad coastal plain) and continuing into the present. A recent survey of data at the Massachusetts Historical Commission (MHC) indicates that the coastal region has the highest density of ancient archaeological sites in the state. Marine resources have been a significant part of Native American subsistence strategies for millennia. European explorers were initially attracted to the Bays for their fishing potential in the 15th century and much of the early colonial settlement was oriented here. Key aspects of the Commonwealth's history are related to its sea-faring industries and dependence on the maritime trades and economies. Important historic and archaeological resources include shipwrecks, marine-dependent structures (e.g., wharves and lighthouses), and various archaeological sites. The latter include Native American habitation areas and villages, historical colonial settlements, and historical marine industries (ships, shipyards, saltworks, fish flakes). Together, these rich cultural resources help define the unique character of the Bays region and provide a better understanding of its historical use and development.

Fishing

Fishing has been an economic and cultural staple of coastal Massachusetts since Colonial times. According to a recent MBP-funded study (Bowen *et al.*, 1992) the total value of fish and shellfish landed in Massachusetts and Cape Cod Bays in 1990 was about $53 million. Lobsters accounted for about 60 percent and finfish 33 percent of this amount. Bluefin tuna brought in the greatest landed value among the finfish, followed by cod, winter flounder, yellowtail flounder, Atlantic herring, and spiny dogfish. Shellfish other than lobsters (primarily soft-shelled clams, quahogs, and sea scallops) accounted for 6.5 percent of the total landed value.

Recreational and sport fishing are also significant to the region's economy. In 1989, 634,000 recreational fishermen harvested $12 million worth of fish from the Massachusetts Bays. Bowen *et al.* (1992) estimated that the annual economic benefit of recreational fishing in the Massachusetts Bays is between $45 and $355 million, equaling or exceeding that of commercial fishing.

It is widely known that major commercial species of Massachusetts Bays are overfished in the region, an ecological tragedy that has led to severe economic hardship for traditional fishing-dependent communities, such as Gloucester (Correia, 1992; Buchsbaum *et al.*, in progress). Eight out of eighteen species of finfish that occur in the Massachusetts Bays region were listed as overexploited by the Northeast Fisheries Science Center of NMFS in their 1993 survey. Total landings of the three most important species of groundfish in Massachusetts waters -- cod, winter flounder, and yellowtail flounder -- are now roughly only 15 percent of what they were in the late 1970s (EOEA, 1990). Haddock, a species long prized by fishermen and consumers, has all but disappeared from Massachusetts waters. Ocean scallops and lobsters in the Gulf of Maine are also classified as overexploited.

In response to these distressing trends, NMFS recently issued new regulations designed to drastically cut fishing mortality by limiting the areas open to fishing, the length of time fishermen can fish, and the total number of people who can fish. At the same time, the Massachusetts Division of Marine Fisheries (DMF) has placed limits on the size of boats that can fish in state waters. Despite these actions, however, recovery of the stocks is uncertain. Atlantic herring is one of the few species that have made a successful comeback from an overfished condition.

Although overfishing is generally considered to be the primary cause of the current crisis in the fishing industry, pollution and habitat loss are thought to play a role as well, especially among fish that spawn nearshore or are anadromous. Such fish have much greater exposure to polluted water and sediments than offshore species. Entrainment of fish in power plant intakes may account for some additional localized impacts. In the spring of 1996, MBP hosted a workshop to present the results of a MBP-funded analysis of the factors impacting fish populations (Buchsbaum, *et al.*, in progress).

Toxic Contamination of Massachusetts Bays Habitats and Resources

Pollutants in Massachusetts and Cape Cod Bays, such as nitrogen, suspended solids, polycyclic aromatic hydrocarbons (PAHs), chlorinated hydrocarbons, trace metals, and pathogens, can increase risks to human health, habitats, and sustainable resources. These pollutants enter the Bays in either one of two general modes: from point sources (i.e., direct discharges) or from nonpoint sources (i.e., diffuse sources such as stormwater, groundwater, or the atmosphere).

Sources of Pollutants to Massachusetts Bays

Recent studies indicate that the drainage basins for Boston Harbor, the lower North Shore, and the Merrimack River contribute the largest pollutant loads to the Bays. Major sources within these basins are effluent from municipal wastewater treatment facilities and industries, rivers, stormwater runoff, and atmospheric deposition (Menzie-Cura, 1991; Menzie-Cura, 1995 a,b; Golomb *et al.*, 1995).

Wastewater treatment facilities, particularly the large ones run by the MWRA, are among the greatest contributors of trace metals, especially copper, lead, and zinc (Alber and Chan, 1994; Uhler *et al.*, 1994; Menzie-Cura, 1995b). In recent years, the level of metals discharged by MWRA facilities has declined due to an industrial pretreatment program and a slower economy (Alber and Chan, 1994). Industrial pipes are generally not a large "direct" source of toxic pollutants to the Bays, as most industries discharge their wastewater into municipal sewer systems rather than directly into the Bays or their tributaries.

The Merrimack River, which drains the largest watershed to the Bays, contributes an estimated 10-40 percent of the total copper load to Massachusetts Bay. It is also an important source of lead, chromium, and mercury. Many of these pollutants are discharged to the Merrimack River by municipal wastewater treatment facilities and industries in the urban centers along the river (Menzie-Cura, 1991). Rivers entering Boston Harbor are major sources of lead and PAHs (Menzie-Cura, 1991; Alber and Chan, 1994).

Stormwater is a significant cumulative source of pollutants on a Bays-wide scale and a major contributor to the degradation of many nearshore waters, including Boston Harbor. Combined sewer overflows (CSOs) also are a significant contributor of various pollutants to Boston Harbor. Atmospheric deposition is a significant contributor of nitrogen, organic compounds (PAHs and polychlorylbiphenyls, or PCBs), and certain trace metals (cadmium, lead, zinc, and mercury). These pollutants enter the atmosphere from car exhaust and emissions from power plants and municipal incinerators (Golomb *et al.*, 1996; Zemba, 1996).

Concentrations of Toxic Pollutants in the Water Column and Sediments

In general, the concentrations of toxic pollutants in the water column in Massachusetts Bays gradually decrease with distance from shore. In parts of Boston Inner Harbor, Salem Sound, and northern Massachusetts Bay, levels of trace metals exceed those recommended by EPA for chronic toxicity to marine life. In addition, contaminated sediments can be a steady source of some toxic pollutants to the water column.

The contaminant levels in virtually all sediments in the Bays are above background levels, even in relatively pristine Cape Cod Bay (Knebel *et al.*, 1991; Hyland and Costa, 1995; Shea and Seavey, in progress). To assess the impact of contaminated sediments on the community of marine invertebrates inhabiting the sediments, MBP funded a sediment triad analysis (Hyland and Costa, 1995). For a variety of coastal sites, this study compared sediment toxicity, contaminant concentrations, and the health of the benthic community. In most areas of the Bays, contaminant levels are below those thought to impact benthic organisms. Nevertheless, there are a number of toxic "hot spots" in depositional areas where toxic contaminants and high levels of organic matter accumulate, resulting in fewer benthic species (Hyland and Costa, 1995). Nearshore sediments in Boston Harbor, Salem Sound, and Broad Sound contain a long list of potentially toxic compounds at hazardous levels (Moore *et al.*, 1995; Hyland and Costa, 1995; NOAA, 1991). In Boston Harbor, levels of chromium, copper, zinc, lead, mercury, PCBs, and DDT significantly exceed the National Oceanic and Atmospheric Administration's (NOAA's) lowest effect range. Chromium is elevated in Salem Harbor sediments (MacDonald, 1991). The Massachusetts Bay Disposal Site and the future MWRA outfall site both violate EPA's proposed sediment criteria for certain PAHs (Cahill and Imbalzano, 1991). (However, with respect to the MBDS, it should be pointed out that the MBDS has not been found to have a significant adverse impact on the habitat of Massachusetts Bay, based on the findings of the MBDS Environmental Impact Statement (EIS) and Disposal Area Monitoring System (DAMOS) research. The Public Record of Decision for the Final EIS for the designation for the MBDS indicated that "The MBDS has been previously used without any significant adverse effects to the marine ecosystem or human health and the proposed future use of the modified MBDS should have no such effects either.")

To further our understanding of the nature of the sediment pollution in the Bays, MBP funded an analysis of pollution levels in cores taken from Massachusetts and Cape Cod Bays (Shea and Seavey, in progress). In addition, MBP funded a review of available sediment pollution data (Cahill and Imbalzano, 1991). These and related studies assist the MBP in understanding the potential impact of major dredging and dredged materials disposal projects in the Bays, as well as characterizing the results of long-term disposal of pollutants into the Bays' waters.

Levels of selected contaminants are expected to decrease in Boston and Salem Harbors as a result of ongoing improvements to wastewater treatment facilities, reduction in CSOs, and the reduced use of certain toxic pollutants, such as DDT, PCBs, and chromium. To help these and other communities implement CCMP actions related to controlling sediment pollution, the MBP funded an analysis of stormwater Best Management Practices and related costs in the Salem Sound area (Battelle, in progress).

Effects of Contaminants on Organisms in the Bays

Diseases and other physiological effects attributed to toxic pollutants have been found in fish and shellfish from Boston Harbor, Broad Sound, and Salem Harbor (Moore *et al.*, 1995; McDowell *et al.*, in progress). Diseases associated with PAHs (e.g., a precancerous condition of the liver) were much higher in winter flounder from Boston Harbor than in flounder from offshore sites (Sullivan and Robinson, 1990; Moore *et al.*, 1992; Moore and Stegeman, 1993). A study by DMF showed that tissue PCB concentrations are elevated in winter flounder and lobsters from Salem Sound and Boston Harbor compared to those from non-urban coastal sites (Schwartz *et al.*, 1991). The effect of toxic pollutants on important marine organisms at the population level is currently being investigated (McDowell, in progress).

To clarify the role of food chain transfer in PAH uptake, the MBP funded a study of PAH metabolism in clams and marine worms (McElroy *et al.*, 1994). In addition, a MBP study examined a biochemical marker that is induced in populations of fish and intertidal shellfish from the Bays which have been exposed to organic contamination. The marker has the potential to serve as monitoring tool to assess pollution exposure (Moore *et al.*, 1995). These studies and related research will be useful in tracking the recovery of the Bays as the CCMP is implemented.

The risk to humans of consuming fish and shellfish containing toxic pollutants is assessed by comparing contaminant levels in edible tissues with action levels set by the federal Food and Drug Administration (FDA). In general, fish in the Massachusetts Bays are considered safe to eat by current standards of risk analysis. The only current health advisory is for the consumption of lobster tomalley from lobsters caught anywhere in Massachusetts Bay and a limited advisory for sensitive people for lobster, flounder, and bivalves from Boston Harbor and bluefish from Massachusetts Bay (US EPA, 1988). An EPA study of fish and shellfish in Quincy Bay puts the risk of developing cancer as a result of consuming PCBs in winter flounder, clams, and lobsters (excluding tomalley) at between one in 1,000 to one in 100,000, depending on how regularly the fish or shellfish is consumed (US EPA, 1998). The consumption of lobster tomalley alone posed the highest risk, one in 100.

Most fish advisories in Massachusetts are restricted to rivers and lakes. Health risks associated with consumption of fish from our marine waters, even those of Boston Harbor, are low. Nonetheless, there are *some* risks, though fish in the Bay are generally considered safe to eat.

Pathogen Contamination of Sustainable Resources

Shellfish Bed Contamination

The closure of shellfish beds due to pathogen contamination is, in the eyes of the public, one of the major environmental and economic problems facing Massachusetts and Cape Cod Bays. Indeed, the 80,000 closed acres of shellfish beds represent a significant annual economic loss to the state. A 1991 estimate of the economic loss from closed beds in the Ipswich River alone was $500,000 (Ipswich Shellfish Advisory Board, 1991). Coastwide, the annual losses are many times this amount.

Contaminated shellfish beds are closed to reduce risks to public health from pathogens in sewage. The two most frequent diseases attributed to sewage pollution of marine waters are gastroenteritis (caused by the Norwalk virus) and hepatitis A. Between 1961 and 1984, 6,000 and 1,400 cases of these two diseases, respectively, were reported in the United States (Williams and Fout, 1992). Many cases go unreported. Massachusetts has shown a promising trend of no reported cases over the past few years.

Although fecal coliform bacteria generally do not cause diseases themselves, they are used as an indicator of the presence of pathogens. Shellfish beds are open to harvesting when overlying waters are less than a (geometric) mean of 14 fecal coliform bacteria per 100 milliliters (ml) of water for 15 samples. No more than 10 percent of those 15 samples can exceed 43 fecal coliforms per 100 ml. (See U.S. Department of Health and Human Services, Food and Drug Administration's 1989 Revision of the *National Shellfish Sanitation Program's (NSSP) Manual of Operations, Part I, Sanitation of Shellfish Growing Areas.*) Many shellfish areas in Massachusetts are conditionally approved, meaning that they are open except during certain predictable pollution events, such as rainstorms or sewage overflows. These areas may be closed during certain seasons or classified as restricted, in which case the shellfish can be harvested but must "cleaned" at a relay site or depuration facility for several days prior to marketing. Beds may be classified as "prohibited" due to high levels of fecal coliforms or subjected to management closure because they were not surveyed. DMF has responsibility for monitoring and classifying all shellfish harvesting areas in the Commonwealth.

At the time of this writing, 61 percent, or 252,568 out of 413,341 acres of Massachusetts Bays coastal waters, are classified as permanently open to shellfishing. As mentioned above, 80,000 acres of the total closed acreage is considered productive (i.e., contains harvestable shellfish). On a regional basis, only 36 percent of the coastal waters from New Hampshire through Boston Harbor are open, compared with 81 percent on the South Shore and 90 percent on Cape Cod (DMF statistics).

Over the past twenty-five years, the acreage of coastal waters open to shellfishing has gradually declined (Buchsbaum, 1992; Heufelder, 1988; Leonard *et al.*, 1989). Between 1970 and 1990, the closed acreage roughly tripled on the South Shore and increased about twenty-fold on Cape Cod. On a more positive note, however, several shellfish beds in the region have been reopened since 1991.

Studies in a number of areas around Massachusetts and Cape Cod Bays (Ipswich, the Annisquam River, Salem Sound, the North River-Scituate, and Cape Cod) show that the primary causes of closures of shellfish beds are inadequate sewage treatment systems, illegal sewer tie-ins to storm drains, stormwater runoff, and wastes from livestock, pets, and wild animals (Roach, 1992; Cooper and Buchsbaum, 1994; Heufelder, 1988). Most of the recent large increases in closures of shellfish growing waters in Massachusetts are attributed to increased development along the coast, resulting in increased nonpoint source pollution, and more intensive monitoring. Nonpoint source pollution of shellfish beds, particularly from stormwater, is often technically difficult to mitigate, since it requires the tracking of many small and diffuse sources, each of which may be polluting only intermittently. Creative land use planning and innovative engineering solutions are required to alleviate this problem and prevent future degradation. MBP is developing a model to help communities identify shellfish beds at risk of closure from future development (Horsley-Witten, in progress).

[Note: While most shellfish bed closures are due to pathogen contamination, certain biotoxins such as paralytic shellfish poisoning (PSP) periodically play a role in bed closures as well. PSP is a naturally-occurring seafood toxin that is caused by a tiny microorganism known as a dinoflagellate, *Alexandrium tamarense*. When the PSP-causing organism is present in large numbers, it is often referred to as "red tide." PSP can lead to serious health effects, and there is no known antidote. Shellfish that are harvested as part of a recreational or subsistence fishery appear to pose the greatest health risk because individuals may not be aware of a problem or do not heed the warnings.

Data from the Centers for Disease Control (CDC) indicated that between 1978 and 1985, there were 15 reported cases of PSP in Massachusetts. While the Northeast Technical Services Unit (NETSU) of the US food and Drug Administration (FDA) reported 41 cases in the same period, milder cases may actually go unreported to health authorities. The incidence of PSP is relatively low considering that the dinoflagellate has been present in Massachusetts coastal waters each spring and summer since monitoring began in 1972. Nevertheless, the PSP problem has been spreading down the coast of the Gulf of Maine for years, with red tide events now occurring periodically in Cape Cod Bay.

Coastal waters as well as the marketplace are monitored for indications of PSP by the Massachusetts Division of Marine Fisheries (DMF) and the Massachusetts Department of Public Health (DPH), respectively. This monitoring system appears to provide adequate public health protection.]

Closures of Swimming Beaches

Beaches are closed to swimming if fecal coliform counts exceed 200 cells per 100 ml seawater. Gastroenteritis is the most common disease that is contracted by swimming in contaminated waters. The Massachusetts Bays Program has calculated that about 10,000 swimmers annually may suffer illness as a result of incidental ingestion of marine waters. This translates to an annual risk of about one in a hundred. The beaches posing the greatest risks are primarily in the region extending from Boston Harbor through Salem. These same beaches experience the greatest number of pollution-related closures.

A positive trend is the decrease in beach closures in Boston Harbor over the past few years. This has been attributed to chlorination of CSOs, repair of sewage interceptor conduits, and cessation of sludge discharges to the Harbor (Rex *et al.*, 1992).

Massachusetts Water Quality Standards

The Massachusetts Division of Water Pollution Control (DWPC), a division within the state Department of Environmental Protection (DEP), sets water quality standards and designated uses for specific coastal and inland waters. These are goals, and are based on an assessment of what a particular body of water should be able to achieve, both in terms of water quality and for shellfishing, fishing, swimming, and sustenance of aquatic life. Coastal waters are classified as either "SA," waters with the highest expected uses, or "SB," areas which cannot meet SA standards. The DWPC, through its biennial water quality assessment reports (under §305(b) of the Clean Water Act) to EPA, periodically assesses how well water bodies are achieving their targeted goals and designated uses.

About 60 percent of Massachusetts marine and estuarine waters assessed by the DWPC do not support their designated uses due to pollution. Another 30 percent support their uses and 10 percent are in partial compliance. Designated uses, such as shellfish harvesting, were achieved for only 58 percent of the waters classified as SA, and for only one percent of those classified as SB. The parameter most frequently causing non-attainment is fecal coliform bacteria. Stormwater, CSOs, and municipal point source discharges are the major sources of non-attainment. Toxic contaminants

and organic enrichment often prevent waterbodies from achieving their designated uses for maintenance of aquatic life and fishing. These observations provide strong support for the MBP's priority goals of reducing pathogen contamination of shellfish beds and reducing toxic pollution from stormwater runoff. MBP-funded studies which have contributed to our understanding of the sources and loadings of pollutants entering the Bays include Menzie-Cura (1991), Menzie-Cura (1995a and 1995b), Golomb *et al.* (1995), and Zemba (1995).

Conclusion

Characterizing the status of the physical and biological resources of the Bays, as well as the sources, loadings, fate and effects of pollutants, serves as an essential first step in developing a sound comprehensive management plan. The recommendations in this CCMP have evolved from our understanding of the state of the Bays, coupled with the practical wisdom and experience of concerned citizens and agency professionals working together over the past five years.

[An expanded State of the Bays report is in preparation and will serve as a companion document to the CCMP.]

CHAPTER III. OVERVIEW OF COASTAL SUBREGIONS

Introduction

This chapter provides important background information on each of the five coastal subregions that comprise the larger Massachusetts Bays region. These five subregions and the communities they include are listed in Table III-1. Also listed are the five Local Governance Committees (LGCs) which represent their regions in the Bays Program, and which are working with MBP and Regional Planning Agency staff to facilitate CCMP implementation at the local and regional levels.

Table III-1. MBP Coastal Subregions

Upper North Shore Region (Eight Towns & the Bay LGC)	Metro Boston Region (Metro Boston LGC)	Salem Sound Region (Salem Sound 2000 LGC)
Salisbury	Swampscott	Manchester-by-the-Sea
Newburyport	Lynn	Beverly
Newbury	Nahant	Danvers
Rowley	Sangus	Peabody
Ipswich	Revere	Salem
Essex	Everett	Marblehead
Gloucester	Chelsea	
Rockport	Winthrop	
	Boston	
	Milton	
	Quincy	
	Braintree	

South Shore Region (South Shore LGC)	Cape Cod Region (Cape Cod Coastal Resources Committee LGC)
Plymouth	Provincetown
Kingston	Truro
Duxbury	Wellfleet
Marshfield	Eastham
Norwell	Orleans
Pembroke	Brewster
Hanover	Dennis
Scituate	Yarmouth
Cohasset	Barnstable
Hull	Sandwich
Hingham	Bourne
Weymouth	

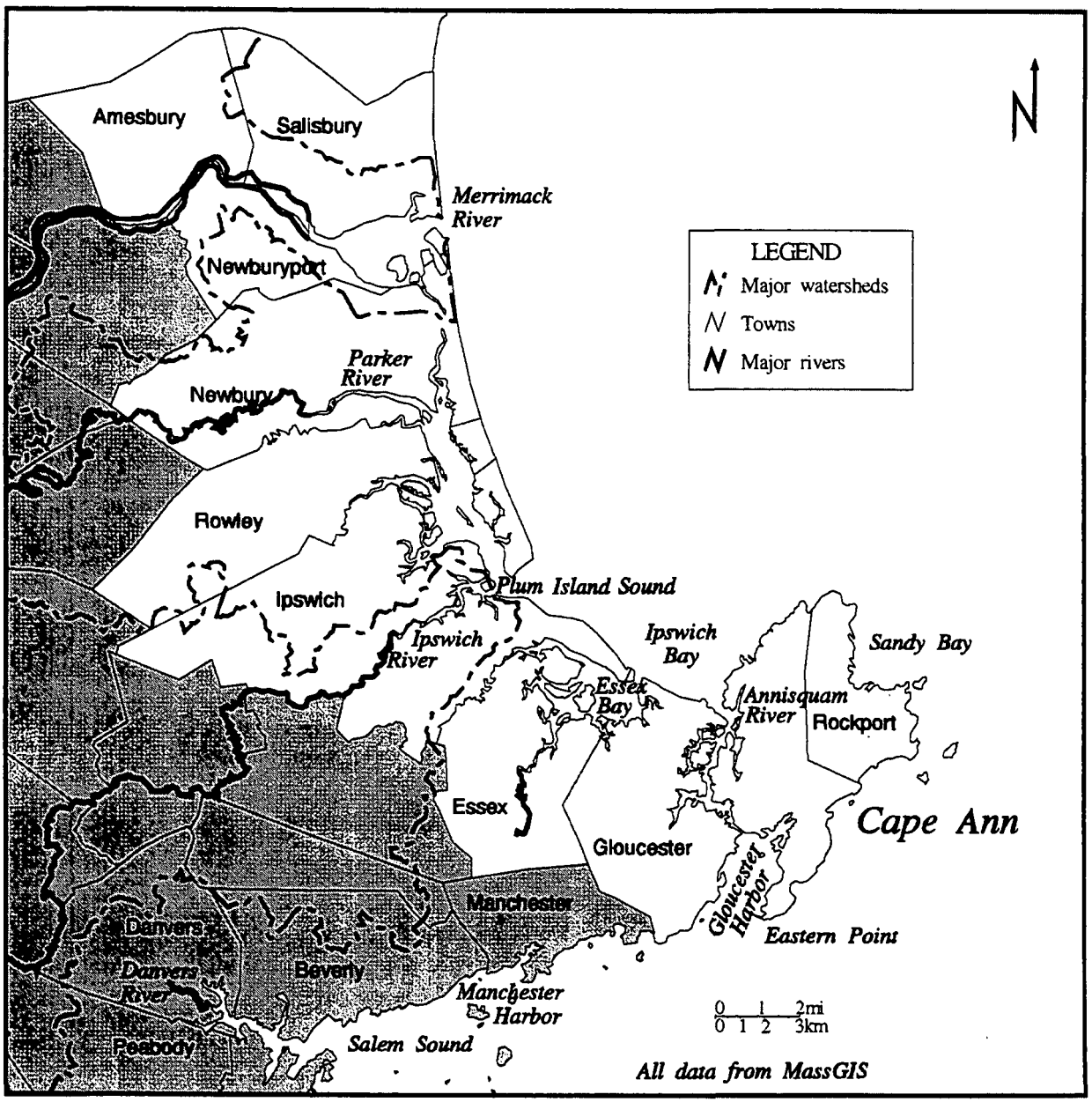
Each of five the subregions is described in terms of its major physical characteristics, population and economy, land use, water quality (including municipal sewage treatment methods), shellfish resources, public beaches, and other commercial and recreational uses. Information is also given on selected resource management issues important to each region - for example, rapid population growth, contaminated shellfish beds, or coastline erosion. Major coastal improvement projects and activities also are described, such as the MBP Mini-Bays projects, stormwater remediation activities, and harbor management planning. Finally, an extensive directory is given of regionally-important projects and programs, key contact persons, and sources of financial and technical assistance.

Upper North Shore Region

I Description of the Region

A. Map

The Upper North Shore region of the Massachusetts Bays Program includes the eight communities of Salisbury, Newburyport, Newbury, Rowley, Ipswich, Essex, Gloucester, and Rockport.



B. Physical Characteristics

1) Geology and Soils

The Massachusetts landscape was covered by glaciers 15,000 years ago. Many present-day geological features of the Upper North Shore (such as depositional beaches, bedrock outcroppings, drumlins, poorly drained soils, and numerous wetlands) reflect the region's glacial history. Salisbury, Newburyport, Newbury, Rowley, Ipswich, and Essex are characterized by long barrier beaches, estuaries, salt and freshwater marsh systems, and generally poorly drained soils. To the south and east, the Cape Ann communities of Gloucester and Rockport are characterized by rocky headlands and shallow soils covering ledge.

2) Description of the Coastline

The Upper North Shore coastline is dominated by long, sandy beaches backed by extensive estuaries in the north, and rocky beaches with small coves in the south. Salisbury Beach, a coarse sand barrier beach, stretches from the Massachusetts/New Hampshire border south to the mouth of the Merrimack River. Plum Island, a nine mile long barrier island sheltering Plum Island Sound, extends from the mouth of the Merrimack south to the mouth of the Ipswich River. Crane Beach (which begins south of the mouth of the Ipswich River) and Coffin Beach (which begins east of the Essex Bay inlet) run south and east, protecting the important estuarine resources of Essex Bay. All told, nearly 20,000 acres of coastal wetlands are shielded by Salisbury, Plum Island, and Crane Beaches. Cape Ann's coastline, which extends eastward from the Annisquam River, is characterized by rocky headlands with intermittent stretches of sand or gravel "pocket" beaches. The rocky headlands are erosion resistant and the shoreline has remained virtually stationary through time.

3) Watersheds and Important Tributaries

The region contains four major watersheds. The largest of these is the **Merrimack River**, which begins in the White Mountains of New Hampshire and drains extensive portions (5,010 square miles) of New Hampshire and Massachusetts. The mouth of this 116-mile river broadens into an expansive estuary that is shared by the communities of Salisbury and Newburyport. The Merrimack River is used extensively for both drinking water and wastewater disposal. The once-serious industrial point source pollution of the past has been largely abated, leaving municipal sewage treatment plant discharges (including combined sewer overflows) and nonpoint sources as the major contributors to the Merrimack's current water quality problems.

The **Parker River** drains 66 square miles in portions of nine communities, the foremost of which are Newbury, Rowley, and Georgetown. Beginning in freshwater wetlands in West Boxford, the Parker River flows in an easterly direction to Newbury, where it empties into Plum Island Sound. Major tributaries to the Parker River and Plum Island Sound include the Mill, Little, Egypt, Rowley, and Eagle Hill Rivers. Historically, water quality in the Parker River has been good, but the river is now under stress from increasing development in once-rural communities.

The **Ipswich River** originates in Burlington, MA and drains 155 square miles before emptying into Plum Island Sound at Ipswich. Its watershed is approximately 24 miles long and 6 miles wide and includes portions of 22 communities. As with many coastal streams, the Ipswich River's surrounding topography is generally characterized by low-lying land interspersed with slow-draining swamps and marshes. The Ipswich River is an important source of drinking water and outdoor recreation. With the exception of selected headwater areas (e.g., Burlington and Wilmington), the river's water quality is generally good until the river passes through the Town of Ipswich, where it picks up contaminants from urban runoff and septic systems.

The estuarine portions of the Parker River and Ipswich River watersheds, as well as the Castle Neck River, Essex River, and Essex Bay, are located within the Parker River/ Essex Bay Area of Critical Environmental Concern (ACEC). Designated in 1979, this is the only ACEC located on the Upper North Shore, but is the largest ACEC in the Commonwealth - approximately 25,500 acres. The ACEC is located in the towns of Essex, Gloucester, Ipswich, Newbury, and Rowley.

The **North Coastal Basin** includes the communities of Essex, Gloucester, Rockport, and northern Salisbury. This basin is characterized by small aquifers and streams whose yields are generally insufficient to meet municipal water supply needs.

C. Economic and Demographic Characteristics

The eight Upper North Shore communities differ in their economic and demographic structures. However, all depend on the diversity and vitality of the area's coastal resources to bolster their economies and provide a desirable quality of life. The communities support a broad array of marine-related industries, including commercial and recreational fishing (finfishing, lobstering, and shellfishing), tourism, whale watching, and boating. The following chart highlights two of the region's important fisheries (lobster and shellfish).

Upper North Shore Lobster and Shellfish Landings
(Note: lobster landings are combined for Newbury/Newburyport and Ipswich/Rowley)

Community	1993 Commercial Lobster Landings Pounds	Economic Value	1993 Reported Shellfish Landings Bushels	Major Species
Salisbury	18,828	$54,789	0	-
Newburyport			0	-
Newbury	65,149	189,584	5,900	soft shell clam
Rowley			227	soft shell clam
Ipswich	42,696	124,245	2,967	soft shell clam
Essex	4,146	12,065	4,805	soft shell clam
Gloucester	1,603,492	4,666,162	3,489	soft shell clam
Rockport	374,024	1,088,410	0	-
Region	2,108,335	$6,135,255	17,388	

Source: *DMF Data*

Many Upper North Shore residents commute to Boston, while many others engage in commerce closer to home. Most of the communities show heavy population increases during summer months as tourists flock to the beaches, seaside restaurants, and art and antique shops. The chart below highlights some of the demographic differences between the eight communities in the region.

Upper North Shore Demographics

Community	Area (sq. mi.)	1990 Pop. Density (/sq. mi)	Year-Round Population 1970	1980	1990	Est. Summer Pop. Inc.*	1990 Avg. Household Income
Salisbury	16.07	428	4,179	5,972	6,882	H	$35,679
Newburyport	9.05	1,803	15,807	15,900	16,317	M	$38,618
Newbury	24.62	228	3,804	4,529	5,623	M	$44,068
Rowley	18.75	237	3,040	3,867	4,452	-	$47,967
Ipswich	32.43	366	10,750	11,158	11,873	M	$42,386
Essex	13.20	247	2,670	2,998	3,260	M	$46,304
Gloucester	27.84	1,031	27,941	27,768	28,716	M	$32,690
Rockport	7.03	1,064	5,636	6,345	7,482	H	$35,195
Region	148.99	568	73,827	78,537	84,605		

* H = High; M = Moderate; L= Low; "-" = None

Source: *1990 U.S. Census Data*

D. Land Use

The Upper North Shore region includes two cities (Newburyport and Gloucester) and six towns. Newburyport, Gloucester, and to a lesser extent Ipswich, contain the largest industrial areas in the region. The communities north of Cape Ann have substantial acreages of tidal marsh, estuary, freshwater wetland and barrier beach. Portions of several towns (Rowley, Newbury, Essex, Ipswich, Salisbury) are still rural in nature and support farming activities. These rural towns grew rapidly in the 1970's and early 80's, creating an overload on community planning and the delivery of services. However, most of the towns still contain considerable developable open land.

E. Water Quality

Overall, water quality in the region is fairly good. The area is not heavily industrialized, and except for a few municipal sewage treatment plant outfalls, coastal point source pollution is not a major concern. Communities have the opportunity to exercise considerable control over coastal pollution, since many smaller streams and rivers remain within municipal boundaries. In spite of this, all of the region's streams are impacted to some degree by nonpoint source pollution. The Merrimack River, while much improved in recent years, is still sufficiently polluted by upstream and local sources to keep all productive Salisbury and Newburyport shellfish beds closed, and occasionally cause water quality criteria for selected metals to be exceeded. In the late 1980s, the Merrimack River was recognized as a critically important regional resource and became the focus of an Environmental Protection Agency watershed initiative. The goal of the Merrimack River Initiative (MRI) is to develop and implement a Watershed Management Plan, similar to the Massachusetts Bays CCMP, that will restore and maintain the physical, chemical, and biological integrity of the river and its watershed to meet existing and future multiple uses and to protect its natural resources. Because the Merrimack River has been the subject of MBP-funded research (Menzie-Cura and Associates, 1991; Menzie-Cura and Associates, 1995),

1992 DEP Water Quality Ratings for Upper North Shore's Major River Basins and Harbors

River Segment	Use * Class	Status**	Pollutants - Sources
Merrimack River Basin			
NH state line to Little River, Haverhill (4 segments)	B	NS	pathogens, nutrients, metals, pH - CSOs, urban runoff, municipal & industrial point sources, agriculture
Little River to Indian River, West Newbury	SB	NS	unionized ammonia, thermal modification, pathogens - CSOs, urban runoff, municipal point sources
Indian River to mouth	SA	NS	pathogens - urban runoff, municipal point sources
Plum Island River	SA	PS	pathogens - unknown
Parker River Basin			
Source to Central St., Newbury	B	S	
Central St. to mouth	SA	Not assessed	
Eagle Hill River	SA	PS	pathogens - source unknown

continued

1992 DEP Water Quality Ratings for Upper North Shore's Major River Basins and Harbors (continued)

River Segment	Use * Class	Status**	Pollutants - Sources
Parker River Basin (continued)			
Paine Creek	SA	PS	nutrients, pH, metals, pathogens, toxics-landfills, unknown
Rowley River	SA	PS	pathogens, unknown
Bull Brook	B	S/T	pesticides, nutrients, siltation, organic enrichment/DO, pathogens - agriculture, natural
Ipswich River Basin			
Source to Sylvania Dam, Ipswich	B	S	
Sylvania Dam to mouth	SA	NS	pathogens - septic tanks, non-urban runoff, unknown
Miles River	B	S/T	metals, toxics, nutrients - recreation, landfills
North Coastal Basin			
Essex River	SA	NS	pathogens, organic enrichment/DO - septic tanks, recreation, agriculture, natural
Annisquam River	SA	NS	pathogens - CSOs, recreation, urban runoff, unknown
Rockport Harbor	SB	NS	pathogens - source unknown
Gloucester Harbor	SB	NS	pathogens - CSOs, source unknown, urban runoff / storm sewers, industrial point sources

* **"Use Classes"** are State goals for the river:
S prefix denotes coastal or marine segment
A = public water supply, fishable, swimmable
B = fishable, swimmable
C = fishable

** **Status Codes:**
S = supports all indicated uses
S/T = supports all uses, but is threatened
PS = supports some uses
NS = supports no uses

Source: *DEP 305(b) Report*

which has identified the Merrimack as a significant source of contaminants to Massachusetts Bay, it is important that both the management plans of the MBP and the MRI recognize their mutual goals and the efforts needed to obtain those goals.

The Ipswich River is relatively clean until it passes through the Town of Ipswich, where it picks up heavy loads of bacterial pollutants before entering Ipswich Bay. The Parker River also is still relatively clean, but periodically has elevated pollutant levels due to development and agricultural activity (e.g., runoff from horse farms) in its basin. Many smaller coastal streams contribute significantly to shellfish bed closures. The major causes of the area's nonpoint source pollution are: failing septic systems (contributing bacteria, nutrients, and pathogens), stormwater runoff (carrying contaminants from a variety of sources including failing septic systems, road emissions, animal wastes, fertilizers, and pesticides), and poorly functioning sewer systems.

Salisbury, Newburyport, Ipswich, Gloucester and Rockport have municipal sewage treatment systems which service parts of the communities. It is surprising, then, that only a little more than 50 percent of Upper North Shore homes are sewered. The remaining homes rely on on-site sewage treatment and disposal systems (septic systems and cesspools), many of which pre-date the Title 5 regulations of the State Environmental Code. The following information is summarized from a 1995 report titled "The Status of Municipal Wastewater Treatment and Energy-Producing Facilities Discharging to Coastal Waters in Massachusetts" (Richard Zeroka, MCZM). Please refer to this report for more information on coastal municipal sewage treatment facilities.

1995 Upper North Shore Municipal Sewage Treatment Information

Community	Population est. Total (1987)	Population est. Served	Current level of treatment	Design Flow - MGD	Actual Average Flow - MGD	CSOs	Effluent discharge	Sludge disposal	Primary source of flow
Salisbury	6,882	>5,000	secondary+ advanced	1.3	0.34	no	tidal creek (Merrimack River)	land application	domestic
Newburyport	16,317	15,500	secondary	3.4	2.1	no	Merrimack River	hauled to Fall River	domestic, commercial, industrial
Newbury	5,623	—	onsite	—	—	—	—	—	—
Rowley	4,452	—	onsite	—	—	—	—	—	—
Ipswich	11,373	6,418	secondary	2.0	1.1	no	Greenwood Crk (Ipswich River)	composting	domestic, industrial
Essex	3,260	—	onsite	—	—	—	—	—	—
Gloucester	28,716	?	primary	7.2	3.4	yes	Gloucester Harbor	local composting; out of state	domestic, commercial, industrial
Rockport	7,482	4,000	secondary	0.8	0.65	no	Rockport Harbor	land application	domestic, commercial
Region	84,105	30,918							

II Coastal Resources

A. Shellfish Beds

Upper North Shore Shellfish Beds and Status as of 07/01/95

	Status*	Open Acres	Closed Acres**
Amesbury			
N2.0	P		37
Essex			
N7.0	CA	689	
N7.2	P		73
N7.3	P		29
N7.4	P		36
N7.5	CA	142	
N.6	CA	189	
Gloucester			
N7.0	CA	202	
N7.1	P		5
N7.6	CA	250	
N8.0	A		2,118
N9.0	P		1,472
N9.1	P		108
N9.10	P		50
N9.11	P		48
N9.12	CA	98	
N9.13	P		19
N9.14	P		58
N9.15	P		17
N9.16	CA	8	
N9.17	P		7
N9.18	P		14
N9.2	P		3
N9.3	P		34
N9.4	P		9
N9.5	CA	20	
N9.6	CA		11
N9.7	CA	370	
N9.8	P		97
N9.9	CA	7	
N10.0	P		8,438
N12.0	MC		2,728
N13.0	MC		7,651
N14.0	MC		6,020

	Status	Open Acres	Closed Acres**
Ipswich			
N3.0	A	5,776	
N4.0	CA	1,660	
N4.3	CA	23	
N4.4	CA	235	
N5.0	P		214
N5.1	P		51
N5.2	P		4
N5.3	P		13
N5.4	P		30
N5.5	P		22
N5.6	P		25
N5.7	P		28
N6.0	P		4,871
N7.4	P		36
N7.5	CA	88	
N7.6	CA	359	
N10.0	P		272
Newbury			
N2.0	P		253
N3.0	A	8,406	
N4.0	CA	641	
N4.1	CA	159	
Newburyport			
N2.0	P		1,413
N3.0	A	960	
Rockport			
N11.0	MC		28,332
N11.1	P		43
Rowley			
N3.0	A	2,275	
N4.0	CA	920	
N4.1	CA	29	
N4.2	CA	161	
N4.3	CA	6	
Salisbury			
N1.0	P		8,951
N1.1	P		48
N1.2	P		31
N2.0	P		1,043

*Status Code:
A=Approved
CA=Conditionally Approved
CR=Conditionally Restricted
P=Phohibited
MC=Management Closure

** Acres Calculation: is for the overall surface water area at high tide within the defined growing area. Outer coastal (beach-side) areas generally have clean water but are not very productive; these areas, usually defined as extending to the 3 mile line, are very large in comparison to the productive, more often closed estuarine areas.

Source: *DMF Data*

The Upper North Shore is famous for its soft shell clams. While coastal pollution has significantly curtailed the region's use of this valuable resource, shellfishing is still equated with a high quality of life. Some open ocean areas remain approved to shellfish harvesting; however, all *productive* shellfish beds on the Upper North Shore are currently closed or only conditionally opened. The Merrimack estuary clam flats (Salisbury and Newburyport), which once yielded annual harvests of over 100,000 bushels, have been essentially closed since 1925. (Shellfish beds are closed in response to high counts of fecal coliform bacteria, which indicate the probable presence of harmful pathogens. Fecal coliforms are found in human and animal waste; they enter streams and the coastal area through failing septic systems, poorly functioning sewer systems, and stormwater runoff.)

B. **Beaches**

The Upper North Shore is blessed with many beaches. The tables below list coastal frontage and area beaches by community.

Upper North Shore Coastal Frontage by Community

Community	Total miles of coastal frontage	Miles of coastal frontage publicly owned	Percent of coastal frontage publicly owned
Salisbury	6.90	4.92	71.3
Newburyport	7.11	0.80	11.3
Newbury	12.69	6.89	54.3
Rowley	8.20	6.72	82.0
Ipswich	22.99	18.55	80.7
Essex	3.03	1.52	50.2
Gloucester	47.19	4.74	10.0
Rockport	14.74	12.33	83.6
Region	122.85	56.47	46.0

Upper North Shore Beaches

Community	Beach Operator
Salisbury	
Town Beach	Salisbury
State Reservation	Department of Environmental Management (DEM)
Newburyport	
Plum Island Beach	Newburyport
	US Fish & Wildlife
Newbury	
Plum Island Beach	US Fish & Wildlife
Rowley	
Plum Island Beach	US Fish & Wildlife
Ipswich	
Plum Island Beach	US Fish & Wildlife
Plum Island State Park	DEM
Crane Beach	Trustees of Reservations
Great Neck Beach	Great Neck Association
Little Neck Beach	Feofees of Little Neck
Clammers (Pavilion) Beach	Ipswich

Community	Beach Operator
Gloucester	
Coffins Beach	private
Wingaersheek Beach	Gloucester
Plum Cove	Gloucester
Niles Beach	Gloucester
Pavilion Beach	Gloucester
Cressy Beach	Gloucester
Magnolia Beach	private
Good Harbor Beach	Gloucester
Rockport	
Long Beach	Rockport
Cape Hedge Beach	Rockport
Pebbly Beach	Rockport
Old Garden Beach	Rockport
Town Beach	Rockport
Front Beach	Rockport
Back Beach	Rockport

C. Other Commercial or Recreational Uses

The Upper North Shore coastal area offers many commercial and recreational opportunities. Gloucester, with its major fishing port and fish processing plants, is the fishing capital of the region. Many lobster boats are sheltered in Rockport, Gloucester, and Ipswich. Recreationists fish for anadromous, near coastal, and deep water species. All communities offer opportunities for pleasure boating; charter fishing, river cruises, and whale watching tours are available in several. Barrier beaches and their intercoastal areas provide opportunities for birding, wildlife observation, and hunting. Each community has seafood businesses and restaurants which utilize the local fish and shellfish catches; each also has an active tourism industry which relies heavily on the nearby coastal attractions.

III Community Resource Management Surveys

This section contains answers to selected questions from recent EOEA surveys. The answers are summarized here to provide a sense of the steps that Upper North Shore communities are taking to protect their resources.

Upper North Shore Resource Management Survey Answers

	Salisbury	Newburyport	Newbury	Rowley	Ipswich	Essex	Gloucester	Rockport
Wetland and Habitat Protection								
Has the community:								
- issued local wetlands guidelines in addition to the Wetlands Protection Act?	N	N	N	N	Y	N	Y	Y
- delineated coastal & inland wetlands?	N	N	N	N	N	N	Y	N
Groundwater Protection								
Does the community have:								
- stormwater control regulation(s)?	N	N	N	Y	Y	Y	Y	N
- Board of Health regulation(s) stricter than Title V?	N	N	N	N	Y	N	Y	N
- septic system inspection program?	N	N	N	N	N	N	N	N
- septic system upgrade program?	N	N	N	N	N	N	N	N
- septic system pumping program?	N	N	N	N	N	N	N	N
Surface and Coastal Water Protection								
Does the community have:								
- flood plain maps (FEMA)	Y	Y	Y	Y	Y	Y	Y	Y
- flood plain zoning	Y	Y	Y	Y	Y	Y	Y	Y
- boat pumpout facilities	Y	Y	N	N	N	N	Y	N
- subdivision stormwater management regulations	N	N	N	Y	Y	N	N	N
General Environmental Protection								
Do these boards have professional staff?								
- Planning Board	N	Y	N	N	Y	N	Y	N
- Conservation Commission	Y	Y	N	Y	Y	N	Y	N
- Board of Health	Y	Y	Y	Y	Y	Y	Y	Y

IV Significant Resource Management Issues

Shellfish bed closures are of major concern to most communities in this region. All productive Upper North Shore shellfish beds are closed either full time or following rain events. The beds are closed by the Division of Marine Fisheries (DMF) in response to unacceptably high levels of fecal coliform bacteria. Important sources of the bacteria include malfunctioning on-site septic and municipal sewerage systems, polluted stormwater, boat wastes, and, in some cases, domestic and wild animals wastes. Solutions to the shellfish bed problem are well documented. However, the implementation of these solutions is very difficult, as strong commitment by communities and individuals is required. Of related concern to area shellfishermen is a potential shortage of **depuration capacity** for the cleansing of shellfish harvested from conditionally restricted areas. Shellfish from conditionally restricted areas live in waters with relatively higher fecal coliform levels, can only be dug by "master diggers", and must be depurated (a filtering process) prior to sale. Some area shellfish beds could potentially be upgraded from prohibited to conditionally restricted, but a possible shortage of depuration facilities may create a problem. The state's only depuration facility, run by the Division of Marine Fisheries, is located on the northern tip of Plum Island (Newburyport). This facility currently accepts clams only from the Boston Harbor area.

Coastal erosion is of special concern to Salisbury. Salisbury Beach has many oceanfront homes and businesses, and has experienced severe erosion during recent storms. The town is encouraging the planting of dune grass and installation of snow fencing by beachfront residents, and built a sacrificial dune at the southern end of the beach during the summer of 1994. The northern end of Plum Island (Newburyport and Newbury) also is heavily developed, but has not experienced major erosion problems in recent years.

Growth management and comprehensive planning tools are needed in all of the Upper North Shore communities. This need goes hand-in-hand with the need for greater **technical assistance** at the community level. Most of the communities are served by volunteer planning, health, and conservation boards with inadequate staff support. Conservation Commissions and Boards of Health in particular are limited in effectiveness because they often have only part-time agents. This is a problem which, unfortunately, only additional funds can remedy.

V Coastal Management and Improvement Activities

A. Massachusetts Bays Program Mini-Bay Project, Demonstration Projects, and Bays Action Grants

Massachusetts Bays Program demonstration projects in the region have been administered primarily through Eight Towns and the Bay (8T&B), the region's MBP Local Governance Committee, and the Plum Island Sound Mini-Bay Project, conducted by Massachusetts Audubon Society: North Shore Office. Eight Towns and the Bay has used MBP funding to initiate a wide variety of activities, including:

- Establishing community-based, volunteer Water Quality Task Forces to encourage grass roots participation in the Massachusetts Bays Program. 8T&B also developed a "Workbook" to help community groups assess nonpoint source pollution in their towns. To date, the Task Forces have conducted a variety of water quality monitoring and educational projects in their communities.

- Sponsoring a septic system assessment grant program for 8T&B communities. The winner of the 1995 grant - the Essex Board of Health - performed a survey of all septic systems in town. Ipswich, a runner-up in the grant contest, was later awarded DEP 604(b) funds for its stormwater and septic system pollution assessment proposal.

- Sponsoring workshops focusing on several coastal issues (e.g., stormwater pollution, salt marsh restoration, shell-fish and finfish aquaculture).

- Providing funding for an assortment of smaller projects including: test well monitoring in Gloucester; development of an Open Space Plan for Rockport; restoration of a small freshwater pond in Essex; water quality monitoring in Rowley; and inventorying of restricted tidal creeks in all 8T&B communities.

- Assisting 8T&B communities in applying for various state environmental planning, assessment, and remediation grants. To date, projects have been funded in Gloucester, Ipswich, and Rowley.

MBP Bays Action Grants have also promoted coastal action and awareness in the region. Grants have been awarded for a variety of activities including: water quality monitoring in Ipswich; an innovative stormwater technology demonstration in Rowley; and whale paintings on the Newburyport boardwalk by school children.

B. Other Government Programs

Marinas in Newburyport and Gloucester have both recently received state grants for boat pump-out facilities. The Town of Rockport hopes to receive funding from the same grants program.

The Merrimack Valley Planning Commission, in collaboration with the Town of Ipswich and the City of Gloucester, is conducting soft shell clam aquaculture demonstration projects on non-productive tidal flats in the Eagle Hill River (Ipswich) and the Little River (Gloucester).

C. Citizen Group Efforts

The Upper North Shore is fortunate to have a number of active citizen groups and nonprofit environmental organizations working in concert to restore and protect water quality and habitat. The Eight Towns and the Bay Committee is the newest group to the area. It was established in 1992 to promote local and regional coastal water quality initiatives, and is comprised of citizens appointed by the chief elected officials in each of the eight member communities. Other regional environmental organizations include: the Merrimack River Watershed Council, the Ipswich River Watershed Association, the Parker River Watershed Association, Massachusetts Audubon: North Shore Office, the Essex County Greenbelt Association, the Trustees of Reservations, and the Bay Circuit Alliance.

Directory of Upper North Shore Coastal Projects, Programs, and Sources of Assistance

State/Federal Programs and Agencies	Contact Person and Telephone Number	Project or Program Description
• Massachusetts Bays Program	Diane Gould, Executive Director (617) 727-9530	Natural Estuary Program - provides planning, technical and financial assistance for the protection of Massachusetts and Cape Cod Bays. Partnership of state/federal and municipal governments.
• Shellfish Bed Restoration Program (MBP, Div. of Marine Fisheries, DEP, Soil Conservation Service)	Deirdre Kimball, Coordinator (617) 727-9530	Collaborative effort by Mass Bays Program, DMF, DEP, and NRCS to remediate storm drain pollution of priority shellfish beds.
• ACEC Program (Area of Critical Environmental Concern)	Leslie Luchonok, ACEC Prog. Mgr. (617) 727-3160	ACEC status provides additional protection to critical resource areas, and creates an ecosystem-based planning and management framework for state and local actions.
• Partners for Wildlife Program (US Fish & Wildlife Service)	Robert Scheirer, Priv. Lands Coord. (603) 225-1411	A federal program providing financial and technical assistance to landowners for wetlands restoration projects.
• Riverways Program (MA Dept. of Fisheries, Wildlife and Env. Law Enforcement)	Maria van Dusen, Joan Kimball (617) 727-1614	Riverways offers guidance documents and technical assistance on local river protection efforts.
• Natural Resources Conservation Service/Community Assistance Unit	Marc McQueen (508) 295-1481	This new technical team helps communities address nonpoint source pollution problems.
• Wetlands Conservancy Program (Department of Environmental Protection)	Charles Costello (617) 292-5704	This state program is charged with mapping coastal and inland wetlands.
• Wetlands Restoration and Banking Program	Christy Foote-Smith, Director (617) 727-9530	A new, statewide EOEA program targeted towards restoring degraded wetlands.
Regional Government Agencies/Programs		
• Eight Towns and the Bay (Upper North Shore Local Governance Committee)	Lisa Nicol, MVPC (508) 374-0519	Regional committee comprised of community appointees. Purposes: information sharing, promoting local and regional actions.
• MBP Plum Island Sound Mini-bays Project	Andrea Cooper MA Audubon: NS (508) 972-1122	MBP-funded study of coastal pollution in Ipswich, Rowley, and Newbury. Includes biological & land use studies and public outreach.

continued

Directory of Upper North Shore Coastal Projects, Programs, and Sources of Assistance

Regional Government Agencies/Programs	Contact Person and Telephone Number	Project or Program Description
• Department of Environmental Protection	Lawrence Gil, Office of Watershed Management (617) 292-5884	Team leader for North Coastal Basin team.
	Elaine Hartman, Office of Watershed Management	Team leader for Ipswich River Basin team.
	Joan Beskinis, Office of Watershed Management	Team leader for Parker River Basin team.
• Coastal Zone Mgmt. Office: North Shore regional assistance	North Shore Coord. (508) 281-7932	CZM develops state coastal zone policy, and monitors coastal activities, and provides technical assistance on broad range of coastal issues.
• Division of Marine Fisheries	David Chadwick, Fisheries Biologist Newburyport Shellfish Plant (508) 465-3553	The Newburyport biologists test North Shore shellfishing areas for pathogens and PSP.
• Essex County Mosquito Control Project (ECMCP)	Walter Montgomery	ECMCP has expertise in saltmarsh restoration work (Open Marsh Water Management).
• Merrimack River Initiative	Carolyn Jenkins NEIWPCC (617) 658-0500 x235	A federally funded, bi-state, public/private initiative designed to foster environmental improvements within the Merrimack River corridor.
• Merrimack Valley Planning Commission (MVPC)	Alan Macintosh, Env. Program Mgr. (508) 374-0519	Regional Environmental Planning.
• Metropolitan Area Planning Council (MAPC)	Martin Pillsbury, Water Resources Planner	Regional Environmental Planning.
	Joan Blaustein, Land Resource Planner (617) 451-2770	(Can also assist with bikeways and pathways planning.)
• Essex County Regional Services	Tia Costello, Coordinator (508) 741-0201	Recycling, composting, household hazardous waste collection, solid waste management, GIS.
	Thomas O'Leary, County Planner	

continued

Directory of Upper North Shore Coastal Projects, Programs, and Sources of Assistance

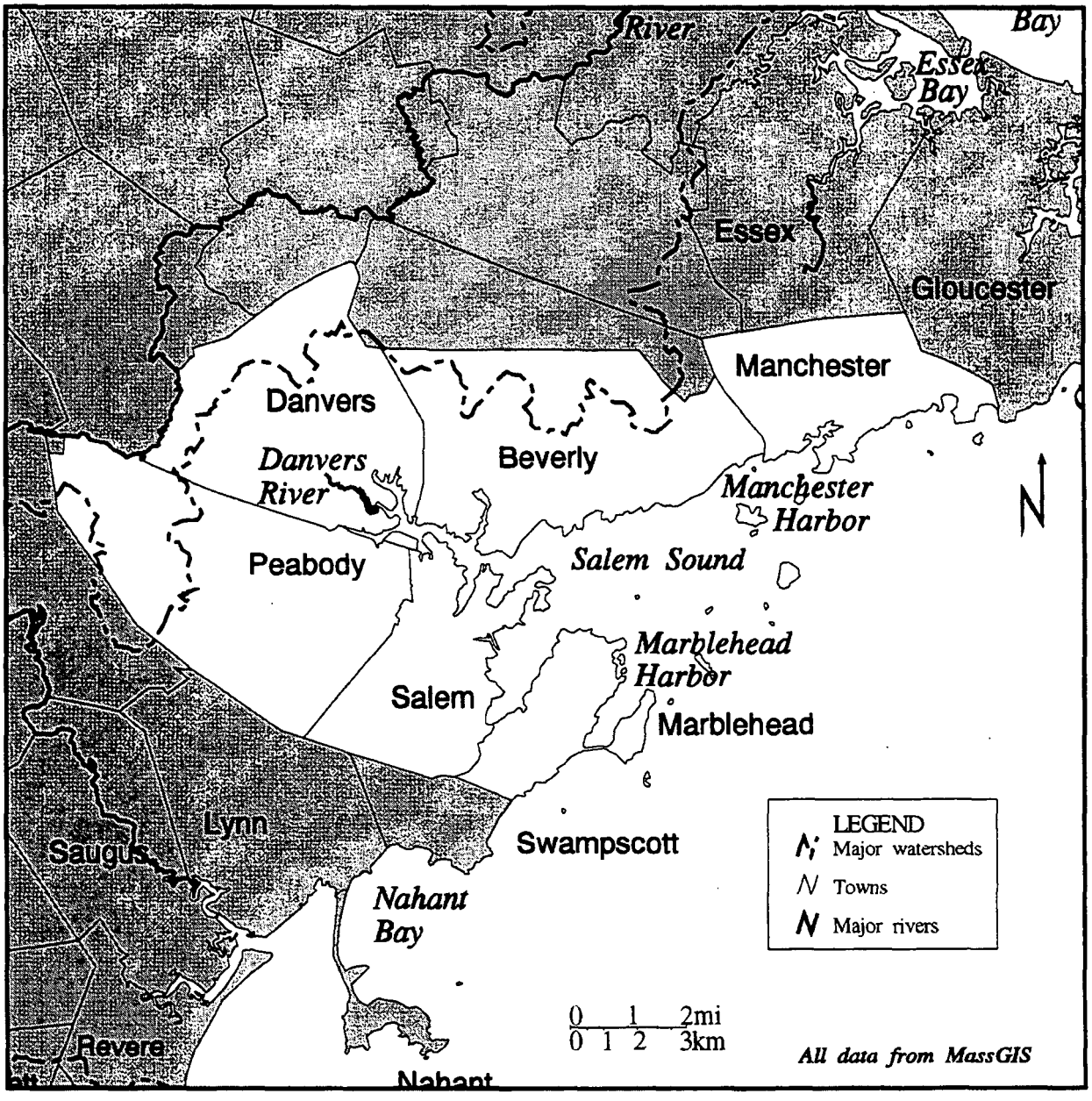
Regional Nonprofit Agencies	Contact Person and Telephone Number
• Essex County Greenbelt Association (ECGA)	Ed Becker, Executive Director (508) 768-7241
• Ipswich River Watershed Association (IRWA)	Kerry Mackin, Executive Director (508) 887-8589
• Massachusetts Audubon: North Shore Office/Mill River Nonpoint Source Reduction Implementation Project	Andrea Cooper, Robert Buchsbaum (508) 927-1122
• Merrimack River Watershed Council (MRWC)	Ralph Goodno, President (508) 681-5777
Local Efforts	
• Essex Water Quality Task Force	Stephan Gersh, Chairman (508) 768-7822
• Gloucester sewering project, BOH septic surveys	Dan Ottenheimer, Health Agent (508) 281-9798
• Ipswich Coastal Pollution Control Committee	Wayne Castonguay, Chairman (508) 281-9275
• Merrimack Estuary Monitoring Project (8T&B/MRWC)	Marea Gabriel, MRWC (508) 681-5777
• Rockport Water Quality Task Force	Ruth Perrault, Chairperson (508) 546-3896
• Rowley Water Resource Committee	Fran Sculley, Chairperson (508) 948-2141

Salem Sound Region

I Description of the Region

A. Map

The Salem Sound region of the Massachusetts Bays Program consists of Manchester-by-the-Sea, Beverly, Danvers, Peabody, Salem, and Marblehead.



B. Physical Characteristics

1) Geology and Soils

Manchester-by-the-Sea predominantly consists of exposed rocky headlands. From Chubb Point (Manchester-by-the-Sea) to Beverly Harbor and around through Marblehead Harbor, the beach complexion changes to coarse sand and gravel with intermittent exposures of rocky headlands.

Much of the watershed in Manchester-by-the-Sea and Beverly and South Salem consists of the Chatfield-Hollis-Rock outcrop association, which generally has loamy soils formed in glacial till with areas of exposed bedrock. Areas in Beverly, Peabody, Salem and Marblehead which are densely settled are classified as Urban soil (i.e., disturbed soil that has been excavated or built upon). Danvers, West Peabody and small areas of Beverly are classified as Merrimac-Hinckley-Urban soil association which has loamy and sandy soils disturbed by urban activities.

2) Description of the Coastline

The portion of Manchester-by-the-Sea which drains to Salem Sound includes the area from Smith's Point to Chubb Point, and is characterized by mixed rocky and sandy beach coastline. The eastern portion of Beverly has several large sections of sandy beach which are erosional zones, with few marshes. The downtown areas of Beverly, Salem and Danvers are generally developed on the waterfront, but have some pockets of marshes remaining in the headwaters and estuarine zone as well as a few sandy beaches. The coastlines of Salem Willows and Winter Island, as well as Marblehead and Marblehead Neck, are mixed rock outcroppings interspersed with sandy beaches.

3) Watershed and Important Tributaries

The major tributary to Salem Sound is the Danvers River, with its tributaries of the Bass, Porter, Crane, and Waters Rivers. Other tributaries to Salem Sound include the Forest, South, and North Rivers. The Sound watershed is located almost exclusively in the bordering communities of Manchester-by-the-Sea, Beverly, Danvers, Peabody, Salem and Marblehead. A small amount of land in Essex, Wenham, Lynn and Swampscott also drains to Salem Sound.

C. Economic and Demographic Characteristics

Salem Sound supports year-round commercial fishing from all of its harbors. In the summer months, recreational use of the Sound increases dramatically. Sailing and recreational boating are very popular, as are use of the area's numerous beaches and parks, fishing, tourist boat excursions, and simply walking along the water's edge. Several of the communities with cottages along the shoreline and on islands experience small population increases during summer months.

Salem Sound Lobster and Shellfish Landings

	1993 Commercial Lobster Landings		1993 Reported Shellfish Landings	
Community	Pounds	Economic Value	*Bushel's	Major Species
Manchester-by-the-Sea	168,280	$489,694	0	-
Beverly	578,995	$1,684,875	0	-
Danvers	64,219	$186,877	0	-
Peabody	N/A		0	-
Salem	6,033	$17,556	0	-
Marblehead	451,691	$1,314,420	0	-
Region	1,269,218	$3,693,424	0	

* All Salem Sound waters are closed to shellfishing

Source: *DMF Data*

In terms of population, Danvers, Peabody, Salem and Marblehead have experienced slight decreases since 1970. Beverly has remained even and Manchester-by-the-Sea shows an increase. 1970, 1980, and 1992 population figures (from U.S. Census) are as follows:

Salem Sound Demographics

Community	Area (sq. mi.)	1990 Pop. Density (sq. mi.)	Year-Round Population 1970	1980	1990	Est. Summer Pop. Inc.	1990 Avg. Household Income
Manchester-by-the-Sea	7.9	674	5,151	5,424	5,410	M	$52,806
Beverly	15.4	2,474	38,348	37,655	38,378	-	39,063
Danvers	10.4	2,276	26,151	24,100	24,484	-	43,759
Peabody	16.4	2,869	48,080	45,976	47,387	-	44,952
Salem	8.1	4,702	40,556	38,220	37,567	-	40,777
Marblehead	4.5	4,408	21,295	20,126	20,423	L	53,333
TOTAL	62.8	2,766	179,581	171,501	173,649		

* H = High; M = Moderate; L= Low; "-" = None

Source: *1990 U.S. Census Data*

D. Land Use

Much of the coastline and watershed of Salem Sound is developed with few natural areas remaining. Waterfront development is mostly residential with some commercial establishments, a number of which are water dependent. Most of the watershed is residential with large industrial/ commercial areas in some cities.

E. Water Quality

All areas of Salem Sound are classified as the less stringent SB designation except for Marblehead Harbor, which has an SA classification. Currently, no part of Salem Sound including its harbors, tributaries, and the Sound itself supports its water quality classification. Commonly noted sources of pollution include urban runoff from storm drain systems, industrial waste, wastewater treatment plant discharges, and boat waste.

1992 DEP Water Quality Ratings for Salem Sound's Major River Basins & Harbors

River Segment	Use * Class	Status**	Pollutants - Sources
Bass River - headwaters to inlet of Shoe Pond, Beverly	B	PS	organic enrichment / DO, pathogens - source unknown, urban runoff / storm sewers
Bass River - inlet Shoe Pond to Danvers River	SB	PS	pathogens - source unknown, urban runoff / storm sewers
Danvers River	SB	NS	pathogens-source unknown, urban runoff / storm sewers, combined sewer overflow
Porter River	SB	NS	pathogens - source unknown, urban runoff / storm sewers
Crane River	SB	NS	pathogens - source unknown, urban runoff / storm sewers

continued

1992 DEP Water Quality Ratings for Salem Sound's Major River Basins & Harbors

River Segment	Use * Class	Status**	Pollutants - Sources
Crane Brook	B	NS	unionized ammonia, pathogens - source unknown, urban runoff / storm sewers
Waters River	SB	NS	pathogens - source unknown, urban runoff / storm sewers
North River	SB	NS	nutrients, organic enrichment/DO, pathogens - industrial point sources, source unknown, urban runoff / storm sewers
Goldthwait Brook	B	NS	pathogens, nutrients, organic enrichment/DO, unionized ammonia - urban runoff / storm sewers, source unknown, industrial point sources
Forest River	SB	NS	pathogens, organic enrichment/DO, nutrients, unionized ammonia - urban runoff / storm sewers, source unknown
Manchester Harbor	SB	NS	pathogens - septic tanks, recreational activities, source unknown, municipal point sources
Beverly Harbor	SB	NS	pathogens - CSOs, recreational activities, source unknown, urban runoff / storm sewers
Salem Harbor	SB	NS	pathogens - urban runoff / storm sewers, recreational activities, industrial point sources
Marblehead Harbor	SA	NS	pathogens - CSOs, urban runoff/storm sewers, source unknown, recreational activities

* **"Use Classes"** are state goals for the river:
S prefix denotes coastal or marine segment
A = public water supply, fishable, swimmable
B = fishable, swimmable
C = fishable

** **Status Codes:**
S = supports all indicated uses
S/T = supports all uses, but threatened
PS = supports some uses
NS = supports no uses

Source: *DEP 305(b) Report*

Each of the six Salem Sound communities is served by municipal or regional sewage treatment facilities. These communities historically have not contained a large number of combined sewer overflows (CSOs). Those that did exist have been, or are in the process of being, corrected. The following information is summarized from a 1995 report titled "The Status of Municipal Wastewater Treatment and Energy Producing Facilities Discharging to Coastal Waters in Massachusetts" (Richard Zeroka, MCZM). Please refer to this report for more information on coastal municipal sewage treatment facilities.

1995 Salem Sound Municipal Sewage Treatment Information									
Community	Population est. Total (1987)	Population est. Served	Current level of treatment	Design Flow - MGD	Actual Average Flow - MGD	CSOs	Effluent discharge	Sludge disposal	Primary source of flow
Manchester-by-the-Sea	5,266	3,470	secondary	.67	.56	no	outer Manchester Harbor	trucked out of state	domestic
Beverly	36,000		primary - South Essex Sewage District (SESD)	(SESD is currently constructing a secondary plant)					
Danvers	25,000								
Peabody	48,000	165,000		41	27	yes	Salem Sound	Peabody landfill	domestic, industrial, commercial
Salem	39,000								
Marblehead	20,000								
	173,260	168,470							

The South Essex Sewage District facility is currently being upgraded to a secondary treatment plant.

The only municipality that is part of the MWRA water supply system is Marblehead. Salem and Beverly have a joint water supply system with a series of reservoirs located in Beverly and Wenham that receive water from small tributaries and pump water from the Ipswich River. Peabody has its own local water supply as does Manchester, which also relies on a well and reservoirs in Hamilton. Danvers shares a water supply system with Middleton with sources located in both communities and one source located in North Reading.

II Coastal Resources

A. Shellfish Beds

All shellfish beds in Salem Sound have been closed for harvesting since the 1960s when direct discharge of sewage and industrial pollution was rampant. Clams and mussels are growing in many areas of Salem Sound but cannot be harvested at this time.

Overlying water which exceeds state criteria for bacteria due to septic systems, sewage treatment plant outfalls, boat waste, and stormwater runoff is currently preventing the opening of shellfish beds for harvesting.

Salem Sound Shellfish Beds and Status as of 07/01/95

	Status*	Open Acres	Closed Acres**
Beverly			
N16.0	P	4,098	
N17.0	P		489
N19.0	P		5
Danvers			
N17.0	P		250
Manchester			
N15.0	P		11,354
N15.1	P		213
N16.0	P		3
Marblehead			
N18.0	P	330	
N18.1	P	41	
Marblehead (con't)			
N19.0	P		2,318
N20.0	P		477
N20.1	P		13
N21.0	P		10,941
N21.1	P		45
Peabody			
N17.0	P		18
Salem			
N17.0	P		590
N18.0	P		140
N18.1	P		424
N19.0	P		5,994

***Status Code:**
A = Approved
CA = Conditionally Approved
CR = Conditionally Restricted
P = Phohibited
MC = Management Closure

****Acres Calculation:** is for the overall surface water area at high tide within the defined growing area. Outer coastal (beach-side) areas generally have clean waters but are not very productive; these areas, usually defined as extending to the 3 mile line, are very large in comparison to the productive, more often closed estuarine areas.

Source: *DMF Data*

B. Beaches

The most frequently visited beaches in the Salem Sound region are Singing Beach in Manchester-by-the-Sea, Devereux and Riverhead Beaches in Marblehead, Sandy Beach in Danvers, and a string of beaches along the Beverly coast, including Mingo, Patch, Rice's, and Dane Street Beaches. In addition, numerous public parks and landings are found along the Sound's coastline.

Salem Sound Coastal Frontage by Community

Community	Total miles of coastal frontage	Miles of coastal frontage publicly owned	Percent of coastal frontage publicly owned
Beverly	10.58	0.94	8.9
Danvers	0.00	0.00	0.0
Manchester-by-the-Sea	11.85	1.82	15.4
Marblehead	16.22	2.69	16.6
Peabody	0.00	0.00	0.0
Salem	11.22	5.63	50.0
Region	49.87	11.08	22.2

C. Other Commercial or Recreational Uses

Salem Sound's always-busy waterfront supports a wide variety of uses. Tourism and water-related activities play an important role in the economies of a number of the Sound's cities and towns. The region has a heavy concentration of boat landings and marinas, along with their attendant service businesses. Several popular excursion boats, as well as a ferry between Gloucester Harbor and Salem Sound, operate during the summer months.

III Community Resource Management Survey

This section contains answers to selected questions from recent EOEA surveys. The answers are summarized here to provide a sense of the steps that Salem Sound communities are taking to protect their resources.

Salem Sound Community Resource Management Survey Answers

	Manchester	Beverly	Danvers	Peabody	Salem	Marblehead
Wetland and Habitat Protection						
Has the community:						
- issued local wetlands guidelines in addition to the Wetlands Protection Act?	Y	N	Y	N	Y	Y (3)
- delineated coastal & inland wetlands?	N	N	Y	N	Y	Y (4)
Groundwater Protection						
Does the community have:						
- stormwater control regulation(s)?	N	Y	N (5)	Y	N	Y
- Board of Health regulation(s) stricter than Title V?	Y	Y	N	N (1)	Y	N
- septic system inspection program?	N	N	N	N	Y	N
- septic system upgrade program?	Y	Y	N	N	N	N
- septic system pumping program?	N	Y	N	N	N	N
Surface and Coastal Water Protection						
Does the community have:						
- flood plain maps (FEMA)	Y	Y	Y	Y	Y	Y
- flood plain zoning	Y	Y	N	Y	N	N
- boat pumpout facilities	Y	Y	Y	N/A	Y	Y
- subdivision stormwater management regulations	N	Y	N	N(2)	N	Y
General Environmental Protection						
Do these boards have professional staff?						
- Planning Board	N	Y	Y	Y	Y	Y
- Conservation Commission	Y	Y	Y	Y	Y	Y
- Board of Health	Y	Y	Y	Y	Y	Y
% relying on septic systems	10-50	< 10	< 10	< 10	< 10	< 10

1) BOH perc tests more restrictive.

2) No management regulations. Planning Board enforces design standards for zero-net run-off increase and 100 year storm.

3) Characterized as "useless" by person who responded.

4) Unofficially mapped.

5) Special conditions in Order of Conditions.

IV Significant Resource Management Issues

Waste Treatment Plants -- The South Essex Sewerage District (SESD) is currently constructing a secondary treatment plant at the existing site and placing a multiport diffuser on its outfall at Great Haste Island. The secondary treatment plant is scheduled to go on-line in August 1997 (see Chapter IV for details). These efforts should result in much improved water quality in Salem Sound. SESD plans to contract for sludge disposal with an out-of-state firm. EPA has identified three CSOs which may require future attention.

The Town of Manchester-by-the-Sea's wastewater treatment plant is currently forbidden from receiving new connections because it is overloaded. The town has been under court order to rebuild and upgrade its treatment plant. In May 1994, the town completed the Facility Plan for upgrading the plant. The upgraded plant is to be located on the existing 1.1 acre site and will be sized to accommodate variations in wastewater flows and loads. The facility will be improved to treat a maximum flow of 1.2 million gallons per day (mgd), averaged monthly; however, the average annual flow and existing facility design flow will remain at 0.67 mgd, thereby remaining in compliance with the requirements of the Ocean Sanctuaries Act (OSA) of 1972. In addition, the town has successfully completed remedial I/I through rehabilitation efforts.

North River -- The North River flows through Salem and Peabody, and had historically been the discharge channel for waste from the many tanneries and other industries along the river. The sediments are heavily contaminated with chromium and other metals, and the site is listed on CERCLIS, the EPA Superfund list of hazardous waste sites which need to be remediated.

Shellfishing -- The shellfishing industry has been non-existent in the Sound since the 1960s when the Commonwealth closed the area to taking shellfish due to poor water quality. Improved water quality may make it possible to harvest shellfish on a restricted basis in the future, and the industry could once again be a feature of Salem Sound and the surrounding communities' economies.

Boat Waste -- Salem, Beverly, Marblehead, and Manchester Harbors contain one of the highest densities of boats per acre in the Commonwealth. The waste created and discharged from marine heads on these boats has also contributed to the closing of the shellfish beds and the degradation of water quality. Last year, funds were granted under the Clean Vessel Act to establish pump-out facilities in all communities and to upgrade the Danvers facility. A number of the communities are using the funds for mobile pump-out stations which will help address the current low frequency of use of existing stationery facilities.

Natural Resource Protection -- Much of the waterfront and watershed of Salem Sound has been developed over the several hundred years since the Colonial era. The few remaining parcels of undeveloped forest, marsh, wetlands, and islands support anadromous fish runs, coastal colonial shorebird nesting habitat, and shellfish growing areas. Efforts to protect these places as special areas need to be encouraged.

Nonpoint Source Pollution -- With the improvements expected in water quality from the secondary treatment system of the South Essex Sewerage District, stormwater runoff will be the primary contributor of pollution to Salem Sound and its tributaries. Municipal programs and homeowner education need to be expanded to address the ubiquitous and incremental damage wrought by nonpoint source pollution.

V Coastal Management and Improvement Activities

A. Mass Bays Program Demonstration Projects and Bays Action Grants

Salem Sound 2000 has received significant support from the Massachusetts Bays Program, the Metropolitan Area Planning Council, and the New England Biolabs Foundation to establish an office and to operate an extensive citizen water quality monitoring program, including analysis and mapping of pollution sources. This project initially involved almost 100 trained local volunteers in walking the entire shoreline. Currently, volunteer monitors regularly sample water quality at strategic locations, and data have been input to a Geographic Information System for analysis of the impacts of land use on water quality. Most recently, volunteer Coastal Water Quality Task Forces were established to work on a number of local water quality improvement projects and public education and outreach initiatives, including storm drain stencilling and production of a Salem Sound video.

The Town of Manchester-by-the Sea received a Bays Action Grant from the Massachusetts Bays Program to publish a list of boat pump-outs that can be found in Salem Sound, including their availability and cost. Most recently, Manchester received a grant to assist with a survey of homeowners with on-site septic systems. The City of Salem received a grant to produce a brochure, to be sent to every resident, that describes actions citizens can take to reduce their impact on the waters of Salem Sound. The Friends of Salem Woods received a grant to upgrade the trail and sign system in the Salem Woods. Venturi Aeration, Inc. received funds to study a new method for treating the wastewater at a tannery in Salem in order to improve the quality of its discharge to the Sound. The Town of Danvers received funds to sponsor a boat pump-out logo contest in the Middle School for the Danversport Yacht Club pump-out, and to design and distribute information on boat waste and pump-outs. The Town of Marblehead received funds for a storm drain stenciling project that is serving as model for other communities.

The Peabody-Essex Museum participates in activities of the Massachusetts Bays Education Alliance, and is conducting teacher training programs and helping to develop school curricula for teachers and students to learn about watersheds and how they drain to embayments.

The Massachusetts Bays Program also contracted with a consulting firm to evaluate costs to Salem Sound communities of management measures to reduce pollutant loads to sediments (Battelle, in progress). The year-long project focused on the cost and effectiveness of Best Management Practices (BMPs) and other stormwater runoff control and reduction strategies.

B. Other Government Programs

A new bridge over the Danvers River is being constructed, with concerns over sediment dredging and disposal having led to extensive sediment analysis.

With support from the Massachusetts Coastal Zone Management Office's Coastal Facilities Improvement Program, public piers have been upgraded at Winter Island (Salem) and in Beverly.

C. Citizen Group Efforts

Salem Sound 2000 is the major watershed organization in the region, and serves as the region's MBP Local Governance Committee. It is a coalition of the Sound's six bordering municipalities, major businesses, and non-profit organizations which are all working together to encourage responsible land use and pollution prevention, and to improve water quality in Salem Sound. This is being done through the collection and dissemination of scientific data, educational programs, and community outreach. Salem Sound 2000 conducts an on-going citizen water quality monitoring program and are involved in a number of educational efforts, including teacher training. Salem Sound 2000 is also working with cities and towns to address stormwater runoff and other nonpoint source pollution problems. As part of its outreach effort, Salem Sound 2000 publishes a quarterly newsletter in collaboration with Eight Towns and the Bay, the Upper North Shore Local Governance Committee.

Other organizations in the area with shared interests include Massachusetts Audubon: North Shore Office, Ipswich River Watershed Association, North River Association, Manchester Conservation Trust, Essex County Greenbelt Association, Friends of Salem Woods, The Trustees of Reservations, National Park Service, and the Peabody-Essex Museum.

Directory of Salem Sound Coastal Projects, Programs, and Sources of Assistance

State/Federal Programs and Agencies	Contact Person and Telephone Number	Project or Program Description
Massachusetts Bays Program	Diane Gould, Executive Director (617) 727-9530	Natural Estuary Program - provides planning technical and financial assistance for the protection of Massachusetts and Cape Cod Bays. Partnership of state/federal and municipal governments.
• Shellfish Bed Restoration Program (MBP, Div. of Marine Fisheries, DEP, Natural Resources Conservation Service)	Deirdre Kimball, Coordinator (617) 727-9530	Collaborative effort by Mass Bays Program, DMF, DEP, and NRCS to remediate storm drain pollution of priority shellfish beds.
• ACEC Program (Area of Critical Environmental Concern)	Leslie Luchonok, ACEC Prog. Mgr. (617) 727-3160	ACEC status provides additional protection to critical resource areas, and creates an ecosystem-based planning and management framework for state and local actions.
• Partners for Wildlife Program (US Fish & Wildlife Service)	Robert Scheirer, Priv. Lands Coord. (603) 225-1411	A federal program providing financial and technical assistance to landowners for wetlands restoration projects.
• Riverways Program (MA Dept. of Fisheries, Wildlife and Env. Law Enforcement)	Maria van Dusen, Joan Kimball (617) 727-1614	Riverways offers guidance documents and technical assistance on local river protection efforts.
• Natural Resources Conservation Service/Community Assistance Unit	Marc McQueen (508) 295-1481	This new technical team helps communities address nonpoint source pollution problems.
• Wetlands Conservancy Program (Department of Environmental Protection)	Charles Costello (617) 292-5704	This state program is charged with mapping coastal and inland wetlands.
• Wetlands Restoration and Banking Program	Christy Foote-Smith, Director (617) 727-9530	A new, statewide EOEA program targeted towards restoring degraded wetlands.
Regional Government Agencies/Programs		
• MBP - Salem Sound 2000 (Lower North Shore Local Governance Committee)	Nancy Goodman, MAPC (617) 451-2770	Regional MBP Committee. Provides technical and financial support to participating communities.
• Department of Environmental Protection	Lawrence Gil Office of Watershed Management (617) 292-5884	Team leader for North Coastal Basin team.
• Coastal Zone Mgmt. Office: North Shore regional assistance	North Shore Coord. (508) 281-7932	CZM develops state coastal zone policy, monitors coastal activities, and provides technical assistance on broad range of coastal issues.

continued

Directory of Salem Sound Coastal Projects, Programs, and Sources of Assistance

Regional Government Agencies/Programs	Contact Person and Telephone Number	Project or Program Description
• Division of Marine Fisheries	Brad Chase Fisheries Biologist Cat Cove Marine Lab Salem (508) 745-3107	Smelt restoration.
	David Chadwick, Fisheries Biologist Newburyport Shellfish Plant (508) 465-3553	The Newburyport biologists test North Shore shellfishing areas for pathogens and PSP.
• Essex County Mosquito Control Project (ECMCP)	Walter Montgomery	ECMCP has expertise in saltmarsh restoration work (Open Marsh Water Management).
• Metropolitan Area Planning Council (MAPC)	Martin Pillsbury, Water Resources Planner	Regional Environmental Planning.
	Joan Blaustein, Land Resource Planner (617) 451-2770	(also assist with bikeways and pathways planning)
• Essex County Regional Services	Tia Costello, Coordinator (508) 741-0201	Recycling, composting, household hazardous waste collection, solid waste management, GIS.
	Thomas O'Leary, County Planner	
Regional Non-Profit Agencies		
• Essex County Greenbelt Association (ECGA)	Ed Becker, Executive Director (508) 768-7241	
• Salem Sound 2000	Sam Cleaves (508) 741-7900	Shoreline surveys, water quality monitoring shellfish bed surveys, storm drain stenciling.
• Peabody-Essex Museum	Jane Winchell Curator Natural History Department, Salem (508) 745-1876	
• Massachusetts Audubon:North Shore Office	Andrea Cooper, Robert Buchsbaum (508) 927-1122	

continued

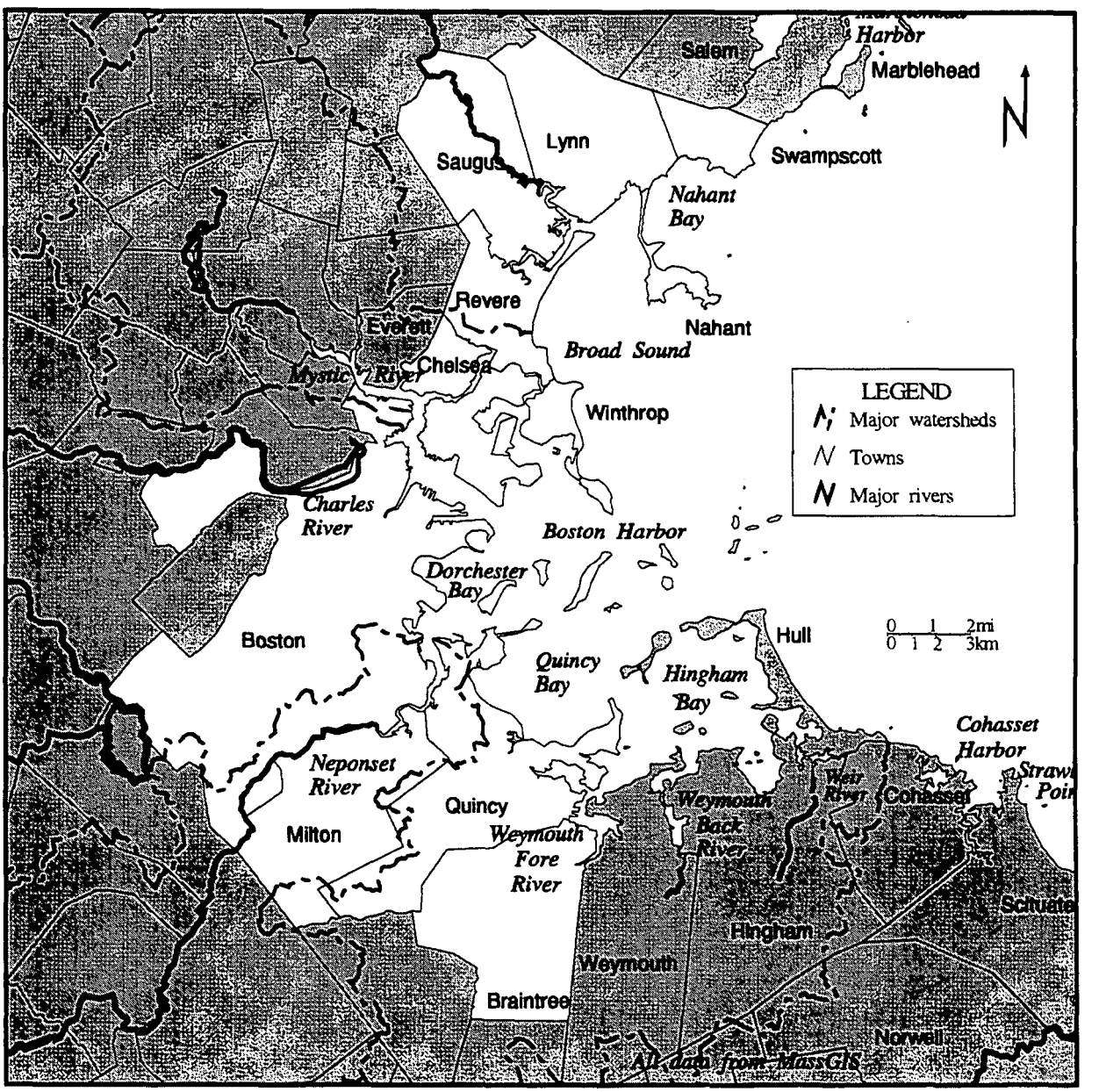
Directory of Salem Sound Coastal Projects, Programs, and Sources of Assistance		
Local Efforts	**Contact Person and Telephone Number**	**Project or Program Description**
• Manchester Conservation Trust	Helen Bethell Box 1486 Manchester-by-the-Sea	Land conservation.
• Friends of Salem Woods	Ian Lynch 203 Washington St. #158 Salem (508) 741-3465	Maintain trails, conduct nature walks, promote passive recreational use of the woods.

Metro Boston Region

I Description of the Region

A. Map

The Metro Boston region of the Massachusetts Bays Program includes the communities of Swampscott, Lynn, Nahant, Saugus, Revere, Everett, Chelsea, Winthrop, Boston, Milton, Quincy, and Braintree.



B. Physical Characteristics

1) Geology and Soils

Swampscott and Nahant beaches consist of fine to medium-sized sand. Nahant Beach is a depositional feature known as a tombolo, and connects rocky Little Nahant and Nahant "Islands" to the mainland. From Point of Pines, Revere, to Deer Island, adjacent to Winthrop, man-made structures dominate the coastline, with occasional large expanses of tidal flats interspersed throughout. The Boston coastline is highly developed. Old Harbor (part of Dorchester Bay) and most of the Harbor Islands are composed primarily of unconsolidated sands and gravels. The same holds true for Quincy Bay, although the beach is flanked by exposed tidal flats. Most of the coastline of Quincy, Weymouth, Hingham, and Hull Bay is dominated by man-made structures, with occasional limited expanses of gravel beach interspersed throughout.

2) Watersheds and Important Tributaries

This region is fed by several large rivers, including the Charles, Mystic, and Neponset Rivers, as well as the Saugus, Pines, Chelsea, and Fore Rivers. The watershed of the Charles River extends to Milford in Worchester County. The Mystic, Neponset, and Fore River watersheds extend inland to Reading, Foxborough, and Randolph, respectively.

C. Demographic and Economic Characteristics

Most of the Metro Boston communities have experienced only slight population increases or decreases since 1970, with Lynn, Everett, Chelsea, Boston, and Milton experiencing the most notable population declines.

Metro Boston Demographics

Community	Area (sq mi)	1990 Pop. Density (/sq mi)	Year-Round Population 1970	1980	1990	Est. Summer Pop. Inc.*	1990 Avg. Household Income
Swampscott	3.05	4500	13578	13837	13650	-	$50,191
Lynn	10.81	7522	90294	78471	81245	-	28553
Nahant	1.24	3190	4119	3947	3828	-	47212
Saugus	10.99	2322	25110	24746	25549	-	41919
Revere	5.92	7251	43159	42423	42786	-	30659
Everett	3.38	10500	42485	37195	35701	-	30796
Chelsea	2.19	13050	30624	25431	28710	-	25144
Winthrop	1.99	9063	20335	19294	18127	-	37240
Boston	48.42	11365	641071	562994	574283	-	29180
Milton	13.04	1978	27190	25860	25725	-	53130
Quincy	16.79	5078	87966	84743	84985	-	35858
Braintree	13.89	2434	35050	36337	33836	-	44734
Region	131.74	7351	1060981	955278	968425		

* H = High; M = Moderate; L= Low; "-" = None

Source: *1990 U.S. Census Data*

Metro Boston Lobster and Shellfish Landings
(Note: Shellfish data are not shown for communities with fewer than 4 diggers)

Community	1993 Commercial Lobster Landings Pounds	Economic Value	1992 Reported Shellfish Landings Bushels	Major Species
Swampscott	208,531	$606,825	N/A	-
Lynn	183,944	$535,277	N/A	-
Nahant	315,980	$919,502	N/A	-
Saugus	283,760	$825,742	N/A	-
Revere	193,337	$562,610	N/A	-
Everett	---	---	N/A	-
Chelsea	*(included w/ Revere)*	*(included w/ Revere)*	N/A	-
Winthrop	96,954	$282,136	N/A	-
Boston	1,279,602	$3,723,641	N/A	-
Quincy	37,887	$110,251	N/A	-
Braintree	*(included w/ Quincy)*	*(included w/ Quincy)*	N/A	-
Milton	---	---	N/A	-
Totals	2,599,995	$7,565,985		

D. Land Use

Most of the waterfront and much of the surrounding watershed for the Metro Boston region are highly developed as urban and suburban land. Water dependent activities and uses are prevalent along many areas of the coast. Coastal communities are fully or near fully developed while some areas in the upper reaches of the region have large tracts of open space remaining. Few natural areas remain directly along the coastline, although the Metropolitan District Commission (MDC) is working toward completing its Emerald Necklace around the Boston area, with improvements slated for the Neponset River and the Boston Harbor waterfront.

E. Water Quality

DEP's water quality ratings for coastal waters in the Metro Boston area are shown in the following chart. All areas are classified as the less stringent SB designation, except for Nahant Harbor, which has an SA classification. Currently, none of the coastal waters in the area supports its water quality classification. Commonly noted sources of pollution include urban runoff, combined sewer overflows, and waste water treatment plant discharges.

1992 DEP Water Quality Ratings for Metro Boston Rivers and Harbors

River/Harbor	Use * Class	Status**	Pollution Sources
Nahant	SA	NS	Runoff, Wastewater Treatment Plant (WWTP) outfall
Lynn Harbor	SB	NS	Runoff, WWTP, CSO
Pines River	SB	NS	Septic systems
Saugus River	B/SB	NS	Septic systems, runoff, CSOs, industrial outfall
Chelsea River	SB	NS	CSO, urban runoff
Mystic River	SB	NS	CSO, urban runoff
Charles River	B	NS	Urban runoff, CSOs, inplace contamination
Neponset River	SB	NS	CSO, runoff
Furnace Brook	B	NS	Runoff
Weymouth Fore River	SB	NS	Runoff

* **"Use Classes"** are state goals for the river:
S prefix denotes coastal or marine segment
A = public water supply, fishable, swimmable
B = fishable, swimmable
C = fishable

** **Status Codes:**
S = supports all indicated uses
S/T = supports all uses, but threatened
PS = supports some uses
NS = supports no uses

Source: *DEP 305(b) Report*

All of the Metro Boston communities are serviced by central sewage treatment facilities. The following information is summarized from a 1995 report titled "The Status of Municipal Wastewater Treatment and Energy Producing Facilities Discharging to Coastal Waters in Massachusetts" (Richard Zeroka, MCZM). Please refer to this report for more information on coastal municipal sewage treatment plants.

1995 Metro Boston Municipal Sewage Treatment Information

Community	Population est. Total (1987)	Population est. Served	Current level of treat-ment	Design Flow - MGD	Actual Average Flow - MGD	CSOs	Effluent discharge	Sludge disposal/ reuse	Primary source of flow
Swampscott	13,800								
Lynn	80,000								
Nahant	4,100	125,000	secondary	?	31	yes	Broad Sound	incinerated on site	domestic, comm., ind.
Saugus	25,000	(Lynn)							
Revere	40,000								
Winthrop	19,000								
Everett	37,000								
Chelsea	28,000	920,000	primary	500	500*	yes	Boston Harbor (Deer Island, Nut Island)	Converted to fertilizer pellets in Quincy	domestic, industrial, commercial
Boston	571,000	(MRWA)							
Quincy	90,000								
Braintree	36,000								
Milton	26,000								
Region	969,900	1,045,000							

* Includes sewage flows from all 43 MWRA communities.

The MRWA facilities are undergoing major upgrades. The new primary treatment plant is scheduled for completion in 1995; the secondary treatment plant should be complete in 1999. A new 9-mile long outfall pipe is being constructed to carry effluent into the deeper waters of Massachusetts Bay. The MRWA also plans to address problems with CSOs and excessive inflow and infiltration.

II Coastal Resources

A. Shellfish Beds

The region has both soft shell clam and mussel beds, but the vast majority of these are closed due to pollution. Many communities have some areas available for commercial clam harvesting provided the clams are taken to the depuration plant in Newburyport for filtration. The table below shows the status of shellfish beds by community in the Metro Boston region.

Metro Boston Shellfish Beds and Status as of 07/01-95

	Status*	Open Acres	Closed Acres**
Boston			
GBH2.0	P		1,636
GBH3.0	P		3,677
GBH3.3	P		2
GBH3.4	P		50
GBH3.5	P		94
GBH3.6	MC		28
GBH3.7	MC		144
GBH4.0	P		1,881
GBH5.0	P		1,129
GBH5.10	P		12
GBH5.11	P		42
GBH5.2	CR	100	
GBH5.3	P		106
GBH5.4	CR	70	
GBH5.6	P		15
GBH5.8	P		37
GBH5.9	P		13
GBH6.0	P		4,508
MB13.0	MC		8,723
N28.0	P		6,997
Braintree			
GBH1.0	P		45
GBH1.21	P		43
Cambridge			
GBH4.0	P		5
Chelsea			
GBH4.0	P		176
Everett			
GBH4.0	P		101
Lynn			
N23.0	P		3,394
N24.0	P		0
N26.0	P		435
Milton			
GBH3.0	P		99
Nahant			
N24.0	P		3,001
N25.0	P		6,627
N26.0	P		1,698
Quincy			
GBH1.0	P		940
GBH1.22	P		21
GBH1.23	CR	76	
GBH1.24	P		10
GBH1.25	CR	99	
GBH1.26	CR	72	
GBH1.27	MC		58
GBH2.0	P		3,606
Quincy (cont'd)			
GBH2.1	CR	192	
GBH2.2	P		132
GBH2.3	P		157
GBH2.4	P		90
GBH2.5	CR	127	
GBH2.6	P		17
GBH3.0	P		722
GBH3.1	P		50
GBH3.2	P		79
GBH3.3	P		38
GBH3.4	P		80
Revere			
GBH4.0	P		32
GBH5.8	P		16
N26.0	P		2,546
N26.1	P		71
N26.2	P		97
N26.3	P		43
N26.4	P		57
N26.5	P		30
N26.6	P		58
Saugus			
N26.0	P		164
N26.1	P		72
N26.3	P		43
N26.4	P		1
N26.6	P		28
Somerville			
GBH4.0	P		13
Swampscott			
N21.0	P		33
N22.0	P		6,098
N22.1	P		33
N23.0	P		0
N23.0	P		3,394
Winthrop			
GBH5.0	P		400
GBH5.1	CR	89	
GBH5.12	P		12
GBH5.2	CR	82	
GBH5.5	CR	81	
GBH5.6	P		3
GBH5.7	P		18
GBH5.8	P		29
N25.0	P		714
N26.0	P		495
N26.2	P		100
N27.0	P		4,396

* Status Code:
A = Approved
CA = Conditionally Approved
CR = Conditionally Restricted
P = Prohibited
MC = Management Closure

** Acres Calculation: is for the overall surface water area at high tide within the defined growing area. Outer coastal (beach-side) areas generally have clean waters but are not very productive; these areas, usually defined as extending to the 3 mile line, are very large in comparison to the productive, more often closed estuarine areas.

Source: *DMF Data*

B. Beaches

Many public beaches exist in the Metro Boston coastal region. Past and present pollution problems, public perception of pollution, and inadequate access have led to many of these beaches not being used to their fullest potential.

The Commonwealth's Joint Commission on the Future of Boston Harbor Beaches recently completed a five-to-seven year plan to improve access to and enjoyment of Boston area beaches from Winthrop to Quincy. In support of this effort, the Commonwealth has appropriated $30,000,000 for capital improvements, to be matched by a $500,000 challenge grant from the City of Boston. Initiated in 1995, the improvements will range from enhancing greenspaces to restoring bath houses and improving traffic circulation.

The following two tables show the Metro Boston region's coastal frontage and beaches by community.

Metro Boston Coastal Frontage by Community

Community	Total miles of coastal frontage	Miles of coastal frontage publicly owned	Percent of coastal frontage publicly owned
Swampscott	3.80	0.33	8.7
Lynn	4.38	1.18	26.9
Nahant	11.49	5.03	43.8
Saugus	0.36	---	0.0
Revere	4.92	2.84	57.7
Everett	---	---	N/A
Chelsea	0.42	---	0.0
Winthrop	9.77	3.19	32.6
Boston	59.77	21.76	36.4
Milton	---	---	N/A
Quincy	25.95	4.58	17.7
Braintree	---	---	N/A
Total	120.86	38.91	32.2

Metro Boston Beaches by Community

Swampscott
- Phillips Beach
- Whales Beach
- Fisherman's Beach
- Kings Beach

Lynn
- Kings Beach
- Lynn Beach

Nahant
- Nahant Beach
- Little Nahant Beach
- Stony Beach
- Forty Steps Beach
- Joseph's Beach
- Pond Beach
- Dorothy Cove
- West Cliff
- Black Rock Beach

Revere
- Revere Beach
- Crescent Beach
- Short Beach

Winthrop
- Short Beach
- Winthrop Beach
- Yirrell Beach
- Donovan's Beach

Boston

(Island Beaches)
- Lovells Island Beach
- Gallops Island Beach
- Georges Island Beach
- Paddocks Island Beach

(Mainland Beaches)

E. Boston--
- Constitution/Orient Heights

S. Boston--
- Pleasure Bay
- Kelley's Landing
- L&M Streets Beaches
- Carson Beach

Dorchester--
- Savin Hill Beach
- Malibu Beach
- Tenean Beach

Quincy
- Nickerson Beach
- Wollaston Beach
- Mound Street Beach
- Town River Bay Beach
- Adams Shore Beach

Braintree
- Smiths Beach

C. Other Commercial or Recreational Uses

Commercial fishing boats operate from almost every coastal community in the region, landing almost every type of commercially available finfish, shellfish, and crustaceans. Recreational boats bring visitors to various Harbor Islands for day trips and overnight visits. Whale-watching fleets also operate from the region. The area also provides wonderful opportunities for observing birds and harbor seals. In addition, the coastal waters of the Metro Boston Region are a busy commercial hub for the transport of cargo, including fuel, foods, and consumer and industrial goods.

Numerous anadromous fish runs in the region provide habitat for smelt, herring, alewife, and shad. Important fish runs include Black Creek and Town River in Quincy, the Weymouth Fore River, the Charles River, the Mystic River, the Saugus River, and the Neponset River.

III Community Resource Management Survey

This section contains answers to selected questions from recent EOEA surveys. The answers are summarized here to provide a sense of the steps that Metro Boston communities are taking to protect their resources.

Metro Boston Resource Management Survey Answers

	Swampscott	Lynn	Nahant	Saugus	Revere	Everett	Chelsea	Boston	Quincy	Milton	Braintree	Winthrop
Wetland and Habitat Protection												
Has the community:												
- issued local wetlands guidelines in addition to the Wetlands Protection Act?	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
- delineated coastal & inland wetlands?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Groundwater Protection												
Does the community have:												
- stormwater control regulation(s)?	N		?	Y	Y			Y	Y	Y	Y	
- Board of Health regulation(s) stricter than Title V?	A	A	Y	A	A	A	A	A	A	N	A	A
- septic system inspection program?	A	A	A	A	A	A	A	A	A	N	N	A
- septic system upgrade program?	A	A	Y	?	A	A	A	A	A	Y	Y	A
- septic system pumping program?	A	A	N	A	A	A	A	A	A	N	A	A
Surface and Coastal Water Protection												
Does the community have:												
- flood plain maps (FEMA)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
- flood plain zoning	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y
- boat pumpout facilities	N	Y	N	N	N	Y	N	Y	Y	N	N	N
- subdivision stormwater management regulations	Y	?	?	Y	?	?	N	Y	Y	Y	Y	Y
General Environmental Protection												
Do these boards have professional staff?												
- Planning Board	N	Y	N	N	Y	Y	Y	Y	Y	Y½	Y	N
- Conservation Committee	N	N	N	N	Y	Y	Y	Y	Y	Y½	Y	N
- Board of Health	Y	N	Y½	Y	Y	Y	Y	Y	Y	Y	Y	Y

A = Not Applicable
sewered

Note: *"½" refers to a one-half time employee*

IV Significant Resource Management Issues

The most pressing concerns in the region are the pollutant discharges from the Deer Island sewage treatment plant, CSOs during precipitation events, and stormwater runoff. The MWRA currently is constructing a secondary treatment plant and new effluent outfall (see Chapter IV for details), and has an active program to reduce or treat discharges from CSOs. When completed, these efforts will yield a much cleaner near-shore environment and help to foster a re-connection to coastal waters for many Metro Boston area residents. However, even after CSO controls are implemented, stormwater runoff will continue to be a problem. Other concerns include contaminated sediments in both the inner Boston Harbor and the shipping channel from historical releases of industrial and human wastes. Planned dredging of the area is scheduled to occur in several years, and may cause problems related to resuspension and disposal of the contaminated sediments (see Chapter IV for details).

The National Park Service (NPS) recently released a special study on the resources of the Boston Harbor Islands. This study examined the natural, cultural, and recreational values of the islands, and concluded that the islands meet NPS criteria for inclusion in the National Park System. The study presents a number of management options which include varying degrees of NPS involvement and responsibility. Designation of the Boston Harbor Islands as a National Park must come from Congress, and several members of the Massachusetts delegation are working toward that end.

In addition, significant issues are raised by the proposed Saugus River Flood Control Project (see Chapter IV for details), and the problems associated with *Pilayella littoralis*, a noxious alga which washes up on the beaches of Swampscott, Lynn, Nahant, Revere, and Winthrop, causing foul odors as it decomposes.

V Coastal Management and Improvement Activities

A. Massachusetts Bays Program Mini-Bay Project, Demonstration Projects, and Bays Action Grants

The Fore River in Braintree-Weymouth-Quincy was selected by the Massachusetts Bays Program as a Mini-Bay site. With funding from the MBP, the three communities are for the first time evaluating their shared resource and developing a management plan. The Mini-Bay project is seeking to determine the level of water and sediment contamination from past and present sources. Through this project, a remediation plan, citizen education project, and the Fore River Watershed Association have been created.

Demonstration projects funded in the Metro Boston area include the Lewis Lake project, for which the Town of Winthrop received funding to study the lake, automate the tide gate, educate abutting property owners about water pollution, and monitor late cleanup. The Friends of the Boston Harbor Islands received MBP funding to re-establish native vegetation on the Harbor Islands by building a nursery and stocking the vegetation. The City of Quincy received funding to repair a tidegate that controls the influx of seawater into the stormwater system. Northeastern University's Marine Sciences Center received funding to research the life cycle and influences of *Pilayella littoralis*, a noxious alga that fouls the shoreline and waters of Broad Sound and Nahant Bay.

Bays Action Grants have been awarded for many projects including: Boston: production of a video about Boston's working port; a Thompson Island clean-up; creation of an environmental group in the Malibu Beach area; boat owner education about marine sanitary waste and its proper disposal, conducted by the Boston Harbor Association and Constitution Marina; storm drain stenciling by the Boston Water and Sewer Commission; and publication of tour guides for Boston's Neponset Marsh, Wood Island Bay Marsh, and Belle Isle Marsh. Quincy: curriculum development for wastewater technology; sponsorship of six 8th grade students in an Outward Bound Environmental Leadership course; environmental education project related to the acquisition of two acres of salt marsh and restoration of a third acre by the city; and development of a private afterschool environmental education program. Other funded projects include an environmental education initiative in Lynn, a multimedia presentation on the Rumney Marshes Area of Critical Environmental Concern (ACEC) in Revere, and purchase of five water quality testing kits by the Mystic River Watershed Association.

B. Government Programs

The major water quality improvement project in the region is the secondary treatment plant and new outfall pipe being constructed by the MWRA. The plan developed to eliminate and disinfect CSOs owned by the MWRA and the communities of Boston, Cambridge, Somerville, and Chelsea will provide additional water quality benefits. A number of interim steps taken relative to these have already yielded significant improvements in local water quality. In addition, the Army Corps of Engineers is currently studying the feasibility of placing a tidegate across the Saugus River. The Commonwealth is constructing a third harbor tunnel and depressing the Central Artery, and the shipping channel through Boston Harbor is scheduled for dredging (refer to Chapter IV for more details).

The Metro Boston region has two estuarine ACECs: the Rumney Marshes ACEC and the Neponset River Estuary ACEC. The Rumney Marshes ACEC is approximately 2,800 acres in size, and is located in Boston, Lynn, Revere, Saugus, and Winthrop. The 1,260-acre Neponset River Estuary is located in Boston, Milton, and Quincy. An ACEC Resource Management Plan for the Neponset River Estuary ACEC is currently underway as part of the Executive Office of Environmental Affairs' commitment to working with municipalities, environmental organizations, and residents for the long-term stewardship of ACECs. Portions of three freshwater ACECs are also in the region: the Cranberry Brook Watershed, the Fowl Meadow-Ponkapoag Bog, and the Golden Hills ACECs.

C. Citizen Group Efforts

Watershed associations exist for the Saugus, Mystic, Neponset, Charles, and Weymouth Fore Rivers. The Friends of Boston Harbor Islands, as well as several small beach protection groups, also are active in the region. The Massachusetts Audubon Society recently initiated an environmental education program for students and residents of the City of Lynn. The community representatives on the Metro Boston Local Governance Committee have worked closely with MBP staff on a variety of water quality improvement projects.

Directory of Metro Boston Coastal Projects, Programs, and Sources of Assistance

State/Federal Programs and Agencies	Contact Person and Telephone Number	Project or Program Description
• Massachusetts Bays Program	Diane Gould, Executive Director (617) 727-9530	Natural Estuary Program - provides planning, technical, and financial assistance for the protection of Massachusetts and Cape Cod Bays. Partnership of state, federal, and municipal governments.
• Shellfish Bed Restoration Program (MBP, Div. of Marine Fisheries, DEP, Natural Resources Conservation Service)	Deirdre Kimball, Coordinator (617) 727-9530	Collaborative effort by Mass Bays Program, DMF, DEP, and NRCS to remediate storm drain pollution of priority shellfish beds.
• ACEC Program (Area of Critical Environmental Concern)	Leslie Luchonok, ACEC Prog. Mgr. (617) 727-3160	ACEC status provides additional protection to critical resource areas, and creates an ecosystem-based planning and management framework for state and local actions.
• Partners for Wildlife Program (US Fish & Wildlife Service)	Robert Scheirer, Priv. Lands Coord. (603) 225-1411	A federal program providing financial and technical assistance to landowners for wetlands restoration projects.
• Riverways Program (MA Dept. of Fisheries, Wildlife and Env. Law Enforcement)	Maria van Dusen, Joan Kimball (617) 727-1614	Riverways offers guidance documents and technical assistance on local river protection efforts.
• Natural Resources Conservation Service/Community Assistance Unit	Marc McQueen (508) 295-1481	This new technical team helps communities address nonpoint source pollution problems.
• Wetlands Conservancy Program (Department of Environmental Protection)	Charles Costello (617) 292-5704	This state program is charged with mapping coastal and inland wetlands.
• Wetlands Restoration and Banking Program	Christy Foote-Smith, Director (617) 727-9530	A statewide EOEA program working to restore degraded wetlands.
Regional Government Agencies/Programs		
• MBP - Metro Boston Local Governance Committee	Bill Clark, Nancy Goodman, MAPC (617) 451-2770	Regional MBP Committee - provides technical and financial support to participating communities.
• Coastal Zone Mgmt. Office: Metro Boston regional assistance	Elizabeth Grob, Metro Boston Coord. (617) 727-9530	CZM develops state coastal zone policy, monitors coastal activities, and provides technical assistance on broad range of coastal issues.

continued

Directory of Metro Boston Coastal Projects, Programs, and Sources of Assistance

Regional Government Agencies/Programs	Contact Person and Telephone Number	Project or Program Description
• Division of Marine Fisheries	Brad Chase, Regional Fisheries Biologist/Cat Cove Marine Lab Salem (508) 745-3107 x111	Finfish habitat monitoring and restoration, Boston to Gloucester; also, smelt restoration program.
	David Chadwick, Sr. Fisheries Biologist Newburyport Shellfish Plant (508) 465-3553	The DMF North Shore biologists test coastal waters from Hull to the North Shore for pathogens and PSP.
• Metropolitan Area Planning Council (MAPC)	Martin Pillsbury, Water Resources Planner (617) 451-2770	Regional environmental planning and technical assistance.
	Joan Blaustein, Land Resource Planner (617) 451-2770	(also assist with bikeways and pathways planning)
	Carol Kowalski, Inner Core Coord. (617) 451-2770	Sub-regional group representing 23 communities on planning and policy matters.
• Norfolk County Mosquito Control Project	Endicott S. Norwood 762-3681	NCMCP has expertise in saltmarsh restoration work (Open Marsh Water Management).
Regional Non-Profit Agencies		
• Charles River Watershed Association	Robert Zimmerman, Executive Director (617) 527-2799 Fax: (617) 332-7465	CRWA works to protect and enhance the health, beauty, and enjoyment of the Charles River and its tributaries.
• Neponset River Watershed Association	Ian Cooke, Executive Director (617) 575-0354	Works to protect, enhance, and restore the resources of the Neponset basin.
• Boston Harbor Association	Vivian Li, Executive Director (617) 482-1722	Founded in 1973 to promote a clean, alive, and accessible Boston Harbor.
• Boston Natural Areas Fund	Valerie Burns Director (617) 542-7696	Works to protect, improve, and enhance open space in the City of Boston.

continued

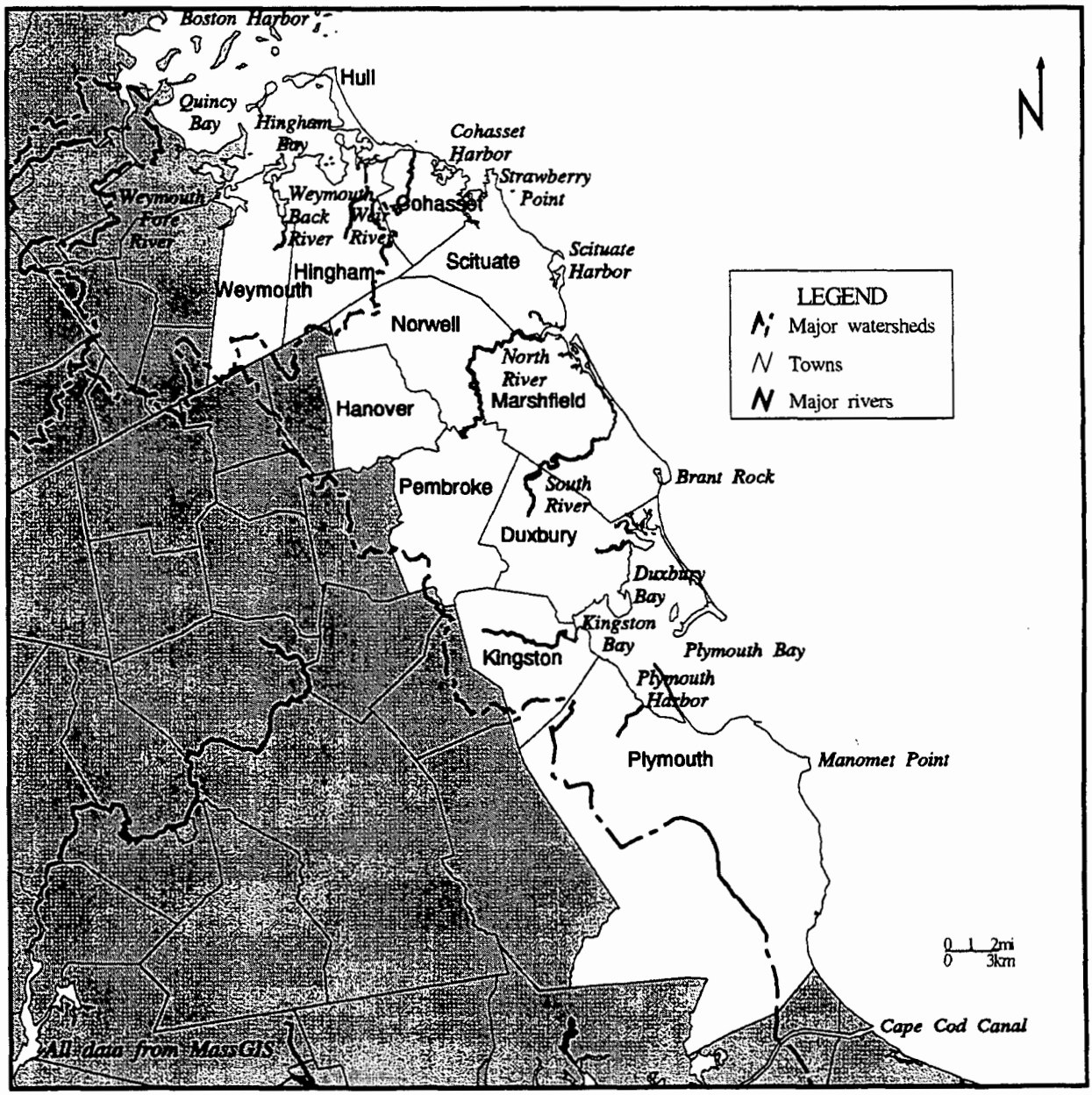
Directory of Metro Boston Coastal Projects, Programs, and Sources of Assistance		
Regional Non-Profit Agencies	**Contact Person and Telephone Number**	**Project or Program Description**
• Environmental Diversity Forum	Russ Lopez, Executive Director (617) 523-2611	EDF is a coalition of individuals, organizations, environmental activists, neighborhood leaders, and government professionals that brings new attention to the environmental problems that affect communities of color.
• Mystic River Watershed Association	Ed Toomey, President (617) 489-3120	Works to protect water quality and quantity of adjacent riverine lands and habitat.
• Save the Harbor/Save the Bay	Jodi Sugarman, Policy Director (617) 451-2860	Works to foster a positive vision of Boston Harbor and Massachusetts Bay, and to build a broad-based constituency to promote the restoration and protection of these valuable resources.

South Shore Region

I Description of the Region

A. Map

The South Shore region of the Massachusetts Bays Program includes the communities of Plymouth, Kingston, Duxbury, Marshfield, Norwell, Pembroke, Hanover, Scituate, Cohasset, Hull, Hingham, and Weymouth.



B. Physical Characteristics

1) Geology and Soils

From the south end of Point Allerton traveling south along Nantasket Beach, the shoreline consists of sand and gravel beaches. The coastline of South Hull and Cohasset, however, is predominately rocky headlands with small pocket beaches interspersed between.

From Scituate to the Marshfield/Duxbury boundary, the shoreline is highly developed, with beaches of mixed sand and gravel. Further south lies Duxbury Beach, a barrier beach, connecting several deposited land forms called drumlins (Gurnet Point and Saquich Head) to the mainland. The back beach environment of Duxbury Beach (Duxbury Bay and Kingston Bay) consists of marshes interspersed with extensive tidal flats.

Extensive tidal flats also are found in Plymouth Harbor, which is sheltered by Plymouth Beach, a long sandy barrier spit. To the south, the coastal terrain is characterized by numerous glacially-formed small hills and valleys called knob-and-kettle terrain. The beach grain size decreases in a southerly direction from gravel at Rocky Point to fine-medium sand at Sagamore Beach.

2) Watersheds and Important Tributaries

The South Shore has many rivers and streams that make a very complex group of watersheds. Key watersheds that directly impact the coastal resources are as follows:

Weymouth Back River - A major segment of this river is an ACEC. The river has a large shellfish resource, a herring/smelt run, and headwaters in a pond that the town uses for drinking water.

Weir River - This is a tidal estuary that is bordered by Cohasset, Hingham, and Hull. The upper part of the river is an ACEC.

Gulf River - This is a tributary to Cohasset Harbor.

North River - This river has 23 miles of shoreline that is being impacted by 15 towns. It is an important river for shellfish, gamefish, and herring.

South River - This river begins in Duxbury and winds through Marshfield. It has many acres of important shellfish beds.

Other significant waters in the area include: Green Harbor River, Duxbury Bay, Pine Point River, Bluefish River, Back River, Kingston Bay, Jones River, Plymouth Bay, Town Brook, Eel River, and Ellisville Harbor.

C. Demographic and Economic Characteristics

The following tables highlight some of the region's key population and fisheries information.

South Shore Demographics

Community	Area (sq. mi.)	1990 Pop. Density (/sq. mi.)	Year-Round Population 1970	1980	1990	Est. Summer Pop. Inc.*	1990 Avg. Household Income
Plymouth	96.5	472.6	18606	35913	45608	L	$39,886
Kingston	20.4	488.9	5999	7362	9045	L	40872
Duxbury	23.76	583.8	7636	11807	13895	L	63878
Marshfield	28.46	755.5	15223	20916	21531	M	48986
Norwell	20.88	444	7796	9182	9279	L	60462
Pembroke	21.85	667.2	11193	13487	14544	L	46932
Hanover	15.61	763.6	10107	11358	11912	L	54759
Scituate	17.18	975.9	16973	17317	16786	M	52044
Cohasset	9.89	714.6	6954	7174	7075	L	62933
Hull	2.97	488.7	9961	9714	10466	L	37683
Hingham	22.47	880.9	18845	20239	19821	L	60274
Weymouth	17.01	3180.2	54610	55601	54060	L	41586
Region	296.98	788	183903	220070	234022		

* H = High; M = Moderate; L= Low; "-" = None

Source: *1990 U.S. Census Data*

South Shore Lobster and Shellfish Landings (Note: Shellfish Data not reported for communities with less than 4 diggers)				
	1993 Commercial Lobster Landings		1993 Reported Shellfish Landings	
Community	Pounds	Economic Value	Bushels	Major Species
Weymouth	30,228	$87,963	N/A	
Hingham	510,193	$1,484,661	N/A	
Hull	294,661	$857,463	77	Sea Clam
Cohasset	465,017	$1,353,199	N/A	
Scituate	582,560	$1,695,249	N/A	
Marshfield	686,611	$1,998,038	N/A	
Duxbury	65,082	$189,388	46,906	Mussel
Kingston	18,239	$53,075	N/A	
Plymouth	783,596	$2,280,264	6,106	Mussel
Region	3,436,187	$9,999,304		

D. Land Use

South Shore communities are predominantly rural-residential, with small community centers dotting the main streets. The region has one major state highway (Route 3) and two major shopping malls. Between 1951 and 1984, when detailed land use inventories were compiled by the state, land development (i.e., residential, commercial, industrial, and transportation uses) increased by 112 percent. Residential growth alone consumed over 15,000 acres of open land, most of which (12,000 acres) was forest. Transportation and commercial uses recorded the highest percent increased of 423% and 305%, respectively. The latest (1985) published land use figures for the region are as follows: 47% forested land, 38% developed land, 8% wetland, 4.5% water and open undeveloped land, and 3% agricultural land.

E. Water Quality

Recent water quality data for selected South Shore rivers and harbors are given in the following table.

1992 DEP Water Quality Ratings for South Shore Rivers and Harbors

River Segment	Use Class*	Status**	Pollutants - Sources
The Gulf	SB	NS	pathogens septic tanks, non-urban runoff
Bound Brook	B	S	
North River (Curtis Crossing Dam to 3A)	SA	NS	organic enrichment/DO, pathogens - septic tanks, non-urban runoff, septage disposal, natural
North River (3A to mouth)	SA	PS	pathogens - septic tanks, non-urban runoff
Herring River	SA	PS	pathogens - septic tanks, recreational activities, non-urban runoff, marinas
Indian Head River	B	PS	nutrients, organic enrichment/DO - municipal point sources, natural
French Stream	B	PS	organic enrichment/DO, nutrients, pathogens - natural, municipal point sources, non-urban runoff
South River (South Res., Duxbury to Main Street, Marshfield)	B	S	
South River (Main Street, Marshfield to North River)	SA	NS	unionized ammonia, pathogens, organic enrichment/DO - non-urban runoff, septic tanks, natural
Green Harbor River	B	PS	pathogens - septic tanks
Jones River (Silver Lake to Wapping Pond, Kingston)	B	S	
Jones River (Wapping Pond to Elm Street, Kingston)	B	S	
Jones River (Elm Street to mouth, Kingston)	SA	NS	pathogens - non-urban runoff
Cohasset Harbor	SA	NS	pathogens - septic tanks, municipal point sources, non-urban runoff
Scituate Harbor	SA	PS	pathogens - source unknown
Green Harbor	SA	NS	pathogens - septic tanks
Duxbury Bay	SA	S	
Plymouth Harbor	SA	NS	pathogens - municipal point sources, urban runoff/storm sewers
Plymouth Bay	SA	NS	pathogens - source unknown
Furnace Brook	S	NS	organic enrichment - urban runoff
Weymouth Fore River	SB	NS	pathogens - urban runoff, storm sewers
Town Brook	S	S	
Monatiquot River	B	NS	pathogens, organic enrichment - septic tanks, urban runoff
Farm River	S	S	
Cochato Rover	B	NS	pathogens, organic enrichment - septic tanks, urban runoff
Trout Brook	S/T	S	oil and grease, priority organics - waste storage, leaks, spills
Weymouth Back River	B	NS	organic enrichment, pathogens, DO - urban runoff, septic systems
Mill River	A	NS	noxious aquatic plants, pathogens, nutrients - septic tanks, urban runoff
Old Swamp River	A	NS	pathogens, organic enrichment/DO - urban runoff, septic systems
Weir River	SA	NS	nutrients, pathogens
Crooked Meadow River	B	NS	organic enrichment, nutrients - urban runoff, septic tanks
Town River Bay	SB	PS	organic enrichment/DO, pathogens - urban runoff

* "Use Classes" are state goals for the river:
S prefix = coastal or marine segment
A = public water supply, fishable, swimmable
B = fishable, swimmable
C = fishable

** Status Codes:
S = supports all indicated uses
S/T = supports all uses, but threatened
PS = supports some uses
NS = supports no uses

Seven of twelve South Shore communities have municipal sewage treatment plants. Sewage from the remaining communities is treated by on-site methods. The following information is summarized from 1995 report titled "The Status of Municipal Wastewater Treatment and Energy Producing Facilities Discharging to Coastal Waters in Massachusetts" (Richard Zeroka, MCZM). Please refer to this report for more information on coastal municipal sewage treatment facilities.

1995 South Shore Municipal Sewage Treatment Information

Community	Population est. Total (1987)	Population est. Served	Current level of treatment	Design Flow - MGD	Actual Average Flow - MGD	CSOs	Effluent discharge	Sludge disposal	Primary source of flow
Weymouth Hingham	55,000 21,000	55,000 part	primary (MWRA)	500	500	no	Boston Harbor (Deer, Nut Islands)	Converted to fertilizer pellets in Quincy	domestic, commercial, industrial
Hull	10,450	10,450	secondary	3.07	1.5	no	Atlantic Ocean	Trucked to Rhode Island	domestic, commercial
Cohasset	7,070	600	secondary	.072	.091	no	James Brook	Trucked to Brockton	domestic, commercial
Scituate	18,000	4,690	secondary	1.0	.80	no	First Herring Brk (North R.)	local landfill	domestic, commercial
Marshfield	21,530	8,000	secondary	2.1	1.2	no	Mass. Bay	local landfill	domestic
Duxbury	13,895	1000 (Marshfield)	secondary	—	—	—	—	—	—
Norwell	9,270	—	onsite	—	—	—	—	—	—
Hanover	11,910	—	onsite	—	—	—	—	—	—
Pembroke	14,544	—	onsite	—	—	—	—	—	—
Kingston	9,000	—	onsite	—	—	—	—	—	—
Plymouth	45,608	14,500	secondary	1.75	1.9	no	Plymouth Harbor	Manomet dump	domestic, commercial, industrial
	237,277	94,240+							

A. Shellfish Beds

South Shore Shellfish Beds and Status as of 07/01/95

	Status*	Open Acres	Closed Acres**
Cohasset			
MB9.0	MC		6,828
MB10.0	A	106	
MB10.1	P		90
MB10.2	P		16
MB10.4	P		12
MB11.0	P		157
Duxbury			
CCB42.0	A	606	
CCB42.1	P		3
CCB43.1	P		74
CCB43.2	A	453	
CCB45.0	A	3,917	
CCB45.1	P		33
CCB45.2	P		1
CCB46.1	A	27	
CCB46.2	CA	33	
CCB46.3	P	3	
CCB46.4	P		22
CCB46.5	P		9
CCB49.0	A	398	
MB1.0	A	11,751	
MB2.0	A	2,154	
Hingham			
GBH1.0	P	1,737	
GBH1.11	CR	52	
GBH1.14	P	83	
GBH1.15	P		9
GBH1.17	P		32
GBH1.19	P		34
GBH1.28	P		19
GBH1.5	CR	1	
GBH1.6	P		33
GBH1.7	CR	79	
GBH1.8	CR	325	
GBH1.9	CR	52	
Hull			
GBH1.0	P		2,160
GBH1.17	P		0
GBH1.2	CR	120	
GBH1.3	CR	100	
GBH1.4	P		23
GBH1.5	CR	77	
GBH1.6	P		35
GBH1.7	CR	0	
GBH2.0	P		898
GBH6.0	P		921
GBH6.1	P		84
MB9.0	MC		0
MB12.0	P		6,201
MB13.0	MC		4,089
Kingston			
CCB42.0	A	194	
Kingston (cont'd)			
CCB42.2	P		40
CCB43.1	P		58
CCB43.2	A	666	
CCB44.0	P		66
Marshfield			
CCB47	A	7	
MB1.0	A	0	
MB2.0	A	7,360	
MB2.1	P		38
MB2.2	P		268
MB3.0	P		50
MB4.0	A	3,046	
MB5.1	P		178
MB6.0	P		271
Norwell			
MB5.1	P		75
Plymouth			
CCB29.3	A	348	
CCB38.0	A	1	
CCB39.0	A	17,230	
CCB39.1	P		1,090
CCB39.2	P		251
CCB40.0	P		8
CCB41.0	A	22,331	
CCB41.1	P		736
CCB42.0	A	721	
CCB42.1	P		2,203
CCB42.2	P		57
CCB45.0	A	668	
MB1.0	A	1,797	
Scituate			
MB2.0	A	0	
MB4.0	A	10,351	
MB5.1	P		303
MB6.0	P		193
MB7.0	P		206
MB8.0	A	13,541	
	M-	A	294
MB10.1	P		134
MB10.3	CA		18
Weymouth			
GBH1.0	P		1.953
GBH1.10	CR	84	
GBH1.11	CR	0	
GBH1.13	CR	74	
GBH1.14	P		81
GBH1.15	P		22
GBH1.16	P		26
GBH1.18	P		57
GBH1.20	CR	26	
GBH1.21	P		124
GBH1.9	CR	3	

***Status Code:**
A=Approved
CA=Conditionally Approved
CR=Conditionally Restricted
P=Phohibited
MC=Management Closure

**** Acres Calculation:** is for the overall surface water area at high tide within the defined growing area. Outer coastal (beach-side) areas generally have clean water but are not very productive; these areas, usually defined as extending to the 3 mile line, are very large in comparison to the productive, more often closed estuarine areas.

Source: *DMF Data*

B. Beaches

The South Shore region is blessed with many miles of scenic shore frontage, as well as a great number and variety of beaches which offer outstanding opportunities for sunbathing, swimming, fishing, and strolling. The following two tables show the region's coastal frontage and beaches by community.

South Shore Coastal Frontage by Community

Community	Total miles of coastal frontage	Miles of coastal frontage publicly owned	Percent of coastal frontage publicly owned
Cohasset	6.1	0.2	3.3
Duxbury	21.9	0.5	2.3
Hingham	12.2	7.2	59.0
Hull	22.6	5.9	26.1
Kingston	1.9	0.3	15.8
Marshfield	8.8	1.6	18.2
Plymouth	33.4	2.9	8.7
Scituate	19.7	1.7	8.6
Weymouth	8.4	3.6	42.9
Region	135.1	23.8	17.6

South Shore Beaches by Community

Cohasset
- Black Rock
- Pleasant Beach
- Sandy Beach
- Bassing Beach

Duxbury
- Duxbury Beach
- Bay Road Beach
- Eagles Nest Beach
- Harding Hill Beach
- South Duxbury Beach

Hingham
- Hingham Harbor
- Crow Point
- Foley Beach

Hull
- Nantasket
- Crescent Beach
- Black Rock Beach
- Kenberma

Kingston
- Kingston Shores
- Greys Beach
- Rocky Nook Park

Marshfield
- Rexhame Beach
- Fieldston Beach (Sunrise Beach)
- Ocean Bluff Beach
- Brant Rock Beach
- Bluefish Cove
- Green Harbor Beach

Plymouth
- Saquish Beach
- Long Beach
- Warren Cove
- Rocky Point
- Priscilla Beach
- White Horse Beach
- Manomet Beach
- Fisherman's Beach
- Churchill Landing
- Surfside Beach
- Bayside Beach
- Harlow's Landing
- Ellisville Harbor
- Cedarville Landing
- Nelson Beach
- Stephens Field Beach

Scituate
- No. Scituate Beach
- Minot Beach
- Peggotty Beach
- Humarock Beach
- Third Cliff Beach
- Mann Hill Beach
- Hatherly Beach
- Egypt Beach
- Fourth Cliff Beach
- Sand Hills Beach

Weymouth
- Wessagusset

C. Other Commercial or Recreational Uses

The South Shore region is a haven for recreational boating. Nearly every town has at least one marina and town mooring field. All the coastal communities support commercial fleets of lobster, charter, and nearshore fishery boats. Several towns, because of their proximity to Stellwagen Bank, also have major tuna and whale watching fleets, which bring substantial revenues into the communities.

Shellfish, although in plentiful supply, are not readily harvestable (except in Duxbury), due mainly to polluted road runoff and other nonpoint sources of pollution.

III Resource Management

This section contains answers to selected questions from recent EOEA surveys. The answers are summarized here to provide an overview of the steps South Shore communities are taking to protect their important national resources.

South Shore Resource Management Survey Answers

	Weymouth	Hingham	Hull	Cohasset	Scituate	Hanover	Norwell	Pembroke	Marshfield	Duxbury	Kingston	Plymouth
Wetland & Habitat Protection												
Has the community:												
- issued local guidelines in addition to the Wetlands Protection Act?	Y	Y		Y	Y		N	N	N	Y	Y	Y
- delineated coastal & inland wetlands?	Y	Y		Y	Y		Y	N	N	Y	Y	N
Groundwater Protection												
Does the community have:												
- stormwater control regulations(s)?	N	N	N	N	N	Y	Y	Y	Y	N	N	Y
- Board of Health regulation(s) stricter than Title V?	N	Y		Y	Y	Y	Y	N	Y	Y	Y	Y
- septic system inspection program?	Y	N		Y	N	N	N	Y	N	N	N	N
- septic system upgrade program?	Y	Y		N	N	Y	Y	N	N	Y	N	N
- septic system pumping program?	N	N		N	N	N	N	N	N	N	N	N
Surface and Coastal Water Protection												
Does the community have:												
- flood plain maps (FEMA)?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
- flood plain zoning?	Y	Y	Y	Y	Y		N		Y	Y	Y	Y
- boat pumpout facilities?	N	Y	N	N	Y	N	N	N	Y	Y	N	N
- subdivision stormwater management regulations?	N	Y		N	N		N	N	Y	N	Y	Y
General Environmental Protection												
Do these boards have professional staff?												
- Planning Board	Y	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y
- Conservation Committee	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y½	Y
- Board of Health	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: *"½" refers to a one-half time employee.*

IV Coastal Management and Improvement Activities

A. Massachusetts Bays Program Mini-Bay Project, Demonstration Projects, and Bays Action Grants:

The **Weymouth Fore River Mini-Bay Project** is an example of three communities with a common goal of improved water quality. For the first time, the communities of Braintree, Quincy, and Weymouth are working together to determine levels of water and sediment contamination from years of industrial usage. Armed with scientific data, a plan is being developed and implemented to improve water quality and raise the public's consciousness of this unique river.

The **North and South River Watershed Association** has an MBP Demonstration Grant to remediate storm drains affecting water quality in the North River.

The **Bluefish River Demonstration Project,** undertaken by the Town of Duxbury and the Bayswide Committee, is a habitat restoration project aimed at opening shellfish beds by identifying and correcting nonpoint source pollution problems using alternative technologies.

The **Regional Water Quality Lab Service Project,** sponsored by the South Shore Local Governance Committee, is a MBP-funded demonstration project that allows each South Shore community access to a DMF-approved lab. The grant provides the necessary equipment for citizen monitoring groups to conduct upstream sampling to locate potential nonpoint source pollution problems.

Bays Action Grant Award Winners:

- Weymouth Waterfront Committee
- Hull Conservation
- Hanover Chamber of Commerce
- Plymouth Marine Mammal Research Center
- Hull Public School
- Friends of the Weir River Estuary
- Atlantic Middle School's Environmental Scholars Project
- Hull Environmental High School
- Furnace Brook School, Marshfield

B. Government Programs

Coastal Zone Management Office South Shore Regional Assistance	David Janik, So. Shore Coordinator (508) 946-8990
Plymouth County Mosquito Control Project	
Partners for Wildlife/ U.S. Fish & Wildlife Service	Robert Schierer (603) 225-1411
Natural Resources Conservation Service/ Mass Community Assistance Program	Marc MacQueen (508) 295-1481

C. Citizen Group Efforts

Due to its multitude of embayments, the South Shore has many different citizen groups working on water quality problems. These include the following:

- North and South Rivers Watershed Association
- Trustees of Duxbury Beach Association
- The Gulf Association (Cohasset)
- Back River Committee (Hingham and Weymouth)
- Bare Cove Park Committee (Hingham)
- Bayswide Committee (Plymouth, Kingston, Duxbury)
- Jones River Watershed Association
- Hull Environmental Services Corp.

D. Areas of Critical Environmental Concern (ACEC)

Currently, there are four ACECs located in the South Shore Region:

- Weymouth Back River (Hingham and Weymouth)
- Weir River (Cohasset, Hingham, and Hull)
- Ellisville Harbor (Plymouth)
- Herring River Watershed (Plymouth and Bourne)

E. Anadromous Fish Runs

The South Shore Region has many anadromous fish runs. These include:

Weymouth	Marshfield
Fore River	North River
Back River	South River
Hull-Cohasset	Duxbury
Weir River	Island Creek
Cohasset	Kingston
Gulf River	Jones River
Scituate	Plymouth
Herring Creek	Town Brook, Billington Sea,
Herring River	Eel River, Russell Millpond

F. Coastal Projects

Coastal Projects are broken into three major categories -- monitoring, remediation, and education, with the focus on improved water quality and eventual opening of shellfish beds. All information gathered by these groups is directly coordinated with DMF and their listed town departments.

Bluefish River Demonstration Project -- Bayswide Committee; Town of Duxbury Con Com, BOH, DPW, Shellfish Department, and Building Department; and Kingston Library.

North and South River Watershed Association -- Stormwater Remediation Project; Marshfield DPW, Con Com, and BOH.

North and South River Watershed Association -- Clam seeding project for students, Marshfield Harbormasters Department, Scituate Shellfish Department.

Weymouth Back River Committee -- Puritan Road Tidal Creek, Weymouth Planning Department, DPW, Con Com, Waterfront Committee, Storm Treat Systems, Inc., and NRCS.

Jones River Watershed Association -- Storm drain remediation, in conjunction with the Town of Kingston Highway Department and Conservation Commission.

Bare Cove Park Committee -- Riverbank stabilization and stormwater control, Hingham Con Com and BOH, and U.S. Army Corps of Engineers.

Back River Committee -- Citizen monitoring and the development of the ACEC management plan for the Back River.

Weir River Estuary Park -- Shoreline survey and cataloguing of marine fauna, Hull Environmental Corp., Shellfish Department, BOH, and WWTP; and Cohasset WWTP.

Partners with Wildlife (USFWS) -- A salt marsh restoration project in the towns of Hingham and Scituate, in conjunction with the Plymouth County Mosquito Control Project.

Town of Marshfield -- Salt marsh restoration, Town Pier Road.

Anadromous Fisheries Restoration Projects -- Back River herring run (Weymouth), Gulf River alewife run (Cohasset), and the Jones River (Kingston).

Directory of South Shore Coastal Projects, Programs, and Sources of Assistance

State/Federal Programs and Agencies	Contact Person and Telephone Number	Project or Program Description
• Massachusetts Bays Program	Diane Gould, Executive Director (617) 727-9530	Natural Estuary Program - provides planning, technical, and financial assistance for the protection of Massachusetts and Cape Cod Bays. Partnership of state, federal, and municipal governments.
• Shellfish Bed Restoration Program (MBP, Div. of Marine Fisheries, DEP, Natural Resources Conservation Service)	Deirdre Kimball, Coordinator (617) 727-9530	Collaborative effort by Mass Bays Program, DMF, DEP, and NRCS to remediate storm drain pollution of priority shellfish beds.
• ACEC Program (Area of Critical Environmental Concern)	Leslie Luchonok, ACEC Prog. Mgr. (617) 727-3160	ACEC status provides additional protection to critical resource areas, and creates an ecosystem-based planning and management framework for state and local actions.
• Partners for Wildlife Program (US Fish & Wildlife Service)	Robert Scheirer, Priv. Lands Coord. (603) 225-1411	A federal program providing financial and technical assistance to landowners for wetlands restoration projects.
• Riverways Program (MA Dept. of Fisheries, Wildlife and Env. Law Enforcement)	Maria van Dusen, Joan Kimball (617) 727-1614	Riverways offers guidance documents and technical assistance on local river protection efforts.
• Natural Resources Conservation Service/Community Assistance Unit	Marc McQueen (508) 295-1481	This new technical team helps communities address nonpoint source pollution problems.
• Wetlands Conservancy Program (Department of Environmental Protection)	Charles Costello (617) 292-5704	This state program is charged with mapping coastal and inland wetlands.
• Wetlands Restoration and Banking Program	Christy Foote-Smith, Director (617) 727-9530	A statewide EOEA program working to restore degraded wetlands.
Regional Government Agencies/Programs		
• MBP - South Shore Local Governance Committee	Bill Clark MAPC (617) 451-2770	Regional MBP Committee - provides technical and financial support to participating communities.
• Department of Environmental Protection	Sara Bacon Office of Watershed Management (617) 292-5654	Team leader for South Coastal Basin team.
• Coastal Zone Mgmt. Office: South Coastal regional assistance	Dave Janik, South Coastal Coord. (617) 946-8990	CZM develops state coastal zone policy, monitors coastal activities, and provides technical assistance on broad range of coastal issues.

continued

Directory of South Shore Coastal Projects, Programs, and Sources of Assistance

Regional Government Agencies/Programs	Contact Person and Telephone Number	Project or Program Description
• Division of Marine Fisheries	Ken Reback, Regional Fisheries Biologist Sandwich, MA (508) 888-1155	Finfish habitat monitoring and restoration.
	Frank Germano, Sr. Shellfish Biologist Sandwich, MA (508) 888-4043	The South Shore biologists test shellfish areas for pathogens and PSP.
• Metropolitan Area Planning Council (MAPC)	Martin Pillsbury, Water Resources Planner (617) 451-2770	Regional environmental planning and technical assistance.
	Joan Blaustein, Land Resource Planner (617) 451-2770	(also assist with bikeways and pathways planning)
	Sally Vecchio, Regional Planner So. Shore Coalition-coordinator	South Shore Coalition sub-regional group representing 10 municipalities on planning and policy matters.
• Norfolk County Mosquito Control Project	Dave Lawson Endicott St., Norwood (617) 762-3681	NCMCP has expertise in saltmarsh restoration work (Open Marsh Water Management).
• Old Colony Planning Council	Jim Watson, Comprehensive Planner, Bruce Hughes, Economic Devt Specialist (508) 583-1833	Regional environmental planning and technical assistance.
• Plymouth County Mosquito Control Project	Ray Zucor Kingston (617) 585-5450	PCMPC has expertise in saltmarsh restoration work.
• South Shore Regional Refuse Planning Board	Carol Swete, Solid Waste Planner	Recycling, composting, household hazardous waste collection, solid waste management, GIS.
Citizen Monitoring Efforts		
• No. & So. River Watershed Association	Debbie Lenahan (617) 659-8168	

continued

Directory of South Shore Coastal Projects, Programs, and Sources of Assistance

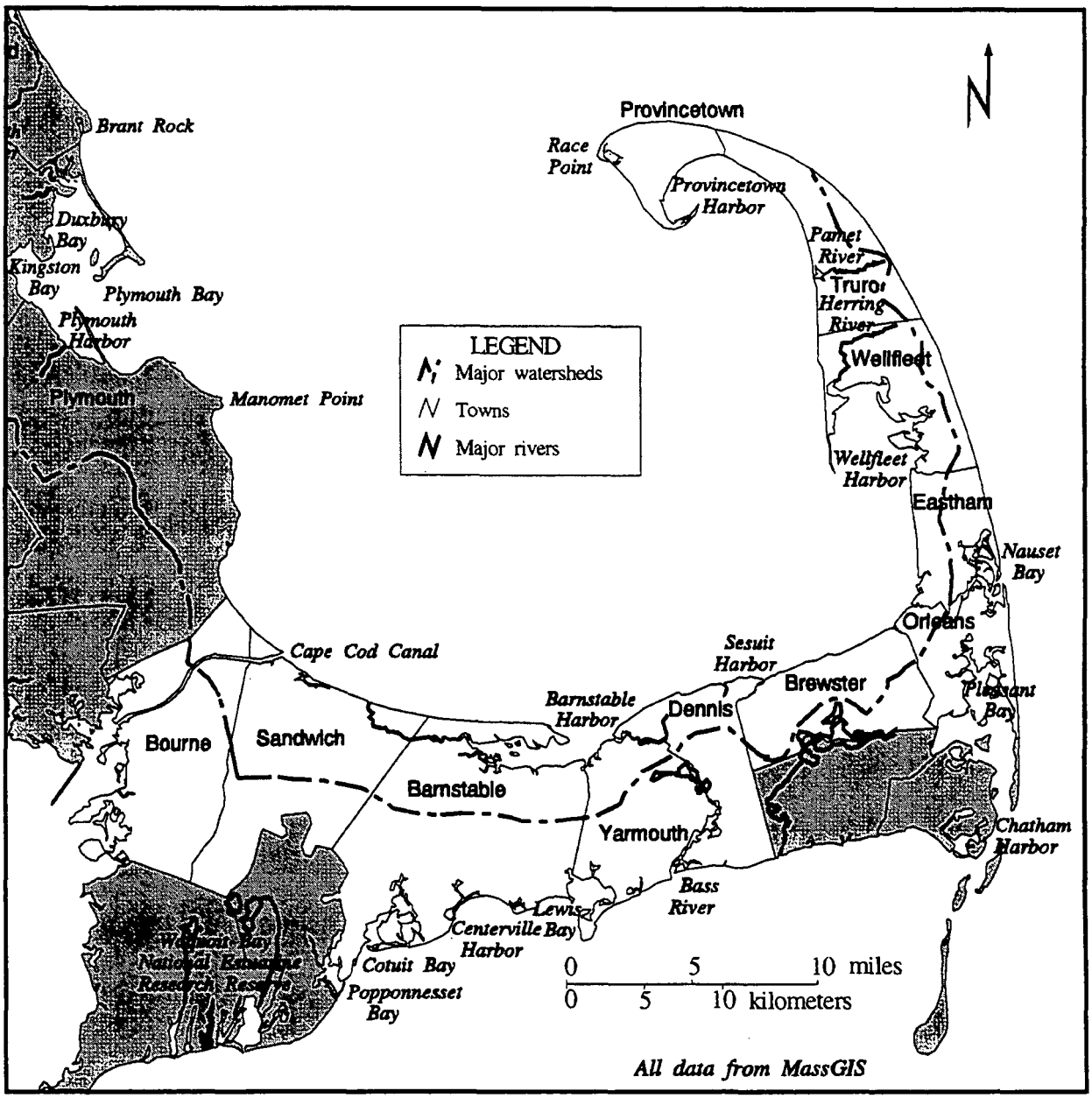
Citizen Monitoring Efforts	Contact Person and Telephone Number	Project or Program Description
• Jones River Watershed Association	Deborah McKie (617) 585-0702	
• Back River Committee	George Dolan (617) 749-4079	Joint community effort between town of Hingham and Weymouth
• Gulf Association	John Hartshorne (617) 383-0317	

Cape Cod Region

I Description of the Region

A. Map

The Cape Cod region of the Massachusetts Bays Program includes the communities of Provincetown, Truro, Wellfleet, Eastham, Orleans, Brewster, Dennis, Yarmouth, Barnstable, Sandwich, and Bourne.



B. Physical Characteristics

1) Geology and Soils

Cape Cod is a distinctive landform of the Massachusetts coastline, jutting out into the Gulf of Maine and forming the southern boundary of Massachusetts and Cape Cod Bays. Cape Cod is a narrow piece of the coast, no wider than 10 miles and extending eastward approximately 25 miles and then northward 35 miles to Race Point. It is a pile of unconsolidated materials - sands, gravel, silts and clays - left as the last glacier receded around 12,000 years ago. The northern edge of the Cape is the glacial moraine, and provides the Cape with topographic relief, forming hills and valleys. The highest elevation on Cape Cod is approximately 400 feet above mean sea level.

2) Description of the Coastline

The Cape's coastline is composed primarily of sand, and is moving both in the vertical and horizontal directions. The coastline is being affected by sea level rise, as well as by the erosional forces of the wind and water. Parts of the coastline, for example Sandy Neck in Barnstable and the backside of Provincetown, support large sand dunes, some over 30 feet high. Other parts of the coastline, in particular the shorelines of Truro and Wellfleet, are sandy glacial banks, with elevations of 50-80 feet in some areas.

3) Watershed and Important Tributaries

Cape Cod is supported by a sole source aquifer, with 5 distinct lenses of water - bearing sands and gravels. The Cape's groundwater is reflected at the surface in the approximately 353 freshwater ponds, 209 of which are considered by the state to be "great ponds" - 10 acres or larger. In addition, Cape Cod supports more than 100 coastal ponds, estuaries, and embayments. There are numerous brooks and streams, and there are some larger streams called rivers - the Pamet River in Truro, the Herring River in Wellfleet, the Mashpee and Quashnet Rivers in Mashpee and Falmouth, and the Red Brook River in Bourne.

C. Economic and Demographic Characteristics

A special study of the Cape Cod economy valued the economic base at $2 billion in 1985: 27% derived from retirement-based income, 26% tourist-based income, 22% from seasonal residents, and 10% and 15% from manufacturing and miscellaneous sources, respectively. According to the 1990 Census, 83% of employed Cape Cod residents aged 16 and over had one of six occupations: sales (15.1%); professional specialty (15%); administrative support/clerical (14%); service (13.4%); executive/administrative/ managerial (13.1%), and precision production/craft/ repair (12.4%).

All of the Cape Cod towns experience at least a doubling of their population in the summer months. These are seasonal residents, who own property on the Cape, with principal residences elsewhere. Tourists are not accounted for in the "summer" population estimates.

Cape Cod Demographics

Community	Area (sq. mi.)	1990 Pop. Density (/sq mi)	Year-Round Population 1970	1980	1990	Est. Summer Pop. Inc.	1990 Avg. Household Income
Provincetown	9.7	367	2,911	3,536	3,561	H	20,487
Truro	21.1	75	1,234	1,486	1,573	H	28,333
Wellfleet	19.8	126	1,743	2,209	2,493	H	24,149
Eastham	14.0	319	2,043	3,472	4,462	H	31,339
Orleans	14.1	414	3,055	5,306	5,838	H	29,518
Brewster	23.0	367	1,790	5,226	8,440	H	34,935
Dennis	20.6	673	6,454	12,360	13,864	H	27,900
Yarmouth	24.3	871	12,033	18,449	21,174	H	27,222
Barnstable	60.1	681	19,842	30,898	40,949	H	33,411
Sandwich	43.0	360	5,239	8,727	15,489	H	43,500
Bourne	40.9	392	12,636	13,874	16,064	H	34,159
	290.6	461	68,980	105,543	133,907		

* H = High; M = Moderate; L= Low; "-" = None

Source: *1990 U.S. Census Data*

It is fair to say that 75% of the Cape's economic base is dependent upon high quality coastal resources - clean water, good swimming beaches, and the ability to go fishing and engage in boating activities. What draws people to Cape Cod is its environment and its coastal amenities. The 1990 Census figures indicate that approximately 4% of the Cape's total payroll is in the agriculture and fisheries category, with an average annual employment of 1,000 individuals.

Cape Cod Lobster and Shellfish Landings

	1992 Lobster Landings		1993 Reported Shellfish Landings	
Community	**Pounds**	**Economic Value**	**Bushels**	**Major Species**
Provincetown	171,629	$499,440	488	Sea Clam
Truro	25,808	$75,101	52	Sea Clam
Wellfleet	33,844	$98,486	12,998	Quahog
Eastham	124,098	$361,125	5,558	Sea Clam
Orleans	*(included w/ Eastham)*	*(included w/ Eastham)*	5,457	Mussel
Brewster	103,462	$301,074	N/A	N/A
Dennis	*(incluced w/ Brewster)*	*(included w/ Brewster)*	825	Softshell Clam
Yarmouth	592,209	$1,723,328	937	Softshell Clam
Barnstable	*(included w/ Yarmouth)*	*(included w/ Yarmouth)*	32,134	Sea Clam
Sandwich	1,018,268	$2,963,159	N/A	N/A
Bourne	45,027	$131,028	7,070	Quahog
Region	2,114,345	$6,152,743		

Source: *Division of Marine Fisheries, 1994; data incomplete*

Official statistics on coastal fishing underestimate the value of the industry. This is due in part to the fact that neither individual towns nor the state and federal fishery agencies maintain reliable statistics regarding Massachusetts fishing activities. Reported landings of fish and shellfish for Cape Cod in 1992 were 26.5 million pounds, with an ex-vessel value of approximately $20.7 million. Not accounted for in these statistics is a growing shellfish aquaculture industry, primarily for quahogs and oysters. In 1992, the aquaculture harvest was estimated to be worth $5.8 million to the growers alone. These harvest values are based on the price paid to the fishermen and does not account for the total value of the fishery to the local economy, such as product transportation, monies spent on fuel and supplies, and vessel and gear repairs.

D. Land Use

Cape Cod has become more developed over the last 20 years, as the population, both year-round and seasonal, has increased. From 1971 to 1990, the amount of acres used to support residential development has increased from approximately 42,000 acres to 71,400 acres. Forest land has decreased to 113,000 acres in 1990 from 149,000 acres in 1971. Between 1984 and 1990, residential development consumed 11,000 more acres, and forest land decreased an additional 15,500 acres.

Agricultural activity on Cape Cod (based upon 1987 statistics) has experienced an overall decline on Cape Cod. However, there are some activities that have expanded: the acreage devoted to cranberry cultivation has increased to just under 1,000 acres, with a 20% increase in harvest. Nursery and greenhouse farms expanded to 42, with a doubling in acreage devoted to nurseries, and an increase to 206,000 square feet of greenhouse capacity.

E. Water Quality

All of the Cape's coastal waters in Cape Cod Bay are classified as SA waters by the Department of Environmental Protection. There are local pollution problems within many of the towns' coastal waters, believed to be due primarily to septic systems and, in some locations, boat waste discharge. The only exception is the Cape Cod Canal, which is classified as SB. As pointed out in the section on shellfish beds, there is very little acreage closed to shellfishing along the Bay's shore. Since the Cape's groundwater flows to the coast, maintaining its quality is important to maintaining coastal water quality. Nitrogen from wastewater is of concern, as is the pollution from the Massachusetts Military Reservation (MMR). Eleven pollution plumes have been delineated on the base, seven solvent plumes and four fuel plumes. In addition, there are four other sites contaminated with fuel. Ten of the 11 MMR plumes are moving south-southwest

towards Nantucket Sound; the eleventh is moving west to Buzzards Bay.

Six of the eleven Cape Cod region communities have municipal sewage or septage treatment facilities. The towns of Barnstable and Provincetown are in the wastewater facilities planning process, and both towns are exploring a variety of wastewater treatment options. This involves evaluating the use of a combination of individual on-site technologies, as well as clustered systems, and determining the need for denitrifying or other enhanced treatment technologies.

The chart below summarizes information from a 1995 report titled "The Status of Municipal Wastewater Treatment and Energy Producing Facilities Discharging to Coastal Waters in Massachusetts" (Richard Zeroka, MCZM). Please refer to this report for more information on coastal municipal sewage treatment facilities.

1995 Cape Cod Municipal Sewage Treatment Information

Community	Population est. Total (1987)	Population est. Served	Current level of treatment	Design Flow - MGD	Actual Average Flow - MGD	CSOs	Effluent Discharge	Sludge disposal	Primary source of flow
Provincetown	4,000	—	Currently, planning a comprehensive analysis of town's sewage disposal needs and possible solutions						
Truro	1,570	—	Truro and Wellfleet are currently planning a septage/wastewater treatment facility to replace existing septage pits; Wellfleet will possibly sewer downtown.						
Wellfleet	2,490	—							
Eastham	4,462	4,500	treatment facility for pumped on-site septage	.045	below	no	sand filter beds	composting	domestic
Orleans	5,838	6,200							
Brewster	8,440	6,800							
Dennis	13,864	13,500	treatment facility for pumped on-site septage	.12	.031	no	sand filter beds	composting	domestic
Yarmouth	21,174	19,000							
Barnstable	41,000	25,000	secondary	4.2	<4.2	no	discharge to groundwater	composting	domestic
Sandwich	15,490	—	Currently working on plan for septage facility to replace existing septage pits.						
Bourne	16,060	200	Planning to connect 5 - 10,000 residents to Wareham facility						
Region	134,388	75,200							

II Coastal Resources

A. Shellfish Beds

Cape Cod Bay experiences good water quality, as evidenced by the shellfish bed classifications maintained by the Massachusetts Division of Marine Fisheries. Of the 160,744 acres of potential shellfishing area on the Bay side of the Cape, only 132,623 acres were open to harvest as of September 30, 1993. Two shorelines, along the west shore of Wellfleet and the north shore of Barnstable, comprising 25,552 acres, are subject to a management closure, as the Division of Marine Fisheries has not yet completed sanitary surveys for these areas. Areas closed to shellfishing encompass 1,354 acres along the Dennis shoreline and the inner harbor of Provincetown, an area subject to road drainage problems as well as improperly functioning septic systems.

Cape Cod Shellfish Beds and Status as of 07/01/95

	Status*	Open Acres	Closed Acres**
Barnstable			
CCB29.0	P		24
CCB30.0	A	12,223	
CCB30.1	CA	1,607	
CCB31.0	A	1,777	
CCB31.1	CA		212
CCB31.2	CA		69
CCB31.20	CA		35
CCB32.0	P		28
CCB33.0	CA		181
CCB34.0	A	169	
Bourne			
CCB35.0	A	0	
CCB38,0	A	2,832	
Brewster			
CCB20.0	A	10,766	
CCB21.0	P		12
CCB22.0	P		5
CCB24.0	P		8
Dennis			
CCB23.0	A	14,641	
CCB23.2	CA		406
CCB24.0	P		7
CCB25.0	CA		44
CCB27.0	CA		55
Eastham			
CCB9.0	A	16,049	
CCB10.0	P		8
CCB11.0	A	1	
CCB15.0	P		38
CCB16.0	P		35
CCB18.0	P		5
Orleans			
CCB9.0	A	0	
CCB17.0	A	3,261	
CCB18.0	P		5
CCB19.0	P		4
CCB21.0	P		10
Provincetown			
CCB1.0	A	18,251	
CCB2.1	P		17
Provincetown (cont'd)			
CCB2.2	CA		136
CCB3.0	A	1,364	
CCB4.0		2,604	
CCB4.1	P		284
CCB4.3	P		3
CCB5.0	P		130
CCB5.1	P		2
CCB6.0	A	1,275	
Sandwich			
CCB30.0	A	0	
CCB35.0	A	14,986	
CCB36.0	P		26
CCB37.0	P		88
Truro			
CCB1.0	A	425	
CCB3.0	A	4,101	
CCB4.0	A	2,127	
CCB6.0	A	7,880	
CCB7.1S	CA		61
CCB7.2	P		9
CCB7.3	P		21
CCB8.0	A	1,752	
Wellfleet			
CCB8.0	A	12,231	
CCB9.0	A	2,237	
CCB10.0	P		2
CCB11.0	A	5,149	
CCB12	CA	186	
CCB12.2	P		21
CCB12.3	P		1
CCB13.0	A	185	
CCB13.1	CA	59	
CCB13.2	CA		4
CCB14.0	A	573	
Yarmouth			
CCB26.1	A	3,895	
CCB26.2	P		4
CCB27.0	CA		51
CCB28.0	P		29
CCB29.0	P		38

*Status Code:
A = Approved
CA = Conditionally Approved
CR = Conditionally Restricted
P = Prohibited
MC = Management Closure

** Acres Calculation: is for the overall surface water area at high tide within the defined growing area. Outer coastal (beach-side) areas generally have clean waters but are not very productive; these areas, usually defined as extending to the 3-mile line, are very large in comparison to the productive, more often closed estuarine areas.

Source: *DMF Data*

B. Public Beaches

Attendance figures for public parks on the north side of the Cape are an indicator of the attractiveness of the Cape's natural resources. In 1992, Nickerson State Park in Brewster hosted 185,000 visitors, Scusset State Beach in Sandwich 391,000 visitors, and Shawme-Crowell State Park in Sandwich 52,700 visitors. Every town with frontage on Cape Cod Bay has at least one town beach. Access to these for nonresidents is generally regulated by sticker fees and availability of parking. In addition to town beaches, the Cape Cod National Seashore manages Bayside beaches in Wellfleet.

Cape Cod Coastal Frontage by Community

Community	Total miles of coastal frontage	Miles of coastal frontage publicly owned	Percent of coastal frontage publicly owned
Provincetown	24.06	15.07	62.6
Truro	20.43	12.26	60.0
Wellfleet	35.53	20.22	56.9
Eastham	29.88	7.80	26.1
Orleans	31.86	14.03	44.0
Brewster	5.80	4.24	73.1
Dennis	13.98	6.62	47.4
Yarmouth	16.61	1.38	8.3
Barnstable	60.89	9.77	16.0
Sandwich	11.36	0.89	7.8
Bourne	49.23	5.95	12.1
Region	299.63	98.23	32.8

The Massachusetts Public Access Board funded the construction of boat ramps in the Towns of Truro, Wellfleet, Eastham, Dennis, and Barnstable.

C. Other Commercial or Recreational Uses

Cape Cod Bay and Stellwagen Bank are important fishing grounds for the Cape's commercial and recreational fishing fleet. The Bay is fished commercially for flounders, sea clams, quahogs, and by party and charter boats for bluefish and striped bass. Stellwagen Bank is important for the groundfish fishery, as well as a seasonal fishery for bluefin tuna. Rock Harbor in Orleans is home port to the largest charterboat fleet on the Cape, and possibly in Massachusetts, with 25 vessels. Commercial fish and shellfish landings reported for Cape Cod in 1992 were a little over 26.5 million pounds, with a value of approximately $20.7 million. Using an economic multiplier of 4.5, the fishery was worth close to $93 million to the state's economy, much of that remaining on the Cape.

The north shores of the Cape and Cape Cod Bay are popular recreational boating areas. The Army Corps of Engineers estimates that at least 6,500 pleasure craft use the Bay in the summer months. The Cape Cod Canal is utilized by pleasure and commercial craft to travel from southern New England waters into the Gulf of Maine. However, the Canal's major traffic is commercial shipping. In 1992, 5.3 billion gallons of petroleum products alone were shipped through the Canal.

Provincetown, Wellfleet, Orleans, Dennis, and Barnstable have important recreational and commercial harbors that require maintenance dredging. The Bayside waters of Provincetown, Wellfleet, Truro and Brewster are also important for shellfish aquaculture. The Cape towns have the highest number of shellfish grants of any region of the state, and Wellfleet leads with a total of 43 grants, totaling almost 130 acres. The next highest number is in Provincetown, with 36 grants totaling 45 acres (1992 statistics).

Stellwagen Bank and eastern Cape Cod Bay are important feeding and nursery grounds for various species of whales, including the endangered right and humpback whales. A significant whalewatching industry has developed in Provincetown and Barnstable Harbor. In 1992, the Barnstable whalewatch boat carried 34,731 passengers. Statewide, it is estimated that 1.5 million passengers participate in whalewatching each year, generating $23 million in revenue. Most of this activity is based on Cape Cod.

III Community Resource Management Survey

This section contains answers to selected questions from EOEA surveys. The answers are summarized here to provide a sense of the steps that Cape Cod communities are taking to protect their resources.

Cape Cod Resource Management Survey Answers

	Provincetown	Truro	Wellfleet	Eastham	Orleans	Brewster	Dennis	Yarmouth	Barnstable	Sandwich	Bourne
Wetland and Habitat Protection											
Has the community:											
- issued local wetlands guidelines in addition to the Wetlands Protection Act?	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
- delineated coastal & inland wetlands?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Groundwater Protection											
Does the community have:											
- stormwater control regulation(s)?	N	N	Y	N	Y	N	Y	N	Y	N	Y
- Board of Health regulation(s) stricter than Title V?	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
- septic system inspection program?	N	N	N	Y	Y	Y	Y	Y	N	N	N
- septic system upgrade program?	N	N	N	Y	Y	Y	Y	Y	Y	N	N
- septic system pumping program?	N	N	N	Y	Y	Y	Y	Y	N	N	N
Surface and Coastal Water Protection											
Does the community have:											
- flood plain maps (FEMA)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
- flood plain zoning	N	N	N	Y*	N	N	N	Y	Y	N	N
- boat pumpout facilities	Y	N	Y	N	Y	N	Y	Y	Y	N	Y
- subdivision stormwater management regulations	N	N	Y	N	Y	N	Y	N	Y	N	Y
General Environmental Protection											
Do these boards have professional staff?											
- Planning Board	N	N	Y	Y	Y	N	Y	Y	Y	Y	Y
- Conservation Commission	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N
- Board of Health	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y

* ACEC only

IV Significant Resource Management Issues

Waste disposal issues top the list of concerns for the Cape's Bayside towns. While various nutrient studies have been conducted on the Cape's south side, there has not been a comprehensive look at whether nitrogen from septic systems is a significant source of nutrients to coastal waters on the north side of the Cape. Data from Provincetown indicate that failing septic systems are a source of contamination to the harbor, and data from the Wellfleet MiniBay project indicate that there may be two problem areas in the inner harbor area. Nitrogen does enter the groundwater from septic systems, and groundwater flows to the edges of the Cape.

A major concern for the Cape Cod Bay communities is the potential long-term impact on the water quality of Cape Cod Bay and town shorelines from the MWRA wastewater treatment facility. There is also concern over the cumulative impact of this facility and other community wastewater discharges into the Bay. Another concern for the Bayside communities is the potential for oil spills from fuel lightering operations off the east entrance of the Cape Cod Canal, as well as from barge and tanker traffic through the Canal. (For a description of the practice of "lightering," please refer to the "Boston Harbor Navigation Improvement Project" discussion in chapter IV.)

Coastal erosion also is a concern for many communities along the Cape Cod Bay shoreline, but in particular for Sandwich, Dennis, Brewster, and Truro. Sandwich and Dennis have numerous structures along their shorelines, and over the past 10 years have experienced significant property damage from coastal storms. Brewster has fewer structures, but also has experienced substantial shoreline erosion in the past four years. The Brewster Conservation Commission is concerned about a possible increase in requests for armouring of the shoreline. Over the past 20 years, many seasonal residences in Cape Cod towns have been converted to year-round occupancy, heightening concern about storm damage and potential pollution from septic systems.

All of the Cape communities are dealing with the consequences of growth and the continuing popularity of the Cape as a summer vacation location. Many feel that the Cape has reached or exceeded its capacity to support the numbers of people who live and visit there.

The Cape Cod Commission, a regional land use planning and regulatory agency was established by state legislation in 1990 to deal with growth management, economic development, and resource protection throughout the Cape. The Commission has the authority to review and assess the benefits and detriments of relatively large development projects, and may approve, disapprove, or approve with conditions projects within its jurisdiction.

The Commission has adopted a Regional Policy Plan to guide development and related decision-making, and all of the Bayside communities are engaged in the preparation of local comprehensive plans (LCPs) consistent with the regional plan. Through their LCPs, the towns examine trends in population growth and changes in land use, natural resources, transportation, and water management, and develop visions for the future. Regional staff from the Massachusetts Coastal Zone Management Office and the Massachusetts Bays Program provide technical assistance to the towns, as well as to the Commission, on coastal and marine resource management issues.

The Barnstable County Extension office is helping the Lower Cape Community Development Corporation to administer a substantial grant from the Executive Office of Communities and Development. The purpose of this grant is to foster the renovation of cranberry bogs and provide incentives to increase aquaculture activity in Cape Cod waters, thereby increasing the number of natural resource-based jobs on the Cape.

V Coastal Management and Improvement Activities

A. Local Stormwater Remediation Projects

Most Cape Cod communities have completed shellfish sanitary surveys conducted by the Division of Marine Fisheries. These surveys identify sources of pollution to shellfish areas. Many of the towns have developed aggressive programs to remediate these problems, and some, for example Barnstable, Yarmouth, and Orleans, have prioritized their drainage systems for remediation, based upon the shellfish/other pubic resource areas affected. Many towns have been working on drainage projects without special appropriations for projects, but as part of their public works department budgets. Examples of town expenditures on these projects include:

Wellfleet - Since 1986, Wellfleet has spent more than $24,000, principally on the installation of leaching catch basins. The town has a bylaw that prohibits stormwater discharges into local waters.

Orleans - Since 1989, Orleans has spent approximately $115,000 on engineering and design work for 4 sites in town. In 1992, the town bonded $370,000 to implement this work. The work, which included the installation of infiltration leaching chambers and gross particle separators, was completed in 1993.

Yarmouth - In 1991, Yarmouth voters approved $200,000 for stormwater remediation, primarily along the Parker's River, supplementing $30,000 the Selectmen had allocated to the town's water quality committee to use for stormwater projects. Much of the work Yarmouth has done has been low technology fixes; for example, replacing existing catch basins with leaching catch basins and installing new catch basins where there previously were none, in order to divert surface runoff away from the estuary.

Dennis - Substantial work has been conducted in the Swan Pond and Swan Pond River area, much of it with regular town funds, not specially appropriated for drainage purposes. A few years ago, the town voted to spend about $100,000 to complete these drainage projects. To date, the town has spent $4,000 of this appropriation on a small infiltration system, and has been awarded a DEP 319 grant of $55,000 for drainage work on Upper County Road.

Barnstable - In 1992-93, Barnstable invested over $195,000 in two stormwater mitigation projects: one in Cotuit Bay and another in Barnstable Harbor. The Cotuit Bay project cost approximately $90,000 and involved the construction of leaching trenches and the installation of leaching chambers to treat stormwater discharging into a productive shellfish area. The site in Barnstable Harbor is a town boat ramp, where the town installed a system to separate sediment from stormwater, and treat the stormwater prior to discharge. The road leading to this site carries a high volume of water and sediment, as it is a steep hill to the water. This project cost was estimated at $105,000, $50,000 of which is construction costs.

B. Massachusetts Bays Program Grant Activity on Cape Cod

Wellfleet - In 1991, the Town of Wellfleet, the Barnstable County Department of Health and the Environment, the Barnstable County Cooperative Extension, and the Cape Cod Commission were awarded a five year grant, funded at $50,000 a year, to gather information on the environmental conditions in Wellfleet Harbor, to conduct socio-economic analyses of the value of fishing activity in the Harbor, and to determine the value people place on water-related activities and good water quality in the Harbor. In addition, the project will support evaluations of various shellfish management techniques. This information will be used to develop a management plan for the Harbor, which will address landuse issues in the watershed as well as coastal and marine resources.

Eastham - In 1992, the Orleans, Brewster, and Eastham Groundwater Protection District was awarded a $9,800 grant for the installation and monitoring of a on-site peat wastewater system at Chapel-In-The-Pines. The grant also supported the conduct of a workshop on the peat system for septic system installers. This project was implemented in cooperation with the Nauset Fellowship, the Barnstable County Department of Health and the Environment, and the Cape Cod Commission.

Yarmouth - In 1991, the Yarmouth Department of Natural Resources was awarded a $879 grant for an environmental study of Mill Pond, conducted in cooperation with the Dennis-Yarmouth Regional High School Science Department.

Barnstable - In 1991, the town was awarded $15,000 to monitor the effectiveness of the stormwater infiltration system installed at the parking lot and boat ramp on Barnstable Harbor (referenced above).

In 1991, the Centerville Elementary School was awarded $370 for an environmental awareness program.

Sandwich - In 1991, Cape Outdoor Discovery was awarded $250 to support a water quality testing program in Scoton Creek.

C. Harbor Management Planning

The Towns of Provincetown, Truro, Wellfleet, Dennis, and Sandwich are engaged in harbor planning efforts, funded in part with grants from the Massachusetts Coastal Zone Management Program.

Provincetown - A major issue in the town's harbor plan is public access, as well as the management of moorings within the harbor.

Truro - Truro has a small harbor, the mouth of the Pamet River, which is scheduled for dredging this fall. An issue of particular concern to the town is the availability and management of moorings.

Wellfleet - Wellfleet is concerned about maintaining a viable town marina and harbor area, as well as protecting the harbor's water quality for the aquaculture business. Wellfleet's harbor generates substantial income for the town; at the end of 1993, Wellfleet had more than $500,000 in its marina enterprise fund. Wellfleet is in the process of evaluating its options for disposal of dredged materials for the harbor dredging project. Wellfleet also has been successfully designated by EPA as the Commonwealth's fifth No Discharge Area (NDA). The designation of an area as an NDA is an option available for communities to address and control boat sewage discharges, and ultimately, to protect the marine environment.

Dennis - The town is interested in making optimal use of their harbor space, as well as protecting the areas of salt marsh within the basin.

Barnstable - The town is working on dredging and dredged material disposal issues associated with Barnstable Harbor. In the process of developing its local comprehensive plan, Barnstable is evaluating land uses around the harbor.

Sandwich - Sandwich is evaluating existing and future land uses adjacent to the harbor, in an effort to maximize the harbor's use and the public's access to this resource. There is a significant commercial fishing fleet that operates from the boat basin, as well as a number of recreational boats. Sandwich owns vacant land adjacent to the harbor which they would like to develop for water dependent use.

D. Areas of Critical Environmental Concern

There are three state-designated Areas of Critical Environmental Concern (ACECs) located on Cape Cod within the Massachusetts Bays watershed. These three ACECs total approximately 24,000 acres and include: the Inner Cape Cod Bay ACEC (2,550 acres), located in Brewster, Eastham, and Orleans; the Sandy Neck/Barnstable Harbor ACEC (8,850 acres), in Barnstable and Sandwich; and the Wellfleet Harbor ACEC (12,350 acres), in Eastham, Truro, and Wellfleet. An ACEC designation provides additional resource protection regarding state regulations, programs, and actions; creates a framework for ecosystem planning and management; and affords an opportunity for increased state-municipal cooperation and collaboration. An ACEC Resource Management Plan is currently being prepared for the Pleasant Bay ACEC, a joint effort of four towns, state and regional agencies, environmental organizations, and residents.

Directory of Cape Cod Coastal Projects, Programs and Sources of Assistance

	Contact Person and Telephone Number	Project or Program Description
Mass Bays Program (MBP) • Wellfleet Bay Mini Bays	George Heufelder Barnstable County Health Department (508) 362-2511 x383	Comprehensive program to evaluate marine water quality and socio-economic values of the harbor and its resources, and to provide information for the town to use in making management decisions regarding future use of the bay.
• Alternative Technologies Assistance Program	Sue Rask Barnstable County Health Department (508) 362-2511 x383	Technical assistance to boards of health and others on alternative on-site wastewater technologies.
• Bays Action Grant Program	Sue Schneider Mass. Bays Program (617) 727-9530 x408	Small grants program ($500-1500) available to communities/individuals/businesses for coastal pollution education and projects.

continued

Directory of Cape Cod Coastal Projects, Programs and Sources of Assistance

	Contact Person and Telephone Number	Project or Program Description
• Cape Cod Coastal Resources Committee	Pat Hughes Cape Cod Commission (508) 362-3828	Regional committee comprised of town appointees. Purpose is to advise county government on coastal issues, share information, and foster regional solutions to coastal problems. Serves as a MBP Local Governance Committee.
Government Programs - Regional		
• Identification of Nitrogen-sensitive coastal waters	Ed Eichner Cape Cod Commission (508) 362-3828	Identify nitrogen sensitive embayments, develop management strategies for controlling nitrogen. Produce manuals for others to use. Funded with 319 monies.
• Wetlands Restoration Projects, associated with regional transportation.	Don Liptack Natural Resources and Conservation Service (508) 362-9332	Use of ISTEA monies to restore wetland areas and improve road drainage along roads and railroads.
• Cape Cod Pathways	Kathy Sferra Cape Cod Commission (508) 362-3828	Development of walking trail across Cape Cod linking existing open space and historic and cultural sites.
• Operation of County Dredge	John Doane Barnstable County Commissioner (508) 362-2511	DEM funds provide dredge equipment for Cape Cod dredging projects, to be operated and maintained by Barnstable County.
• Natural Resources Economic Development Program	Bill Clarke Barnstable County Extension (508) 362-2511 x585	Two year grant to encourage the restoration of abandoned cranberry bogs, and to increase aquaculture activity in the eight lower Cape Cod towns.
• Underground Fuel Tank Program	Charlotte Steifel Barnstable County Health Department (508) 362-2511	Regional program to inventory and test all commercial and residential underground fuel tanks.
• Hazardous Materials Program	Marina Brock Barnstable County Health Department (508) 362-2511 x336	Regional program to assist towns in inventorying hazardous materials and users. Outreach program to businesses on right-to-know laws and proper handling.
• Landfill Monitoring Program	Sean O'Brien Barnstable County Health Department (508) 362-2511 x383	Collection and analysis of groundwater around town landfills.
• Assistance to Boards of Health	George Heufelder Barnstable County Health Department (508) 362-2511 x383	Provide technical assistance to boards of health and fill in for health agents in Cape Cod towns, as needed.

continued

Directory of Cape Cod Coastal Projects, Programs, and Sources of Assistance

	Contact Person and Telephone Number	Project or Program Description
• Evaluation of Waquoit Bay Watershed	Tom Cambareri Cape Cod Commission (508) 362-3828	Determination of groundwater flow affecting Waquoit Bay, and volume of groundwater discharging into the Bay.
• Wellhead Protection Assistance	Gabrielle Belfit Cape Cod Commission (508) 362-3828	Delineation of zones of contribution and appropriate wellhead protection actions.
• Watershed Management Assistance	Tom Cambareri Cape Cod Commission (508) 362-3828	Analysis of land use and protective measures in the towns within the Monomoy Lens of the Cape Cod Aquifer. Recommendations developed for consistent protection of area among the four towns.
• Fisheries Development Planning	Michael Collins Cape Cod Economic Development Council (508) 790-4980	Grant to develop and implement strategic plan for fisheries development, aquaculture, and other water based industries on Cape Cod.
Government Programs - State		
• ACEC Program (Area of Critical Environmental Concern)	Leslie Luchonok ACEC Prog. Mgr. (617) 727-3160	ACEC status provides additional protection to critical resource areas, and creates an ecosystem-based planning and management framework for state and local actions.
• CZM Regional Assistance	Cape Cod Regional Coordinator (508) 362-3828	Assist Cape Cod towns on coastal management issues including harbor planning, and assisting Cape Cod towns with boat pump-out programs.
• DEM - Nickerson State Park Management Plan	Steve Nichol (508) 896-3491	Development and implementation of Master Plan.
• DEM-WBNERR Alternative Technologies Demonstration Project	Christine Gault (508) 457-0495	EPA funded program to install and test alternative on-site wastewater technologies in the Waquoit Bay recharge area.
• DFWELE-MCZM Clean Vessel Act	Cape Cod Regional Coordinator	Funding for boat pump-out facilities for 12 Cape Cod towns.
Government Programs - Federal		
• NRCS - Natural Resource Planning	Don Liptack (508) 362-9332	Work cooperatively with towns and other government agencies on natural resource planning and stormwater control.
• ACOE - marsh restoration project	Dick Heidebrecht (617) 647-8513	Restoration of a 250 acres marsh site in Sagamore in cooperation with Mass. Exec. Office of Environmental Affairs.

continued

Directory of Cape Cod Coastal Projects, Programs and Sources of Assistance

	Contact Person and Telephone Number	Project or Program Description
• ACOE - beach nourishment project	Cathy LeBlanc (617) 647-8564	Evaluation of nourishment of private/commercial beachfront in Truro.
• NPS - Cape Cod National Seashore Management Plan	Mark Taber (508) 349-3785 x206	Development of general management plan for the seashore.
• USFWS - Additions to national wildlife refuge system	Mary Varteresian (413) 253-8450	Evaluation of establishment of refuge adjacent to WBNERR.
• Gulf of Maine Program - Marine Debris Program	Pam Rubinoff MCZM (508) 362-3828	Developing pilot marine debris reduction program in Provincetown, in cooperation with WHOI Sea Grant and MCZM.
Non-Profit Agency Efforts • Association for the Preservation of Cape Cod	Susan Nickerson (508) 255-4142	Action 2000 Agenda for Cape Cod's future; Oversight of MA Military Reservation Pollution Identification and Remediation Program.
• Center for Coastal Studies	Russell DeConti (508) 487-3622	Fishing Net Recycling Project; Water Quality Monitoring of Provincetown Harbor.
• Cape Cod Compact of Conservation Trusts	Mark Robinson (508) 362-9131	Workshops of wetlands protection strategies; included all assistance to land trusts and property owners on land conservation programs.
Citizen Monitoring Efforts • Falmouth Pond Watchers	Tracy Crago WHOI (508) 457-2000 x2398	
• Coalition for Buzzards Bay	Eileen Gunn (508) 759-1140	
• Friends of Meetinghouse Pond	Joe McCarthy (508) 255-4648	

CHAPTER IV. PROJECTS OF REGIONAL SCOPE AND IMPACT

Introduction

Although for convenience sake we sometimes think of coastal embayments as distinct or isolated systems, it is important to remember that currents and tides, nutrient cycles, energy flows, and food webs link the ecological health of each embayment within the Bays area to the larger marine ecosystem. What happens in one part of the Bays ecosystem may affect, for good or ill, other parts of the ecosystem.

A number of large projects are currently being planned or constructed in the Massachusetts Bays region that are expected to have a greater-than-local impact on the water quality, coastal habitat, and living marine resources of the Bays ecosystem. These projects of regional significance (so-called "megaprojects") include:

- Boston Harbor Project: Upgrading Sewage Treatment in the Metro Boston Area
- Central Artery/Tunnel Project
- Boston Harbor Navigation Improvement Project
- Massachusetts Bay Disposal Site
- South Essex Sewerage District Project
- Saugus River Flood Control Project
- Plymouth Sewage Treatment Project

Any comprehensive plan to conserve and manage the Bays' resources would be flawed if it did not examine these megaprojects in some detail. The MBP believes that such expensive and complicated projects should be held to the highest standards of public review. The inclusion of these projects in the CCMP is intended to identify and illuminate issues of environmental concern and to recommend actions that will help ensure the long-term sustainability of the region's marine resources.

Each of the following megaproject discussions is divided into seven sections: Background, Project Description, Expected Benefits, Progress to Date, Work to be Completed, Issues of Concern, and Recommended Actions. With respect to the latter, the Massachusetts Bays Program has attempted to develop and build consensus on those actions which should be taken to ensure that each of the projects proceeds in a manner which maximizes benefits for the people of the region while posing the least risk to the marine ecosystem.

BOSTON HARBOR PROJECT:

UPGRADING SEWAGE TREATMENT IN THE METRO BOSTON AREA

Background

It would be difficult to overstate the significance of Boston Harbor to the city that grew up along its shores. The harbor has served as a channel for commerce and trade, supported fishing and maritime industries, and provided recreational opportunities for millions of people. Unfortunately, many of these values have been impaired by the legacy of using the harbor as a dumping ground for wastewater generated in the Boston metropolitan region.

Boston's earliest settlers discharged their sewage directly into the harbor, but because of their relatively small numbers, this waste did not significantly degrade water quality. As the population of the city and surrounding areas expanded, however, it became evident that the harbor was simply not large enough to dilute the sewage of a large urban population and that some improvements in the sewage disposal system had to be made.

The earliest system improvements were designed to simply push sewage further offshore. For instance, a brick sewer line constructed in the 1870s transported raw sewage under Dorchester Bay to Moon Island, where it was stored temporarily and then released on the outgoing tide. Unfortunately, these early system improvements did not achieve significant water quality benefits, since much of the sewage simply washed back into the harbor on incoming tides.

In 1952, the Metropolitan District Commission (MDC) first began to treat the region's sewage before discharging it into Boston Harbor. A primary treatment plant opened that year on Nut Island in Quincy to treat about one third of the region's wastewater. Sixteen years later, in 1968, a larger plant opened on Deer Island to treat most of the remaining flow. By killing disease-causing bacteria and viruses, these primary treatment plants significantly reduced the human health risk of the effluent discharged into Boston Harbor. They also removed some of the solids from the wastewater flow.

But primary treatment could not remove all of the solids, oxygen-consuming organic matter, or toxic contaminants from the effluent, and as a result, these pollutants continued to enter the harbor. In addition, wastewater sludge was still discharged on outgoing tides. To make matters worse, significant amounts of partially treated and untreated sewage were released into the harbor or its tributaries through combined sewer overflows (CSOs) when the volume of wastewater exceeded the capacity of the treatment plants, during periods of wet weather.

In 1972, only four years after treatment facilities were opened at Deer Island, Congress passed the Clean Water Act, which set national standards for water quality in coastal and inland waters. The MDC, finding itself consistently underfunded by the state legislature, sought an exemption from these federal standards. Meanwhile, water quality continued to deteriorate. By the mid-1980s, Boston Harbor had gained notoriety as one of the nation's most polluted harbors.

The Massachusetts Water Resources Authority (MWRA), an independent authority, was created in 1984 to take responsibility for the water and sewer systems formerly operated by the MDC. In 1985, in response to a series of lawsuits, a federal court found the MDC and its successor, the MWRA, liable for numerous Clean Water Act violations. A detailed compliance schedule for meeting the requirements of the Clean Water Act was established which mandated the construction of a secondary treatment plant to treat the wastewater discharged into Boston Harbor. Unlike primary treatment, which relies solely on physical processes to treat wastewater, secondary treatment uses a combination of physical and biological processes that together are much more efficient at removing most contaminants.

Project Description

The MWRA is moving into compliance with the Clean Water Act by constructing new primary and secondary treatment plants on Deer Island and a new outfall to discharge treated effluent into Massachusetts Bay. Significant interceptor construction and CSO facilities planning also are underway.

The MWRA's efforts are, by any measure, an enormous undertaking. An average of 361 million gallons per day of wastewater passes through the MWRA sewer system--about the combined flow of the Charles, Mystic, and Neponset Rivers. And the Boston Harbor Project's estimated cost of $3.3 billion makes it one of the biggest public works projects ever undertaken in New England. (Note: the $3.3 billion includes only the "Boston Harbor Project" proper, not CSO control or collection system improvements.) The Boston Harbor Project and related capital improvements to the sewer system include:

- *Collection and delivery system improvements*: Before wastewater can be treated, it must be collected and delivered to the treatment plants at Deer and Nut Islands. When the MWRA assumed control of Metropolitan Boston's sewer system, it inherited a collection of aging pipes and pumps. Deterioration from age and lack

of maintenance led to numerous backups and overflows. The problem of limited flow capacity was exacerbated by the infiltration of groundwater and inflow from illegally connected sump pumps, improperly connected catch basins, and defective tidegates. Infiltration and inflow (I/I) may constitute as much as 60 percent of average flow in some parts of the system. The MWRA is in the process of rebuilding the collection and pumping system at its most vulnerable points, and is implementing a new flow management strategy to improve overall system efficiency.

Combined sewer overflow (CSO) reduction and treatment: A few communities in the MWRA region have combined sewer systems that carry both wastewater and stormwater. When the carrying capacity of these systems is overwhelmed during periods of wet weather, excess flow may be diverted from approximately 80 CSO outfall pipes directly into Boston Harbor or its tributaries. As part of its recently completed Combined Sewer Overflow/System Master Plan, the MWRA is working to optimize the present system and complete a CSO Facilities Plan to implement an integrated, cost-effective approach to reducing CSO impacts.

New headworks: The treatment plant on Nut Island will eventually be replaced by a headworks to screen wastewater from the southern portion of the collection system. To transport screened sewage from this headworks to the treatment plant at Deer Island, the MWRA is constructing an inter-island tunnel beneath Boston Harbor.

New treatment facilities: Among the most important elements of the MWRA's wastewater efforts are the improvements planned for the treatment plants themselves. The new Deer Island plant already has entirely new primary treatment facilities and will eventually have entirely new secondary treatment facilities. Secondary treatment is expected to significantly improve effluent quality, as shown by the following table which compares the relative effectiveness of primary and secondary treatment for selected pollutants:

Primary Treatment vs. Secondary Treatment

Pollutant	(% Removed) Primary	Secondary
Total Suspended Solids	60	85
Toxic Contaminants	10-46	32-95*
Biochemical Oxygen Demand (BOD)	35	85
Nitrogen	5	10-15

* Range varies based on contaminant type and secondary treatment process used.

Source: Alber, M., J. Hallam, and M.S. Connor, 1993. *The State of Boston Harbor 1992.* MWRA Environmental Quality Department Technical Report No. 93-6, March 1993.

- *Outfall tunnel:* A 9.5-mile outfall tunnel will eventually carry treated effluent to the deeper waters of Massachusetts Bay. At the end of the outfall, effluent will pass through 55 vertical riser pipes into ocean water more than 100 feet deep. Within 200 feet of the diffusing system, the MWRA expects average dilution to be about 150 parts seawater to one part effluent. The model developed by the scientific community predicts that within three to five miles of the diffuser, dilution is expected to be about 400 to 1 (Blumberg et al, 1993).

- *Source reduction:* Through its Toxic Reduction and Control Department (TRAC), the MWRA is working to limit the pollutant loadings that enter the wastewater stream. TRAC issues sewer permits to a variety of commercial and industrial sewer users, monitors their discharges, and enforces discharge regulations. Recognizing that household wastes are another significant source of wastewater contamination, the MWRA has also launched a public outreach effort to educate citizens about the proper use and disposal of hazardous household products.

Expected Benefits

The Boston Harbor Project and the other wastewater system improvements are expected to make the harbor healthier than it has been in more than a century. Computer models predict that with the new outfall, effluent will be more diluted throughout Massachusetts and Cape Cod Bays, especially in near-shore waters (Blumberg et al, 1993). The EPA's Supplemental Environmental Impact Statement (SEIS) for the outfall predicts that once secondary treatment exists, Massachusetts Bay will meet most water quality goals set by the state, but not all, due to ambient conditions (e.g., PCBs). CSO and other collection system improvements are also expected to result in significant water quality improvements to Boston Harbor and its tributaries.

Progress to Date

Since starting the Boston Harbor Project, the MWRA has met several major construction deadlines. By the fall of 1995, nearly all of the design and three quarters of the construction had been completed at a cost $700 million below the FY 1988 estimate. Progress to date on this and other wastewater efforts includes:

- *Improvements to the collection and delivery system*: Much of the collection system has already been inspected and repaired. In 1990, the MWRA completed upgrades of its existing headworks facilities and the old Deer Island Power and Pump station. Since then, significant repair and replacement of three other pump stations have also taken place. One indication of overall system improvement is the decrease in "choking time" at the Deer Island headworks which dropped from more than 5,000 hours in FY 1987 to less than 1,000 hours per year in FY 1991 through FY 1994. New pumps at the new Deer Island Treatment Plant are expected to sustain and enhance the improvements made by these interim upgrades.

  Combined sewer overflows: Working with the Boston Water and Sewer Commission and the other combined sewer communities, the MWRA has successfully increased the amount of combined flow that reaches its treatment plants. Dry weather CSOs have been non-existent for the past several years, and wet weather CSOs have been significantly reduced since the mid-1980s. The MWRA has also constructed or upgraded six major CSO treatment facilities which provide screening and chemical disinfection to much of the excess flow. Approximately 60% of the overflow is now screened and disinfected before being discharged.

  In 1994, the MWRA completed a conceptual long-term CSO plan that uses a watershed approach to evaluate the relative contribution of CSOs compared with other sources. Implementation of the plan, which is currently in the State environmental review process, will: 1) eliminate CSO discharges to Dorchester Bay, the Neponset River, and Constitution Beach, 2) reduce untreated overflows in each of 10 other receiving waters to an average of one to four times per year (versus the current discharge of up to 80 times per year in some areas), and 3) upgrade existing CSO facilities at Cottage Farm, Prison Point, and East Somerville, as well as construct additional CSO treatment facilities to increase control of bacteria and floating pollution to Boston Harbor and its tributaries.

- *Interim improvements to primary facilities*: In addition to installing new disinfection systems which are more reliable and which use an agent which is safer to store and handle, the MWRA has installed new scum removal systems at the Deer Island and Nut Island treatment plants to remove grease and floatable trash from the top of sedimentation tanks. These scum removal systems are responsible for a noticeable improvement to the aesthetics of Boston Harbor. The new Deer Island Treatment Plant includes scum removal facilities that will maintain the level of performance reached by these interim improvements.

- *Sludge processing facilities:* Perhaps the single greatest improvement to date involves the solids which settle out in sedimentation tanks. Previously, this "sludge" was dumped back into the harbor after digestion--some 40 tons of sludge were discharged on the outgoing tide every day. In December 1991, the MWRA opened its new sludge-to-fertilizer plant at the former Fore River Shipyard. Sludge which used to be discharged to the harbor is now barged to the pelletizing plant, where it is converted into high-grade fertilizer. Since sludge dumping was ended, concentrations of sewage-related bacteria in the harbor have dropped dramatically, especially in the vicinity of the old sludge outfall.

- *Nut Island headworks and inter-island tunnel*: Construction of the new Nut Island headworks began in the summer of 1992 and is scheduled for completion in 1996. Construction of the inter-island tunnel began in December 1992. Although extremely poor rock conditions and other problems have slowed progress, in November 1995 the contractor completed excavation and began preparations for lining the tunnel.

- *New primary and secondary treatment plants*: The MWRA has made substantial progress toward the completion of the new primary and secondary treatment plants. In January 1995, the MWRA successfully introduced wastewater into the first half of the new primary plant. The second half of the new primary plant was placed in operation later in the year.

Construction is also underway on the first two batteries of secondary treatment. The first major contract for construction of the secondary treatment plants began in November 1992 and the second in August 1993.

In August 1991, the MWRA began constructing eight new sludge digesters on Deer Island. Four were placed into operation in the summer of 1995. These egg-shaped storage tanks process sludge from the new treatment facilities, cutting its volume in half and reducing odor - and disease-causing bacteria. Construction of the remaining four digesters was completed in November 1995.

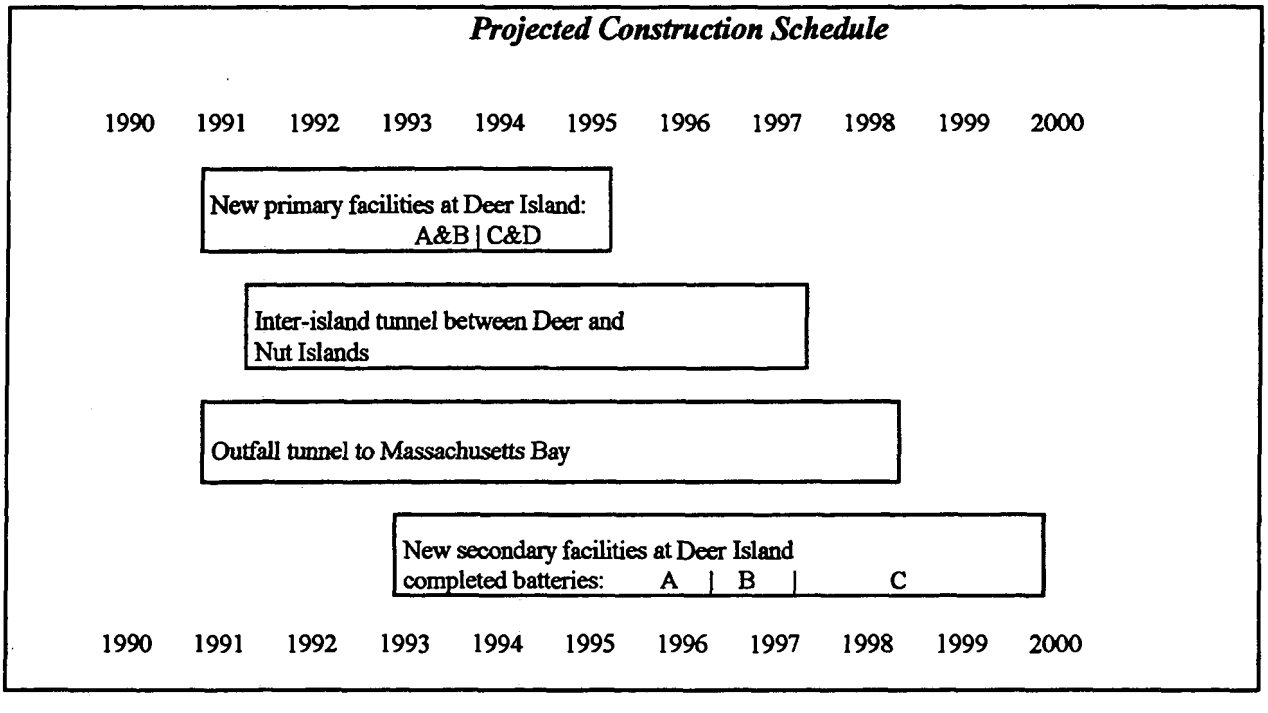
- *Outfall tunnel*: Excavation began in June 1992. That same summer, crews installed 55 vertical riser pipes that will eventually connect to the last section of the outfall tunnel. Although progress has been stalled several times due to mechanical difficulties and tunneling conditions, more than 8 miles of tunnel had been excavated by November 1995. Construction of the tunnel is currently several years behind the MWRA's original schedule.

- *Toxic reduction and control:* Over the past several years, the MWRA has continually refined its toxic reduction and control program. Since 1984, there has been a 75% decrease in the total amount of metals in the MWRA effluent.

Work to be Completed

- *Boston Harbor Project:* Despite the progress made to date, completing the Boston Harbor Project continues to present significant challenges. The new treatment facilities at the Deer Island plant are scheduled to go on line in phases, beginning with the introduction of wastewater into the first half of the new primary treatment plant in January 1995. If no major changes are made to the project, secondary treatment facilities are scheduled to be completed by December 1999. The construction timetable is summarized in the chart below.

- *Wastewater Management:* Other continuing challenges include maintaining the new system assets, extending the useful life of older facilities as much as possible, and completing the construction of large and aggressive CSO and sewage interceptor improvement projects.



Issues of Concern

The Boston Harbor Project raises a number of issues with which the Massachusetts Bays Program is concerned. These include:

- *Outfall tunnel*: Perhaps the most controversial component of the Boston Harbor Project is the 9.5-mile outfall tunnel which will disperse treated wastewater into Massachusetts Bay. The U.S. Environmental Protection Agency (EPA) approved the location of the outfall after federal and state agencies made detailed assessments of the project's potential environmental impact as required by the National Environmental Policy Act and the Massachusetts Environmental Policy Act.

  The MWRA's decision to proceed with the outfall was based on the best available scientific data. However, there has been concern that relocation of nutrient loading to the vicinity of the outfall terminus may trigger eutrophication or algal blooms in Massachusetts Bay. Aside from being aesthetically unpleasant, algal blooms could potentially cause severe hypoxia (oxygen depletion from organic decay) and thereby adversely impact the marine ecosystem of Massachusetts Bay. The potential impacts could be heightened if effluent was discharged through the outfall before full secondary treatment had come on line. A separate concern related to nutrient loading is a group of algae known as dinoflagellates, some species of which produce the toxins responsible for paralytic shellfish poisoning (PSP).

  Moreover, there has been concern that the outfall will negatively impact the resources of Stellwagen Basin and Stellwagen Bank, a sandy underwater plateau located about 16.5 miles from the outfall terminus. The nutrient-rich waters of the Bank, which was recently designated as a National Marine Sanctuary, are a feeding ground for several species of marine mammals, including the endangered humpback, right, fin, and sei whales. Because the deep water in Stellwagen Basin does not circulate freely, it is especially sensitive to the potential for depressed dissolved oxygen. Reduced dissolved oxygen may adversely impact the prey of marine mammals, which in turn could negatively affect the marine mammals present.

  The MWRA has acknowledged that "processes associated with eutrophication and species changes are complex and, to a degree, unpredictable," and EPA's Supplemental EIS predicts a modest increase in algal production near the outfall. But it appears that most of the pollutants released from the existing outfalls at the entrances to Boston Harbor already make their way to Massachusetts Bay on outgoing tides. The Authority maintains that no Baywide eutrophication or hypoxia will occur, and that the new outfall will have minimal or no impact on the resources of Stellwagen Basin or Stellwagen Bank. Federal agencies, including EPA and the National Marine Fisheries Service (NMFS), have reached the same conclusion, stating the outfall pipe "is not likely to jeopardize the continued existence of any endangered or threatened species." However, they recognize the uncertainty surrounding the ecosystem's response to the cumulative impacts of this discharge and all other pollutant sources to the Bays.

  In response to concerns about the effects of the new outfall on Massachusetts and Cape Cod Bays, an Outfall Monitoring Task Force (OMTF) was established to report to the Secretary of Environmental Affairs on the outfall's environmental impact. The OMTF consists of academic scientists, officials from state and federal agencies, and representatives from environmental interest groups. The MWRA began monitoring in February 1992 with several baseline studies to determine conditions in the Bay before the new outfall begins discharging effluent. Sampling has been concentrated in the area immediately surrounding the outfall, but extends into remote areas of the Bays as well. The OMTF will examine and interpret monitoring data and suggest remedial action should it determine that the outfall is causing an adverse impact on Massachusetts Bay. In addition, the MWRA, EPA, and the NMFS recently entered into an Agreement to conduct various activities to monitor and study effects of the outfall discharge on the marine environment. The MWRA also released for comment a Draft Contingency Plan (March 1995), which describes ongoing action to ensure protection of the ecosystem and triggers for conducting additional studies and taking future action as needed.

- *Rate increases*: The benefits of the Boston Harbor Project have not come cheaply. Most of the project is being financed with 30-year revenue bonds. Although the federal government has committed $632 million dollars to the project, and the Commonwealth recently established a Rate Relief Fund to help offset debt service costs, MWRA ratepayers will likely shoulder almost 65 percent of the project cost. Annual water and sewer bills, which averaged $410 per household in 1991, are expected to rise throughout and beyond the remainder of the decade. Every homeowner, business owner, or renter who flushes a toilet in the 43 MWRA sewer communities will feel the burden, especially those on low or fixed incomes. Although the MWRA has kept average rate increases lower than first expected, public support for additional water quality improvements in Boston Harbor and elsewhere may depend on keeping project costs to a minimum and finding additional state and federal revenues to finance the project. The MWRA is currently working with a broad coalition seeking additional federal and state revenue for the Boston Harbor Project.

- *Project revisions*: Any project as extensive as the Boston Harbor Project must be subject to revision as better data become available. The most significant revision recently considered concerns the capacity of the secondary treatment facilities. A study completed by the MWRA indicated that due to revised estimates of flows and loads based on actual data, the size of the planned secondary treatment facilities could be reduced while still meeting all Clean Water Act requirements. Based on this information, the Federal Court recently approved the elimination of Battery D of secondary treatment.

Recommended Actions

The Massachusetts Bays Program has attempted to identify areas of environmental concern and to build consensus on those actions which should be taken to ensure that the project proceeds in a manner that both maximizes benefits for the people of the region and poses the least risk to the marine ecosystem. The following recommendations have been developed by the staff of the Massachusetts Bays Program, with input from officials from the implementing agencies and interested members of the public.

The Massachusetts Water Resources Authority (MWRA) should:

- plan its operating budget to ensure sufficient funds are available for operation and maintenance of the new treatment facilities. (This budget parameter is a requirement for the receipt of federal funding.);
- continue aggressive enforcement of industrial permits;
- continue efforts to reduce household hazardous waste and to educate the public about proper use of the sewer system;
- eliminate CSOs where deemed appropriate by a public review process;
- continue maintaining the sewer system;
- monitor the health of the ecological community by assessing species abundance *and* diversity of the benthos in Stellwagen Basin, in Cape Cod Bay, and near the outfall; and
- implement contingency planning, with public input, based on meaningful and verifiable triggers.

Communities and citizen organizations have taken an active role in reviewing and commenting on the March 1995 Draft Contingency Plan. The Coastal Advocacy Network and others have recommended that, should unforeseen circumstances seriously threaten the health of the Bays, the contingency planning process should give consideration to all contingency options, including advanced levels of treatment (e.g., effluent filtration, organic polymer addition, etc.) and inshore diversion of effluent. Several communities have expressed the concern that contingency planning should protect the health of Boston Harbor, as it continues to recover from the effects of past effluent discharges. The Massachusetts Bays Program recommends that the MWRA should:

- consider *all* contingency planning options, and, consistent with the goals of this CCMP, the MWRA should strive to protect *all* of our shared coastal resources, from the North Shore to Boston Harbor to Cape Cod Bay; and
- continue to make all monitoring data available to interested parties in a mutually-agreed upon and timely fashion.

The 43 MWRA customer communities should:

- minimize infiltration and inflow;
- implement strong stormwater management measures aimed at achieving the water quality standards in Boston Harbor and its tributaries; and
- maintain their portions of the sewer system.

The Outfall Monitoring Task Force should:

- Adopt meaningful change values for several environmental indicators, including, but not necessarily limited to:
  1. percent change in liver lesions of winter flounder;
  2. exceedences of water quality standards;
  3. exceedences of FDA limits for seafood safety; and
  4. changes in dissolved oxygen for Stellwagen Basin.
- Recommend meaningful changes for:
  1. biological productivity; and
  2. structure of the benthic community, particularly as it relates to contaminant levels in marine sediments.
- Ensure that MWRA monitoring efforts are coordinated with the state's planned monitoring program and the nationwide marine monitoring programs.

The U.S. Environmental Protection Agency (EPA) should:

- in collaboration with DEP, ensure MWRA compliance

with its discharge permit when the permit is finalized and becomes effective; and

- continue to collaborate with MWRA and NMFS on the Memorandum of Understanding (MOU) to implement the conservation recommendations in the NOAA Biological Opinion.

The National Marine Fisheries Service (NMFS) should:

- immediately implement the Recovery Plans for the North Atlantic Right Whale and Humpback Whale.

The National Oceanic and Atmospheric Administration (NOAA) should:

- continue to upgrade modeling techniques and pursue acoustical methods for the monitoring of outfall-generated plumes.

The Department of Environmental Protection (DEP) should:

- in collaboration with EPA, ensure MWRA compliance with its discharge permit when the permit is finalized and becomes effective.

CENTRAL ARTERY / TUNNEL (CA/T) PROJECT

Introduction

Almost everyone who lives or works in Boston is familiar with the elevated highway slicing through the heart of the city. This section of Interstate 93--better known as the Central Artery--serves approximately 190,000 vehicles every day. Few people like to drive on this road, and with good reason--the Artery's safe design capacity is only 75,000 vehicles per day. Traffic jams are the norm and the accident rate is about twice the national average for urban interstates.

The Central Artery/Tunnel (CA/T) Project is designed to increase the capacity and safety of the highway system, improve access to Logan Airport and the South Boston seaport, and reduce congestion on roads in downtown Boston. By most accounts, the project is much needed and long overdue. The Massachusetts Highway Department first projected the need for a third harbor tunnel in 1957, and a 1974 study confirmed the technical feasibility of depressing the artery. The ambitious project now underway will finally achieve those visions. In doing so, it will transform Boston, not only by altering traffic patterns in and around the city, but by creating about 20 acres of new open space in the Central Artery area when the existing artery is dismantled.

Project Description

The $7.9 billion CA/T project consists of four major components:

- a widened, mostly underground I-93 (Central Artery) from Charlestown to just south of the Massachusetts Avenue interchange. The new artery will have 8 traffic lanes plus intermittent auxiliary lanes;
- an I-90 (Massachusetts Turnpike) extension via a Seaport Access Highway and Harbor Tunnel to Logan Airport in East Boston, with a connection to Route 1A. The new harbor tunnel extends from the Subaru terminal in South Boston to Bird Island Flats in East Boston (The new harbor tunnel was opened December 15, 1995 and dedicated as the "Ted Williams Tunnel".);
- an extended frontage road system parallel to I-93, both northbound and southbound, from Causeway Street to just past Southampton Street; and
- a South Boston Bypass Road to connect I-93 to the Seaport Access Highway and the Commonwealth Flats area of South Boston. (The South Boston Bypass Road opened December 15, 1995.).

Roughly half the project will be constructed within the existing I-93/Central Artery right of way, and the rest on a new right-of-way through industrial areas of South Boston and Logan Airport.

Expected Benefits

The CA/T Project will expand the capacity and improve the geometry of the existing highway system. When it is completed, the new Artery will be able to accommodate 247,000 vehicles per day. The project will have other benefits aside from improving traffic flow through Boston, however. Despite a small, temporary decline in downtown sales while the artery is under construction, the project is expected to generate economic benefits for Boston and the region. Reorganizing the many underground utilities will greatly benefit future maintenance.

The project may also have a number of environmental benefits, including:

- improvements in air quality resulting from fewer traffic snarls;
- increased parkland and open space in downtown Boston, East Boston, along the Charles River, and on Spectacle Island;
- a cap to prevent leaching from the existing landfill on Spectacle Island; and
- restoration of 14 acres of coastal wetland at Rumney Marsh.

Progress to Date

As of February 1996, the CA/T Project had awarded approximately $3.3 billion in design and construction contracts. Progress on the major components of the project is as follows:

- *Central Artery*: early in 1993, project crews began relocating the jumble of utility lines within the area of the new underground artery. Site preparation is expected to be finished in 1996.
- *Ted Williams Tunnel*: constructing the 540-foot-wide tunnel trench required the removal of over 200,000 cubic yards of rock from beneath the harbor floor, and clamshell dredging to remove more than one million cubic yards of marine sediment and clay. The tunnel

itself is made up of a series of steel and concrete tubes which were constructed off-site, towed into Boston Harbor by barge, and lowered into the trench. Approximately nine months after the first section of tube was placed in February 1993, all 12 tube sections had been installed and connected. The tunnel was completed and opened for interim use by authorized vehicles in December 1995.

- *Surface roads*: The South Boston Haul Road, which opened to commercial traffic in September 1993, represents the first mile of completed roadway on the CA/T Project. The South Boston Bypass Road, which connects the Haul Road to the Southeast Expressway, was opened in December 1995.

- *Spectacle Island*: Material from the CA/T Project will be used to cover an existing landfill on Spectacle Island. More than two million of the 2.7 million cubic yards of material earmarked for the island have already been delivered.

Work to be Completed

A carefully phased and coordinated construction program has been developed to maintain surface traffic through the city and to minimize disruptions to Boston residents and businesses. Construction on the Project's major components is expected to proceed as follows:

- *Central Artery*: Construction of the new under-ground expressway along Atlantic Avenue began in September 1995. By 2003, the tunnels are expected to be operational both northbound and southbound. The final components of I-93, including removal of the old elevated Artery and construction of the Charles River Crossing, are expected to be operational by 2004.

- *Spectacle Island*: After the existing landfill is capped, Spectacle Island will be regraded and revegetated for use as a park as envisioned in the Boston Harbor Islands State Park Master Plan.

- *Permitting process:* Permits from agencies which regulate activity in or near the water have been of special concern to the Massachusetts Bays Program. To date, the CA/T Project has successfully handled a very large and complex permitting process without encountering significant obstacles.

Issues of Concern

The Massachusetts Bays Program is concerned with the project's potential impact on water quality in Boston Harbor and its main tributaries, as well as its potential impact on fragile coastal areas, including the islands of Boston Harbor.

- *Aquatic habitat:* Existing environmental regulations strongly discourage placing fill in coastal waters. Although early design modifications reduced intrusion into coastal waters, current design specifications still require fill to cover several acres of benthic habitat. Eight acres of aquatic habitat around Spectacle Island have already been filled to facilitate the landfill closure plan. Another five acres will be filled in Fort Point Channel. A November 1995 project design change will reduce the amount of proposed fill in the Millers River. Compensatory mitigation for aquatic habitat losses is currently in the planning as well as preliminary construction phases.

- *Disposal of excavated and dredged materials*: After more than 5 years of construction, the CA/T Project has excavated roughly 25 percent of the approximately 14 million cubic yards of total material it is expected to dig up or dredge. Suitable material will be used for Project backfill, as needed. In addition, the CA/T Project has coordinated with DEP to develop a program for beneficially reusing clay at publicly-owned landfills. This program seeks to ensure environmentally sound management of the clay and till. One million cubic yards of dredged sediment have already been placed at the Massachusetts Bay Disposal Site (MBDS) and at Governor's Island. Additional dredged material from Fort Point Channel and the Charles River Crossing will be disposed of at the MBDS and Spectacle Island in the future.

  City conservation officials have expressed concern over the adequacy of erosion control measures at Spectacle Island, and have reported incidents of erosion of fill material at Spectacle Island during severe weather conditions. In order to prevent further erosion of fill, CA/T Project officials have stated that effective best management practices have been instituted around the perimeter of Spectacle Island.

- *Stormwater system design:* The amount of stormwater discharged in the project area will not change substantially, but the project is expected to change drainage patterns and the rate of storm flow at several locations.

Although all stormwater systems have not yet been designed, runoff from construction areas will be directed to existing or new storm sewers, all of which must meet current state regulations for stormwater discharge. In areas where new storm sewers are constructed, combined sewer overflows (CSOs) are expected to decrease.

- *Sedimentation*: In 1991, the CA/T Project obtained the first-in-the-nation NPDES permit for construction site dewatering and stormwater runoff. Consistent with the permit requirements, contract specifications include strict performance standards to be met by contractors via the use of best management practices.

- *Public access to waterfront areas*: Most phases of the construction project have been planned to ensure that public access to the waterfront is not seriously impeded. The banks of the lower Charles and Millers Rivers will be disturbed by construction activities during later stages of the project. These bank areas currently provide only limited access west of the existing I-93 corridor as they are not yet developed as public open space. When construction is completed, the current design is expected to expand parkland in the river basin, allowing pedestrian and bicycle connections from the esplanade to the harbor.

- *Aesthetic concerns*: The CA/T Project will include some temporary facilities near the waterfront, including a casting basin at the edge of Fort Point Channel, and a large number of temporary bridges, ramps, barricades, and fences throughout the project area. These temporary aesthetic concerns are minimized since the project area is an already highly developed industrial zone.

Permanent features of the project, especially the Charles River Crossing, will reduce impacts on aquatic resources and navigation, and will reduce visual impacts in comparison to earlier alternative designs officially considered in the environmental process. This design was approved by the Secretary of Environmental Affairs in March 1994 and by the Federal Highway Administration in June 1994. The crossing will be built on the banks of the Charles River, near the point where it flows into Boston Harbor. The crossing will include a mainline (I-93) long-span cablestayed bridge with 10 travel lanes carrying traffic between downtown Boston and Routes 1 and I-93 north of the river. Connections to and from Leverett Circle/Storrow Drive will be on a second 4-lane bridge similar in profile to the mainline bridge, and by land-based tunnels south of the river passing below the North Station railroad tracks.

Recommended Actions

The MBP has not developed recommendations specific to the Central Artery/Tunnel Project at this time. However, the MBP will continue to track the nature and progress of the project, and will issue future recommendations as determined appropriate.

BOSTON HARBOR NAVIGATION IMPROVEMENT PROJECT

Background

In 1634, only four years after settlers from the Massachusetts Bay Company first arrived in Boston, Englishman William Wood described Boston Harbor as "fittest for such as can Trade into England, for such commodities as the Country wants, being the chief place for shipping and Merchandise." Encouraged by Wood's description, trading ships soon began to frequent the harbor, and since that time, Boston has become one of the busiest commercial ports in the United States.

Of course, Boston Harbor was more than deep enough to accommodate the sailing ships with which William Wood was familiar. The large-draft ships and tankers which run through the harbor today, however, need deep access channels to navigate safely. Shipping companies have long known that large vessels minimize the cost of transporting bulk cargo. It is not surprising, then, that the average vessel in the worldwide commercial shipping fleet has steadily become larger in length, beam, and draft. In the last 160 years, Boston Harbor has been dredged repeatedly to accommodate the growing commercial fleet. Occasional improvement dredgings to increase channel depths have been supplemented with more frequent maintenance dredgings, the last of which occurred in 1983.

The container ships and tankers which are the mainstay of today's international shipping industry need 40-foot access channels to navigate safely and efficiently. While Boston Harbor's principal entrance and main access channels are 40 feet deep, its three major tributaries, along which most port terminals are located, are only 35 feet deep. These channels and many of their berths are currently too shallow to accommodate commercial traffic except during high tides, resulting in tidal delays and limits on vessel size and loading.

Even slight delays can substantially increase the operating costs of a shipping company and jeopardize its long-term profitability. This is especially true in the northern Atlantic, where commercial shipping is a highly competitive enterprise. In order to avoid delays, shipping companies sometimes engage in "lightering," or transferring their cargo to a barge. This may raise a ship enough to navigate a shallow channel or dock at a shallow berth. Although lightering is time-consuming and expensive, it is of necessity an increasingly common practice in Boston Harbor.

Increased operating costs associated with tidal delays and lightering have already discouraged some shipping lines from calling on the Port of Boston, and may prevent the port from attracting new business in the future. Since the 1960s, Congress has recognized that Boston Harbor needs deeper channels to maintain its position as a prominent international port. A study completed in 1988 established the feasibility of the proposed Navigation Improvement Project, which was authorized in the Federal Water Resources Development Act of 1990.

Project Description

The Boston Harbor Navigation Improvement Project would deepen several major tributaries of Boston Harbor:

- *Reserved Channel:* most of the existing 35-foot channel would be deepened to 40 feet, including a portion of the main ship channel to provide a deep-water turning area.
- *Mystic River:* a major portion of the existing 35-foot channel would be deepened to 40 feet, except for areas along the south side and at the upstream limit where 40-foot depths are not required.
- *Chelsea River:* the existing 35-foot channel would be deepened to 38 feet after the relocation and alteration of utility crossings beneath the channel.
- *Inner Confluence Area:* the 35-foot confluence of the Mystic and Chelsea Rivers along the East Boston waterfront would be deepened to provide a safe 40-foot approach to both the Mystic River and Chelsea River.
- *Berth dredging:* berths that will economically benefit from channel dredging would be deepened at non-federal expense.

Project cost and cost sharing are both dependent on the two stages required to complete the project: dredging of channel maintenance material and improvement dredging.

Maintenance Dredging: The existing tributary channels to be deepened by the project have been maintained to the authorized 35-foot depth. The cost of dredging maintenance material during project construction will be funded as maintenance dredging at 100% federal cost. Maintenance material is primarily silt (about 896,800 cubic yards [cy]) which has accumulated since the channels were last deepened, and is contaminated with organic compounds, heavy metals, and other toxic compounds. Maintenance material must be removed prior to the improvement dredging. It is estimated that disposal of maintenance material in-channel (Mystic River, Chelsea River, and Inner Confluence) will cost $32 million.

Improvement Dredging: The cost of the Navigation Improvement Project (deepen from -35 ft mean low water [MLW] to project depth) will be shared. The federal share of the project is $18,695,000, which includes 65% of the cost of channel deepening and the U.S. Coast Guard cost for navigation aids. The non-federal share is $11,820,000, which includes 35% of the cost of channel deepening and 100% of the cost to deepen berth areas and relocate or protect utilities. The total cost for the improvement project is $30,515,000. Materials to be removed consist of silts in the project berths (54,500 cy), undisturbed parent material from the channels (1,550,700 cy), undisturbed parent material from the project berths (71,600 cy), and rock from the channels (88,100 cy).

Expected Benefits

Ships carry approximately 95 percent of America's foreign commerce. International trade is the fastest growing segment of the American economy, and is expected to expand even more rapidly as a result of recent trade agreements.

As one of the country's oldest and most experienced ports, Boston is an important gateway for international commerce. More than 25 million tons of cargo, worth some seven billion dollars, pass through the Port of Boston each year. More than 6,000 people are directly employed by the cargo industry in Boston, and another 3,000 have jobs which indirectly support this activity. In 1992, shipments through Boston generated nearly $1.86 billion in economic benefits for the region.

By reducing the cost of transporting bulk commodities through the Port of Boston and reducing tidal delays for larger vessels, the Navigation Improvement Project will increase the efficiency and competitiveness of Boston Harbor and bring economic benefits to the entire region. By allowing the passage of larger, more efficient vessels over a longer period of the tidal cycle, and by reducing barge traffic from nearby ports, the project should alleviate congestion in the harbor. The project also should reduce the risk of accidents and hazardous materials spills.

Progress to Date

Preconstruction engineering and project design began in September 1990. Ship simulation model studies were used to determine optimum channel dimensions and locations, and subsurface material surveys were completed by November 1992. Massport and the Army Corps of Engineers (ACOE) filed a Final EIR/EIS in June 1995. A 60-day comment period followed, and a Massachusetts Environmental Policy Act (MEPA) Certificate was issued in September 1995.

Work to be Completed

Massport and the ACOE are initiating the permit application process. Construction, which would take approximately 18 months to complete, could begin as early as 1997.

It is expected that the ACOE will issue one dredging contract for both the channels and the berths. This will likely require special arrangements between the ACOE and Massport, since berth dredging is a non-federal responsibility. Massport is the project's non-federal sponsor. Massport's responsibilities are generally outlined in the Water Resources Development Act of 1986 and will be more particularly described in the Project Cooperation Agreement (PCA). The ACOE and Massport will work together to assure that all permit requirements are met, whether it be through the ACOE contract or separately.

Altogether, the project will dispose of 1.1 million cubic yards of contaminated sediments in cells to be constructed below the federal navigation channels in the Mystic River, Chelsea River, and Inner Confluence area. The silt will be capped with three feet of clean material and armored with rock in areas of significant propeller wash. In the course of conducting characterization studies on the marine sediment in the proposed project area, the ACOE determined that the 1.1 million cubic yards of surface silt in the project area is not suitable for unconfined ocean disposal. The remaining material which meets federal criteria will be disposed of at the Massachusetts Bays Disposal Site (MBDS).

Issues of Concern

- *Disposal of contaminated sediments:* surface sediments dredged from the floor of Boston Harbor are not suitable for unconfined or confined ocean disposal. The ACOE and Massport have conducted a detailed analysis of alternative disposal sites. Using criteria based on technical feasibility, environmental impact, and cost, the project team initially selected 351 possible disposal sites. More rigorous screening criteria were used to narrow the number of sites to 21, then to 6 "preferred practicable" sites, and finally to a combination of in-channel locations.

  The preferred disposal site identified in the EIR/EIS for the silty maintenance material is in-channel disposal. The silty material would be buried deeper than the authorized depth in the Mystic River, Chelsea River, and Inner Confluence, and then capped with coarse grained material. The clean parent material (Boston blue clay, and rock and gravel) will be disposed of at the MBDS.

* Note: for a broader discussion of the Massachusetts Bay Disposal Site (MBDS), refer to the *Massachusetts Bay Disposal Site* megaproject discussion in Chapter IV.

- *Impact on water quality:* extensive dredging may disrupt water quality in the harbor by increasing turbidity in the project area and by triggering the release of contaminants which have accumulated in marine sediments. Proper use of dredging equipment, including sealed dredging buckets, can minimize water quality impairments during the dredging process. However, current water quality modelling has not shown an unacceptable increase in turbidity during dredging and disposal. Monitoring of the project while in progress will be imperative to ensure that minimal water quality violations occur.

- *Impact on marine biota and habitat:* benthic organisms and demersal fish in the project area would be killed during dredging and blasting, although recolonization would be expected approximately one year after construction has ended. If sediments are disposed of at an aquatic site, resident organisms including finfish and marine mammals would be temporarily displaced from the disposal area due to increases in noise and turbidity. Benthic organisms in the disposal area would be buried. Disposal events would be frequent enough to prevent recolonization until the end of the 18-month dredging process.

  In-channel disposal with capping reduces the risk of significant environmental harm. Regular monitoring and response by appropriate agencies would reduce this risk further.

- *Source control:* because marine sediments will continue to accumulate in Boston Harbor, periodic maintenance dredging will be necessary to keep navigation channels clear. The proposed Navigation Improvement Project area is expected to generate 1.8 million cubic yards of silt over for the next 50 years. The maintenance dredging of the main ship channel and President Roads anchorage area (not part of the currently proposed Navigation Improvement Project), is expected to generate 4.4 million cubic yards of material over the next 50 years. The quality of these sediments will depend in large measure on pollution loadings to the Boston Harbor during that time. Controlling pollution at the source is the best way to prevent further degradation of the harbor's sediment. An effective source control program will also lower the cost of maintenance dredging in the future.

- *Maintenance Dredging and Disposal:* although source control is extremely important, it is unlikely that the silty sediments which refill Boston's deepened shipping channels will be suitable for open ocean disposal in just ten to fifteen years when the first maintenance dredging will become necessary. Currently, limited viable, environmentally-safe options exist for disposal of this maintenance silt. Alternative technologies for treating contaminated sediments which were not appropriate for the improvement project may be appropriate for maintenance dredging if planning begins now.

Recommended Actions

The Massachusetts Bays Program has attempted to identify areas of environmental concern and build consensus on those actions which should be taken to ensure that the project proceeds in a manner which maximizes benefits for the people of the region and which poses the least risk to the marine ecosystem. The following recommendations have been developed by the staff of the Massachusetts Bays Program, with input from officials from the implementing agencies and interested members of the public.

The **Army Corps of Engineers (ACOE)** should:

- ensure adequate monitoring of the cap after completion of construction; and

- ensure that appropriate environmental performance standards are incorporated into construction contracts.

Massport, ACOE, EPA, NMFS, and the **Massachusetts Executive Office of Environmental Affairs (EOEA)** should:

- begin planning now for disposal of contaminated maintenance material, and explore range of applicable alternative technologies; and

- ensure adequate independent monitoring of all dredge and disposal work during construction.

MASSACHUSETTS BAY DISPOSAL SITE (MBDS)*

Background

Current state and federal policies recognize both the need to maintain navigation channels and the need to protect coastal water quality through proper control of dredge and fill operations. It has been estimated that over the next century, more than 23 million cubic yards of sediment will be generated from various dredging projects along the coast of Massachusetts and Cape Cod Bays. The U.S. Environmental Protection Agency (EPA) has determined that available upland disposal sites are not sufficient to meet these disposal needs. Since finding suitable disposal areas is essential to the long-term viability of the nation's ports, EPA and the U.S. Army Corps of Engineers (ACOE) reaffirmed the need to designate an ocean disposal site.

Unlike the other "megaprojects" examined in this chapter of the CCMP, the Massachusetts Bay Disposal Site (MBDS) "project" did not involve any construction. The objective of this purely regulatory project was to identify an ocean disposal site which would minimize potential impacts to the environment. The decision to formally designate the MBDS was important because the site may now be considered as a disposal site for uncontaminated dredged material from other megaprojects examined in this chapter.

Project Description

The Massachusetts Bay Disposal Site (MBDS) is an open water disposal area, roughly 21 nautical miles from Boston and 15 nautical miles from Gloucester. The site is located in waters ranging from 275-300 feet deep, and has a diameter of two nautical miles. Since the 1940s, the area has been used for the disposal of dredged sediments. Federal regulations promulgated in 1977 restricted some ocean dumping practices which were adversely impacting the marine environment, but allowed sediment disposal to continue at more than 100 interim disposal sites, including the MBDS. Between 1982 and 1992, the ACOE disposed or permitted the disposal of approximately 3 million cubic yards of dredged material at the site.

In January 1988, EPA proposed to officially designate a dredged material disposal site in Massachusetts Bay. After investigating several potential sites within an economically and operationally feasible distance from the shore, EPA concluded that the MBDS area best met its established site selection criteria. However, the EPA decided to relocate the site slightly to the south and west of its former location. The modified site boundary is a circle, two nautical miles in diameter, centered at 70°35.0′ west longitude and 42°25.1′ north latitude. This location was favored because it:

- preserves the relatively pristine condition of the eastern portion of the former MBDS;
- increases the distance between the disposal site and the National Marine Sanctuary at Stellwagen Bank;
- provides an opportunity to cover previously disposed contaminated sediments; and
- avoids an area of the pre-existing Industrial Waste Site that contains a high concentration of drums.

In August 1993, EPA issued a "Final Rule" which formally designated the MBDS as a disposal site for uncontaminated dredged sediments. Disposal was specifically limited to material which meets the requirements of the Marine Protection, Research, and Sanctuaries Act and its accompanying regulations. These requirements consider impacts to the marine environment, aquatic life, and human health. The Final Rule also prohibited disposal-and-capping of materials too contaminated for unconfined ocean disposal at the MBDS until its efficacy can be effectively demonstrated and it is authorized by law.

EPA's designation of the MBDS was *not* an authorization for the disposal of any particular dredged material at the site. Final site designation simply allows the MBDS to be *considered* as a disposal option when land-based alternatives are not practicable. Since only the actual disposal of dredged material, as authorized by EPA and the ACOE, directly affects Massachusetts Bay, the designation, by itself, will have no impact on the water quality or marine ecology of the Bays.

The Massachusetts Coastal Zone Management Office (CZM) will formally review any activity at the MBDS or modification of site restrictions which may be proposed in the future for consistency with its own policies. Projects also will be reviewed by NOAA, under the Sanctuary Consultation provision of the National Marine Sanctuaries Act (to insure that the activity will not adversely affect the resources or

* Note: for a broader discussion of the dredging issue, refer to the *Dredging and Dredged Materials Disposal* Action Plan in Chapter V.

qualities of the Sanctuary) as well as under Section 7 of the Endangered Species Act (for protected species issues).

Expected Benefits

Designation of the MBDS provides a disposal alternative for uncontaminated dredged material.

Issues of Concern

- *Disposal alternatives for contaminated sediments:* because harbors and ports act as catch basins for industrial pollutants, much of the material dredged in port improvement projects will be contaminated. These contaminated sediments are not suitable for unconfined ocean disposal, and may not be suitable for confinement.

  At the present time, there is no disposal site in the Massachusetts Bays region which can accept large volumes of contaminated sediment. Upland disposal sites are prohibitively expensive and have limited capacity. Ocean dumping regulations restrict contaminated sediments from aquatic disposal sites.

  The lack of suitable disposal alternatives has been and may continue to be a significant obstacle to all port dredging projects in the Massachusetts Bays region.

  If and when the feasibility of capping in deep water has been demonstrated, the MBDS may become a possible disposal site for sediments which are otherwise unsuitable for ocean disposal. However, until the legality and efficacy of this disposal technique has been effectively demonstrated, EPA will not allow contaminated sediments to be disposed at the site. By objecting to ocean disposal of contaminated sediments generated in a number of recent projects, EPA has reaffirmed its commitment to keep contaminated sediments out of the MBDS.

- *Impact on water quality:* the best scientific data available to date indicate that the MBDS is depositional and that past use of the MBDS has not impaired water quality in or around the site. Future disposal of clean material is not expected to degrade water quality significantly, although it will result in unavoidable, localized impacts during and immediately following disposal activities.

- *Impact on marine biota:* possible localized effects associated with use of the MBDS include local mounding of dredged material and the smothering of benthic organisms. However, the ability of these organisms to recolonize in similar sediments probably renders this impact short-term and insignificant. Noticeable effects associated with disposal operations are expected to diminish rapidly as distance from the site increases. EPA does not expect use of the site to have any negative impact on commercial or recreational fishing in the vicinity, and the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have both concluded that disposal of clean material will not endanger any protected species that may occur in the area, including those which feed in or migrate through the Stellwagen Bank National Marine Sanctuary (SBNMS).

- *Stellwagen Bank National Marine Sanctuary:* the Stellwagen Bank National Marine Sanctuary is located approximately 200 meters from the northeastern perimeter of the MBDS. The regulations of the National Marine Sanctuary prohibit the disposal of dredged material both within the Sanctuary and outside the Sanctuary if the outside-disposed material is likely to enter the Sanctuary and harm a Sanctuary resource or quality. Given the proximity of the Sanctuary to the disposal site, it is therefore critical that barges disposing of dredged material at the MBDS dump the material as close as possible to the permitted disposal location. Recent research conducted by the U.S. Geological Survey and SBNMS has indicated that past disposal activities have been less than precise, and these agencies are working with the U.S. Coast Guard to insure that subsequent disposal operations are monitored more carefully by enforcement personnel.

- *Industrial Waste Site:* for many years, chemicals, low-level radioactive waste, munitions, vessels, and construction debris were disposed at an Industrial Waste Site (IWS) partially overlapping the MBDS.

  It is possible that contaminants from the IWS may be degrading water or sediment quality in the MBDS area. Because there are many possible sources of contamination at the MBDS, including the IWS, cause and effect relationships can be difficult to determine. However, in order to develop a sound site management plan, federal agencies will need to distinguish contamination from the IWS and other sources from contamination that may be caused by disposal activities at the MBDS.

During 1991 and 1992, information searches and field surveys were conducted by various federal and state agencies to determine the potential threat posed by past dumping of hazardous materials at the IWS. The EPA is currently synthesizing this information and will prepare an interagency report to provide a comprehensive assessment of the Industrial Waste Site's impact on the marine environment and recommend further action.

- *Site management and monitoring:* all disposal activities at the MBDS must conform with the Ocean Dumping Criteria set forth in 40 CFR Part 227. The ACOE issues permits for individual disposal actions at the MBDS. Site monitoring is the joint responsibility of both EPA and ACOE. These agencies have conducted considerable monitoring at the MBDS over the last two decades, including surveys to determine the composition, distribution, and movement of disposed sediments, food chain interactions in and around the site, and bioaccumulation of contaminants in benthic organisms.

  Concern has been expressed about the adequacy of monitoring at the MBDS. The specific components of a long-term monitoring program for the MBDS have not yet be en determined. The EPA is currently developing long-term management plans for all of its open water disposal sites, including the MBDS. The MBDS plan, which will include a monitoring component, will be in place by January 1997.

Recommended Actions

The Massachusetts Bays Program has attempted to identify areas of environmental concern and build consensus on those actions which should be taken to ensure that the project proceeds in a manner which maximizes benefits for the people of the region and which poses the least risk to the marine ecosystem. The following recommendations have been developed by the staff of the Massachusetts Bays Program, with input from officials from the implementing agencies and interested members of the public.

EPA, ACOE, and CZM, in consultation with other appropriate federal and state agencies, should:

- lead an interagency study group to define parameters for a demonstration study which could determine whether containment of contaminated sediments (e.g., capping) is a viable disposal option for the MBDS.

EPA and NOAA should:

- complete the interagency comprehensive assessment report on the IWS, giving particular attention to the site's potential impact on water quality and marine habitat in the MBDS area.

SOUTH ESSEX SEWERAGE DISTRICT PROJECT

Background

Salem Sound, in the northern section of Massachusetts Bay, is scheduled to benefit from a project that is in many ways similar to the MWRA's Boston Harbor Project. Like Boston Harbor, Salem Sound has long been used as a receptacle for the residential and industrial wastewater generated in nearby communities. This wastewater is discharged by the South Essex Sewerage District (SESD), a wastewater management authority which serves the nearby communities of Salem, Beverly, Marblehead, Danvers, and Peabody. After passage of the Clean Water Act in 1972, SESD constructed a primary plant to treat the wastewater generated by these communities, while at the same time it applied for a waiver from the requirement that it build secondary treatment facilities. The U.S. Environmental Protection Agency (EPA) initially issued a tentative approval of the waiver, but in its final decision, denied the waiver request. The District appealed EPA's decision throughout the 1980's, until EPA sued to bring the District into compliance.

Project Description

Under the terms of a 1991 court settlement, SESD agreed to build a new secondary treatment plant to meet the water quality criteria of the Clean Water Act. The new plant will be constructed alongside the District's existing primary treatment facilities at Cat Cove, which currently treats about 29 million gallons of wastewater a day. The project will also include some upgrades at the existing primary treatment facilities and a new diffuser system to discharge treated effluent.

Expected Benefits

Water quality improvements should enhance recreational and commercial uses of Salem Sound, as well as improve the health of the marine ecosystem. Existing primary treatment facilities remove approximately 60 percent of the total suspended solids (TSS) and 25-35 percent of the biochemical oxygen demand (BOD). New secondary treatment facilities are expected to remove approximately 90 percent of the TSS and 90 percent of the BOD.

Progress to Date

In January 1994, SESD formally proposed a plan recommending how the cost of the project should be divided among its five constituent communities. Soon after, the District advertised various components of the cleanup project for bidding. Project bids were submitted to the SESD in April 1994. Construction began in July 1994, and is currently slated for completion in 1997.

Issues of Concern

- *Rate increases:* the entire capital plan associated with this project is expected to approach $260 million. The outside assistance which SESD has received to date includes a $29 million loan from the federally-assisted state revolving loan program and $135,000 through a new state grant program initiated expressly to help communities ease high water and sewer rates. However, water and sewer users in the five SESD communities will still bear most of the project's cost. Most ratepayers can reasonably expect their bills to triple over 1990 levels by the time the project is completed. The Commonwealth of Massachusetts, Essex County, and the Town of Middleton--all three of which purchase some services from the SESD--also will pay a small percentage of the overall project cost.

- *Monitoring:* the SESD will need to implement a comprehensive marine monitoring program to determine the effects of secondary effluent in Salem Sound. This program will be most effective if it is integrated with existing monitoring programs, including those efforts currently supported by the Massachusetts Bays Program.

Recommended Actions

The Massachusetts Bays Program has attempted to identify areas of environmental concern and build consensus on those actions which should be taken to ensure that the project proceeds in a manner which maximizes benefits for the people of the region and which poses the least risk to the marine ecosystem. The following recommendations have been developed by the staff of the Massachusetts Bays Program, with input from officials from the implementing agencies and interested members of the public.

All stakeholders in this project, including the South Essex Sewerage District (SESD), the Massachusetts Department of Environmental Protection (DEP), the U.S. Environmental Protection Agency (EPA), and contributing municipalities should:

- promote source reduction as a means of reducing contaminant loadings into Salem Sound;
- promote water conservation; and
- continue to seek state and federal funds to ease rate increases.

SAUGUS RIVER FLOOD CONTROL PROJECT

Background

Coastal estuaries are among the most productive environments on earth, but they are also among the most susceptible to damage from human development. The 1,660-acre Saugus and Pines River Estuary is no exception. This estuary--one of the largest on the northern coast of Massachusetts--contains a rich diversity of habitat, including high and low marsh, pannes, ponds, tidal creeks, and mud flats. Its more than 1,000 acres of vegetated wetland provide habitat for hundreds of species of fish and wildlife. The floodplain in and around this estuary, however, is highly developed. More than 40,000 people live or work there. Residential, industrial and commercial real estate in the floodplain is worth approximately $3 billion; with building contents and infrastructure included, total property value in the floodplain probably ranges between $5 to 10 billion.

Like most low-lying estuaries, the Saugus and Pines River Estuary is occasionally inundated by tidal surges during severe storms. In an undeveloped estuary, these tidal flushings are of little concern. In the Saugus and Pines River Estuary, however, coastal flooding can cause extensive property damage. Over the past twenty years, surges associated with six different storms have caused substantial damage to property in the estuary's floodplain. The worst of these storms, the Blizzard of 1978, damaged more than 3,000 homes and businesses and forced the evacuation of some 4,000 people. The U.S. Army Corps of Engineers (ACOE) estimates that today a storm of the same magnitude would cause approximately $130 million of property damage. The worst storm imaginable (the "Standard Project Northeaster" or SPN) would flood as many as 5,000 buildings and cause an estimated $500 million in property damage.

Project Description

To protect property in and around the Saugus and Pines River Estuary, the ACOE worked with local governments and the public to develop a project which would reduce coastal storm damage. The proposed Saugus River Floodgate Project would include more than three miles of dikes, walls and sand dunes along the coast. Its principal feature is a series of floodgates across the mouth of the Saugus River--one 100-foot-wide navigation gate and eight 50-foot-wide flushing gates. These floodgates would remain open at most times, but during severe storms they would be closed to prevent tidal surges from spilling into the floodplain. The Commonwealth of Massachusetts would acquire the approximately 1,660 acres of estuarine land, to be used for flood storage and runoff. Future development would be prohibited in this area.

Studies of the $115 million project were sponsored by the Metropolitan District Commission and the municipalities of Lynn, Malden, Revere, and Saugus. In 1992, the federal government authorized funds to cover 64 percent of the project's cost, leaving the local sponsor to contribute the balance--about $41 million. Operation and maintenance of the project's structural components and implementation of an estuary management plan would require an additional annual allocation of $270,000 from the state.

Expected Benefits

The Saugus River Floodgate Project would protect residential, industrial, and commercial property in the 4,000-acre floodplain which overlaps four separate municipalities. Although the project would primarily reduce private property damage within that area, it would also protect important regional utility systems and transportation routes which serve Boston's North Shore, including the Massachusetts Bay Transportation Authority's Blue Line and Routes 1 and 1A. The project would also reduce the costs of emergency evacuation and related services.

Progress to Date

Although the ACOE completed a combined EIS/EIR in 1989, the Saugus River Floodgate Project has not passed beyond the design phase. When asked in 1993 to commit to the project, the Massachusetts Executive Office of Environmental Affairs (EOEA) postponed its decision until further study of other non-structural flood protection measures - supplementing the ACOE's earlier studies - could be accomplished. These would include:

- maintenance and repair of existing dikes, seawalls, and tidal gates;
- retrofitting or elevating the most floodprone structures;
- dike construction;
- wetland acquisition;
- dune restoration;
- a floodplain management plan;
- infrastructure retrofit; and
- an early flood warning system.

Studies to determine the cost-effectiveness of this approach have been completed and reviewed by the ACOE. EOEA is not expected to make a decision on the Saugus River Flood Control Project until it has completed its analysis of the ACOE's technical findings regarding the state's plan and the impacts of current federal budgetary policies.

Issues of Concern

- *Cost effectiveness:* EOEA expected a nonstructural flood protection program to be considerably more cost-effective than the ACOE's proposed action. Although the ACOE's studies indicated that only 7 percent of buildings in the floodplain were candidates for protection under an economically feasible nonstructural program, its analysis looked solely at elevating structures in the 100-year flood plain. The ACOE found EOEA's estimates overly optimistic in light of construction experience.

- *Public safety:* EOEA has acknowledged that a nonstructural approach would not provide the same level of protection as the floodgate project. Since existing storm forecast systems cannot provide much advance warning of flood events in the Saugus and Pines River Estuary, a non-structural flood control strategy would include public infrastructure retrofit, and improved warning and evacuation systems in order to ensure public safety during severe storms.

- *Environmental impact*: the Saugus and Pines River Estuary is by no means pristine. The entire estuary has been steadily degraded by urban pressures, including local storm runoff, oil and gas spills, chemicals, debris, and sewage overflow from flooded systems. An artificial embankment limits tidal flushing in approximately 400 acres of salt marsh. Another 40 acres of drained wetlands have been overtaken by *Phragmites*, a type of reed which has displaced the native flora. Despite these problems, however, the estuary contains significant natural resources. Recognizing the need to protect and maintain these resources, the state designated part of the estuary an "Area of Critical Environmental Concern."

  According to the ACOE's assessment, the project would have very little effect on tidal flushing under "gate-open" and present sea level conditions. As a result of engineering modifications intended to maintain near ambient flushing conditions, environmental impacts under the gate-open condition would be minimal. Significant effects are expected to be limited to the direct displacement of about 3 acres of intertidal habitat within the footprint of the structure that would be replaced at the I-95 embankment.

  The ACOE has estimated that the floodgates would typically be closed an average of 2-3 times per year for 1-2 hours per closure under existing sea level conditions once the entire tidal wetland has been submerged. Under extreme storm conditions (the 10-year storm or greater), the gates would be closed *before* the entire marsh was flooded in order to provide storage for interior runoff. Because these closures would be so infrequent, they would have a negligible effect on the marsh and estuary. Indeed, the presence of the floodgates would allow for breaching of the abandoned I-95 embankment to restore tidal flushing to the expansive area of salt marsh behind the embankment.

  With a one-foot rise in sea level (projected to occur within 100 years at the historic rate of sea level rise), the frequency of floodgate closures is projected to increase to 35-45 per year, with a typical closure duration of 2-3 hours. Such closures would occur during extreme astronomic tides as well as storm conditions. The combined EIR/EIS concluded that changes to the marsh would occur with sea level rise -- as measured against the "without-project" condition -- but was inconclusive with respect to marsh accretion. The ACOE will continue to evaluate the potential ecological effects associated with a rise in sea level and more frequent gate closures if the project as authorized continues to be considered for implementation.

- *Floodplain development:* By lowering construction and insurance costs, the proposed floodgate project might accelerate development in the floodplain. Increased development is undesirable not only because it would put additional pressure on the estuarine ecosystem, but because all property in the floodplain would be highly vulnerable to failure of the system, should such system failure occur.

- *Precedent:* Massachusetts advocates through policy and regulations a nonstructural approach to flood protection. The Saugus River Floodgate Project appears to be inconsistent with the Commonwealth's approach to coastal flooding.

The project would also require variances to several state environmental regulations, such as that which prohibits placing fill in Outstanding Resource Waters. State agencies reviewing these variance requests are expected to be wary of establishing any precedents that weaken the state's environmental regulations. The project has not yet received any of the environmental permits required by the state and cannot proceed to construction until these permits have been granted.

Recommended Actions

The Massachusetts Bays Program supports efforts to develop a flood control plan which takes advantage of recent advances in nonstructural flood mitigation practices and which incorporates the flood protection guidelines of the Department of Environmental Management (DEM). The Massachusetts Bays Program has attempted to identify areas of environmental concern and to build consensus on those actions which should be taken to ensure that the project proceeds in a manner that both maximizes benefits for the people of the region and poses the least risk to the marine ecosystem. If a nonstructural flood protection program is unable to provide adequate defense against storm damage, the Massachusetts Bays Program will support continued work to dovetail the structural expertise of the ACOE with the Commonwealth's policy on flood damage mitigation. While the project is reviewed in greater detail, the following recommendations should be implemented as appropriate.

Coastal communities should:

- strictly enforce municipal ordinances, including zoning ordinances and the Massachusetts Wetlands Protection Act, which regulate development in flood-prone areas.

Coastal communities and DEM should:

- strengthen existing flood protection regulations as appropriate.

EOEA should:

- support efforts to preserve flood storage in the Saugus and Pines River Estuary and investigate a possible alliance with current efforts to restore wetlands;
- discourage development in flood hazard areas and pursue a nonstructural program of flood damage mitigation whenever feasible; and
- provide technical resources and enforcement assistance to communities seeking to tighten enforcement of municipal flood protection ordinances.

PLYMOUTH SEWAGE TREATMENT PROJECT

Background

Centralized treatment facilities are the traditional means of managing wastewater. Unfortunately, as centralized sewer systems age and populations grow, wastewater flows can overwhelm a treatment plant's designed capacity. The disposal of effluent and residuals can then cause a wide array of environmental problems, and can be the source of permitting problems and civil penalties for municipal authorities. To avoid these problems, communities may undertake long-term wastewater facilities planning. In the Massachusetts Bays region, the scientific and regulatory complexities associated with long-term wastewater facilities planning are particularly apparent in the Town of Plymouth. In addition, several other Massachusetts Bays communities (e.g., Gloucester, Barnstable) are undertaking planning efforts similar in scope to Plymouth's. Accordingly, Plymouth is presented here as an example of the complexities of these approaches.

Portions of Plymouth are currently served by a secondary treatment plant which was designed to handle an average flow of 1.75 million gallons per day (mgd). The plant uses an activated sludge process to remove most contaminants from the wastewater, and the treated effluent is discharged into Plymouth Harbor. When the plant became operational in 1970, Plymouth had a population of only 18,600 residents, and average flow was well below the plant's design capacity. However, like many coastal communities, Plymouth experienced explosive growth in the next twenty years. As the town's population expanded, so did the volume of wastewater reaching the treatment plant. Increased flows quickly reduced the plant's efficiency, and by 1977, the Massachusetts Department of Environmental Protection (DEP) began to identify violations of the plant's discharge permit.

Today, more than 47,000 people live in Plymouth. Although the treatment plant still services only a small portion of the town--an area of approximately 2,000 acres in a town with a total of almost 63,000 acres--the strain on the existing facilities has mounted steadily. Daily flows to the plant have at times exceeded 2.3 million gallons. Because the plant was not designed to handle such large flows, its effluent has occasionally exceeded standards set forth in the discharge permit.

In 1987, after ten years of violations, the DEP sued Plymouth to finally force compliance with the permit. In an effort to reduce flows and enhance plant performance, the town completed a major interceptor project in November 1991. Although the interceptor successfully reduced infiltration and inflow, organic loadings to the plant remained relatively constant, and the effluent occasionally violated discharge standards. Three months later, to avoid lengthy court proceedings and possible civil penalties, Plymouth entered a Consent Decree which established a timetable for initiating and completing additional treatment capacity.

Project Description

Under the terms of the Consent Decree, the Town of Plymouth has been required to conduct a multi-phased Wastewater Treatment Facilities Plan and Environmental Impact Report (FP/EIR) to evaluate feasible management strategies. This report must assess the Town's need for additional treatment capacity and determine the type of facilities that will best meet that need.

Preliminary facilities planning conducted in 1984 had recommended that the Town extend its sewers to portions of West Plymouth and Manomet. West Plymouth includes an industrial park where the Town expects future economic growth. However, the industrial park overlies an aquifer that supplies about 35 percent of the town's public water supply. Because municipal by-laws limit the amount of wastewater that can be discharged in the aquifer's zone of recharge, economic growth could not occur in this area without sewering. Manomet is a densely populated residential area on the coast. It is characterized by high groundwater and small property lots with outdated, onsite disposal systems (such as cesspools). Although these onsite systems are thought to contribute to water quality problems in public swimming areas, very small lot sizes in a dense portion of Manomet make system upgrades to comply with the basic requirements of Title 5 impossible. West Plymouth's industrial park and the dense central area of Manomet are therefore regarded as priority areas needing better wastewater treatment and disposal solutions.

The new treatment facilities are being designed to handle Plymouth's wastewater through the year 2018. Flows at that time are expected to total 3.0 mgd, although a water conservation program could reduce that amount.

The process of planning facilities to treat this wastewater poses a number of complex technical issues, which must be resolved in an evolving regulatory context. Before any construction can begin, the Town must:

- project its future wastewater flows and decide how far to extend its sewer system;
- decide what type of treatment facilities will most efficiently meet its wastewater needs;
- evaluate potential sites for these facilities;

- decide how to best manage the residuals produced as a by-product of the treatment process; and
- determine how to dispose of the treated effluent.

Overall capital costs for facilities construction will likely range between $33 million and $40 million. Operating and maintenance costs will require another $1.3 to $1.7 million per year.

Expected Benefits

The benefits of this project cannot be described in detail until a final facilities plan is adopted. However, the planning process now underway is likely to develop a wastewater management plan that serves the long-term interests of the community.

Progress to Date

In April 1992, the Town of Plymouth contracted with the firm of Camp Dresser & McKee to conduct the multi-phased assessment report required by the Consent Decree. *Phase I* of the report, completed in September 1992:

- verified and updated previous wastewater facilities planning;
- screened several feasible treatment and residuals management options;
- defined several facilities alternatives; and
- screened several potential land discharge sites.

Because ocean disposal of the treated effluent would require a variance to the Massachusetts Ocean Sanctuaries Act, Plymouth's consultant recommended that *Phase II* of the Wastewater Treatment Facilities Plan evaluate technologies for wastewater treatment with discharge to land.

The *Phase II* report was completed in October 1993. The best land application alternatives were determined to present unacceptable environmental impacts on surface water and groundwater, including groundwater reserves the Town may need to supplement its municipal water supply. Because the consultant was not able to identify a long-term wastewater management program, Plymouth was granted an extension to the Consent Decree's original schedule to complete a Phase III report.

Draft *Phase III* of Plymouth's Wastewater Treatment Facilities Plan was completed in May 1995. This phase of the multi-phased assessment report:

- analyzes wastewater treatment facility needs based on a revised flow of 3.0 mgd (down from the previous 4.2 mgd).
- evaluates all potential feasible land treatment and effluent disposal sites;
- assesses the viability of continued use of the existing wastewater treatment facility on Water Street with its associated 1.75 mgd of harbor outfall capacity;
- evaluates the environmental impacts associated with the various alternatives; and
- recommends a cost-effective and implementable long-term plan to address Plymouth's wastewater needs.

Phase IIIA describes the various components of the recommended plan, discusses financing issues associated with the plan, presents an implementation schedule, and provides a scope of services for *Phase IIIB* that will allow the recommended plan to be finalized.

The goals of the recommended plan are to:

- construct a new 3.0 mgd wastewater treatment facility in order to maximize efficiency of operation;
- relocate the existing treatment facility from the waterfront to a better buffered inland site that has space for future expansion if needed;
- maintain use of the existing harbor outfall to provide multiple methods of effluent disposal; and
- implement a phased approach to use of land-applied effluent so that potential surface water impacts near the land application site can be closely monitored.

Work to be Completed

The *Phase IIIB* scope of work, now underway, will define additional tasks that will be required to finalize the recommended plan. Some currently anticipated tasks include: further field studies of the existing ocean outfall in the harbor, additional environmental impact analyses for the recommended plan sites, and more comprehensive soils and groundwater evaluations. However, the Town also has begun to re-evaluate the amount of industrial and commercial activity to be supported by the wastewater treatment facility, as well as discharge locations relative to Zone II wellhead protection areas and the Eel River.

The Consent Decree originally required facilities to go on-line in 1998. In order to give the consultant sufficient time to complete the Phase III report, that schedule has since been revised. Facilities are not expected to be operational before 2000.

Issues of Concern

- *Extent of sewering:* at the present time, it is still not clear how far the Town of Plymouth will extend its sewer system, nor how much additional treatment capacity will be needed. The Town's consultant has recommended that, at minimum, the West Plymouth Industrial Park area be sewered to solve existing or potential water quality and/or health problems. However, the consultant has also recommended that the Town encourage the use of onsite disposal systems whenever possible.

  In particular, the recommended plan for Manomet is to rely on on-lot septic system upgrades for most of the Manomet area, and, in the very dense portion, to work with property owners to implement on-site disposal options on adjacent vacant lots that cannot be developed, and to develop shared system solutions where feasible.

- *Effluent disposal:* if no other effluent disposal alternatives are deemed acceptable, Plymouth will likely try to secure a variance to the Ocean Sanctuaries Act which would allow it to extend an outfall beyond the Plymouth-Kingston-Duxbury embayment. Before this variance can be granted, the Town must (1) prove that ocean discharge is the "only feasible alternative" as defined by the law, and (2) demonstrate that the quality of the receiving waters would not violate existing standards established by the Massachusetts DEP.

- *Alternatives to sewering:* the traditional strategy for managing municipal wastewater is to construct or expand a centralized treatment plant. While there is no doubt that sewering is better than no action, this response is always expensive, and in the long run, may not adequately address all sources of wastewater contamination. A comprehensive wastewater management plan should carefully examine alternatives to sewering, such as new decentralized and/or on-site treatment and management technologies and source reduction programs.

- *Septage management:* more than 70 percent of Plymouth's residents currently rely on subsurface systems to dispose of their wastewater. Although the Town has already adopted several local supplements to Title 5, at least half of these on-site systems were installed prior to the promulgation of Title 5, and therefore do not meet the state's minimum performance or siting standards. On-site sewage systems are currently contributing to water quality problems in Plymouth's groundwater, surface water bodies, and nearshore marine waters.

  Even if the proposed sewer expansions are implemented, more than 60 percent of the Town's residents will continue to rely on onsite systems in the year 2018. Therefore, a long-term septage management program is an essential component to Plymouth's wastewater planning.

Recommended Actions

The following recommendations are intended to ensure that the Plymouth Sewerage Project proceeds in a manner which maximizes benefits for the people of the region and which poses the least risk to the marine ecosystem. They have been developed by the staff of the Massachusetts Bays Program, with input from officials from the implementing agencies and the Town of Plymouth, and interested members of the public.

The Town of Plymouth should:

- clearly identify, on a site-specific basis, the specific public health and/or environmental threats caused by on-site wastewater disposal, and direct its consultants to evaluate potential alternatives to central sewering for each of these areas, including community systems, alternative on-site technologies, system upgrades to Title 5, and inspection and maintenance programs; and

- explore alternatives to sewering the Industrial Park.

The Massachusetts Department of Environmental Protection (DEP) should:

- encourage Plymouth and other communities, as well as consulting engineering firms, to explore and use alternative and decentralized wastewater treatment and management technologies whenever feasible; and

- aggressively enforce water conservation standards established by the Water Resources Commission (October 1992) to help reduce wastewater flows and the need for additional wastewater treatment and management facilities.

CHAPTER V. ACTION PLANS

Introduction

The action plans in this chapter form the centerpiece of the Comprehensive Conservation and Management Plan for the Massachusetts Bays. Successful implementation of these plans is expected to lead to the restoration and protection of the Bays' water quality, living resources, and fish, shellfish, and wildlife habitat.

While some of the plans' prescribed actions are mitigative in nature, overall the emphasis is on ***prevention***, in recognition of the simple truth that it will cost far more to clean up pollution later than to prevent it now. The plan is also based on a premise of ***shared responsibility*** among all of us in the Massachusetts Bays region who use and enjoy the Bays' bountiful resources. It recognizes that fish, wildlife, water, and pollutants cross jurisdictional lines, and establishes a framework based on a partnership among government agencies (federal, state, regional, and local), nonprofit organizations, the private sector, and citizens.

In all, there are 15 major action plans, as follows:

CCMP ACTION PLANS

1. **Protecting Public Health**
2. **Protecting and Enhancing Shellfish Resources**
3. **Protecting and Enhancing Coastal Habitat**
4. **Reducing and Preventing Stormwater Pollution**
5. **Reducing and Preventing Toxic Pollution**
6. **Reducing and Preventing Oil Pollution**
7. **Managing Municipal Wastewater**
8. **Managing Boat Wastes and Marina Pollution**
9. **Managing Dredging and Dredged Materials Disposal**
10. **Reducing Beach Debris and Marine Floatables**
11. **Protecting Nitrogen-Sensitive Embayments**
12. **Enhancing Public Access and the Working Waterfront**
13. **Planning for a Shifting Shoreline**
14. **Managing Local Land Use and Growth**
15. **Enhancing Public Education and Participation**

Each major action plan contains a series of individual recommended actions, each of which is divided into eight sections: Rationale, Responsible Agent(s), Implementation Strategy, Legislation Required, Estimated Cost, Potential Funding Source(s), Target Date, and Further Information. These sections document the need for each action and describe the organizations, strategies, and timetables recommended for implementing them. Estimated costs and potential funding sources are identified as well. For more extensive information on funding opportunities, the reader is referred to the MBP report entitled, *Financing the Massachusetts Bays CCMP: Federal, State, and Local Funding Sources and Mechanisms* (December 1994). In addition, Chapter VII of this CCMP provides a summary of this report.

To demonstrate implementation of CCMP actions, the Massachusetts Bays Program has funded over 30 projects, including the five-year Mini-Bays Projects in Plum Island Sound, the Fore River Embayment, and Wellfleet Harbor. A list of these projects, costs, and contacts is included in Appendix I. A CCMP companion document that provides more information on the demonstration projects, as well as a series of individual fact sheets, are in preparation. These will be available in early summer, 1996.

A matrix of the 15 major action plans, individual recommended actions, and implementing agents follows.

Matrix

SUMMARY OF RECOMMENDED ACTIONS		
Responsible Agency	**ACTION PLAN #1** **Protecting Public Health**	**ACTION PLAN #2** **Protecting and Enhancing Shellfish Resources**
Department of Public Health (DPH)	1.1 Establish a central clearinghouse program for all beach testing and closure information generated for Massachusetts' coastal public beaches.	
Division of Marine Fisheries (DMF)		2.1 Conduct three (3) *Sanitary Survey Training Sessions* annually -- one each on the North Shore, Metro Boston/South Shore, and Cape Cod -- to educate local shellfish constables and health officers on the proper techniques for identifying and evaluating pathogen inputs into shellfish harvesting areas. 2.2 Develop and administer a local *Shellfish Management Grants Program* to help communities finance the development and implementation of effective local shellfish management plans.
Shellfish Bed Restoration Program (SBRP)		2.3 Continue and expand the innovative *Shellfish Bed Restoration Program* to restore and protect shellfish beds impacted by nonpoint source pollution.

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #3 Protecting and Enhancing Coastal Habitat
Municipalities	**3.1** Prepare and implement an EOEA - approved *Open Space Plan* to preserve and protect key wetlands, floodplains, fish and wildlife habitat, and other ecologically- and recreationally-important natural resource areas. **3.2** Adopt and implement a local *Riverfront District Bylaw* to maintain river water quality, preserve fish and wildlife habitat, and protect downstream nursery and shellfish resources. **3.3** Work cooperatively with neighboring communities, EOEA agencies, and other interested parties to develop proactive, long-term *ACEC Management Plans* to preserve and protect these vital resource areas. **3.4** Adopt and implement a local *Wetlands Protection Bylaw* to supplement the state Wetlands Protection Act Regulations. **3.5** Prepare and implement ecosystem-based *Barrier Beach Management Plans* to promote responsible use and protection of these critical coastal resources. **3.6** Employ full-time, professionally-trained conservation staff to provide ongoing technical and administrative support to local Conservation Commissions.
Department of Environmental Management (DEM)	**3.7** Develop and implement *Resource Management Plans* for all DEM-owned coastal properties. **3.8** Develop and promote the use of river basin planning reports to facilitate responsible water resources planning and management at the local and regional levels. **3.9** Acquire and restore undeveloped coastal properties that offer outstanding living resources habitat and public recreation opportunities.
Department of Environmental Protection (DEP)	**3.10** Complete the statewide inventorying and mapping of coastal and inland wetlands, and provide local Conservation Commissions with: 1) accurate base maps depicting wetland boundaries, and 2) instruction on proper wetland map interpretation and use.
Department of Fisheries, Wildlife and Environmental Law Enforcement (DFWELE)	**3.11** In collaboration with the Riverways Program, prepare an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region and develop a strategy to prioritize, restore, and maintain these runs. **3.12** In collaboration with the Riverways Program, develop and implement a citizen-based *Fishway Stewardship Program* to restore and maintain anadromous fish runs along the Massachusetts Bays coast.
Executive Office of Environmental Affairs (EOEA)	**3.13** Continue the innovative *Wetlands Restoration and Banking Program* to restore and protect degraded coastal and inland wetlands.
Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and U.S. Army Corps of Engineers (ACOE)	**3.14** Continue and expand current efforts to support eelgrass habitat protection and restoration in Massachusetts and Cape Cod Bays.

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #4 Reducing and Preventing Stormwater Pollution
Municipalities	**4.1** Adopt subdivision regulations that require the incorporation of stormwater runoff best management practices (BMPs) into all new development plans. **4.2** Implement best management practices to mitigate existing stormwater discharges that are causing or contributing to the closure of shellfish harvesting areas and swimming beaches.
Department of Environmental Protection (DEP)	**4.3** In collaboration with Regional Planning Agencies, Natural Resources Conservation Service/MassCAP (formerly U.S. Soil Conservation Service), and Massachusetts Coastal Zone Management Office, 1) disseminate the *Nonpoint Source Management Manual* and *Urban Best Management Practices for Massachusetts,* and 2) sponsor public workshops to educate local officials about best management practices and performance standards for controlling stormwater runoff. **4.4** Develop a coordinated and streamlined regulatory system within DEP to assure effective implementation of the stormwater components of the Massachusetts Clean Water Act, Wetlands Protection Act, and Federal Stormwater Program (Federal Clean Water Act, Sections 401 and 402).
Environmental Protection Agency (EPA)	**4.5** Reduce stormwater pollution in the Massachusetts Bays watersheds through: (a) technical assistance to communities in developing comprehensive stormwater management programs; and (b) National Pollutant Discharge Elimination System (NPDES) compliance for industrial stormwater dischargers. Targeted areas are the lower Charles River for the stormwater management programs and the Neponset River for the industrial stormwater dischargers.
Massachusetts Highway Department (MHD)	**4.6** Prepare an *Environmental Manual* to complement the *Highway Design Manual* and provide for the integration of environmental concerns (including stormwater management) into all phases of highway project planning, design, construction, and maintenance. **4.7** As part of its forthcoming pollution prevention plan, develop a *Stormwater Pollution Mitigation Program* to identify, prioritize, and correct existing stormwater pollution problems associated with state highway drainage facilities. **4.8** Sponsor annual workshops to train local public works personnel on the proper use of stormwater runoff best management practices.
Massachusetts Highway Department (MHD) and Metropolitan District Commission (MDC)	**4.9** Require the use of on-site stormwater best management practices as a precondition to the permitting of private property tie-ins to state drainage facilities.

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #5 Reducing and preventing Toxic Pollution	ACTION PLAN #6 Reducing and Preventing Oil Pollution
Municipalities	**5.1** Adopt and implement the following set of regulations to ensure the safe use, storage, and disposal of toxic and hazardous materials: 1) *Toxic and Hazardous Materials Regulation*, 2) *Underground Storage Tank Regulation*, and 3) *Commercial/Industrial Floor Drain Regulation*. **5.2** Establish *Household Hazardous Waste Collection Programs* for difficult-to-manage hazardous products to ensure their proper disposal on a regular basis.	**6.1** Establish and promote the use of *Used Motor Oil Collection Facilities* to ensure the proper collection and disposal of used motor oil from do-it-yourself oil changes.
Department of Education (DOE)	**5.3** In collaboration with the Department of Environmental Protection, develop and offer continuing education courses on hazardous materials management to create a pool of trained "HazMat Specialists" at the local level.	
Department of Environmental Protection (DEP)		**6.2** In collaboration with the U.S. Coast Guard, EPA, and NOAA, implement the *Policy on the Use of Oil Spill Chemical Countermeasures (Dispersants)* to protect coastal resources from the adverse effects of oil spills.
Executive Office of Environmental Affairs, Municipalities, & Private Sector Partnership	**5.4** Form partnerships to facilitate the safe management of hazardous products, emphasizing reduced products use and recycling wherever possible.	
Environmental Protection Agency (EPA)	**5.5** Reduce and prevent toxic pollution through targeted National Pollutant Discharge Elimination System (NPDES) permitting of significant discharges in the Massachusetts Bays; in particular, oil tank farms on Chelsea Creek and the Island End River.	
EOEA Office of Technical Assistance for Toxics Use Reduction (OTA)	**5.6** Continue to perform on-site assessments and provide instructional materials to help businesses and industries in the Massachusetts Bays region reduce the use of toxic substances.	
US Coast Guard (USCG)		**6.3** In collaboration with other federal, state, and local agencies, continue to update and implement the Massachusetts coastwide *Area Contingency Plans* to assure a rapid and effective response to discharges of oil and other hazardous substances into the marine environment.

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #7 - Managing Municipal Wastewater		
	7A. Managing Centralized Wastewater Treatment Facilities	**7B. Managing On-Site Sewage Disposal Systems**	**7C. Decentralized Wastewater Management and Treatment**
Municipalities		**7B.1** Identify resource areas sensitive to wastewater and develop management plans appropriate to these areas, focusing on the capacities of natural systems to assimilate wastewater. **7B.2** In cooperation with DEP, develop and implement regular inspection and maintenance (I/M) programs for on-site wastewater systems. **7B.3** Employ full-time, professionally-trained public health staff to provide ongoing technical and administrative support to the local Boards of Health.	**Note:** Specific recommended actions for this Action Plan will be developed by the Massachusetts Bays Program and incorporated in future supplements to the CCMP.
Coastal Regional Planning Agencies		**7B.4** Establish a Title 5 and alternative systems technical assistance program directed to local Boards of Health and health agents, systems engineers / installers, and homeowners.	
Department of Environmental Management (DEM)	**7A.1** In collaboration with other state and federal agencies, continue to implement the Ocean Sanctuaries Act by closely monitoring all facilities plans which propose increased waste-water treatment plant discharges into an ocean sanctuary.		
Department of Environmental Protection		**7B.5** Evaluate and build upon the centralized statewide repository for testing information on alternative technologies, to be established as part of the Buzzards Bay Project's two-year Environmental Technology Initiative Project.	
Environmental Protection Agency (EPA)	**7A.2** Support the control of combined sewer overflows in the Massachusetts Bays watersheds, especially the lower Charles River, and target National Pollutant Discharge Elimination Systems (NPDES) permitting to implement technology- and water quality-based requirements in the Merrimack River watershed.		
Environmental Protection Agency, Exec. Office of Environmental Affairs, Dept of Environmental Protection, and Coastal Zone Management Office	**7A.3** Work collaboratively to develop and implement an effective program for monitoring and enforcing point source discharges from wastewater treatment plants and energy-producing facilities.		

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #8 Managing Boat Wastes and Marina Pollution	ACTION PLAN #9 Managing Dredging and Dredged Materials Disposal	ACTION PLAN #10 Reducing Beach Debris and Marine Floatables	ACTION PLAN #11 Protecting Nitrogen-Sensitive Embayments
Municipalities	**8.1** Work cooperatively with neighboring communities, private boatyards and marinas, and state agencies (DFWELE and CZM) to establish, promote, and maintain *Boat Pumpout Programs* in targeted embayment areas. **8.2** With assistance from CZM and DEP, require private boatyards and marinas to implement effective storm-water runoff control strategies which include the use of pollution prevention measures and the proper design and maintenance of hull servicing areas.		**10.1** Work cooperatively with the Massachusetts Coastal Zone Management Office, neighboring communities, and waterfront users to design and implement *Beach and Marine Debris Reduction Programs.*	
Army Corps of Engineers (ACOE)		**9.1** Continue to monitor dredged material disposal sites in the Massachusetts Bays region and initiate the planning necessary to begin a capping demonstration project at the Massachusetts Bay Disposal Site.		
Department of Environmental Protection (DEP)				**11.1** Strengthen *Massachusetts Water Quality Standards* to enhance and protect nitrogen-sensitive coastal embayments.
Executive Office of Environmental Affairs (EOEA)		**9.2** Coordinate the development of a comprehensive *Dredging and Dredged Materials Disposal Plan* to improve and maintain access to the Commonwealth's ports, harbors, and channels, and to minimize adverse impacts to the marine environment.		
Regional Planning Agencies, Department of Environmental Protection, and Municipalities				**11.2** Work collaboratively to expand upon current Massachusetts Bays Program efforts to identify nitrogen-sensitive embayments, determine critical loading rates, and recommend actions to manage nitrogen so as to prevent or reduce excessive nitrogen loading to coastal waters and groundwater.

SUMMARY OF RECOMMENDED ACTIONS			
Responsible Agency	**ACTION PLAN #12 Enhancing Public Access and the Working Waterfront**	**ACTION PLAN #13 Planning for a Shifting Shoreline**	**ACTION PLAN #14 Managing Local Land Use and Growth**
Municipalities	**12.1** Develop and implement *Municipal Harbor Plans* which: 1) promote marine-dependent waterfront uses, 2) enhance public access to the water, and 3) protect habitat of shellfish and other living resources.	**13.1** Adopt and implement strict development/ redevelopment standards within FEMA A and V flood hazard zones and other areas subject to coastal flooding, erosion, and relative sea level rise.	**14.1** Develop and implement *Local Comprehensive Plans* (LCPS) which: 1) direct development into areas in the community capable of absorbing the impacts of growth and its associated facilities, and 2) preserve and protect the community's important natural resources.
Coastal Zone Management Office (CZM)	**12.2** Enhance the Designated Port Area (DPA) program with new planning and promotional initiatives. **12.3** Establish a new technical assistance program to accelerate municipal efforts to identify and legally reclaim historic rights-of-way to the sea. **12.4** In collaboration with the Department of Environmental Management and MassGIS, prepare and distribute a statewide *Coastal Access Guide* to facilitate public access to the shoreline.		
Department of Environmental Management (DEM)		**13.2** Continue to assist communities in the development of effective *Floodplain Management Regulations*.	
Executive Office of Environmental Affairs (EOEA)	**12.5** In collaboration with coastal municipalities, develop and implement an *Access-Via-Trails* program to enhance public access along the coast.		

SUMMARY OF RECOMMENDED ACTIONS

	ACTION PLAN #15 Enhancing Public Education and Participation	
Responsible Agency	**15A. Educating Teachers, Students, and the Public About the Bays**	**15B. Developing a State Nonpoint Source Education and Outreach Strategy**
Department of Education (DOE)	**15A.1** In collaboration with the Executive Office of Environmental Affairs, continue to develop and integrate environmental education as an important component of the curriculum in the public schools of the Commonwealth, making broad use of the Benchmarks for Environmental Education developed by the Secretaries' Advisory Group on Education (SAGEE).	
Executive Office of Environmental Affairs (EOEA)	**15A.2** Continue to work closely with the Department of Education through the Secretaries' Advisory Group on Environmental Education (SAGEE) in order to develop a strategy for the implementation of the "Benchmarks for Environmental Education". Further, EOEA should continue to place a priority on the role of environmental education and provide adequate staffing to insure that appropriate state leadership is maintained. **15A.3** In cooperation with the Department of Education, continue to develop a grant relationship with the National Science Foundation and other funding agencies in order to provide technological outreach aimed at enhancing environmental literacy. The goal is to make resource and curriculum materials widely accessible and to provide ongoing coordination among the various members of the education community. The Massachusetts Bays Program represents an important aspect of the total environmental picture and should play a key role in this effort, helping to establish a unified voice to speak for environmental education concerning the Bays region.	**15B.1** Develop and maintain a clearinghouse of NPS education, information, and technical assistance materials, as well as a database of available state NPS materials and programs. **15B.2** Develop and maintain a matrix, by topic, of NPS education, information, and technical assistance materials produced by state agencies and associated organizations. **15B.3** Expand upon Massachusetts Bays Program efforts and develop a strategy for NPS outreach and technical assistance statewide that would coordinate the development and production of NPS education, information, and technical assistance materials, and provide technical assistance in order to implement NPS pollution controls.
Exec. Office of Environmental Affairs (EOEA) and the Department of Education (DOE)	**15A.4** Empower exemplary teachers, administrators, and/or schools who demonstrate the competence to carry out formal and non-formal environmental education initiatives that complement the Commonwealth's environmental education programs.	
Massachusetts Bays Education Alliance (MBEA)	**15A.5** Continue and expand its current efforts to build a community of educators who can ably teach about and promote the protection of the Massachusetts Bays, their shores, and watersheds.	
Coastal Advocacy Network (CAN)	**15A.6** Continue to serve as a vehicle for bringing information to and from the government on environmental issues affecting the Bays, with a particular emphasis on proposed projects or regulatory changes.	
Massachusetts Bays Business and Users Group (BUG)	**15A.7** Continue to provide a public forum for the exchange of information and ideas on CCMP development and implementation among the Bays' business community and resource users.	
Marine Studies Consortium	**15A.8** Continue to offer undergraduate marine science and policy courses; and, through the bi-annual Massachusetts Marine Environment Symposium, bring together diverse marine interests to promote a better understanding of marine policy issues.	

ACTION PLAN #1

PROTECTING PUBLIC HEALTH

Imagine that you have just returned from a day at the beach. While remembering the hours of fun you had in the ocean, you leaf through a local newspaper and happen upon an article about a nearby beach that was closed because of sewage contamination. Dismayed, you wonder if you risked illness by swimming in the ocean.

This scenario may not seem especially likely today, decades after the passage of strong environmental legislation. However, reports by the Natural Resources Defense Council (*Testing the Waters - A National Perspective on Beach Closings*, July 1992) and others have shown that U.S. coastal waters are not consistently monitored for contamination and that swimmers are not always adequately protected from avoidable public health risks.

In 1991, for example, U.S. ocean and bay beaches were closed or advisories were issued against swimming on more than 2,000 occasions in the coastal states that monitor beach water quality (NRDC, 1992). High levels of bacteria -- primarily from raw and inadequately treated sewage -- were responsible for the overwhelming majority of these closures and advisories.

Major sources of high bacteria levels in beach water include: inadequate and overloaded sewage treatment plants, illegal sewer hook-ups and discharges, combined sewer overflows (CSOs), stormwater runoff, faulty septic systems, and boat wastes.

In order to properly assess the threat to public health in control waters, public health officials use "indicator organisms." The indicator organism is one that, by its presence at certain levels, "indicates" the potential for the presense of human pathogens (disease-causing organisms). The principal indicators currently in use in Massachusetts are total coliform bacteria, fecal coliform bacteria, and *Enterococcus*. The use of such indictors, as opposed to the direct measurement of the pathogens themselves, is necessary, in part, because of the lack of economical assay methods for the multitude of potential pathogens.

Pathogens of concern in coastal waters include numerous viruses, such as those responsible for gastroenteritis and hepatitis -- the two most common swimming-associated diseases worldwide -- and bacteria that can cause salmonellosis, shigellosis, and cholera. Other microbial pathogens found at varying concentrations in recreational waters include amoeba and protozoa that can cause giardiasis, amoebic dysentery, skin rashes, and "pink eye."

While most of the reported outbreaks of infectious diseases associated with bathing beaches are non-enteric (for example, skin rash), there is some risk of gastrointestinal disease from swimming in sewage-contaminated water. It is important that all beaches open to the public for swimming be monitored regularly during the swimming season, and that the monitoring data collected be centrally recorded and interpreted so that water quality problems can be properly identified and corrected so as to minimize public health risks.

The following recommended action directed to the Massachusetts Department of Public Health is a positive step toward addressing this need.

DPH ACTION # 1.1:

The Department of Public Health should establish a central clearinghouse program for all beach testing and closure information generated for Massachusetts' coastal public beaches.

RATIONALE:

The waters of all Massachusetts coastal beaches that are open to the general public for swimming must, by law, be tested bi-weekly for total coliform bacteria during the beach operating season. Currently, forty-seven coastal communities conduct some level of bacteria testing at their public beaches to ensure that water quality does not pose a significant health risk. However, it is not clear which communities employ the code-required *total* coliform standard and which use a different risk indicator, such as *fecal* coliform bacteria or *Enterococcus*. Nor is it clear which communities adhere strictly to the bi-weekly testing requirement. Currently, most local beach data reside solely within the individual communities. (Notable exceptions include data gathered on a regular basis by the Metropolitan District Commission (MDC) for its Boston area beaches and data exchanged informally by several neighboring South Shore communities.) Since there is no requirement to submit the data to a single, central authority, there may be a lack of uniformity in water quality monitoring and record-keeping practices from community to community and from region to region. As a consequence, it is extremely difficult to identify and compare beach water quality conditions and trends along the coast, and to target current "hotspots" or areas in decline (if any) for priority pollution abatement action.

All of this points to the need for the Department of Public Health, in coordination with other state agencies and local Boards of Health, to establish a central clearinghouse for all local and regional beach testing and closure information. Creation of a centralized, readily-accessible database on beach water quality will help local and state public health and environmental officials to identify problem areas and marshall the resources necessary to improve beach water quality, reduce public health risks, and protect the marine environment.

RESPONSIBLE AGENT(s):

The Department of Public Health's Bureau of Environmental Health Assessment (DPH/BEHA) will be the lead agent for this action, but should coordinate with the Department of Environmental Protection (DEP), Office of Coastal Zone Management (CZM), local Boards of Health, the Metropolitan District Commission, and other entities (such as private land trusts) that are responsible for monitoring public beach water quality.

IMPLEMENTATION STRATEGY:

The DPH/BEHA will create a comprehensive database and track water quality testing and closure information for all coastal public beaches. The public beaches will be identified on a community-by-community basis with the assistance of CZM and local Boards of Health.

The DPH/BEHA will notify all coastal community Boards of Health and others responsible for beach water quality testing about the start-up of the program, and will provide each with a uniform reporting template. The water quality data collected by the Boards and others will be submitted monthly to the DPH/BEHA, where it will be entered into a central database.

The specific parameters of the database are yet to be established, but will be developed in collaboration with representative Boards of Health, DEP, CZM, MDC, and others to ensure that all relevant data are collected and reported. The data will be catalogued, interpreted, and made available for public dissemination by the DPH/BEHA staff. MBP, through its RPA/LGC technical assistants, will work closely with the DPH/BEHA staff and local officials to ensure that the data are presented in a way that is useful to beach managers in identifying potential "hot spots" for increased monitoring and remediation.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost to DPH / BEHA of establishing and maintaining this new clearinghouse function is expected to be about $4,000 / annum, including $2,100 for a paid intern (8 weeks) and $2,000 in in-kind support and management by the DPH / BEHA staff. The costs to local Boards of Health, the MDC, and others collecting beach testing data will vary depending on staffing, number of water samples collected, laboratory

costs, and the cost of the monthly data transfers to DPH / BEHA. In general, these costs are expected to be minimal.

POTENTIAL FUNDING SOURCE(s):

Activities under this initiative are expected to be financed through the existing operating budgets of the DPH/BEHA, MDC, local Boards of Health, and other participants.

TARGET DATE(s):

DPH / BEHA began developing the clearinghouse program in July 1995. Work on this will continue into 1996, when the program will become a part of DPH's ongoing operation.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Department of Public Health
(Bureau of Environment Health Assessment)
(617) 727-7170

ACTION PLAN #2

PROTECTING AND ENHANCING SHELLFISH RESOURCES

Shellfish have historically been one of the most abundant and heavily utilized resources along the coast of Massachusetts Bays. Even the casual explorer of the Bays' shallow coves, estuaries, salt marshes, and coastal ponds will usually find exposed shellfish or signs of shellfish buried in the mudflats.

The inshore shellfishery of Massachusetts Bays is a major component of the region's marine fishery resource and an integral part of the state's coastal heritage. A wide array of shellfish species in the Bays are harvested for human consumption, including soft-shell clams, quahogs, oysters, bay scallops, blue mussels, and, to a lesser extent, conchs and razor clams. Between 1987 and 1990, shellfish beds in Massachusetts and Cape Cod Bays yielded an average of 60,000 bushels to commercial harvesters each year -- a catch with a market value estimated at $3 million. In that same period, recreational harvesters collected approximately 7,000 bushels of shellfish a year, worth some $400,000.

Unfortunately, shellfish beds up and down the coast of Massachusetts Bays are threatened by disease-causing viruses and bacteria. These pathogens enter the Bays from a variety of sources, both point and nonpoint (diffuse). Sewage treatment plants and combined sewer overflows have long been recognized as sources of contaminants. More recently, pathogen contamination has been tied to nonpoint sources such stormwater runoff, boat sewage, and faulty septic systems.

As they filter small food particles from the water, bivalve shellfish concentrate these harmful pathogens in their stomachs. Although the pathogens probably do not affect the shellfish themselves, they *do* pose a health risk to human consumers who fail to prepare the shellfish properly. Consumption of contaminated shellfish can cause gastroenteritis, a type of food poisoning that produces nausea, vomiting, diarrhea, and abdominal cramps. An even more serious health concern is the Hepatitis A virus, which can be concentrated in shellfish and passed on to the human consumer. After an incubation period of 15 to 50 days, this life-threatening virus produces symptoms such as nausea, malaise, and jaundice, although in children and some adults it may show no symptoms at all.

Because pathogens are difficult to measure directly, their presence is measured indirectly by the presence of sewage-derived bacteria called fecal coliform. Using fecal coliform concentrations as an indicator, the Massachusetts Division of Marine Fisheries (DMF) samples, classifies, and certifies shellfish harvesting areas according to the requirements of the National Shellfish Sanitation Program (NSSP). DMF currently classifies shellfish beds as follows:

- *Approved:* monitoring indicates low levels of fecal coliform bacteria in the water overlying the shellfish bed. The shellfish are suitable for human consumption.

- *Conditionally approved:* approved except during intermittent or unpredictable pollution events, such as rainfall or combined sewer overflows. These beds require close monitoring during periods of wet weather.

- *Conditionally restricted:* shellfish harvested in these areas must be relayed to either a clean site or to a depuration plant to remove pathogens. In many cases, only specially licensed diggers are allowed to harvest from these beds.

- *Prohibited:* closed due to fecal coliform levels consistently exceeding 88 fecal coliforms per 100 ml. of seawater.

- *Management closure:* closed because DMF lacked the manpower to survey and monitor what it assumed to be an unproductive or heavily-contaminated area.

Currently, only about 60 percent of the state's shellfish beds are permanently open. More than 90,000 productive acres are closed either permanently, seasonally, or conditionally. Some areas in the Massachusetts Bays region, including all of Boston Harbor and much of the North Shore, have been closed to shellfishing or restricted for many years due to unacceptably high concentrations of fecal coliform. Other areas have seen a dramatic increase in shellfish bed closures only during the past two decades. Between 1970 and 1990, the total area of closed shellfish beds on the South Shore increased roughly threefold. On Cape Cod, the restricted

acreage doubled between 1970 and 1980, and then increased another *tenfold* between 1980 and 1990. In 1990, the Town of Ipswich lost an estimated $3.4 million from its local economy due to restricted shellfish resources. Even coastal waters that the state has designated as Areas of Critical Environmental Concern, such as Ellisville Harbor, have been closed to shellfishing due to pathogen contamination.

Closures continue to increase because more pathogens are finding their way into the Bays and, to a lesser extent, because improved monitoring has identified previously undocumented problems. To compound the problem, a growing body of scientific evidence suggests that, in some cases, traditional fecal indicator organisms may not be adequately portraying real pathogen risks. Pathogen contamination in shellfish areas causes economic loss, poses a significant risk to human health, and may possibly impair the natural dynamics of the marine ecosystem. Although the state's shellfishery is not in imminent danger of collapse, the time is ripe to devise a proactive shellfish management strategy to restore closed shellfish beds, ensure the sustainable management of those beds that remain open, and improve monitoring.

The interagency *Shellfish Bed Restoration Program (SBRP)* -- a coordinated partnership of the Division of Marine Fisheries, the Massachusetts Bays Program, the Natural Resources Conservation Service/MassCAP (formerly U.S. Soil Conservation Service), the County Conservation Districts, the Department of Environmental Protection, and coastal communities -- is beginning to address this need.

At the federal level, assistance also will be available from the U.S. Environmental Protection Agency. EPA will continue its ongoing efforts to assist the Massachusetts Water Pollution Abatement Trust (which administers the State Revolving Fund (SRF) in cooperation with the Massachusetts Department of Environmental Protection, which makes decisions regarding SRF expenditures), with the marketing of the SRF as a funding vehicle for nonpoint source projects (as planned under s.319, Clean Water Act) and CCMP implementation projects (as planned under s.320, Clean Water Act). EPA will assist the Trust and DEP, as necessary, in their efforts to design a streamlined loan process for local nonpoint source pollution abatement projects that will improve the quality of shellfish growing areas and other coastal waters.

[See also *Action Plan for Reducing and Preventing Stormwater Pollution*.]

DMF ACTION #2.1:

The Division of Marine Fisheries should conduct three (3) *Sanitary Survey Training Sessions* annually – one each on the North Shore, Metro Boston/South Shore, and Cape Cod – to educate local shellfish constables and health officers on the proper techniques for identifying and evaluating pathogen inputs into shellfish harvesting areas.

RATIONALE:

The consumption of raw and/or partially cooked bivalve shellfish can pose a public health risk if the shellfish are harvested from waters contaminated with bacterial pathogens associated with sewage or with other contaminants associated with industries and agriculture. The first critical control point for assuring safe shellfish for the state's commercial and recreational shellfisheries is insuring that the shellfish are harvested from waters of acceptable sanitary quality. Conducting regular sanitary surveys in accordance with the provisions of the National Shellfish Sanitation Program is the recognized method for determining acceptable shellfish water quality.

RESPONSIBLE AGENT(s):

The Division of Marine Fisheries will be responsible for this action. DMF has the statutory responsibility to classify shellfish growing waters and to determine which areas are safe for the harvesting of shellfish for direct human consumption. DMF generally accomplishes these tasks by working with local officials, most often shellfish constables and health agents, to conduct shoreline surveys to identify and evaluate all real and potential sources of pollution to shellfish waters. The shoreline survey is part of the larger sanitary survey, but is the most time consuming and labor intensive part of the sanitary survey. As such, it generally requires the combined resources of the DMF shellfish program staff and the communities.

Historically, most coastal communities have been eager to assist DMF in shoreline surveys in order to provide local knowledge on their particular shellfish growing areas and to expedite the survey work.

IMPLEMENTATION STRATEGY:

DMF will conduct one day of classroom instruction on shoreline survey techniques on the North Shore, Metro Boston/South Shore, and Cape Cod, followed by one day of field training for each participating community. The training will be limited to two employees per community - preferably the shellfish constable and health agent (or others as designated by the mayor or selectmen). Flexibility will be exercised both in the scheduling and the formality of the sessions to accommodate the participants.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

DMF will assume all costs associated with this action; the training sessions will be offered free of charge to the participating communities.

POTENTIAL FUNDING SOURCE(s):

Not applicable.

TARGET DATE:

Annually each summer.

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(Sandwich Office)
(508) 888-1155

DMF ACTION # 2.2:

The Division of Marine Fisheries should develop and administer a local *Shellfish Management Grants Program* to help communities finance the development and implementation of effective local shellfish management plans.

RATIONALE:

Shellfish management in Massachusetts is vested in the coastal cities and towns pursuant to M.G.L. C.130 §52. Historically, the Division of Marine Fisheries has provided reimbursements under §20A for local monies expended for shellfish management. Originally appropriated from the Tourism Fund, and later from the General Fund, an average of $300,000 was apportioned annually on a percentage basis according to actual expenditures among the eligible communities. This reimbursement program was in place from FY1975 until 1989, but has been unfunded since that year. Now there is mounting interest in reviving this program as a *grants* program, with greater oversight by DMF. Funding could be prioritized based on peer review, and could be directed to specific shellfish propagation programs. The recipient communities could maximize the benefits of these grants by receiving them at the beginning of each fiscal year and augmenting them with local funds.

RESPONSIBLE AGENT(s):

DMF, assisted by local shellfish officers, would be responsible for this action.

IMPLEMENTATION STRATEGY:

If an appropriation for this purpose were made from the General Fund and transferred to the Marine Fisheries Fund, the Director of DMF could promulgate regulations to establish the *Shellfish Management Grants Program*. An advisory committee, comprised of DMF staff and local shellfish officers, could then be appointed by the Director and the Massachusetts Shellfish Constables' Association to help develop and implement the program. The committee could establish evaluation criteria and review and approve grant applications. DMF could administer the grants and evaluate the performance of the recipient communities.

LEGISLATION REQUIRED:

New legislation is not required if this action is undertaken as part of the state's annual budget process. Alternatively, the program could be established through separate legislation, possibly filed by members of the Cape Cod delegation.

ESTIMATED COST:

$300,000. Previous legislation on this matter included authorization for one staff position within DMF to administer the original reimbursement program. At the present (higher) level of staffing within DMF's Shellfish Sanitation and Management Program, the proposed *Shellfish Management Grants Program* could be administered without additional staff support. A first year appropriation of $300,000 would be sufficient to fund the local grants.

POTENTIAL FUNDING SOURCE(s):

General Fund, matched by local appropriations.

TARGET DATE:

Implementation is dependent on the budget cycle. The proposed program could be developed as soon as funding is authorized and implemented shortly thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(617) 727-3193

SBRP ACTION #2.3:

The interagency *Shellfish Bed Restoration Program* task force should continue and expand its innovative efforts to protect and restore shellfish beds impacted by nonpoint source pollution.

RATIONALE:

Closure of shellfish beds due to nonpoint source pollution is both a visible indicator of degraded water quality and evidence of a decline in quality of life for coastal residents. Harvesting local shellfish beds has served for generations as a source of both income and recreational pleasure. No single state, federal, regional, or local entity has the resources and mandate to identify, assess, remediate, monitor, and reopen shellfish beds. Rather, an integrated, multi-agency team approach is needed. Such an approach allows the focusing of shared resources on the common goal of reopening beds, and is an innovative solution to the shellfish pollution problem.

RESPONSIBLE AGENT(s):

In October of 1993, an interagency task force coordinated by the Massachusetts Bays Program agreed to work together on the common goal of reopening shellfish beds along the Massachusetts and Cape Cod Bays coastline. Secretary of Environmental Affairs Trudy Coxe offered her support and endorsement to this effort, called the *Shellfish Bed Restoration Program (SBRP)*. The members of the task force are the Massachusetts Bays Program, the Division of Marine Fisheries (DMF), the Natural Resources Conservation Service/MassCAP (NRCS, formerly the U.S. Soil Conservation Service), the County Conservation Districts, the Department of Environmental Protection (DEP), and representatives of impacted communities.

IMPLEMENTATION STRATEGY:

The Division of Maine Fisheries has agreed to develop a list of shellfish bed sites adversely impacted by storm drain runoff which could be opened following a program of pollution mitigation and monitoring. The Natural Resources Conservation Service/MassCAP and County Conservation Districts have agreed to assist in pollution source assessment and design of remediation strategies. The Massachusetts Bays Program has agreed to provide technical assistance to the impacted communities and to seek their participation in the pursuit of funding for mitigation. In addition, the Massachusetts Bays Program has agreed to assist in developing an outreach program in the communities and to transfer technical information and lessons learned to other impacted communities. DMF has agreed to monitor the success of the remediation efforts and to reopen shellfish beds to harvesting when the water quality has improved sufficiently. Recently, the DEP joined this collaborative effort, offering its support in the areas of pollution source assessment and remediation.

Since its inception, the *Shellfish Bed Restoration Program* has identified twelve closed shellfish beds for assessment and remediation. Preliminary site assessments have been completed for each of these closed beds, and mitigation strategies have been designed for six of the sites. A full-time program manager/shellfish biologist was hired early in 1995. Over the next year, the SBRP will work with local, regional, state, and federal agencies and citizens groups to: 1) assess pollution sources and design mitigation strategies for the remaining sites; 2) implement projects for which funding has already been secured; 3) develop monitoring programs and outreach strategies to ensure that reopened beds remain harvestable; 4) promote task force participation by other state agencies with an interest in shellfish resources (e.g., the Department of Fisheries, Wildlife, and Environmental Law Enforcement's Riverways Program); and 5) coordinate with other regional initiatives focused on shellfish bed restoration - for example, in the Gulf of Maine. Finally, the SBRP will continue to identify new sites for remediation and will actively work with communities to develop proposals for funds which target nonpoint source pollution remediation.

LEGISLATION REQUIRED:

New legislation is not required at this time.

ESTIMATED COST:

Assessments and development of pollution mitigation strategies	- $100,000
Pollution mitigation	- $500,000
Staffing and equipment	- $120,000

POTENTIAL FUNDING SOURCE(s):

The Massachusetts Bays Program has committed $80,000 for site assessment, remediation strategy development, and monitoring of the initial group of twelve shellfish bed sites. Implementation of mitigation strategies is estimated to cost $500,000. A total of $80,000 is available for assessment and mitigation projects under the USEPA's Section 104(b)3 Program (Clean Water Act funds). Additional Clean Water Act funds (FY95, $62,000) have been awarded from the Section 319 Program for two remediation demonstration projects, and additional s.319 funds are being sought for FY96.

Other potential funding sources include: the Seaport Bond, an EOEA budget line item in support of Coastal Assessment and Enhancement, and Massachusetts Highway Department "Enhancement" funds.

TARGET DATE:

June 1996 for reopening of acreage within the initial 12 shellfish beds.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Bays Program
(617) 727-9530

ACTION PLAN #3

PROTECTING AND ENHANCING COASTAL HABITAT

Massachusetts and Cape Cod Bays contain a rich variety of estuarine and marine habitats. The coastal zone encompasses shallow tidal creeks, sandy beaches, rocky headlands, and deep ocean waters. The same areas that often attract human development also provide essential food, cover, migratory corridors, and breeding and nursery areas for a broad array of coastal and marine organisms, including commercially important fish and shellfish species. As development pressures mount, it is increasingly important to protect and enhance sensitive coastal habitat.

The coastal zone encompasses several distinct types of habitat, including:

Salt Marshes

Salt marshes are flat, open, grassy areas bordering tidal waters. They are typically found in or adjacent to areas protected from the high energy of the open coast, such as estuaries, salt ponds, and barrier beaches. Once considered wasteland, salt marshes were often filled to support residential development or agriculture. They are in fact extremely productive habitat, and are now recognized as a critical component of the marine ecosystem. Many economically and environmentally significant fish and shellfish species reside in salt marshes for at least part of their life cycle. Moreover, decaying salt marsh grasses are consumed by a wide variety of invertebrates, which in turn are consumed by fish, birds, and marine mammals. Salt marshes also protect the coastal zone from floods and absorb certain water-borne contaminants.

Although a large percentage of the state's salt marshes have been lost to development, there are still more than 36,000 acres of salt marsh habitat in the Massachusetts Bays region. Most of this is located on the North Shore and Cape Cod. Important pocket marshes found throughout the region include a total of 5,700 acres on the South Shore and approximately 2,000 acres in the Boston Harbor region.

Tidal Flats

Also known as clam flats, tidal flats are shallow, intertidal areas in quiet bays and estuaries. Their sand-mud substrate does not support large plants, but it does provide habitat for microscopic algae and vast numbers of clams, quahogs, and marine worms. Some of the species found on tidal flats -- especially shellfish -- are commercially important. All play an important role in the coastal ecosystem. Tidal flats are especially important foraging areas for wading shorebirds and migratory waterfowl. Cape Cod boasts more than 15,000 acres of tidal flats. Another 17,000 acres are scattered throughout the Massachusetts Bays region.

Beds

Although eelgrass may look to the casual observer like any other marine flora, eelgrass beds actually serve several critical functions in the estuarine environment. These beds provide habitat for many species of finfish, shellfish, and waterfowl. They reduce turbidity and improve water quality by filtering suspended sediments and serving as a baffle to moving sand. They are an essential component of nearshore food webs. And they provide nursery and feeding grounds for a number of commercially and ecologically important fish species, such as winter flounder and bay scallops.

Unfortunately, eelgrass beds are threatened by many sources of pollution, including sewer and stormwater discharges, dredge and fill projects, heavy boat traffic, and nonpoint sources of pollution such as urban runoff and nearby septic systems. Although the status of Commonwealth's eelgrass beds is still largely undetermined, limited aerial surveys and on-site investigations indicate that beds are shrinking throughout the Massachusetts Bays region. Eelgrass is now reduced or absent in a number of North Shore estuaries and embayments in which it once occurred, including the Merrimack River estuary, Essex Bay, and Salem and Marblehead Harbors. Eelgrass meadows in some Cape Cod embayments have also been replaced by undesirable macro-algal communities. Further reductions in eelgrass habitat may have serious consequences for nearshore ecosystems.

Barrier Beaches

Most barrier beaches are long, narrow strips of coastal dune and beach comprised of sand and gravel. They typically begin as spits of sand which grow out from and run parallel to the shore. As nearshore currents and tides deposit or erode additional material, the barrier beach may connect to land on both ends, or it may form an island. Whatever its shape, the inland side of a barrier beach generally borders an estuary or

marsh system. The side facing the open ocean absorbs the brunt of storms and tides, and is therefore extremely unstable. Although most geological changes to the land occur too gradually to be noticeable to the human observer, erosion and deposition can dramatically alter a barrier beach in only a few years.

Ecologically, barrier beaches are extremely important. They provide critical feeding and nesting habitat for wading birds, shorebirds, and waterfowl, including rare species such as the piping plover and roseate tern. Moreover, many marine and anadromous fish use the sheltered, brackish waters behind barrier beaches as feeding or spawning areas. Human uses, too, are significant. Barrier beaches are outstanding aesthetic and recreational resources. Careful management is needed to ensure that human uses are compatible with inherently fragile and volatile barrier habitats.

Rocky Headlands and Intertidal Shores

Rocky shore ecosystems occur along numerous stretches of the Massachusetts Bays coastline. In some places, they have developed on rocky headlands such as those found in Rockport, Gloucester, and other North Shore communities. In other places they have developed on the boulders and cobbles of glacial moraines, common along the South Shore and Cape Cod. Pounded by waves, dried by sun and wind, these resilient ecosystems are often subject to great physical stress. Despite these harsh conditions, however, rocky shores support a wide array of plant and animal life, including algae, crustaceans, mollusks, and some finfish.

Nearshore Waters

The nearshore waters of Massachusetts Bays are the chief breeding ground for many commercially important marine animals, including lobster, haddock, bluefin tuna, winter flounder, and Atlantic cod. These waters are also a feeding ground for numerous marine birds and mammals such as the Atlantic white-sided dolphin, harbor porpoise, harbor seal and on occasion, the grey seal. Deeper, offshore waters attract many species of whale, including the humpback, finback, minke, and the world's last remaining Northern right whales.

Islands

Most of the islands in Massachusetts Bays are highly developed. However, there are some islands with unspoiled herbaceous, shrub and forest habitat. Because of their isolation and lack of predators, these islands attract nesting populations of migratory seabirds, including terns, gulls, egrets, and herons. Outstanding examples of undisturbed islands include Thatcher Island and Milk Island off the North Shore.

Some of the best coastal habitat in the Massachusetts Bays region is publicly owned and protected. The Thatcher Island National Wildlife Refuge, the Parker River National Wildlife Refuge, Cape Cod National Seashore, the Crane Wildlife Refuge, and the Boston Harbor Islands State Park are examples of publicly-owned, relatively pristine coastal habitat.

Unfortunately, parts of the coasts, including wetlands, are being steadily degraded or irretrievably lost to development. Since colonial times, Massachusetts has lost approximately 20 to 30 percent of its original coastal wetlands to human development. Another 1,000 acres of coastal and inland wetlands--0.2 percent of the state's total--are lost each year. Losses result both from direct development and from the cumulative impacts of small projects.

Recognizing the importance of its wetlands, the Commonwealth has established a complex structure of laws and regulations to combat wetlands loss. The cornerstone of the state's current Wetlands Protection Program is the Wetlands Protection Act. This Act established a public review and decision-making process to preserve the state's dwindling wetlands. It is administered by local Conservation Commissions with oversight from the state Department of Environmental Protection (DEP). Under its provisions, any person who would remove, fill, dredge, or alter a wetland must file a Notice of Intent to initiate a process of public review. In wetland areas that provide habitat for rare or endangered species, no alteration which would have an adverse impact is allowed. A number of such areas have been mapped by the Natural Heritage and Endangered Species Section of the Massachusetts Division of Fish and Wildlife (DFW). The Act also sets strict performance standards for any alteration to banks, submerged land, and some floodplain areas which support wildlife.

Although Massachusetts is considered to have one of country's the most effective wetlands protection programs, the state has not been able to completely stem wetlands loss. Losses still occur from certain public and private projects (such as bridge construction and road crossings) which are exempt from the Wetlands Protection Act. Farming practices which qualify as "normal maintenance and improvement" of agricultural land also are exempt, and small dredge and fill projects may be permitted by variance under the Act. Moreover, the Wetlands Protection Program relies heavily on replicated wetlands to mitigate "unavoidable" losses. The success rate of these replication projects seems to have been less than adequate, according to some state and local conservation officials.

At the federal level, agencies such as the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (ACOE) play key roles in protecting wetlands under s404 of the Clean Water Act. It should be noted that this regulatory framework can apply to those projects which may be exempt from the State's Wetlands Protection Act. Further, under the ACOE's specific regulatory responsibilities, the "nationwide permits" have been revoked in Massachusetts and replaced with the Programmatic

General Permit (PGP). The PGP simplifies and strengthens wetlands protection, since it dovetails with federal, state, and local permitting processes and efforts.

The effectiveness of the Wetlands Protection Act is also impaired by the limitations of municipal government. At the local level, responsibility for protecting coastal wetlands falls primarily on local Conservation Commissions. Most Commission members take this responsibility seriously, and invest considerable time in attempting to properly review Notices of Intent filed in their community. Unfortunately, most Commissions lack professional staff, and their volunteer members are often ill-equipped to deal with the Act's intricacies. Although the state DEP offers voluntary training courses, many Commission members never receive formal training in the provisions of the Act and its regulations. While Commission members do learn from experience, the learning process can be quite lengthy, especially when compared with the typical rate of turnover on a Commission. Compounding this problem is the lack of accurate, up-to-date maps, scaled for local use, showing the location of coastal habitats which warrant special protection. Existing maps are spread throughout a variety of local, state, and federal agency files, and vary considerably with respect to scale, format, and reproducibility. Accordingly, they are either unavailable to Commission members or are of limited value to local decision-makers.

The Wetland Protection Program's efforts to prevent wetland *degradation* are lagging even further behind its efforts to prevent wetland loss. The quality of coastal habitat is intimately related to the quality of incoming water and sediment. Unfortunately, the state's existing management framework does not adequately address the point and nonpoint pollution sources which affect coastal wetlands. Nor does it address the hydrographic modifications associated with small development projects, such as changes in the amount of freshwater flowing into a wetland area or the rate of sediment deposition. When evaluating the overall threat to coastal habitat, these cumulative or secondary impacts must be considered as seriously as direct development.

The Commonwealth has launched some creative initiatives to remedy the shortcomings of the Wetlands Protection Program and to help the state meet its short-term goal of "no net loss" of wetlands. The Wetland Conservancy Program uses aerial photographs to map wetland areas and inform public officials and land owners of activities which are incompatible with the goals of the Wetlands Protection Program. More recently, the Massachusetts Executive Office of Environmental Affairs (EOEA) initiated a Wetlands Restoration and Banking Program. This program will coordinate the restoration of degraded wetlands throughout the state, and will study the concept of wetlands "banks" as a means of improving the success of wetlands mitigation.

The complexity of the state's wetlands regulations provides one indication of its commitment to protect and preserve its coastal habitat. Local officials and private landowners must show the same commitment if the coastal habitat of Massachusetts Bays is to be maintained. The following recommendations suggest ways in which all parties can work cooperatively towards the common goal of preserving our coastal heritage.

MUNICIPAL ACTION # 3.1:

Municipalities should prepare and implement an EOEA - approved *Open Space Plan* to preserve and protect key wetlands, floodplains, fish and wildlife habitat, and other ecologically- and recreationally-important natural resource areas.

RATIONALE:

The appearance of a community, the lifestyle of its residents, and the richness of its natural resources can be dramatically altered in a short period of time if steps are not taken to preserve open space. During the building boom of the '80s, numerous Massachusetts communities saw their populations increase radically, straining their infrastructure and financial resources, and destroying or degrading irreplaceable land and water resources. In many instances, loss or fragmentation of open land resulted in noticeable declines in water quality and wildlife habitat.

Completing an *Open Space Plan* gives the community a powerful tool to begin directing development away from sensitive natural resources and, in some cases, to achieving lasting economic benefits. Protecting aquifers and watershed lands, for example, can avert prolonged and costly drinking water contamination incidents in a community. Protected open space also increases the taxable value of adjacent properties and, in the long run, can impose less strain on a municipal budget than the infrastructure and services required by development.

Completing an *Open Space Plan* can also start a growth management process that will lead to the development of strategies to maintain ecosystem integrity. Although not properly part of an official *Open Space Plan*, the thought process in developing those strategies can lead to: 1) adoption of stricter zoning bylaws and other development controls that regulate percent imperviousness in a watershed; 2) establishment of strong sediment and erosion control bylaws; and 3) adoption of design or performance standards for stormwater runoff best management practices (BMPs).

Completing a local *Open Space Plan* also positions the community to take an important next step - establishing a more expansive greenway network for the surrounding region. Linking gems of open space in neighboring communities preserves regionally-significant scenic vistas and wildlife corridors, and provides recreational opportunities not available at the local level alone. Within the coastal zone, this concept has been extended to include the linkage of sites in more developed waterfront areas. It has taken hold in several communities where continuous public access to and along the shoreline of developed harbors has been pursued with technical and financial assistance from CZM's Harbor Planning Program.

RESPONSIBLE AGENT(s):

Conservation Commissions and Planning Boards would generally be responsible for this action, with input and assistance from Recreation Committees, local land trusts, watershed associations, and outdoor user groups (hikers, hunters and fishermen, cross-country skiers, etc.).

IMPLEMENTATION STRATEGY:

The Open Space Planning process should be an open, interactive process that invites the participation and input of diverse sectors of the community. The Executive Office of Environmental Affairs (EOEA) Division of Conservation Services has developed a step-by-step handbook (*The Open Space Planner's Workbook, 1990*) to help guide communities through this process, and local planners should closely follow these guidelines in developing their *Open Space Plans*. Consistency of the local plans with the EOEA guidelines is a prerequisite for state approval of the plans. State approval helps to establish a community's eligibility for Self-Help and other grant program funds to purchase and protect key open space parcels. While particular open space and development-related issues may vary from one community to another, municipalities should generally adhere to the planning process prescribed by EOEA, as follows:

Form Core Open Space Planning Group
↓
Develop Community Participation Process
↓
Inventory, Map, and Evaluate Environmental Resources (emphasizing lands of special conservation and outdoor recreation interest)
↓
Analyze Resource Protection and Community Needs
↓
Formulate Open Space Goals and Objectives
↓
Develop Five-Year Action Plan
↓
Draft *Open Space Plan*
↓

Solicit Public Comment

↓

Complete and Submit Plan for EOEA Approval

↓

Implement the *Open Space Plan* (ongoing)

In setting priorities for land acquisition (or preservation via conservation restrictions), coastal communities should give special consideration to developable upland areas which: 1) adjoin, or drain to, prime shellfish harvesting areas; 2) are located within flood hazard zones or will be subject to relative sea level rise; and 3) border vegetated wetlands. The latter areas should be kept as free as possible from development as these will be needed for wetlands to retreat to under rising sea level conditions.

LEGISLATION REQUIRED:

Preparation of an *Open Space Plan* will not require new legislation. However, *implementation* of the plan may require some legislative changes locally, including amendments to the zoning bylaw and new or revised land use policies and regulations.

ESTIMATED COST:

The cost of preparing an *Open Space Plan* can vary widely, depending on a community's staff resources and reliance on paid consultants. Many, if not most, successful plans have been developed at relatively low cost by teams of local volunteers supported by Regional Planning Agencies and other outside groups. EOEA strongly recommends this approach, and numerous environmental agencies and organizations (EOEA, Regional Planning Agencies, U.S. Fish and Wildlife Service (USFWS), watershed associations, land trusts) are willing and able to offer valuable information and assistance. (For example, various EOEA agencies and USFWS can assist municipalities in the identification of important coastal habitats, as well as opportunities for state and federal grants to protect and enhance these habitats. They recently contributed fish and wildlife habitats information to the *Massachusetts Bays Community Resource Atlas*, an MBP-funded document that will be distributed among the 49 coastal communities in the near future.) The local cost of a plan prepared largely by volunteers, including mapping and production costs, is often less than $5,000.

POTENTIAL FUNDING SOURCE(s):

In most cases, local revenues must be used for development of the plan. However, for *implementation* of the plan, specifically land acquisition and preservation, the Division of Conservation Services offers several grant programs, including the Self-Help and Urban Self-Help Programs (52% - 70% state funding), and the Federal Land and Water Conservation Funds (50% federal/50% local). Another federal grant program, the Urban Park and Recreation Recovery Program (UPARR), can provide matching grants and technical assistance to selected, economically distressed urban communities.

In addition, DEM, DFWELE, and various nonprofit land trusts can commit funds to purchase and protect lands of special ecological significance.

TARGET DATE:

1996 and as local resources permit. A local *Open Space Plan* is an integral part of a community's overall planning program and may require 1-2 years to complete. (*Implementation* of the plan is, of course, an ongoing process.) Accordingly, communities should begin the open space planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Division of Conservation Services
(617) 727-1552
Your area's Regional Planning Agency
Your County Conservation District
U.S. Fish and Wildlife Service
(Gulf of Maine Project)
(207) 781-8364

MUNICIPAL ACTION #3.2:

Municipalities should adopt and implement a local *Riverfront District Bylaw* to maintain river water quality, preserve fish and wildlife habitat, and protect downstream nursery and shellfish resources.

RATIONALE:

The Massachusetts River Protection Act (MRPA) bill currently before the Legislature seeks to establish river corridor protection on a uniform statewide basis. The bill calls for the creation of a 25-150 foot riverfront setback for development along many rivers and streams in the Commonwealth. So why adopt a *local* bylaw if the state passes the Massachusetts River Protection Act? There are several compelling reasons:

1) Many tributaries are not covered by the MRPA and warrant further protection from inappropriate development.

2) Local bylaws can be written specifically for the needs of local rivers and the community.

3) Local bylaws can require a *vegetated* buffer strip (not required by the MRPA) within a Riverfront District to attenuate nonpoint source pollution and provide wildlife habitat.

4) A community will be more likely to enforce a local bylaw that it has helped craft and that its citizens support.

In addition, the provisions of the local bylaw may serve as a "Municipal Development and Protection Plan" under the proposed MRPA with approval from the Secretary of the Executive Office of Environmental Affairs. This means that, with approval, the provisions of the local bylaw would also serve as the provisions governing the application of the MRPA within the community. Local *Riverfront District Bylaws* will complement and supplement the MRPA just as local wetlands bylaws complement and give added local protection to the Wetlands Protection Act.

RESPONSIBLE AGENT(s):

Planning Boards and Conservation Commissions would generally be responsible for this action, with input and assistance from other local boards (Selectmen, Board of Health), Adopt-A-Stream groups, local land trusts, sportsmen clubs, and abutting property owners.

IMPLEMENTATION STRATEGY:

The River District planning process should be an open, interactive process that invites the participation and input of diverse sectors of the community. One practical way for a community to proceed with a *River District Bylaw* is for the Planning Board to appoint a subcommittee to: (1) study the community's rivers and evaluate options for protection, and (2) if feasible, draft an amendment to the zoning bylaw and help shepherd it through Town Meeting. Because state law requires that the Planning Board issue a report with recommendations on all proposed zoning changes to Town Meeting, the Planning Board can play a key role in the process. By involving Planning Board members early in the initiative, they can share their knowledge, "buy" into and promote the initiative, and provide political standing. In return, the subcommittee will be helping an already busy town board by doing much of the background work required to establish local river protection.

The Riverways Program within the Department of Fisheries, Wildlife & Environmental Enforcement (DFWELE) has published a step-by-step handbook (*Riverways Community Guide-Strategies for Drafting and Passing Local River Protection Bylaws*) to help guide communities through this process, and this should be consulted to get the process underway.

LEGISLATION REQUIRED:

This action involves adoption of a local *Riverfront District Bylaw* as an amendment to the community's existing zoning bylaw, and requires town meeting or city council approval, depending on the community's governmental structure.

ESTIMATED COST:

The cost of developing and adopting a *Riverfront District Bylaw* should be minimal. Model river protection bylaws are available that can be adopted either in their present form or with minor modifications to reflect individual community needs. Technical assistance in drafting a river protection bylaw is available from the DFWELE Riverways Program and the Regional Planning Agencies.

POTENTIAL FUNDING SOURCES:

Local revenues

TARGET DATE:

1996 and as local resources permit. This is a high priority action from a water quality standpoint and should be implemented by municipalities as soon as possible to prevent further loss and degradation of important river corridors.

FURTHER INFORMATION:

For further information and assistance contact:

DFWELE Riverways Program
(617) 727-1614
Your area's Regional Planning Agency

MUNICIPAL ACTION #3.3:

Municipalities with Areas of Critical Environmental Concern (ACEC) should work cooperatively with neighboring communities, EOEA agencies, and other interested parties to develop proactive, long-term *ACEC Management Plans* to preserve and protect these vital resource areas.

RATIONALE:

An ACEC is an area containing concentrations of highly significant environmental resources that has been formally designated by the Commonwealth's Secretary of Environmental Affairs following a public nomination and review process.

The enabling legislation and the regulations for ACECs list several kinds of environmental features that critical areas may include, ranging from wetlands and water supply areas to rare species habitat and prime agricultural land. To be eligible for designation, an area must contain at least four of these resource features, and the resources and area must be of at least regional or statewide significance.

The objective of ACEC designation - *i.e., the long-term preservation, management, and use - or* ***stewardship*** *- of critical resource areas* - is a shared responsibility that can only be met through the collaborative efforts of many parties - governmental, civic and environmental, business, and private citizens. At the *state* level, ACEC responsibilities and actions are well established. Among other things, state regulations require that all EOEA agencies subject certain projects of federal, state, and local agencies and private parties to the "closest scrutiny" to assure that strict environmental standards are met for any action "subject to their jurisdiction." While this directive covers a number of important activities, many others remain the province of *local* government. In fact, effective stewardship of ACEC's must be largely community-based.

To date, few communities have purposefully integrated the stewardship of ACECs into their land use policies, plans, and regulations. As a result, many zoning bylaws, building codes, health regulations, and the like may be at variance with critical resource area protection, and may need to be strengthened to assure the long-term viability of the ACECs.

Statewide, there are 25 coastal and inland ACECs comprising approximately 170,000 acres:

	Approx. Acres	Communities
Coastal ACECs		
Bourne Back River	1,850	Bourne
*Ellisville Harbor	600	Plymouth
*Herring River Watershed	4,450	Bourne, Plymouth
*Inner Cape Cod Bay	2,550	Brewster, Eastham, Orleans
*Neponset River Estuary	1,260	Boston, Milton, Quincy
*Parker River/Essex Bay	25,500	Essex, Gloucester, Ipswich, Newbury, Rowley
Pleasant Bay	9,050	Brewster, Chatham, Harwich, Orleans
Pocasset River	150	Bourne
*Rumney Marshes	2,800	Boston, Lynn, Revere, Saugus, Winthrop
*Sandy Neck/Barnstable Harbor	8,850	Barnstable, Sandwich
Waquoit Bay	2,550	Falmouth, Mashpee
*Weir River	950	Cohasset, Hingham, Hull
*Wellfleet Harbor	12,350	Eastham, Truro, Wellfleet
*Weymouth Back River	950	Hingham, Weymouth
Inland ACECs		
Canoe River Aquifer	17,200	Easton, Foxborough, Mansfield, Norton, Sharon, Taunton
*Central Nashua River Valley	12,900	Bolton, Harvard, Lancaster, Leominster
*Cranberry Brook Watershed	1,050	Braintree, Holbrook
*Fowl Meadow/Ponkapoag Bog	8,350	Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, Westwood
*Golden Hills	500	Melrose, Saugus, Wakefield
Hinsdale Flats Watershed	14,500	Dalton, Hinsdale, Peru, Washington
Hockomock Swamp	16,950	Bridgewater, Easton, Norton, Raynham, Taunton, West Bridgewater
Kampoosa Bog Drainage Basin	1,350	Lee, Stockbridge
Karner Brook Watershed	7,000	Egremont, Mount Washington
Schenob Brook Drainage Basin	13,750	Mount Washington, Shellfield
*Westborough Cedar Swamp	1,800	Hopkinton, Westborough

* Denotes location within Massachusetts Bays watershed

RESPONSIBLE AGENT(s):

Planning Boards, Boards of Health, Conservation Commissions, and the nominators of ACEC designations would share much of the responsibility for this action, but should solicit the advice and assistance of other local authorities -- Selectmen, Boards of Appeal, DPWs -- which also play a role in effecting local land use policies and practices. Municipalities may be interested in establishing a local or regional ACEC task force or working group.

IMPLEMENTATION STRATEGY:

Development of a local *ACEC Management Plan* should be an open, interactive process that invites the participation of diverse sectors of the community. In addition to the above boards, the process should involve representatives of local land trusts and watershed associations, affected property owners and businesses, Regional Planning Agencies, and state environmental agencies -most notably DEM and CZM. The latter two agencies share much of the responsibility for monitoring and protecting ACECs at the state level, and can offer trained staff to advise and assist communities on ACEC-related matters. CZM has developed guidelines to help communities prepare coastal resource management plans for ACECs pursuant to the Chapter 91 (Waterways) Regulations (see *Final Guidance Document - The Development of Resource Management Plans for Coastal Areas of Critical Environmental Concern*, 1992), and these are an excellent starting point. Further guidance materials may be forthcoming from the DEM ACEC Program over the next several years.

In developing a local *ACEC Management Plan*, communities should generally adhere to the following process:

Form Core Working Group
↓
Establish Public Education/Outreach Process
↓
Collect Available ACEC Data and Maps
↓
Inventory, Evaluate, and Map Critical Resources
↓
Identify and Prioritize Threats to Resources
(development, pollution, overuse, etc.)
↓
Assess Adequacy of Existing Protection Measures
↓
Recommend Additional Protection Measures as Warranted
↓
Develop Strategy for Implementing Enhanced Protection Measures
↓
Publish Draft and Final *ACEC Management Plans*
↓
Implement *ACEC Management Plan* (ongoing)

Critical to the ultimate success of this effort will be the public's awareness of, and appreciation for, the ACEC - so public outreach and education should be a key component of the planning and implementation process.

LEGISLATION REQUIRED:

Preparation of a local *ACEC Management Plan* will not require new legislation. However, *implementation* of the plan may require some legislative changes locally, including amendments to the zoning bylaw and building code, and new or revised land and water use policies and regulations.

ESTIMATED COST:

The cost of preparing a local *ACEC Management Plan* will depend on the plan's level of detail and the community's reliance on paid consultants. If the bulk of the work is performed by local staff and volunteers, as is recommended, costs should be modest ($2,500 - 5,000). A broad range of technical assistance - including inventorying, mapping, and evaluation of natural resources, and drafting of protection strategies - is available from DEM, CZM, and the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues; Executive Office of Communities and Development (EOCD) strategic planning grants.

TARGET DATE:

1999 and as local resources permit. A local *ACEC Management Plan* will be an integral part of the community's overall planning program and may require several years or more to complete. (*Implementation* of the plan is, of course, an ongoing process.) Accordingly, communities are encouraged to begin the ACEC management planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM's ACEC Program (617) 727-3160
Coastal Zone Management Office
(617) 727-9530
Your area's Regional Planning Agency
NRCS Community Assistance Unit
(508) 295-1481

MUNICIPAL ACTION #3.4:

Municipalities should adopt and implement a local *Wetlands Protection Bylaw* to supplement the state Wetlands Protection Act and Regulations.

RATIONALE:

While the Massachusetts Wetlands Protection Act (WPA) and its Regulations are considered among the most protective wetlands legislation in the country, they have several deficiencies which stricter *local* bylaws can address. As examples, the Cape Cod Commission's Regional Policy Plan cites the following:

- The Wetlands Protection Act does not provide any protection for buffer areas surrounding wetlands that provide important functions, including mitigating stormwater impacts, removing nutrients, and recharging ground water. Research has documented the increase in nitrogen and phosphorus loading to wetlands as adjacent watershed areas are cleared of vegetation. Buffer areas are also often exceptionally valuable wildlife habitat. Many bird species such as herons nest in upland trees adjacent to wetlands, but feed in the wetlands. Without buffer area protection, these nesting areas could be destroyed. Recent studies suggest that buffers 100 to 300 feet wide are needed to protect surface water bodies from sedimentation and maintain wildlife habitat, and 300 to 1000-foot buffers are needed for 50 to 90 percent nutrient removal. A 200 foot buffer is recommended to protect the scenic value of a natural area.

- Many of the Cape's wetlands occur as isolated kettle holes that do not meet the size thresholds for protection in the state Act.

- Many developments have been designed to discharge stormwater directly to waterbodies or to use natural wetlands for stormwater management and attenuation of pollutants, a practice that may result in degradation of the wetland and could adversely affect downstream waters.

Local wetlands bylaws can compensate for these deficiencies by expanding the definition of wetlands resources, requiring building and septic system setbacks to protect buffer zones and improve water quality, and prohibiting or limiting wetlands replication (conversion of upland to man-made wetland). In addition, they can address the special needs of non-permanent wetland types, such as vernal pools and seasonally variable ponds (e.g., Mary Dunn Pond in Hyannis). They also can provide for enhanced enforcement authority and the hiring of expert consultants to review development proposals at the applicant's expense.

RESPONSIBLE AGENT(s):

Conservation Commissions and their agents would have primary responsibility for this action, with assistance from the Board of Health, Planning Board, and Building Inspector.

IMPLEMENTATION STRATEGY:

Conservation Commissions should: 1) obtain and review model local wetlands bylaws prepared by the Regional Planning Agencies and Massachusetts Association of Conservation Commissions; and 2) adapt these bylaws, as appropriate, to respond to local needs. Such bylaws typically contain minimum performance standards to address some of the WPA deficiencies cited above. Examples include the following:

- *Natural, undisturbed buffer areas of at least 100' width shall be maintained from the edge of coastal and inland wetlands, including isolated wetlands, to protect their natural functions, including but not limited to mitigation of stormwater impacts and their wildlife habitat value. This policy shall not be construed to preclude pedestrian access paths, vista pruning, or construction and maintenance of water-dependent structures within the buffer area, any of which may be permitted at the discretion of permitting authorities where there is no feasible alternative to their location. The Conservation Commission shall require a larger buffer area where necessary to protect sensitive areas or where site conditions such as slopes or soils suggest that a larger buffer area is necessary to prevent any adverse impact to wetlands and associated wildlife habitat. Where a buffer area is already developed, this requirement may be modified by the permitting authority, provided it makes a finding that the proposed alteration will not increase adverse impacts on that specific portion of the buffer area or associated wetland.*

- *Disturbance of wetlands and buffer areas for operation and maintenance of underground and overhead utility lines (electrical, communication, sewer, water, and gas lines) may occur. Installation of new utility lines through these areas may occur where the permitting authority finds that the proposed route is the best environmental alternative for locating such facilities. In all instances, disturbance of wetland and buffer areas shall be minimized and surface vegetation, topography, and water flow shall be restored substantially to the original condition.*

- *Stormwater management plans for new development shall preclude direct discharge of untreated stormwater into natural wetlands and waterbodies.*

[Note: the state's new Stormwater Initiative and the guidance document *Urban BMPs for Massachusetts* will place additional emphasis on the creation of "artificial" wetlands for stormwater treatment in Massachusetts. Federal guidance to the states is encouraging the development and use of manmade wetlands that will retain and assimilate some pollutants before they enter coastal waterbodies. In order to ensure that these engineered systems operate effectively and in full compliance with state regulations, CZM and DEP are working collaboratively to develop policies and general guidance for artificial wetlands construction. This guidance will be available to local Conservation Commissions and Planning Boards, site designers and landscape contractors, and others interested in minimizing the water quality impacts of urban runoff.]

LEGISLATION REQUIRED:

This action requires the adoption of a local *Wetlands Protection Bylaw*, usually as a general (non-zoning) bylaw, by vote of town meeting or city council, depending on the community's governmental structure. The Conservation Commission would be responsible for administering the bylaw.

ESTIMATED COST:

The cost of developing a local *Wetlands Protection Bylaw* should be minimal. Model wetlands bylaws are available that can be adopted either in their present form or with minor modifications to reflect individual community needs. Technical assistance in drafting the bylaws is available from the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues.

TARGET DATE:

1996-1997.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Association of Conservation Commissions
(617) 489-3930

Your area's Regional Planning Agency

MUNICIPAL ACTION #3.5:

Municipalities with locally-owned barrier beaches should prepare and implement ecosystem-based *Barrier Beach Management Plans* to promote responsible use and protection of these critical coastal resources.

RATIONALE:

Barrier beaches comprise approximately 222 miles (or about 21%) of Massachusetts' 1,500-mile beach shoreline. These 681 barrier beaches provide a wealth of ecological and economic benefits to the commonwealth's citizens, including:

- Outstanding fish and wildlife habitat;
- Diverse recreation and tourism opportunities; and
- Effective protection against storm and erosion damage.

Inappropriate development on barrier beaches can destroy or degrade irreplaceable natural resources and pose significant hazards to public health and safety. It also can cost the taxpayer enormous sums of money in the form of subsidized loans, disaster assistance, and infrastructure improvements. According to State-Federal Hazard Mitigation Team reports, "Hurricane Bob" (August, 1991), the "Halloween Northeaster" (October 1991), and the "December '92 Northeaster" cost Massachusetts taxpayers **over $50 million** (over and above monies paid from the Federal Flood Insurance Program) to repair public roads, seawalls, sewer and water lines, buildings, and other public facilities. The 1991/1992 storm season also caused billions of dollars in damages to private property -- much of this on barrier beaches. Approximately two-thirds of all homes destroyed by these storms were located on barrier beaches. Many of the homes were behind seawalls and other erosion control structures that gave homeowners a false sense of security. Those same seawalls also contributed to beach erosion, thereby reducing the natural storm defenses of the barrier beach. Most of these seawalls have been reconstructed, sometimes at great public expense. (The large seawall and stone mound structure on Minot Beach in Scituate, for example, has been reconstructed nineteen times, and its reconstruction after the "Blizzard of '78" cost taxpayers over $700,000.)

Effective management of barrier beaches requires the coordinated involvement of all levels of government. At the state level, Executive Order Number 181 (1980) established a framework for the state management of barrier beaches. This order directs that state acquisition of barrier beaches be made a priority. It also assigns the highest priority for use of disaster assistance funds to relocate willing sellers away from storm damaged barrier beach areas. In addition, both state and federal monies for construction projects cannot be used to encourage new growth and development on barrier beaches. These economic policies recognize barrier beaches as hazard-prone areas where future storm damage will inevitably occur.

Local governments also play a key role in barrier beach management. Since municipal commissions, committees, and boards routinely review proposals for construction activities on barrier beaches, a large responsibility resides with local officials to ensure that proposed activities reflect both the natural and economic hazards and the environmental sensitivity characteristic of barrier beaches. The Massachusetts Barrier Beach Task Force strongly encourages municipalities to develop management plans for locally-owned barrier beach areas to promote their appropriate use and protection.

RESPONSIBLE AGENT(s):

Planning Boards and Conservation Commissions would generally be responsible for this action, with input and assistance from other local authorities -- Selectmen, Boards of Health, Boards of Appeal, Harbor and Recreation Committees -- that also play a role in effecting land use policies and practices in locally-owned barrier beaches areas.

IMPLEMENTATION STRATEGY:

Development of a local *Barrier Beach Management Plan* should be an open, interactive process that invites the participation of diverse sectors of the community. In addition to the above boards, the process should involve representatives of beach user groups, affected property owners and businesses, Regional Planning Agencies, and state environmental agencies - most notably CZM, DEP, and DEM. The latter agencies share much of the responsibility for monitoring and protecting barrier beaches at the state level, and offer trained staff to advise and assist communities on barrier beach-related matters. To assist in this effort, the Massachusetts Barrier Beach Task Force has published working guidelines (see *Guidelines for Barrier Beach Management in Massachusetts*, February 1994) that are directed to those with stewardship responsibility for the 681 barrier beaches in the Commonwealth. These guidelines prescribe a series of recommended performance standards

and management measures ("best management practices") for a broad range of land and water use activities on and around barrier beaches. Such activities include:

- Construction of buildings and facilities;
- Pedestrian uses (hiking, hunting, fishing and shellfishing, etc.);
- Watercraft and off-road vehicle use;
- Erosion control and beach restoration;
- Beach cleaning;
- Nuisance control (mosquitos, greenhead flies, exotic plants); and
- Wildlife conservation and management.

In developing a local *Barrier Beach Management Plan*, communities should carefully consult the above referenced guidelines and contact CZM for assistance. CZM has readily available maps which identify and delineate each barrier beach in the Commonwealth (see *Coastal Zone Management Barrier Beach Inventory Project*, December 1982).

In the instances where barrier beaches cross political or jurisdictional boundaries, a regional approach should be followed in drafting *Barrier Beach Management Plans*.

LEGISLATION REQUIRED:

Preparation of a local *Barrier Beach Management Plan* will not require new legislation. However, *implementation* of the plan will likely require some legislative changes locally, including amendments to the building code and new or revised land and water use policies and regulations.

ESTIMATED COST:

The cost of preparing a local *Barrier Beach Management Plan* can vary, depending on the plan's level of detail and the community's reliance on paid consultants. If the bulk of the work is performed by local volunteers, as is recommended, costs should be modest ($2,500-5,000). A broad range of technical assistance is available from CZM, DEP, DEM, and the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues, including the general fund, a dedicated enterprise fund, beach parking and user permit fees, and non-criminal ticket fees (for violations of beach bylaws or regulations).

TARGET DATE:

1999. A local *Barrier Beach Management Plan* should be an integral part of the community's overall planning program and may require several years or more to complete. (*Implementation* of the plan is, or course, an ongoing process). Accordingly, communities should begin the Barrier Beach Management Planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management Office
(617) 727-9530
DEM Division of Forests & Parks
(617) 727-3180
DEP Division of Wetlands & Waterways
(617) 292-5695
Your area's Regional Planning Agency

MUNICIPAL ACTION #3.6:

Municipalities should employ full-time, professionally-trained conservation staff to provide ongoing technical and administrative support to the local Conservation Commissions.

RATIONALE:

Among their many other responsibilities, including open space planning and protection, local Conservation Commissions represent the first line of defense in implementing the Wetlands Protection Act (WPA). The WPA and its associated regulations are lengthy and complex, and cover a number of areas in which technical interpretations and professional judgement are required. Under the WPA, Commission authority extends to the review of projects on land under the ocean, land under salt ponds, fish runs, and land containing shellfish. Properly exercised, this authority can be used to protect valuable marine habitats -- such as DMF-designated shellfish growing areas, town-designated resources areas, Areas of Critical Environmental Concern (ACECs), fish runs, and eelgrass beds -- by prohibiting or limiting the number of new docks, piers, and their associated dredging activities or by mitigating the impacts of approved projects.

Unfortunately, not all Conservation Commissions are equipped to fully exercise this authority. The formal training of Commission numbers is not compulsory and the turnover rate of Commissioners is often high, so few members have developed the technical skills or comprehensive understanding of the regulations necessary to ensure their effective administration. The ongoing review of subdivision and site plans, the identification and mapping of wetlands boundaries, the development of performance standards, and the writing and enforcement of Orders of Conditions all require technical capabilities and an investment of time that are generally not available through an all-volunteer board or part-time conservation agent. Accordingly, Conservation Commissions should hire full-time professionally-trained staff (for example, an environmental engineer or wetlands scientist) who can devote full attention to carrying out the Commissions' multiple resource protection responsibilities.

RESPONSIBLE AGENT(s):

The Conservation Commission, supported by other municipal boards, would have primary responsibility for this action.

IMPLEMENTATION STRATEGY:

The Conservation Commission, in consultation with the community's finance board and chief governing body, would request approval of an expanded annual operating budget to accommodate the new staff position(s). Approval will be by either town meeting or city council vote, depending on the local government structure.

The Massachusetts Association of Conservation Commissions and the Massachusetts Municipal Association can offer guidance in developing job descriptions and advertising the new position(s) to attract qualified candidates.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost associated with hiring a full-time conservation administrator/agent is $35,000 - $40,000 per year, including benefits, overhead, professional membership fees, travel, and other expenses.

POTENTIAL FUNDING SOURCE(s):

Local revenues and filing fees from wetlands applications.

TARGET DATE:

1996/1997.

FURTHER INFORMATION

For further information and assistance, contact:

Massachusetts Association of Conservation Commissions
(617) 489-3930
Massachusetts Municipal Association
(617) 426-7272

DEM ACTION #3.7:

The Department of Environmental Management should develop and implement *Resource Management Plans* for all DEM-owned coastal properties.

RATIONALE:

DEM is one of the largest landowners of coastal property in Massachusetts, with coastal frontage totaling more than 32 miles. Many of these properties include fragile barrier beaches, salt marshes, and other sensitive land and water resources. Together they provide outstanding habitat for a wide variety of plant and animal species, including a number of rare and endangered species. Most of these resource areas are also highly desirable recreation sites, attracting thousands of visitors each year to fish, swim, and stroll along the water's edge. The Massachusetts Office of Travel and Tourism reports that coastal areas are the fastest growing tourist areas in the state, growing at a rate of 13% per year. The varied, and sometimes conflicting, demands that are placed on these areas require that DEM and other coastal landowners develop *Resource Management Plans* that will promote a proper balance between recreational use and the long-term protection of natural resources for future generations.

RESPONSIBLE AGENT(s):

DEM's Division of Forests and Parks and Division of Resource Conservation will share responsibility for this action.

IMPLEMENTATION STRATEGY:

The DEM staff is currently working to develop a barrier beach management plan that will address general management issues for DEM's beach properties. This general plan will be followed by specific management guidelines and plans for each of DEM's barrier beaches and other coastal properties.

Within the Massachusetts Bays region, property-specific management plans will be prepared for the following DEM coastal properties:

<u>DEM Owned and/or Operated Coastal Properties</u>

Salisbury Beach State Reservation - Salisbury
Plum Island (North End) - Newburyport
Sandy Point State Reservation - Ipswich
Halibut Point State Park - Rockport

Boston Harbor Islands State Park - Boston

- Gallops Island
- Great Brewster Island
- Bumpkin Island
- Grape Island

Webb Memorial State Park - Weymouth
Ellisville Harbor State Park - Plymouth
Scusset Beach State Reservation - Sandwich
Nickerson State Forest Park - Brewster
Cape Cod Bay Property

The plans are expected to follow a standard format consisting of the following:

- plan cover with photo of subject property;
- table of contents and introduction, including appropriate citations - e.g., Barrier Beach Executive Order, Wetlands Protection Act (Coastal Preamble), applicable DEM regulations;
- regional locus map and property map (topographic, GIS, or hand drawn by staff);
- property description - location, size, access, key physical and ecological attributes, public use, staffing;
- vehicular use;
- management guidelines and specifications (e.g., NHESP nationally accepted guidelines for managing plovers and terns, specifications for modular boardwalks, etc.);
- copies of information signs installed seasonally at access areas; and
- other attachments as needed, such as DEM's off-road vehicle (ORV) regulations.

In preparing the plans, DEM will consult with and seek approval (as warranted) from local Conservation Commissions, CZM and DEP regional offices, DFWELE's Natural Heritage and Endangered Species Program, and others as appropriate.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of developing the DEM-owned coastal property management plans is expected to be borne by DEM using existing DEM planning and field staff.

POTENTIAL FUNDING SOURCE(s):

Proposed Open Space Bond.

TARGET DATE:

1996/1997

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Office of Natural Resources
(617) 727-3160

DEM ACTION #3.8:

The Department of Environmental Management should develop and promote the use of *river basin planning reports* to facilitate responsible water resources planning and management at the local and regional levels.

RATIONALE:

River basin planning reports are intended to provide a technical reference point for responsible water resources planning, management, and decision-making at the local and watershed levels. They provide the basic data and analyses needed to: 1) identify potential water resource management problems; 2) resolve outstanding issues of resource use and protection; and 3) develop and implement recommendations for community and regional water supplies and demand management activities.

RESPONSIBLE AGENT(s):

The Massachusetts Water Resources Commission, with management, planning, and engineering assistance from DEM's Office of Water Resources, will be responsible for this action. Input will be sought from the DEP Offices of Water Supply and Watershed Management, the Department of Fisheries, Wildlife, and Environmental Law Enforcement, municipal water managers, local and regional planners, citizen groups, and other agencies and individuals as appropriate.

IMPLEMENTATION STRATEGY:

DEM's Office of Water Resources will prepare sections of the EOEA river basin reports dealing with basin and subbasin characteristics, including surface water and ground water hydrology, water supply sources and yields, current and projected community population, water use, and water conservation status. The plans will be developed on the schedule approved by EOEA (see chart) and updated every five years.

In addition, the Office of Water Resources will prepare water resources reports to inventory and assess other aspects of basin water resources and will work with communities, other state agencies, and local groups to develop specific action plans. For example, options can be developed for a community seeking to construct a new public water supply well in an ecologically-sensitive area and may need guidance on alternative approaches. DEM reports will be distributed among governmental, regional planning, and environmental advocacy groups to promote broad awareness of water issues and the watershed approach, and to facilitate responsible water resources planning and management at both the local and regional (i.e., watershed) levels.

EOEA BASIN SCHEDULE
(Massachusetts Bays River Basins)

Basin	Assessment	Planning	Implementation
Nashua	1993	1994	1995
Merrimack	1994	1995	1996
Boston Harbor	1994	1995	1996
Cape Cod	1994	1995	1996
Parker	1994	1995	1996
Ipswich	1995	1996	1997
Shawsheen	1995	1996	1997
Concord	1996	1997	1998
South Coastal	1996	1997	1998
Charles	1997	1998	1999
North Coastal	1997	1998	1999

LEGISLATION REQUIRED:

Preparation of these planning reports does not require new legislation. However, the Water Resources Planning Task Force is in the process of updating the *Massachusetts Water Supply Policy Statement* which was last revised in 1984. This policy emphasizes the need for long-range statewide planning as mandated by 313 CMR 2.00, and adopts supply and demand management policies in a balanced approach aimed at:

- providing for multiple uses;
- protecting water quality;
- assuring availability for consumptive and non-consumptive needs; and
- supporting local and regional capabilities to plan, construct, manage, and protect water supplies.

ESTIMATED COST:

The cost of preparing these reports will vary, depending on the size and development of a basin and complexity of water-related issues.

POTENTIAL FUNDING SOURCE(s):

Massachusetts Water Resources Commission.

TARGET DATE:

The river basin planning reports will be prepared in accordance with the EOEA basin schedule shown on the preceding page.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Office of Water Resources
(617) 727-3267

DEM ACTION #3.9:

The Department of Environmental Management should acquire and restore undeveloped coastal properties that offer outstanding living resources habitat and public recreation opportunities.

RATIONALE:

Only about one quarter of the Massachusetts coastline is in public ownership. As a result, many of the Commonwealth's prime coastal resources are vulnerable to degradation. In addition, only about 10% of the entire coast is truly accessible to all members of the public. This, combined with the Colonial Ordinance which limits public use of the intertidal zone to "fishing, fowling, and navigation," severely restricts public access to the shore. Protection of the Commonwealth's remaining unspoiled coastal areas should be a high priority for DEM's Land Acquisition Program.

RESPONSIBLE AGENT(s):

DEM's Land Acquisition Program staff will be responsible for planning and implementing future coastal acquisitions. In addition, DEM will be responsible for the Massachusetts Coastal Access Project, through which DEM will acquire public easements for pedestrian access across selected privately-owned intertidal areas along the coast.

The restoration of degraded coastal habitat acquired by DEM will be the joint responsibility of DEM's Waterways Program staff and Coastal Property Program staff, with assistance from appropriate federal and state agencies (e.g., EOEA Wetlands Restoration and Banking Program), and citizen volunteers.

IMPLEMENTATION STRATEGY:

DEM has completed research to identify significant unprotected areas of the coast, and will target appropriate properties for acquisition. In addition, DEM will work to restore degraded coastal habitat through beach replenishment and dune stabilization. DEM also is analyzing the privately-held intertidal zone, and will identify selected areas where acquisition of right-to-walk easements would provide much-needed public access to the coast.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$15 million.

POTENTIAL FUNDING SOURCE(s):

1987 Open Space Bond Coastal Acquisition Account; 1996 Open Space Bond.

TARGET DATE:

Ongoing as opportunities arise.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Office of Natural Resources
(617) 727-3160
DEM Office of Waterways
(617) 727-3160

DEP RECOMMENDATION #3.10:

The Department of Environmental Protection should complete its statewide inventorying and mapping of coastal and inland wetlands, and provide local conservation commissions with: 1) accurate base maps depicting wetland boundaries, and 2) instruction on proper wetland map interpretation and use.

RATIONALE:

Despite the protection offered by the state Wetlands Protection Act and its Regulations, coastal and inland wetlands continue to be destroyed or degraded at an unacceptable rate. A recent study conducted in southeastern Massachusetts indicated that, between 1977 and 1986 alone, over 1,300 acres of freshwater wetlands were lost. The cumulative impacts of many small projects -- development of homes and businesses, construction of docks and piers, dredging of boating channels -- are often the most significant cause of wetlands loss and habitat decline. Contributing to these losses is the uneven administration and enforcement of wetlands regulations at the local level. This stems in part from a lack of reliable local wetlands information, especially wetland maps which accurately depict wetland boundaries. All too often, Conservation Commissions and other town boards must rely on wetland maps that are either sorely out-of-date or are produced at a scale inappropriate for site-level planning and decision-making. There is an urgent need for more current and consistent wetland maps that can be used both locally and regionally to identify and protect wetlands. At the same time, there is an urgent need for direct technical assistance to the local boards to ensure that they are properly interpreting and using the maps.

RESPONSIBLE AGENT(s):

The DEP Wetlands Conservancy Program (WCP) staff will be responsible for this action.

IMPLEMENTATION STRATEGY:

Funding permitting, the WCP staff will complete the inventorying and mapping of the Commonwealth's coastal and inland wetlands using recent aerial photography and photo interpretation. These updated wetlands maps will be used by state personnel to increase understanding of the extent and condition of the state's wetlands, and to improve coordination among DEP's regulatory programs which deal with wetlands and water quality issues. Equally important, the maps will serve as a new and valuable planning and management tool for local Conservation Commissions and Planning Boards, regional planning agencies, watershed associations and land trusts, and private land owners.

The photos to be used in the mapping process are color infrared (CIR) aerial photos at the 1"=1,000' scale. These photos will be viewed, in stereo, by experienced interpreters from the Wetlands Mapping Unit at the University of Massachusetts. Wetlands will be delineated to a minimum size of one-quarter acre. Currently, the WCP has completed wetlands photo interpretation for over 40% of the state.

The base maps upon which the wetland delineations will be displayed are extremely accurate orthophoto maps at the 1"=417' scale. Because these maps are photo-based, they will show all the features of both the natural and human-made landscape. At this time, approximately 20% of the Commonwealth is covered by this type of base map. Statewide coverage is expected to be completed over the next several years.

As the wetland maps are produced, the DEP Wetlands Conservancy Program staff will present one set of maps, free of charge, to each community's Conservation Commission. The WCP will notify Conservation Commissions of the availability of the maps and will provide instruction on their proper interpretation and use. Additional copies of both the maps and the color infrared aerial photos will be available to other town boards and organizations at the cost of reproduction.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

One set of orthophoto wetlands maps will be given free of charge to each Conservation Commission. Additional maps will be available at a cost of $10 per map. (On average, 5-7 maps will be required for complete coverage of a community.)

POTENTIAL FUNDING SOURCE(s):

1996 Open Space Bond.

TARGET DATE:

Funding permitting, the orthophoto wetlands maps for the following regions are projected to be available by the end of 1996:

Region

Metro/Suburban Boston
Buzzards Bay (West Shore)
MDC Watersheds (Sudbury, Quabbin, Wachusett)
Portions of North Shore (Ipswich, Rowley, and Parker River Watersheds)
City of Cambridge Water Supply Watershed Area
Fort Devens Area
Merrimack Valley

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Division of Wetlands and Waterways
(Wetlands Conservancy Program)
(617) 292-5907

DFWELE ACTION #3.11:

The DFWELE Division of Marine Fisheries should prepare an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region and develop a strategy to prioritize, restore, and maintain these runs.

RATIONALE:

The Division of Marine Fisheries last surveyed the Commonwealth's anadromous fish runs in 1968-1970. A report on this survey, published in 1972, described individual coastal streams and their headwaters; identified obstructions to fish passage; assessed the condition of passage facilities; calculated the size of spawning areas; and developed a priority list for restoration. In the 25 years since this survey was conducted, many changes have occurred. New fishways were constructed while others have deteriorated; populations of anadromous fish were re-established while others have declined; and the character of many streams has changed due to agricultural, commercial, and residential development. In order to successfully manage the Commonwealth's anadromous fish resources, it is necessary to prepare an up-to-date inventory of anadromous fish runs. This inventory would serve as the basis for establishing a prioritized schedule for fish run restoration and maintenance.

RESPONSIBLE AGENT(s):

DMF is ultimately responsible for managing the Commonwealth's anadromous fish resources, although the authority to regulate individual fisheries can be assumed by municipalities under Section 94 of Chapter 130 of the Massachusetts General Laws. With 64 coastal streams within the Massachusetts Bays region, preparation of an updated Bays-wide inventory is a labor-intensive proposition that will require additional staff support, at least on a seasonal basis. The responsibility for restoration strategy development, and the actual restoration and maintenance of fish runs, can be delegated in part to the U.S. Fish and Wildlife Service by utilizing their fishway design capabilities and to municipalities through Section 94. In addition, DMF's evolving *Fishway Stewardship Program* (see DFWELE Action #2) is expected to provide a volunteer labor force to aid in cleaning, maintaining, and regulating fishways over the long term.

IMPLEMENTATION STRATEGY:

DMF will conduct a survey of the 64 coastal streams in the Massachusetts Bays region to determine their present condition and development potential as anadromous fish runs. Basic water quality parameters will be measured for each stream, obstructions to fish passage will be noted, and the condition of existing fishways will be evaluated. The survey will be conducted during the period March 15 - May 15 in order to better confirm the presence or absence of anadromous fish species. DMF will use the 1972 survey report as a guide for designing the new survey, and will present the results in a similar format.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The estimated cost of this action is $7,500, as follows:

Salaries	-	$6,500
Transportation	-	500
Equipment	-	500
Total		$7,500

POTENTIAL FUNDING SOURCE(s):

Federal Wallop-Breaux Funds

TARGET DATE:

1997/1998

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(617) 727-3193

DFWELE ACTION #3.12:

The DFWELE Division of Marine Fisheries, in collaboration with the Riverways Program, should develop and implement a citizen-based *Fishway Stewardship Program* to restore and maintain anadromous fish runs along the Massachusetts Bays coast.

RATIONALE:

Massachusetts coastal streams contain over 200 constructed fishways. These structures allow the passage of a variety of freshwater and anadromous species, although they are primarily intended for use by river herring. DMF, acting under the authority granted by Section 19 of Chapter 130 of the General Laws, has the statutory responsibility to ensure that these structures are in place and functioning properly. After a half-century of continuous fishway construction, most spawning areas of significant size have again been made accessible, and the emphasis is now shifting to ongoing maintenance and repair.

With so many fishways in the Commonwealth, it is impossible for DMF's three-person construction crew to provide the annual attention needed to maintain optimum efficiency of passageways. The problem is exacerbated by the seasonality of the work and the conflicting demands placed on the crew's time by the added responsibilities of shad and alewife stocking.

In the early 1970's, DMF encouraged local control of alewife fisheries to shift some of the burden of fishways management to town government, while still retaining a degree of oversight. In some cases (usually towns with highly visible, income-producing fish runs), this has worked well. Under the leadership of the local herring warden or his/her counterpart, cleanup and repair of fishways are underway. Many other towns, however, have failed to react to the deterioration of their fishways. This failure is due largely to changing administrations, loss of individuals knowledgeable about alewife requirements, and the lack of financial resources during the current economic downturn. In a surprising number of instances, local officials are completely unaware that they have been granted control. The net result is that, while DMF can point to a few spectacularly successful runs, many of the smaller runs which cumulatively may contribute more to the total Massachusetts anadromous fish population are diminishing.

To remedy this problem, DMF, in collaboration with the Riverways Program, has initiated a program of ongoing citizen participation in fishways maintenance and repair. This program, called the *Fishway Stewardship Program*, seeks to enlist the existing broad base of volunteer support established under the "Adopt-a-Stream" program to help DMF's staff improve and maintain the quality of local fish runs along the coast.

The *Fishway Stewardship Program* has the potential to provide the Commonwealth with an effective and economical means of upgrading and maintaining a large portion of its fishways. At the very least, it will provide a much needed watchdog task force to oversee the fish runs and detect problems which DMF can then respond to in a more timely fashion than was possible in the past.

RESPONSIBLE AGENT(s):

The Division of Marine Fisheries and the Riverways Program will share responsibility for implementing this action.

IMPLEMENTATION STRATEGY:

With the basic structure and operating procedures of the program now in place, the Riverways Program, with its already well-established network of Adopt-a-Stream volunteer organizations, is ready to take the lead in promoting the concept.

Riverways and DMF have prepared materials for distribution to groups that want to "adopt" fishways and become long term stewards of anadromous fish runs. Letters of agreement, to be signed by DMF and the volunteer organizations, will describe in detail the tasks to be delegated. DMF will provide onsite instruction and make regular inspections to assess the progress of the work and to correct any problems. In the case of locally controlled fisheries, all work will be cleared through the appropriate town officials. Participants will not be allowed to regulate water flow in public water supplies or water bodies used for agricultural purposes without prior consent of the user. Since local groups will be assigned to individual fishways, management plans specific to the needs of each fishway will be developed.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of this program is expected to be negligible as the work will be performed by volunteers. Any incidental costs, such as for fishway replacement materials, will be borne by DMF, the towns, or affected landowners.

POTENTIAL FUNDING SOURCES:

Not applicable

TARGET DATE:

Several small-scale pilot projects have been underway since 1993, but the full-fledged, formalized program did not begin until 1995. The program will be developed further during 1996, at which time implementation will begin and will be an ongoing proposition.

FURTHER INFORMATION

For further information and assistance contact:

DFWELE Division of Marine Fisheries (Sandwich Office)
(508) 888-1155

DFWELE Riverways Program
(617) 727-1614

EOEA ACTION #3.13:

The Executive Office of Environmental Affairs should continue its innovative *Wetlands Restoration and Banking Program* to restore and protect degraded coastal and inland wetlands.

RATIONALE:

Wetlands provide numerous environmental and economic benefits to Massachusetts. Wetlands help to control flooding, protect the shoreline from storm damage, purify water supplies by filtering out pollutants and sediment, and provide recreational and educational opportunities. In addition, wetlands provide habitat that is essential for commercial fish and shellfish, as well as rare and endangered species. When wetlands are lost, many of these important functions must be provided by manmade facilities, such as wastewater treatment plants, dams, and shoreline protection structures. These facilities are expensive and often fail to replicate the natural wetland functions.

According to recent EOEA estimates, Massachusetts has lost more than 28 percent of its valuable wetlands acreage since Colonial times. In addition, because the state is densely developed, much of the remaining 600,000 acres is moderately or highly degraded. Although Massachusetts has been committed to wetlands protection for decades and has maintained a policy since the early 1990s of "no net loss in the short term, and a net gain in the long term," previous losses, current illegal filling, and continued degradation of wetlands all point to the need for an innovative and ambitious wetlands restoration program statewide.

RESPONSIBLE AGENT(s):

In June of 1994, U.S. Congressman Gerry Studds, Secretary of Environmental Affairs Trudy Coxe, and other federal and state agency representatives signed a *Resolution to Restore Massachusetts Wetlands*. In signing the Resolution, Massachusetts launched a partnership with a host of federal agencies to restore lost and degraded wetlands throughout the state. Included in this partnership are representatives of the Federal Partners of Coastal America, whose purpose is to protect, preserve, and restore the nation's coastal systems by integrating appropriate federal programs and cooperating with state, local, and non-governmental efforts. Federal agencies belonging to the Coastal America partnership include the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the U.S. Departments of Interior, Agriculture, Commerce, and Transportation. These agencies will participate in a coordinated approach to restoring Massachusetts' wetlands that have been filled, drained, and polluted.

The Resolution calls for extensive scientific and citizen advisory committee input to develop a watershed-based wetlands restoration plan. This plan will outline how the cooperating agencies will work closely with communities to: set priorities for wetlands restoration; increase public awareness and support for restoration projects; undertake and complete restoration projects; and monitor these projects to ensure that program goals are met.

As stated by Representative Studds, "this effort represents a level of governmental cooperation that is unprecedented." The *Resolution to Restore Massachusetts Wetlands* establishes a partnership of not only the federal and state agencies that signed the Resolution, but other parties who wish to contribute to wetlands restoration. Partners will play a variety of roles in wetlands restoration, from funding studies to volunteering to plant marsh grass.

IMPLEMENTATION STRATEGY:

Under this Resolution, EOEA's Wetlands Restoration and Banking Program (WRBP) will initiate and coordinate the restoration of drained, filled, and polluted wetlands statewide. Many restoration projects are expected to result from the restoration plans developed under the Department of Environmental Protection Office of Watershed Management (OWM). OWM will use Geographic Information Systems (GIS) and field data, watershed by watershed, to: 1) evaluate water resources information; 2) consolidate and target permitting, enforcement, compliance, technical assistance, and grant programs; and 3) help communities develop wetland resource management strategies. Through this approach, OWM will directly involve communities in water resources decision making, such as choosing appropriate wetland restoration sites.

Unlike wetlands creation and restoration required under permits to compensate for wetlands destruction caused by construction and other activities, WRBP restoration projects may be initiated by project sponsors who simply want to restore Massachusetts' wetland heritage, solve community water quality and flooding problems, or restore wildlife habitat. Restoration project sponsors may be public agencies

(including Conservation Commissions), non-profit organizations, farmers, businesses, or other private landowners.

WRBP will work in partnership with communities, financial supporters, landowners, and project sponsors by:

- developing inventories of wetlands restoration sites, watershed by watershed;
- identifying and supporting project sponsors;
- helping sponsors establish clear goals for restoration projects;
- establishing scientific criteria and providing technical assistance;
- coordinating project funding;
- coordinating with other agencies;
- facilitating restoration work;
- evaluating and reporting project and program successes;
- maintaining a data base of restored wetlands; and
- ensuring that proposed restoration projects comply with state and federal wetlands laws.

As a parallel and complementary effort, WRBP will study the concept of wetlands "banking" as a means of improving the success of wetlands mitigation associated with unavoidable permitted wetlands loss and wetlands violations. A public advisory committee will be convened and broad public input will be sought before final decisions are made.

The Water Resources Commission has established a policy that: 1) mitigation banking shall be utilized to compensate for project impacts only when wetland impacts are unavoidable - that is, all measures have been taken to avoid and minimize such impacts or loss BEFORE mitigation of any kind is considered; and 2) wetlands banks shall not be viewed as an opportunity to propose wetlands fill or increase the amount of proposed fill for any project.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The costs of implementing this multi-year program are as yet undetermined, but are expected to be in the millions of dollars. Program costs support the following components:

- WRBP general operations (staff, travel, equipment, etc.);
- wetlands watershed restoration planning (data gathering, data analysis, public outreach);
- wetlands restoration projects (site assessment, project design, construction, monitoring);
- research; and
- program tracking and monitoring.

POTENTIAL FUNDING SOURCES:

The overall program will rely on a complex support network. At this time, funding for WRBP operations comes from the state operating budget, the state capital budget, and from federal grants. Funding for inventories, projects, and monitoring is expected to come from a variety of public and private sources, such as:

- Partners For Wildlife - USFWS;
- S.22 Planning Assistance to States - ACOE;
- Floodplain Management Studies - ACOE;
- MARSH Program - Ducks Unlimited;
- 319 Nonpoint Source Competitive Grants - DEP/EPA;
- 104(b)(3) Wetlands Grants - EPA/DEP;
- 104(b)(3) Stormwater Grants - EPA/DEP;
- Massachusetts Environmental Trust;
- ISTEA - FHA/MHD;
- National Fish & Wildlife Foundation Grants; and
- Open Space Bond.

TARGET DATE:

Wetlands restoration is an ongoing, long term effort. Developing detailed wetlands inventories for each watershed will take several years. WRBP will rely on those inventories to prioritize and select future projects. However, the important work of restoring the Commonwealth's wetlands resources cannot wait for completion of the inventories. Work on several restoration projects is already underway and WRBP is seeking additional restoration projects and project sponsors. The success of WRBP's wetlands restoration efforts will depend on an active and involved citizenry.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Wetlands Restoration & Banking Program
(617) 727-9800 x213

EPA/NMFS/ACOE ACTION #3.14:

The Environmental Protection Agency, National Marine Fisheries Service, and Army Corps of Engineers should continue and expand their current efforts to support eelgrass habitat protection and restoration in Massachusetts and Cape Cod Bays.

RATIONALE:

Eelgrass (*Zostera marina* L.) is a submerged, narrow-bladed, grass-like plant which typically grows in the shallow, less disturbed waters of Massachusetts and Cape Cod Bays. This plant performs many important functions in the estuarine ecosystem. It is usually found in "beds," distinct ecosystems which provide breeding and nursery habitat for many finfish species, as well as for shellfish and crustaceans. It also is a food source for numerous species of wading birds and migratory waterfowl. In addition, eelgrass beds serve to both stabilize coastal sediments and filter suspended particulates and nutrients from surrounding waters. Finally, decaying eelgrass supplies significant quantities of organic material to the oceanic food chain.

These varied and important functions create significant economic value for the recreational and commercial fishing industries, the recreational hunting industry, and the tourism and service industries which support these activities. Further, due to its sensitivity to changes in water quality, eelgrass is an important indicator of the overall health of the estuarine ecosystem.

Research has identified four major factors affecting the health and expansion potential of eelgrass beds:

1) ***General water quality degradation; reduced water clarity, in particular***. As water clarity is reduced, the depth to which light sufficient for eelgrass growth can penetrate is also reduced. Wastewater disposal, discharge of stormwater runoff, and faulty septic systems all can contribute to reduced water clarity;

2) ***Elimination of suitable habitat***. Dredging, filling, and pier construction are examples of activities that can reduce or eliminate shallow water areas where eelgrass thrives;

3) ***Conflicts with fishing and boating activities***. Propeller wash and fishing gear can uproot large areas of eelgrass; areas frequently exposed to this type of activity typically display non-vegetated bottom sediments; and

4) ***"Wasting" disease***. This disease has been implicated in widespread eelgrass die-offs. However, neither the exact cause of the disease nor the conditions which trigger its outbreaks have been conclusively determined.

Given the obvious importance of these habitats to the economic and environmental health of the estuarine ecosystem, as well as the significance of the impacts to these habitats, it is important for all involved parties to support, enhance, and expand their protection, management, and restoration activities.

RESPONSIBLE AGENT(s):

The EPA, NMFS, and ACOE will continue to be the major responsible parties for these efforts, with support from other federal agencies (such as the U.S. Fish and Wildlife Service), state agencies, municipalities, research institutions, and nonprofit organizations.

IMPLEMENTATION STRATEGY:

For several years, EPA and NMFS have convened an annual technology transfer meeting for eelgrass researchers and regulators in New England, including those working within the Massachusetts Bays region. These two agencies will continue this effort, as it provides significant opportunities for the exchange of technical information, research results, and other pertinent data among the responsible agents. Further, EPA and NMFS, along with ACOE, will seek to capitalize on other opportunities to restore, protect, or manage eelgrass habitat, within their existing operating budgets.

LEGISLATION REQUIRED:

None.

ESTIMATED COST:

Minimal. The annual technology transfer meeting is covered by the current operating budgets of the participating organizations; in addition, the recommendation for any future action includes the stipulation that such action would occur within these current budgets.

POTENTIAL FUNDING SOURCES:

Agency and organization operating budgets, as previously noted, as well as contributions of cash and in-kind services from these participants.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

Environmental Protection Agency
(617) 565-3533
National Marine Fisheries Service
(508) 281-9204
Army Corps of Engineers
(617) 647-8231

ACTION PLAN #4

REDUCING AND PREVENTING STORMWATER POLLUTION

Precipitation that falls on land either percolates into the ground or drains into streams, rivers, and, eventually, the sea. Although precipitation is often considered to be generally free of contaminants as it falls, in fact it can pick up a variety of contaminants from the air. As it pools on the ground and flows over the land, it picks up many more. Before reaching the sea, stormwater travels over countless streets, parking lots, lawns, golf courses, and farms. As it goes, it washes sediments, pathogens, nutrients, toxic metals, pesticides, and other organic compounds off the land, and eventually, into coastal waters.

In order to drain roadways efficiently and to eliminate or reduce local flooding, most urban and suburban areas are serviced by stormwater collection systems. These systems direct excess water through stormwater drains which connect to basins, ditches, or pipes. These, in turn, leach the runoff into the groundwater or divert it directly into a nearby surface waterbody. Of course, as it flows to the storm drains, the runoff collects debris, sediment, animal wastes, toxics, oil, and just about everything else that accumulates on city streets. If the collection system diverts the runoff into a coastal tributary, these contaminants will eventually reach, and degrade, nearshore waters.

In older urban areas, storm drains may lead to combined sewers which carry both stormwater runoff and municipal wastewater. During periods of wet weather, excessive stormwater can quickly overwhelm the combined sewer system's limited flow capacity. When this happens, the combined sewers overflow and discharge untreated sewage and stormwater directly into receiving waters. The sewage component of the overflow typically carries extremely high levels of pathogens and other wastewater contaminants.

Rural runoff also can contribute to water quality problems in the coastal zone. In areas that are not serviced by stormwater collection systems, most stormwater percolates into the soil and groundwater, where it is gradually released to rivers, wetlands, estuaries, and other surface water bodies. A portion of stormwater (up to 40 percent) can flow as unconsolidated sheets directly into surface waterbodies. Although sheet flow generally moves more slowly, and therefore carries less debris than urban runoff, it does carry away pathogens, nutrients, and some sediments. In agricultural areas, it picks up toxics used in pesticides and herbicides, and in the same way, it washes fertilizer from suburban lawns and golf courses.

Development generally exacerbates stormwater impacts. By increasing the percentage of land that is paved or otherwise covered with impervious surfaces such as roads, parking lots, rooftops, and driveways, development reduces percolation, and increases both the volume and velocity of stormwater runoff. As stormwater flows increase, so too do the total contaminant loads reaching coastal waters and wetlands.

Historically, the institutional and statutory framework for regulating stormwater runoff has not been cohesive. Amendments to the Federal Clean Water Act of 1987 updated and revised the municipal and industrial stormwater discharge permit program, administered by EPA. This program (the National Pollutant Discharge Elimination System, or NPDES) applies to stormwater discharges from both large municipalities (population greater than 100,000) and to numerous types of industrial land uses. Given the sheer number of potential permits in this latter category, EPA actions have largely focused, and will continue to focus, on discharges of major environmental impact or those located in high priority resource areas. Additional efforts include general permits for industrial land uses.

Nevertheless, this picture has been changing in a positive way in recent years with the development of two strong and complementary nonpoint source pollution initiatives by the Massachusetts Coastal Zone Management Office (CZM) and the Massachusetts Department of Environmental Protection (DEP). These two state agencies share responsibility for developing and implementing the state's Coastal Nonpoint Program. They have worked closely with other state agencies, local officials, Regional Planning Agencies, non-profit organizations, and wide range of industry groups and affected individuals to develop a comprehensive and effective coastal nonpoint program. CZM has assumed the lead for developing this program and its associated action plan (*Coastal Nonpoint Pollution Control Plan*, or CNPCP) with support and coordination from DEP. The CNPCP contains comprehensive descriptions and explanations of the various federal

requirements mandated under s.6217 of the 1990 Coastal Zone Act Reauthorization Amendments. It also describes the specific strategies Massachusetts has developed to implement effective, enforceable stormwater and other nonpoint source (NPS) controls, as well as preventive planning. In support of these control and planning efforts, CZM is developing a technical guidance document, *The NPS Control Manual: Guidance for Local Officials, Planners, and Managers to Aid in Implementation of s.6217 Management Measures.*

Paralleling this effort, DEP, with assistance and coordination from CZM, has developed a comprehensive stormwater control strategy (the "Stormwater Initiative") to regulate stormwater discharges through existing environmental programs. For example, through its Office of Watershed Management (OWM), DEP will focus on enforcing stormwater discharges that require federal NPDES permits, as well as on conducting assessments and requiring remediation of other significant existing discharges. DEP also is drafting a series of stormwater management performance standards which will be implemented through the regulatory review and permitting processes of the Wetlands Protection Act and the s.401 Water Quality Certification Program. In support of this effort, DEP is developing a guidance manual, *Urban Best Management Practices for Massachusetts*, to explain these performance standards and provide technical and regulatory guidance to the regulated community and local officials.

Locally-developed stormwater controls can complement these stormwater regulations and prescribed performance standards originating at higher levels of government. Within well-established municipal authority, there are numerous methods to control water pollution associated with new development. One of the most effective methods of mitigating the impact of stormwater is through the adoption of regulations or bylaws designed to limit the loadings of bacteria, nutrients, and sediments. At the present time, few communities in the Massachusetts Bays region have adopted such regulations or bylaws.

A simpler method of controlling stormwater impacts is through the use of existing regulatory reviews. For example, under the provisions of the state Wetlands Protection Act (WPA), any development within or near a wetland must be reviewed by the local Conservation Commission. In order to mitigate the impact of stormwater on a nearby wetland or waterway, the Commission may condition its permit on appropriate measures to control both short-term construction impacts and long-term changes in runoff quantity and quality. One frequently imposed condition requires that developers use stormwater retention basins and/or leaching fields to prevent an increase in the peak runoff rate. Although the Commission's authority to impose such conditions ends at the limits of the WPA, Planning Board review offers further opportunities for community input on stormwater mitigation. Subdivision regulations, for example, may provide guidelines for removing runoff from roads and paved areas, although currently these regulations are more often used to promote drainage efficiency rather than to protect water quality.

Municipalities can best prevent future stormwater impacts by implementing "best management practices" (BMPs) at the local level. Accepted BMPs include:

- *infiltration devices* to increase the percolation of stormwater into soil and thus decrease runoff volume. These devises may include porous pavement, soak-away pits or dry wells, infiltration trenches, percolation basins, and grass swales;

- *wet detention basins* to detain runoff and allow for settling of sediments and reduction of nutrients through biological processes; and

- *regular public works cleaning and maintenance* to remove sediment, debris, and associated contaminants from streets, catch basins, and storm sewers.

Of course, the most effective and most appropriate stormwater mitigation design will vary with individual site conditions, the type and use of receiving waters, and the cost of implementation.

Although local stormwater controls can minimize the impact of new development, there is really no easy or inexpensive way to reduce the impact of *existing* storm drains and ditches, which are present in large numbers throughout the Massachusetts Bays region. In some cases, it may be cost-effective to concentrate mitigation efforts on especially problematic point sources of stormwater runoff, such as those known to be impacting shellfish beds. However, such sources constitute only a small part of the total runoff problem, so long-term solutions will ultimately require broader scale remediation, sound land use planning, and proactive runoff control strategies. A collaborative effort between federal, state, regional, and municipal officials will be required to successfully address stormwater pollution in the Massachusetts Bays region.

The following recommended actions are an important step in this direction.

MUNICIPAL ACTION #4.1:

Municipalities should adopt subdivision regulations that require the incorporation of stormwater runoff best management practices (BMPs) into all new development plans.

RATIONALE:

Stormwater runoff from developed areas and construction sites is a major source of sediment, nutrients, and bacteria to Massachusetts Bays, and contributes to the closure of shellfish harvesting areas and swimming beaches. Over the past two decades, a number of stormwater runoff BMPs have been developed and refined to help mitigate adverse impacts associated with development activity. BMPs such as porous pavement for driveways or parking lots, infiltration basins, constructed wetlands, and grassed swales and filter strips can attenuate downstream flood flows and control the transport of pollutants from new development sites. By mandating such practices as a fundamental component of each subdivision development plan, communities can minimize further stormwater impacts to Massachusetts Bays and its living resources.

RESPONSIBLE AGENT(s):

Local Planning Boards will have primary responsibility for this action, but should solicit the advice and assistance of other local authorities -- Conservation Commissions, town engineers, DPW or highway departments, Boards of Health -- that are also concerned with stormwater management. Technical assistance in drafting the regulations is available from the Regional Planning Agencies (RPAs). In addition, the DEP Nonpoint Source Program can offer specific guidance on performance standards. Involvement of these agencies can help ensure consistency of regulations between communities which share watersheds or embayments.

IMPLEMENTATION STRATEGY:

Model stormwater management regulations are available from a variety of sources, including the RPAs and the DEP Nonpoint Source Program, and these can serve as useful guides in developing regulations tailored to local conditions. Such regulations generally emphasize retention and treatment of stormwater on-site via source controls and best management practices, and contain: 1) minimum design and/or performance standards to prevent the generation and transport of stormwater pollutants off-site; and 2) inspection and maintenance requirements to ensure the structural integrity and pollutant removal efficiency of BMPs during and after construction of a project. Because stormwater often impairs water resources and habitats shared by multiple jurisdictions, it is imperative that communities coordinate their actions to ensure successful implementation at the natural resource, rather than individual town, level.

LEGISLATION REQUIRED:

This action requires new or upgraded local stormwater management regulations, adopted by Planning Boards as an addition to their existing subdivision rules and regulations.

ESTIMATED COST:

The cost of developing and adopting the new regulations should be minimal. Model regulations are available that can be incorporated either in their present form or with minor modifications to reflect individual community needs. Technical assistance in drafting the regulations is available from the Regional Planning Agencies, DEP Nonpoint Source Program, and Natural Resources Conservation Service (formerly Soil Conservation Service) Community Assistance Unit.

POTENTIAL FUNDING SOURCE(s):

Local revenues

TARGET DATE:

1996/1997. This is a high priority action from a water quality standpoint, and should be implemented by Planning Boards as soon as possible to prevent additional discharges of untreated stormwater runoff from new development sites.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Nonpoint Source Program
(617) 292-5597
Natural Resources Conservation Service
(508) 295-1481

MUNICIPAL ACTION # 4.2:

Municipalities should implement best management practices to mitigate existing stormwater discharges that are causing or contributing to the closure of shellfish harvesting areas and swimming beaches.

RATIONALE:

Sanitary surveys conducted by the Division of Marine Fisheries (DMF), the Department of Environmental Protection (DEP), and others have documented the presence of hundreds of known and suspected stormwater pollution sources along the Massachusetts Bays' coast. These sources, including storm sewers and drainage ditches, have been found to be major contributors of bacteria and other pollutants to coastal waters, and are a leading cause of shellfish bed and swimming beach closures. Mitigation of these sources through the application of appropriate BMPs is essential to reclaiming and preserving these resources for present and future use.

RESPONSIBLE AGENT(s):

Stormwater mitigation projects can be complicated and costly, and will generally require the participation and commitment of property owners and a number of local authorities, including chief elected officials, public works officials, harbormasters, shellfish officers, boards of health, and Conservation Commissions. Representatives of these groups should take the lead on local stormwater mitigation projects through the formation of "Water Quality Task Forces" or "Coastal Pollution Control Committees." Technical assistance, including assessment of water quality data and design of best management practices, is available from DMF, DEP, the Natural Resources Conservation Service/MassCAP (formerly Soil Conservation Service), and Regional Planning Agencies.

IMPLEMENTATION STRATEGY:

Before actual mitigation can begin, the Water Quality Task Forces will need to inventory, evaluate, and prioritize storm drain problems based on their effect on critical resources and the technical feasibility and cost of mitigation. This would include seeking out and eliminating illegal sewer connections to storm drains. (The Boston Water and Sewer Commission, in particular, has been successful in reducing local pollution problems on beaches by eliminating illegal sewer connections.) Communities sharing an embayment or affected resource area should coordinate their efforts to ensure that the mitigation project will result in the reopening or substantial improvement of shellfish beds or swimming beaches.

Following the prioritization of storm drain problems, the Water Quality Task Forces will need to evaluate the mitigation options available, then select, design, and implement BMP(s) appropriate for the conditions at hand. Throughout this process, DMF and Natural Resources Conservation Service/MassCAP personnel can work cooperatively with the municipalities (as they did recently in assessment projects in Ipswich and Gloucester), providing technical information and engineering expertise not available locally. DEP's Nonpoint Source Program staff and CZM's Coastal Nonpoint Program staff can provide information on BMPs and performance standards as well as technical assistance.

LEGISLATION REQUIRED:

New legislation is not required unless a community seeks to establish a special stormwater utility district, in which case two-thirds majority approval by both houses of the State Legislature is required.

ESTIMATED COSTS:

Costs for stormwater treatment facilities (sediment basins, constructed wetlands, peat-sand filtration systems, etc.) vary widely, depending on such factors as drainage and impervious surface area, land use, soils, cost of land rights or easements, and maintenance requirements. Design and permitting costs can range from 50% to over 100% of construction costs. (At the high end of such costs would be retrofitting of storm drain outlets just above the high tide line, for example.) Construction costs range from under $10,000 to over $30,000 per impervious acre treated.

POTENTIAL FUNDING SOURCES:

Potential sources of funds include: Section 319 Nonpoint Source Program grants available from the DEP; State Revolving Fund (SRF) loans, available from the DEP;

ISTEA "Enhancement" funds available from the Massachusetts Highway Department; Coastal Pollution Remediation Program (CPR) funds available from CZM; and stormwater utility fees. (The latter require prior Legislative approval of special stormwater utility districts.)

TARGET DATE:

1996 and as funds permit. This is a high priority action from a water quality standpoint, and should be implemented by municipalities as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Nonpoint Source Program
(617) 292-5597
CZM Coastal Nonpoint Program
(617) 727-9530
Natural Resources Conservation Service
(508) 295-1481

DEP ACTION #4.3:

The Department of Environmental Protection, in collaboration with Regional Planning Agencies, Natural Resources Conservation Service/MassCAP (formerly U.S. Soil Conservation Service), and Massachusetts Coastal Zone Management Office, should: 1) disseminate its *Nonpoint Source Management Manual* and *Urban Best Management Practices for Massachusetts*, and 2) sponsor public workshops to educate local officials about best management practices and performance standards for controlling stormwater runoff.

RATIONALE:

The Department of Environmental Protection (DEP), through its Nonpoint Source Program, has produced and distributed an excellent general guidance document for local officials, entitled *Nonpoint Source Management Manual -- A Guidance Document for Local Officials*. A second guidance document, *Urban Best Management Practices for Massachusetts*, is in preparation.

The first of these documents, commonly referred to as the *Megamanual*, offers general guidance on the management of a broad range of diffuse, largely unregulated, *nonpoint* sources of pollution, such as stormwater runoff, landfill leachate, and agricultural runoff. It is intended to provide local officials with the framework for developing a community-based *Nonpoint Source Management Plan* that is tailored to each community's individual circumstances and needs. Such a plan can serve as a blueprint for initiating and directing local actions that will protect and manage water resources and related land uses. The plan also can be used to document the need for, and identify sources of, financial, planning, and technical assistance. The ultimate goal is to prevent and mitigate nonpoint source pollution, with the emphasis on *prevention*. Without exception, pollution prevention and source reduction have proven to be more effective and less costly than remedying a problem after the fact.

The second guidance document, *Urban Best Management Practices for Massachusetts*, is still in development and will provide technical details and design recommendations for acceptable stormwater control practices. It also will provide performance standards that must be met, including standards for reducing annual loadings of total suspended solids by 80 percent. The guidance will not mandate the implementation of specific practices, however. All of the performance standards will be consistent with CZM's s.6217 management measure requirements, and the development of the DEP document is being closely coordinated with CZM and other agencies.

Broader outreach, including hands-on workshops, is needed to ensure that both the *Megamanual* and *Urban Best Management Practices for Massachusetts* reach their intended audience (i.e., Planning Boards, Boards of Health, Conservation Commissions, Public Works Departments, and other local stormwater management practitioners), and that their pollution control recommendations are understood and implemented.

RESPONSIBLE AGENT(s):

DEP's Nonpoint Source Program staff will have primary responsibility for this action, but should seek the advice and assistance of the Regional Planning Agencies, Natural Resources Conservation Service/MassCAP, and CZM's Coastal Nonpoint Program.

IMPLEMENTATION STRATEGY:

Under the direction of DEP's Nonpoint Source Program staff, the above agencies should jointly develop a strategy for financing and holding a series of regional workshops aimed at educating local officials about best management practices (BMPs) and performance standards to control stormwater runoff and other nonpoint sources of pollution. The workshops should be specifically targeted to Chief Elected Officials, Planning Boards, Boards of Health, Conservation Commissions, Public Works Departments, and other municipal authorities who play a key role in local pollution control policies, regulations, and practices. The workshops should be held at convenient locations and should be extensively advertised via press releases, direct mailings, and telephone calls in order to maximize community participation. The five Local Governance Committees (LGCs) of the Massachusetts Bays Program should be explored as a vehicle for co-sponsoring and promoting the workshops.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$5,000 per regional workshop (includes additional copies of both the *Megamanual* and *Urban Best Management Practices for Massachusetts*, and handout materials tailored to individual boards and departments).

POTENTIAL FUNDING SOURCE(s):

DEP Nonpoint Source Program; CZM Coastal Nonpoint Source Program; Massachusetts Highway Department surface transportation enhancement (ISTEA) funds.

TARGET DATE:

Planning and development of workshops and handout materials - 1996/1997
Publicizing and holding of workshops - 1997/1998

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Nonpoint Source Program
(617) 292-5500
CZM Coastal Nonpoint Program
(617) 727-9530
Natural Resources Conservation Service
(508) 295-1481

DEP ACTION #4.4:

The Department of Environmental Protection should develop a coordinated and streamlined regulatory system within DEP to assure effective implementation of the stormwater components of the Massachusetts Clean Water Act, Wetlands Protection Act, and Federal Stormwater Program (Federal Clean Water Act, Sections 401 and 402).

RATIONALE:

Overlapping regulatory authority on stormwater permitting has given rise to conflicting standards and a confusing, inefficient bureaucracy. Stormwater needs to be regulated with "less process and more protection" so that the DEP can direct its limited resources where they will be most effective.

Accordingly, DEP's Stormwater Initiative will implement a regulatory and outreach program designed to address the discharge of untreated stormwater runoff by promoting effective stormwater management practices. This program will simplify the existing system, which is currently inefficient and confusing for regulated parties and regulators alike. The goal is a streamlined, enforceable, and predictable permitting process which will improve water quality and decrease flooding impacts, leading to both economic and environmental benefits.

With the assistance of an Advisory Committee, DEP has drafted proposed stormwater performance standards to establish uniform criteria for adequate stormwater management for use as Department-wide guidance. These standards are intended to be consistent with the Surface Water Quality Standards, the requirements of the Wetlands Protection Act, and the regulations to protect drinking water supplies. The standards establish design criteria that will require implementation of stormwater management systems to reduce water quality and flooding impacts.

RESPONSIBLE AGENT(s):

DEP's Bureau of Resource Protection (BRP), assisted by an Advisory Committee, will be responsible for this action.

IMPLEMENTATION STRATEGY:

The DEP Advisory Committee has reviewed the agency's existing organizational responsibilities, policies, and standards relative to stormwater pollution control, and has recommended improvements that will lead to a more coordinated and streamlined regulatory system within the Department. Initiatives to be undertaken tentatively include the following:

- Development and adoption of BRP stormwater performance standards which, if met by project proponents, will protect the interests of the Wetlands Protection Act and eliminate the need for a surface water discharge permit.
- Establishment of a review process that encourages Conservation Commission use of the adopted BRP performance standards when writing local Orders of Condition; dissemination of BMP guidance materials to project proponents proposing stormwater discharges; and targeting of certain large projects for individual review using the MEPA thresholds.
- Setting of stormwater management priorities, beginning with the impact of highway runoff within public water supply watersheds and areas discharging to closed or threatened shellfish beds.
- Addressing existing stormwater discharges within the basin framework established by the Office of Watershed Management (OWM).

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$40,000.

POTENTIAL FUNDING SOURCE(s):

DEP Nonpoint Source Program funds; Section 104(b)3 stormwater funds (currently being used).

TARGET DATE:

This action is expected to be implemented by DEP according to the following schedule:

Task	Projected Completion Date
Develop/adopt stormwater performance standards	Spring 1996
Develop BMP manual and related guidance	June 1996
Revise policies/regulations	June 1997
Prepare/distribute outreach materials	Winter-Spring 1996
Select implementation target areas (as part of EOEA/OWM basin program)	1996

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Bureau of Resource Protection
(617) 556-1172

EPA ACTION # 4.5:

The Environmental Protection Agency should reduce stormwater pollution in the Massachusetts Bays watersheds through: (a) technical assistance to communities in developing comprehensive stormwater management programs; and (b) National Pollutant Discharge Elimination System (NPDES) compliance for industrial stormwater dischargers. Targeted areas are the lower Charles River for the stormwater management programs and the Neponset River for the industrial stormwater dischargers.

RATIONALE:

Typically, water which runs off from developed areas such as lawns, streets, parking lots, and construction sites during storm and melting events ("stormwater runoff") carries numerous contaminants, including nutrients, bacteria, and solids. In particular, runoff from residential areas is usually less polluted than that from industrially developed facilities, as the latter often carries metals, oils and grease, and other toxic substances from material storage locations, parking lots, and related facilities. In either case, the runoff is frequently directed to a wetland, waterway, or waterbody where these contaminants are discharged. Adverse impacts to these sensitive ecosystems from the released contaminants include algal blooms, decreased dissolved oxygen levels, and sedimentation.

While numerous remedial and preventive "best management practices" (BMPs) exist to minimize water quality impacts from stormwater runoff, their implementation is enhanced when undertaken through a comprehensive stormwater management program. These programs will be prepared on a community-by-community basis along the lower Charles River as part of the EPA's initiative to restore this portion of the river to fishable and swimmable status by 2005. Due to its urban nature, the lower Charles River receives significant quantities of polluted runoff from developed areas, leading to poor water quality. Accordingly, the comprehensive programs will address related issues such as pollutant source identification and prevention, as well as design and implementation of appropriate BMPs. These programs will be developed in conjunction and coordination with related efforts such as the MBP and DEP's Basin Team, within EPA's position to offer technical assistance where needed or required.

Stormwater runoff is also a significant water quality problem in the Neponset River. The Neponset River watershed has served as the pilot project for the Massachusetts Department of Environmental Protection's (DEP) assessment, planning, and implementation efforts that comprise the state's Watershed Initiative. In support of this Initiative as well as community-based efforts, EPA will work with industrial dischargers to build compliance with the NPDES stormwater program. Through a permitting process in this program, certain industrial facilities which discharge stormwater into wetlands, waterways, and waterbodies are required to implement BMPs to improve the quality of their discharges.

RESPONSIBLE AGENT(s):

The initiative to improve water quality in the lower Charles River will be guided and monitored by EPA's "Clean Charles Task Force," comprised of state agencies, local communities, and environmental groups. With respect to NPDES compliance, EPA will be primarily responsible for supporting outreach and permitting industrial discharges in the Neponset River watershed, with continued coordination with the Massachusetts DEP.

IMPLEMENTATION STRATEGY:

No major organizational efforts are needed to implement these recommendations in the specified areas; EPA has already created the Clean Charles Task Force and has been a participant in the Watershed Initiative/Neponset pilot project since its inception.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The financial resources necessary to support the EPA staff charged with carrying out these recommended actions are currently being considered for inclusion in the agency's operating budget.

POTENTIAL FUNDING SOURCE(s):

Agency and organizational operational budgets, as well as potential contributions of cash and in-kind services from participants.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance contact:

EPA - New England
(617) 565-4422

MHD ACTION # 4.6:

The Massachusetts Highway Department should prepare an *Environmental Manual* to complement its *Highway Design Manual* and provide for the integration of environmental considerations (including stormwater management) into all phases of highway project planning, design, construction, and maintenance.

RATIONALE:

In 1989, the Massachusetts Highway Department (formerly the Massachusetts Department of Public Works) issued a comprehensive *Highway Design Manual* to guide the planning and design of all highway construction, reconstruction, and rehabilitation projects for which the Highway Department is responsible. This manual describes the highway design process and prescribes specific criteria to be used by Department engineers and consultants in designing projects to meet all necessary transportation service and public safety requirements. Among the criteria are a series of drainage and erosion control measures that are intended to prevent or minimize project-related flooding, erosion, and sedimentation, both on-site and downstream. While these criteria give considerable attention to controlling the *hydraulic* aspects - i.e., the volume and rate - of stormwater runoff, they do not adequately consider the *water quality* aspects of stormwater runoff (especially in light of the recent advancements in the application of stormwater Best Management Practices). As a result, some highway projects are failing to achieve the stormwater pollutant removal efficiencies that are necessary to safeguard inland and coastal water quality. A comprehensive *Environmental Manual* to complement the Highway Department's *Highway Design Manual* is needed to ensure the integration of environmental considerations, including stormwater quality control, into all phases of highway project planning, design, construction, and maintenance. In addition to serving the specific needs of the state Highway Department engineers and consultants, this manual could also be a valuable guidance document for *local* public works personnel.

RESPONSIBLE AGENT(s):

MHD's Environmental Division will be responsible for this action.

IMPLEMENTATION STRATEGY:

Preparation and implementation of the *Environmental Manual* will be pursued in accordance with the following work elements:

1. Development of a Targeted Outreach Program to identify the goals and responsibilities of the Highway Department, applicable regulatory agencies, and environmental advocacy groups, and to identify regional environmental issues to be considered in the development and maintenance of corridor-specific roadway and bridge projects and maintenance of facilities.

   This outreach program will consist of meetings with applicable Division and District staff of the Highway Department, the Massachusetts Executive Office of Transportation and Construction, and all regulatory branches of the federal and state agencies which have permit responsibilities for highway and bridge projects. Agencies such as the Federal Highway Administration, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Massachusetts Environmental Policy Act (MEPA) Unit, and the Massachusetts Department of Environmental Protection will be included. A professional facilitator will be provided through a consultant contract to moderate the meetings with regulatory agencies and advocacy groups in order to maintain focused discussions on agency purpose and need and on general regulatory requirements, rather than on project specific discussions.

   Targeted environmental advocacy groups will include watershed associations, the Massachusetts Association of Conservation Commissions, and the Massachusetts Bays Program Coastal Advocacy Network.

   A committee of Highway Department staff selected by the chief Engineer and chaired by the Environmental Project Manager will participate in these outreach meetings. Representation will consist of the appropriate MHD Divisions and Bureaus and all District offices.

   The information gained through these meetings will be used in the development of the *Environmental Manual* as described in elements 2 through 4, below, and will also be used to develop environmental resource guides for each District. These resource guides will provide information on the priority environmental concerns within each region of the State and will serve as a focus for design alternatives analysis.

2. Preparation of the main body of the *Environmental Manual* to include:

   - Environmental Policy Directive for Department activities; and

   - Identification of the specific tasks and level of effort of environmental review, documentation, design considerations, and best management practices for all phases of project advancement from planning through construction and maintenance.

   Coordination and review of each section of the *Environmental Manual* will be undertaken with the District Highway Directors and applicable Divisions and Bureaus within Headquarters to insure that the policies and procedures properly reflect the mission of the Department to design, build, and maintain a safe and efficient highway system for the general public.

3. Preparation of Guidance and Directive on the preparation of all permits and regulatory compliance actions required for highway and bridge projects.

   For all permits and compliance actions that may be required by a highway or bridge construction/ maintenance project, guidelines will be developed which will detail the type and extent of information, documentation, coordination, and plans needed to complete a permit/compliance application.

4. Preparation of Training Modules for use by the Environmental Division and others for conduct of training for Department personnel and consultants.

   To effectively implement the *Environmental Manual*, training will be provided to both Department personnel and consultants on a regular basis. Such training will be offered in the form of training modules with appropriate graphics and resource materials.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$430,000

POTENTIAL FUNDING SOURCES:

Federal Highway Administration Statewide Planning and Research (SPR) funds.

TARGET DATE:

1996-1997.
Preparation of the *Environmental Manual* began in 1994 and is expected to be completed in 1996. Development and presentation of the training modules and accompanying resource materials are planned for 1996/1997.

FURTHER INFORMATION:

For further information and assistance contact:

MHD Environmental Division
(617) 973-7309

MHD ACTION #4.7:

As part of its forthcoming pollution prevention plan, the Massachusetts Highway Department should develop a *Stormwater Pollution Mitigation Program* to identify, prioritize, and correct existing stormwater pollution problems associated with state highway drainage facilities.

RATIONALE:

In 1994, Governor Weld issued Executive Order 350, known as the "Clean State Order." Under this Order, state agencies were directed to identify all existing and potential environmental problems associated with state facilities and properties. A cooperative inter-agency effort was initiated to identify, prioritize, and correct these problems. The technical expertise of state employees of all agencies was pooled to implement an effective program of environmental compliance.

A major component of the Executive Order is the preparation of Pollution Prevention Plans for each agency. These plans prescribe preventive measures that can be taken to insure that future violations do not occur, and identify pro-active measures which can be implemented to improve the environmental sensitivity of each agency's actions.

Currently, state roadway and bridge projects are selected solely on the basis of safety and operational criteria. Unsafe conditions or structural deficiencies dictate priorities for action. These criteria are seen as having paramount importance because the State Highway Department has been specifically charged by the Legislature with providing a safe and efficient roadway system for the transport of people and goods. Indeed, this is the Department's primary mission. Nevertheless, other criteria could be added to the selection process, and the analysis of existing roadway deficiencies could be broadened to include consideration of stormwater pollution problems associated with state highway facilities.

Above the agency level, the Commonwealth as a whole has a broad mission to insure the safety and well-being of the public. This mission includes protection of water and other environmental resources. Within each agency's areas of responsibility, then, consideration of the statewide public interests should be integrated with the assigned agency mission.

The Massachusetts Highway Department currently incorporates stormwater best management practices (BMPs) as part of the design process on individual projects. However, this is a piecemeal approach and its impact on improving water quality statewide is extremely limited. A pro-active, agency-wide program should be developed to identify existing stormwater pollution problems statewide, prioritize these problems for corrective action, and incorporate this prioritization scheme into the project selection process.

Since the Highway Department has jurisdiction over thousands of miles of roadway throughout the state -- roadways which traverse every major watershed and many water supply zones of contribution -- implementation of such a stormwater mitigation program could have a major beneficial impact on water resources statewide.

RESPONSIBLE AGENT(s):

The Commissioner of the Massachusetts Highway Department is responsible for establishing policy for the agency, and the Chief Engineer implements these policies through the various Divisions and Districts. A commitment should be made by the Commissioner to establish stormwater pollution mitigation as an environmental priority for the agency. The Chief Engineer would then direct the appropriate Division within MHD to take the lead in developing a Stormwater Pollution Mitigation Program.

IMPLEMENTATION STRATEGY:

The *Environmental Manual* to be developed by the Department (see MHD Action #1) would provide the appropriate vehicle for developing the framework for the Stormwater Pollution Mitigation Program. The Scope for the proposed *Environmental Manual* includes an outreach component

which will bring together a wide range of environmental agencies and advocacy groups. Their collective expertise on stormwater management could be tapped to help develop the Stormwater Pollution Mitigation Program.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Development of the Stormwater Pollution Mitigation Program could be undertaken as part of the *Environmental Manual* project, for which funding is currently being pursued.

Implementation of the program -- i.e., correction of the stormwater problems statewide -- is expected to cost many millions of dollars. This could be programmed into each year's transportation budget through the Bond Bills submitted to the Legislature every few years. This would spread out the cost and minimize the financial impact on the general public.

POTENTIAL FUNDING SOURCE(s):

The Transportation Bond Bills provide state funds for projects undertaken by the transportation agencies. The 1994 Bond Bill passed by the State Legislature provides approximately $1 million for the retrofitting of stormwater systems for the purpose of mitigating pollution. Future Bond Bills should continue to incorporate similar requests.

The Federal Transportation Bond, known as ISTEA (Intermodal Surface Transportation Efficiency Act), is the funding source for projects eligible for federal aid. Use of these funds for improvements to drainage systems is permissible when such improvements are part of a larger roadway project. In addition, a new category of funds, "Enhancement Funds," can provide grants for projects which fall within certain specified categories. Stormwater pollution mitigation is one of those categories.

TARGET DATE:

The identification and prioritization of existing stormwater pollution problems is expected to be completed by MHD during 1996, with implementation proceeding as priorities are established and as funds become available.

FURTHER INFORMATION:

For further information and assistance, contact:

MHD Environmental Division
(617) 973-7309

MHD ACTION #4.8:

The Massachusetts Highway Department should sponsor annual workshops to train local public works personnel on the proper use of stormwater runoff Best Management Practices.

RATIONALE:

The traditional thinking behind highway design has been to remove stormwater runoff from the paved surface as quickly as possible and discharge it directly to the nearest stream, pond, or wetland. While it remains essential for public safety purposes to remove stormwater from road surfaces as quickly and efficiently as possible, it is now recognized that the direct discharge of runoff to water courses can have a serious long-term impact on water quality. Runoff from roadways carries a wide array of contaminants, including solids, nutrients, heavy metals, oil and grease, and bacteria. These contaminants contribute to the degradation of our costal and inland waters and the closure of shellfish beds and swimming beaches.

Best management practices (BMPs) for stormwater have been proven to substantially improve the quality of roadway runoff. Stormwater BMPs include both nonstructural and structural measures. Nonstructural measures refer to such practices as street sweeping and catch basin cleaning, and the controlled use of fertilizers, pesticides, and deicing compounds. Structural BMPs include *storage controls* such as detention and retention basins, *infiltration practices* such as infiltration basins and trenches, porous pavement, and leaching catchbasins, *vegetative controls* such as grassed swales and vegetative filter strips, and *artificial wetlands*. These measures are generally both cost effective and reasonably simple to implement.

Because municipal public works and highway departments rely heavily on the standard design practices prescribed by the Massachusetts Highway Department in its *Highway Design Manual*, there has been a general reluctance to implement innovative and alternative solutions to runoff management. However, an effective statewide stormwater management program must incorporate a wide array of both traditional and innovative solutions. It must also involve active participation by the municipalities as well as the MHD. Inasmuch as the municipalities look to the State Highway Department for guidance on roadway and drainage design, MHD is the appropriate authority to provide direct ("hands-on") instruction on stormwater BMPs to local public works personnel.

RESPONSIBLE AGENT(s):

The Chief Engineer of the Massachusetts Highway Department is responsible for establishing engineering design policy. This individual should direct MHD's Environmental Division and Highway Engineering Division to develop an appropriate guidance document on stormwater BMPs for roadway design and to issue this guidance as an Engineering Directive. The MHD Environmental Division should then coordinate with the Bay State Roads Program to develop a series of regional workshops targeted to municipal highway personnel. The Bay State Roads Program is a technology transfer program that provides continuing education on issues relevant to local highway departments.

IMPLEMENTATION STRATEGY:

At the direction of the Commissioner and the Chief Engineer, the MHD Environmental Division should develop a scope of work for the preparation of a guidance manual on stormwater BMPs for roadways. Funding for the manual should then be secured and a contract let. The effort should be coordinated with other agencies that are also concerned with, and knowledgeable about, stormwater management, including CZM, DEP, and the Natural Resources Conservation Service/MassCAP (formerly Soil Conservation Service).

LEGISLATION REQUIRED:

New legislation is not required. The Transportation Bond Bill passed by the Massachusetts Legislature this year provides the matching funds needed to access federal research monies for this action. (See "Potential Funding Source(s)", below.)

ESTIMATED COST:

Development of the BMP guidance manual and training workshops for local DPW personnel is estimated at under $50,000.

POTENTIAL FUNDING SOURCE(s):

The most likely source of funds is Federal SPR (research) funds. The Deputy Secretary for Environmental Policy in the Executive Office of Transportation and Construction (EOTC) has begun the application process to obtain these funds.

TARGET DATE:

Development of the BMP guidance manual can begin when funds are secured. It is anticipated that this work will be completed in 1996 and that three regional workshops for local highway personnel will be offered in 1996/1997 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

MHD Environmental Division
(617) 973-7309

MHD/MDC ACTION #4.9:

The Massachusetts Highway Department and the Metropolitan District Commission should require the use of on-site stormwater Best Management Practices as a precondition to the permitting of private property tie-ins to state drainage facilities.

RATIONALE:

Many areas of Massachusetts are densely developed, and the options for installing new drainage systems are limited. Drainage systems for commercial and industrial sites in particular often face severe areal and topographical constraints. Often, the only recourse is to "tie in" to an existing drainage facility. When these facilities are under the jurisdiction of a state agency, permits are required.

Traditionally, the principal criterion for permitting private party tie-ins to a state drainage system is one of hydraulics -- i.e., will the system be able to handle the additional volume of runoff? If it can, the tie-in is generally permitted, regardless of whether on-site stormwater retention or treatment measures have first been employed.

As our focus on stormwater management broadens to include water *quality* considerations, it becomes increasingly important to reach beyond just the hydraulic capabilities of a public drainage facility and look toward influencing site design on properties abutting the public facility. As stormwater regulations are strengthened, more and more public revenues will be spent on redesigning and retrofitting the existing stormwater systems on public roadways. The public should not be expected to bear the added burden of mitigating stormwater pollution from private developments as well.

Requiring the implementation of stormwater best management practices (BMPs) as a precondition to a private party's tying into a state facility is no more burdensome than the conditions placed on wastewater and other effluent discharges to Publicly Owned Treatment Works. The cost of implementing on-site BMPs has been shown to be minimal when compared to the public cost of remediating polluted stormwater discharges or of retrofitting existing storm drainage systems.

RESPONSIBLE AGENT(s):

The Commissioner and the Chief Engineer of the Massachusetts Highway Department and the Commissioner of the Metropolitan District Commission are responsible for setting policy for their respective agencies. These public officials should direct the appropriate personnel within their agencies to develop water quality related performance criteria for use in evaluating and permitting private property tie-ins to state drainage facilities.

IMPLEMENTATION STRATEGY:

The process for developing water quality-related permit criteria for drainage system tie-ins should be a cooperative effort between the MHD and MDC. Consistency in permit requirements between the two state agencies would benefit the general public and the development community.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The development of water quality-related performance criteria can be accomplished through the environmental and permitting staff of the respective state agencies. Other than the cost of employee salaries for the time involved, no additional funds should be necessary.

POTENTIAL FUNDING SOURCE(s):

Not applicable.

TARGET DATE:

The development of the new permit criteria, including the required coordination between MHD and MDC and consultation with other agencies as appropriate, is expected to be accomplished in 1996.

FURTHER INFORMATION:

For further information and assistance, contact:

MHD Environmental Division
(617) 973-7309

ACTION PLAN #5

REDUCING AND PREVENTING TOXIC POLLUTION

All living systems use and recycle a variety of naturally-occurring chemicals and nutrients. Changing the normal balance of chemical concentrations in an ecosystem can jeopardize the health and reproductive capacity of the organisms in that ecosystem. Chemicals which induce such deleterious effects are called "toxics." Since 1940, more than 70,000 synthetic chemicals have been introduced to the marine environment. Many of these chemicals are toxic even in minute concentrations.

There are several classes of toxics in the marine environment. Those of greatest concern include:

Polycyclic aromatic hydrocarbons (PAHs)
PAHs are a class of organic compounds found primarily in fossil fuels such as oil and coal. These compounds enter the Bays from many different sources, including oil spills and runoff, car exhaust, worn tire rubber, and soot from backyard barbecues, to name only a few. Prolonged exposure to PAHs is believed to cause cancer and birth defects, as well as physiological damage.

Toxic metals
Copper, arsenic, lead, cadmium, mercury, silver, chromium, nickel, zinc, and other metals enter the Bays both from nonpoint sources such as urban runoff and point sources such as wastewater discharges. Although low concentrations of these metals occur naturally in the marine environment, elevated concentrations may endanger marine organisms. All metals are chemical elements, which means they cannot be destroyed or broken down. Once they enter the marine environment, they persist indefinitely.

Polychlorinated biphenyls (PCBs)
PCBs are a family of organic compounds used since the 1920s in electrical transformers, liquid coolants, flame retardants, lubricants, adhesives, caulking compounds, and various other products. They are believed to be highly carcinogenic. PCBs do not readily break down into less harmful chemicals and therefore persist in the environment for long periods.

Pesticides
Although many of the most harmful pesticides have been banned in Massachusetts, many chemicals used during the 1950s and '60s still persist in the Bays. Less toxic compounds are still used extensively in agricultural areas to combat crop pests and in wetland areas to hold down mosquito populations, as well as on suburban lawns and golf courses. All of these eventually find their way to coastal waters.

Toxic contaminants enter the Bays through many routes: industrial and municipal waste, dredged material, atmospheric fallout, stormwater discharges, and nonpoint runoff, to name a few. In 1991, the Massachusetts Bays Program sponsored the first comprehensive survey of the sources of toxic contaminants in the Bays' ecosystem. This survey found toxic contamination to be most serious along the North Shore and in the vicinity of Boston Harbor, where industrial wastewater and urban runoff contain relatively high loadings of chemical contaminants. However, tracing the diverse origins of these contaminants is no easy task. Each toxic may have its own unique source. For instance, corroding water pipes are believed to be a major source of copper. Lead, on the other hand, seems to enter the marine environment mostly through atmospheric deposition.

However they enter the marine environment, toxic contaminants eventually settle out of the water column and come to rest on the ocean floor. The highest concentrations of contaminants are typically found in sediments close to shore, localized around a point source of pollution or in a tranquil depositional area. Most contamination is concentrated in the vicinity of urban areas or localized "hot spots."

Evaluating the fate and effects of chemical contaminants in the Bays is a complex task which requires an understanding of the contaminants' temporal and spatial distribution. After toxic contaminants become incorporated into marine sediments, invertebrates may accumulate the toxics and pass them along the marine food web. The rate of bioaccumulation depends on variables such as species feeding patterns, the nature of the contaminant, and the contaminant's persistence in the environment. Toxics tend to become more concentrated as they move up the food chain. As they accumulate toxics in their tissue, individual organisms may develop cancerous tumors or other diseases. Toxic contami-

nation has already been tied to disease in some commercially valuable species in Massachusetts Bays, including liver lesions and fin rot in flounder, and black gill disease in lobsters. Widespread disease could potentially cause declines in populations of sensitive species, alter foodweb interactions, and impact the marine ecosystem.

Human exposure to toxic pollution generally occurs indirectly, through consumption of contaminated seafood. The magnitude of the health risk is difficult to quantify because the effects of exposure do not immediately manifest themselves in an acute illness. Consumption of contaminated seafood probably raises the overall risk of cancer and neurological impairments in fetuses or children. However, because the effects may not be apparent for many years, it is difficult to definitively link consumption to impacts.

Even if the magnitude of risk is uncertain, management decisions still need to be made to protect public health and the health of the marine ecosystem from exposure to chemical contaminants. Federal and state authorities have already taken preliminary steps to regulate the chemically-contaminated fishery resources in Massachusetts Bays. The U.S. Food and Drug Administration (FDA), which regulates all seafood shipped across state lines, has set "action levels" or thresholds for chemical concentrations in all food products. The U.S. Environmental Protection Agency (EPA) has established similar tolerance levels for pesticides. However, these action levels are based on average national consumption rates, and are not intended to protect local segments of the population whose seafood consumption may exceed the national average. Moreover, the FDA has not yet set action levels for many chemicals in Massachusetts coastal waters.

The Massachusetts Department of Public Health (DPH), with the assistance of the state Division of Marine Fisheries (DMF), supplements the work of these federal agencies. The state has issued two advisories concerning chemically-contaminated seafood. The first warns all segments of the population against eating the tomalley of lobsters harvested in Boston Harbor. The second advises certain high-risk segments of the population to avoid all seafood harvested in Boston Harbor.

Much work needs to be done in order to fully understand the sources of toxic contamination, its effects on the marine ecosystem, and its potential impact on human beings. While scientists work to resolve these uncertainties, action must be taken to reduce the amount of toxic pollution reaching the Bays. The following recommendations will move us in the right direction.

MUNICIPAL ACTION #5.1:

Municipalities should adopt and implement the following set of regulations to ensure the safe use, storage, and disposal of toxic and hazardous materials: 1) *Toxic and Hazardous Materials Regulation*, 2) *Underground Storage Tank Regulation*, and 3) *Commercial/Industrial Floor Drain Regulation*.

RATIONALE:

Leaking underground fuel storage tanks (USTs) and improper storage and disposal of hazardous materials have contaminated scores of drinking water supplies across the Commonwealth, and are a source of toxic contaminants to Massachusetts Bays. While federal and state regulations provide some measure of protection, they are not a substitute for strict oversight at the local level. For example, the State Board of Fire Prevention Regulations (527 CMR 9.00) that govern underground fuel storage specifically exempt farm and residential fuel oil tanks of 1,100 gallons capacity or less from construction/installation, monitoring, and tightness-testing requirements, even though these tanks can be a significant source of contaminants to the environment. Moreover, numerous small commercial and industrial establishments (gas stations, autobody shops, machine shops, furniture refinishers, etc.) house unauthorized floor drains which can discharge contaminants directly into the ground or a leaching facility, and many of these establishments often go largely unregulated.

RESPONSIBLE AGENT(s):

Boards of Health and Fire Departments would share most of the responsibility for this action, with assistance from the Local Emergency Planning Committee (LEPC) Coordinator, Building Inspector, and Plumbing Inspector. Technical assistance in drafting the recommended regulations is available from the Regional Planning Agencies, the DEP Division of Water Supply, and the DEP Division of Hazardous Waste.

IMPLEMENTATION STRATEGY:

The Board of Health and other local authorities cited above should evaluate the community's existing regulations pertaining to toxic and hazardous materials management, based on model regulations provided by the Regional Planning Agencies. Where existing regulations are found to be outdated or otherwise deficient, the Board of Health should adopt new regulations which empower the Board and the Fire Chief to better track and control the siting, storage, and disposal of hazardous materials in the community. The new regulations can be stricter and more comprehensive than the corresponding state and federal regulations, so long as they do not conflict with the state and federal regulations. As an example of a stricter local provision, some municipal UST regulations call for the outright removal or intensive leak detection-testing of all underground storage tanks 20 years or older, regardless of tank size, use, or construction material.

As part of this process, local officials can provide facility owners and operators with helpful guidance materials on best management practices (BMPs) appropriate for their particular business. These guidance materials are readily available from DEP and OTA in the form of individual fact sheets which prescribe specific waste handling and storage practices for a range of business operations, such as autobody painting, furniture stripping, and commercial dry cleaning.

LEGISLATION REQUIRED:

If the recommended regulations are adopted as Board of Health regulations (rather than as general bylaws or ordinances), this action will require majority approval by the Board of Health following the issuance of a public notice and a public hearing. Adoption as general bylaws or ordinances will require town meeting or city council approval.

ESTIMATED COST:

The cost of drafting and adopting the recommended regulations should be minimal. Model regulations are available that can be adopted either in their present form or with minor modifications to reflect specific local needs. Assistance in drafting the regulations and establishing associated record-keeping systems is available from the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues

TARGET DATE:

1996/1997. This is a high priority action from a water quality standpoint and should be implemented by municipalities as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Division of Water Supply
(617) 292-5770
DEP Division of Hazardous Waste
(617) 292-5853
EOEA Office of Technical Assistance
for Toxics Use Reduction
(617) 727-3260

MUNICIPAL ACTION #5.2:

Municipalities should establish *Household Hazardous Waste Collection Programs* for difficult-to-manage hazardous products to ensure their proper disposal on a regular basis.

RATIONALE:

Households account for approximately 25% (35,000 tons per year) of hazardous waste disposal in Massachusetts, and discharge a variety of toxic chemicals into septic systems, sewers, and landfills. These chemicals are found in everyday household and yard products such as oven and tile cleaners, spot removers, wood stains and preservatives, and pesticides. Disposed of improperly, many of these contaminants ultimately reach ground and surface waters, where they endanger public health and the environment.

RESPONSIBLE AGENT(s):

Local Boards of Health and health departments will generally be responsible for this action, with assistance from local fire departments, public works departments, recycling committees, civic organizations, and citizens. Regional Planning Agencies can provide technical assistance in many phases of a collection event, including: selection of an appropriate collection site; preparation of the bid specification package; selection of a qualified hazardous waste contractor; and event promotion.

IMPLEMENTATION STRATEGY:

Until such time as permanent collection facilities are established in or near each community (or mobile collection facilities are available on a rotating basis), municipalities should sponsor annual household hazardous waste collection events for difficult-to-manage hazardous products. These are products, such as pesticides, that are not readily recycled and/or are highly toxic. The collection events are typically held in the spring or fall to coincide with home and yard cleanups, and provide an effective means for removing large quantities of potentially harmful household products. They also afford an opportunity to educate homeowners on the use of safer alternative products, and on the hazards posed by certain products, such as septic system cleaners that contain organic degreasers. For best results, the events should be held at convenient sites (large, centrally-located parking lots, for example) and should be widely publicized (press releases, flyers, cable t.v.) to maximize community participation. *Joint* sponsorship of events by neighboring communities can reduce costs significantly.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Collection event costs vary widely, depending on the length (hours) and frequency of events, number of participants, types and volumes of wastes collected, and contractor's fee. For small to mid-size communities (5,000 - 25,000 residents) costs typically range from $15,000 to $25,000, of which $4,500 - $6,000 is the contractor's fixed fee for site setup. The remaining costs cover event publicity, and waste transport and disposal.

Cost savings can be achieved through: preventative consumer education, participant pre-registration, pre-screening of wastes to prevent the introduction of non-hazardous wastes, regionalization, and "Buy-A-Barrel" campaign contributions from sponsoring businesses and civic organizations.

POTENTIAL FUNDING SOURCES:

Local revenues, including fees on water, sewer, and municipal solid waste services; cash contributions from business and civic organizations; and modest "tipping" fee to participants.

TARGET DATE:

1996 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
EOEA Office of Technical Assistance
(617) 727-3260
DEP Division of Hazardous Waste
(617) 292-5853

DOE ACTION #5.3:

The Department of Education, in collaboration with the Massachusetts Community College System and with technical assistance from the Department of Environmental Protection, should develop and offer continuing education courses on hazardous materials management to create a pool of trained "HazMat Specialists" at the local level.

RATIONALE:

Communities are becoming increasingly concerned over the threats toxic and hazardous materials pose to their drinking water supplies and sewage treatment plants. Nonpoint sources of pollution are a particular problem. Leaking landfills and underground storage tanks, businesses using and storing hazardous materials, and even individual households are all recognized as potentially significant contributors of toxic contaminants to the environment. To address these concerns, many communities are adopting hazardous materials bylaws to help monitor the use, storage, and disposal of hazardous chemicals in the community. Unfortunately, the task of implementing these bylaws often falls on the shoulders of already overburdened health officers or other local officials who have little, if any, formal training in hazardous materials management. As a result, many of the bylaws are not being administered or enforced as effectively as they should be.

The availability of qualified HazMat specialists at the local level would help remedy this problem. Depending on the needs of the community, these specialists could be either paid employees (such as health agents or building inspectors), volunteer board members, or even private citizens. The latter could include retirees or graduate interns interested in serving their community. In addition to helping administer the bylaws, which often includes the difficult task of setting up and operating a comprehensive record-keeping system, the local HazMat Specialists could provide public outreach and education services. These specialists could assist users of hazardous materials, both residential and commercial, in identifying less-toxic alternatives and understanding proper management of hazardous chemicals in the home and the workplace.

RESPONSIBLE AGENT(s):

The Department of Education (DOE), assisted by the Department of Environmental Protection (DEP), would have primary responsibility for this action. DOE should engage the services of a professional curriculum specialist to: 1) develop a HazMat training course (or series of courses) to be offered through the state community college system; and 2) develop an application process for interested colleges to apply for grants to operate the "HazMat Specialist" program.

Linkages with the Local Emergency Planning process (SARA Title III), Massachusetts Firefighting Academy training program, and Massachusetts Health Officers Association certification program should be explored.

IMPLEMENTATION STRATEGY:

Once a source of funding is developed, DOE should issue a Request for Proposals for a professional curriculum specialist. Components of the course should include basic environmental principles related to the protection of land, air, and water; the nature of chemicals used in small commercial operations and in households; public education tools and techniques; municipal inspection and enforcement strategies; and roles and responsibilities of federal, state and municipal environmental protection authorities. The second phase of program implementation would be training of instructors.

Federal job development and training programs aimed at minorities and senior citizens should be explored for possible linkages.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$100,000 (or less) per participating college. This would cover the cost of integrating the HazMat curriculum, training of instructors, administrative overhead, and preparation of instructional materials. Registration fees for course participants would not be covered.

POTENTIAL FUNDING SOURCES:

Massachusetts Department of Employment and Training (Job Training Partnership Act Program).

University of Lowell's Toxics Use Reduction Training Program, funded through the Toxics Use Reduction Act.

Massachusetts Department of Education.

Environmental Education Grants Program, Environmental Education Division, U.S. EPA.

TARGET DATE:

1998 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Hazardous Waste Management Program
(617) 292-5853

EOEA/MUNICIPAL/PRIVATE SECTOR PARTNERSHIP ACTION #5.4:

The Executive Office of Environmental Affairs, municipalities, and the business community should explore and form partnerships to facilitate the safe management of hazardous products, emphasizing reduced products use and recycling wherever possible.

RATIONALE:

The following preliminary actions are the result of recent discussions among representatives of the Executive Office of Environmental Affairs (EOEA) and the Massachusetts Bays Program, including the MBP's Business and Resource Users Group. While these actions are not developed as fully as the other actions in the CCMP, they are expected to be the subject of an ongoing dialogue between EOEA and MBP over the next year, and may be presented as more complete actions in future supplements to the CCMP.

State Actions (preliminary)

- The Executive Office of Environmental Affairs (EOEA) should develop a comprehensive plan for household hazardous waste (HHW) management to coordinate programs on a state-wide basis. The plan should develop comprehensive collection programs for wastes such as used oil, oil filters, antifreeze, car batteries, tires, household batteries, and paint, which form the bulk of the waste stream at HHW collections but can be handled more cost-effectively through tailored programs. The plan should include a strategy for other household hazardous wastes that are considered as priorities for collection due to their toxicity. This plan should refine existing programs, as well as provide guidance for establishing new program initiatives.

- The Commonwealth should encourage and assist in developing research initiatives into the public health and environmental effects caused by specific household hazardous products and chemicals. This research should be used to establish priorities for focusing HHW collection efforts.

- In cooperation with municipalities, regional governments, and the private sector, the Commonwealth should develop and promote public outreach and educational programs to encourage citizens to shift away from the use of hazardous products and to handle the household hazardous products that they do use in a safe manner. EOEA also should provide increased technical assistance, including a "how to" manual for the safe handling of specific types of HHW and a technical assistance packet for municipalities containing a list of available technical assistance information.

- EOEA should work with the Department of Environmental Protection (DEP) and the Department of Procurement and General Services (DPGS) to provide state contracts for the collection of used oil, oil filters, antifreeze, and paint products. In addition, EOEA should work with a battery manufacturer to provide collection services for lead acid car batteries collected by municipalities. These agreements would provide collection services to state, municipal, and regional government agencies at a low cost based on economies of scale.

- EOEA should use the Clean Environment Fund to provide additional equipment grants to help municipalities establish collection centers for automotive materials and paint products. These grants should be coupled with training and technical assistance to ensure proper collection and handling procedures.

- The Commonwealth should encourage development of private sector collection sites by easing regulatory requirements for businesses which generate hazardous wastes such as used oil.

- The Commonwealth should improve options for very small quantity generators to safely dispose of hazardous wastes through existing collection programs and by exploring new collection mechanisms such as private sector collection centers.

- EOEA should establish a working group to mobilize and promote business community involvement in carrying out these actions, using the MBP Business and Resource Users Group as the vehicle to accomplish this.

Municipal Actions (preliminary)

- Municipalities should develop tailored programs to collect readily recyclable wastes, such as used oil, oil filters, antifreeze, lead-acid car batteries, tires, household batteries, and paint products, on a regular basis. Collection of these wastes should be the cornerstone of municipal household hazardous waste (HHW) collection programs, even if held on only a periodic basis.

- Municipalities should develop "automotive recycling centers", which would handle all major automotive waste products, including oil filters, antifreeze, tires, and

lead-acid car batteries. Ideally, municipalities should collect all four of these materials. The costs of collecting all four materials may range anywhere from $750 - $1,500, depending on market conditions, transporter's fees, and amounts of the material collected.

- Municipalities should consider purchasing on-site antifreeze recycling systems as an alternative to hiring a contractor to collect antifreeze, especially if the municipalities have large municipal vehicle fleets. Use of on-site recycling systems can reduce the need to purchase new antifreeze.

- Municipalities should apply for state grants to purchase used oil collection tanks and paint storage sheds.

- Municipal and regional governments should minimize reliance on one-day HHW collection events that indiscriminately collect and dispose of all household wastes perceived as "hazardous" without regard to the actual risk such wastes present. HHW collection programs should be used only for specific hazardous wastes, such as pesticides, that cannot be safely handled through other, more efficient and cost-effective mechanisms. When one-day collection events continue to be necessary to provide for safe disposal of household hazardous waste, municipalities should take advantage of competitive market dynamics to negotiate agreements for less costly collection services and use model RFPs offered by the state.

- Municipalities should work with the private sector to establish permanent collection mechanisms, hold collection events on a multi-town or regional basis, and emphasize reduction in toxic materials use.

- Municipalities and the Commonwealth should amend their procurement processes to purchase recycled and reused materials such as re-refined oil, recycled antifreeze, recycled paint, recycled paper products, recycled construction materials, and other products made from recycled content. This strategy will help "close the recycling loop" for these materials and reduce local collection and processing costs for recyclables. Municipalities should work with the Department of Procurement and General Services to take advantage of existing and future state purchasing agreements for recycled products.

EPA ACTION #5.5:

The Environmental Protection Agency (EPA) should reduce and prevent toxic pollution through targeted National Pollutant Discharge Elimination System (NPDES) permitting of significant discharges in the Massachusetts Bays; in particular, oil tank farms on Chelsea Creek and the Island End River.

RATIONALE:

Several classes of toxic contaminants exist in the marine environment as a result of stormwater runoff and point source discharges, atmospheric deposition, and dredging of contaminated sediments. Toxic contamination causes direct impacts to marine life, as evidenced by liver lesions in flounder. Human health impacts from toxic contamination in the marine environment also can occur, typically through the consumption of contaminated seafood.

A particular class of toxic contaminant prevalent in the Massachusetts Bays is known as "polycyclic aromatic hydrocarbons" or PAHs. PAHs are a component of many grades of crude and refined oils (e.g., gasoline). While many concentrated "hot spots" of PAH contamination exist within the Massachusetts Bays, two tributaries of Boston Harbor - Chelsea Creek and the Island End River - are hot spots of particular note. Numerous oil storage facilities are situated along the banks of these waterways, due to their proximity to material handling facilities and shipping channels. These so-called "tank farms" are thought to be sources of PAHs for two reasons. First, each tank is designed to hold condensation, small leaks, and overflows in a storage area at the base of the tank. This storage area is sometimes drained directly to the nearest waterway after only limited pretreatment or remediation. Second, the paved areas surrounding the tanks routinely have significant quantities of oil on their surfaces due to releases which occur when oil is transferred to or from the tank. Accordingly, the stormwater runoff from these areas may contain concentrations of PAHs and other petroleum hydrocarbons.

Under the NPDES program, industrial land uses which discharge, via point sources, stormwater runoff or other types of releases into wetlands, waterways, and water bodies, are required to implement treatment and preventive best management practices (BMPs) through a permitting process in order to maintain the quality of the receiving waters. This is the same compliance effort targeted for stormwater discharges in the lower Charles River Basin, as described in EPA Action #4.5.

RESPONSIBLE AGENT(s):

NPDES permitting and compliance for the oil tank farms in the targeted areas is the responsibility of the EPA, with continued coordination with the Massachusetts Department of Environmental Protection (DEP).

IMPLEMENTATION STRATEGY:

No major organizational efforts are needed to implement this recommendation in the specified areas, since EPA staff resources dedicated to the NPDES program will be redirected to the Chelsea Creek and the Island End River industrial discharges, in coordination with Massachusetts DEP.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Minimal, since the recommended action will be carried out by EPA staff who are already funded by the agency's operating budget.

POTENTIAL FUNDING SOURCE(s):

Agency operating budgets.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

EPA - New England
(617) 565-4422

OTA ACTION #5.6:

The EOEA Office of Technical Assistance for Toxics Use Reduction (OTA) should perform on-site assessments and provide instructional materials to help businesses and industries in the Massachusetts Bays region reduce the use of toxic substances.

RATIONALE:

Under the Toxics Use Reduction Act of 1989, over 600 Massachusetts companies must develop and implement pollution prevention plans, and *all* hazardous waste generators must adopt waste minimization plans. OTA, a non-regulatory state agency, was created to work cooperatively with business and industry to meet the statewide goal of a 50% reduction in toxic wastes by 1997, and to make continued progress thereafter. This goal is to be achieved through a promising new approach to the management of toxic substances called "Toxics Use Reduction", or TUR.

TUR includes a variety of changes in production processes and practices, all of which reduce or eliminate the generation or use of toxic substances without increasing risk to workers or consumers. TUR differs from more traditional approaches to industrial pollution in that it refocuses attention away from the treatment and disposal of toxic emissions at the *end* of the manufacturing process, and toward minimization or elimination of toxic materials used *during* the process.

Because TUR prevents toxic pollution at its source, rather then merely treating it once it has been created, it represents the safest and most environmentally responsible approach to managing industrial toxics. It also offers powerful economic incentives to industries which employ it. Indeed, against the backdrop of soaring treatment and disposal costs and the liability exposure associated with the use of hazardous materials, TUR makes increasing sense from a purely *economic* standpoint.

To date, OTA has held over 50 TUR workshops throughout the state, worked closely with several hundred Massachusetts businesses, and provided direct on-site consultation and viable TUR recommendations to more than 60 firms. Nevertheless, many commercial and industrial facilities have not yet availed themselves of OTA's free (and confidential) technical assistance, and numerous opportunities exist for further progress in toxics use reduction in the workplace.

Recently, in an effort to maximize these opportunities, OTA joined forces with over 80 businesses in the Merrimack Valley region to establish a Business Environmental Network. This network brings diverse industries together to promote business awareness on environmental issues and regulatory requirements, and to share information and expertise on pollution prevention technologies. Businesses in other regions in the Commonwealth, including coastal areas, have expressed interest in either expanding this existing network or forming additional networks, and have requested OTA's assistance to accomplish this.

RESPONSIBLE AGENT(s):

OTA will be responsible for initiating and implementing industry outreach and technical assistance actions. Expansion of the existing Business Environmental Network or establishment of additional networks will be pursued by OTA in collaboration with local businesses.

IMPLEMENTATION STRATEGY:

OTA will implement its TUR program by offering the following non-regulatory services at no charge:

- Perform on-site assessments designed to help businesses identify TUR opportunities and learn about alternative processes and technologies applicable to their particular operations.
- Respond to telephone and written requests for general information about TUR and specific information about the legal requirements of the Toxics Use Reduction Act.
- Sponsor conferences, workshops, seminars, and trade fairs to disseminate information about TUR technologies.
- Promote alternative manufacturing processes that reduce toxic substance use, hazardous waste generation, toxic air emissions, and wastewater discharge.

To support these efforts, OTA will develop and broadly disseminate materials that promote the concept and practice of pollution prevention. One such publication, OTA's "*A Practical Guide to Toxics Use Reduction*," provides step-by-step guidance on all aspects of TUR planning and implementation.

Overall, OTA's strategy will be directed not to merely

encouraging individual, short term TUR projects, but rather to helping businesses launch and sustain long term in-house TUR programs.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of the TUR program will be borne by OTA, with possible grant assistance from EPA for the Business Environmental Network component.

POTENTIAL FUNDING SOURCES:

Grant from EPA Waste Management Division.

TARGET DATE:

1996 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Office of Technical Assistance for
Toxics Use Reduction
(617) 727-3260

ACTION PLAN #6

REDUCING AND PREVENTING OIL POLLUTION

Few environmental catastrophes do more damage to marine resources or cause more public outrage than a large oil spill. Six years after the *Exxon Valdez* spill in Alaska's Prince William Sound, few people have forgotten images of oil-soaked beaches and poisoned wildlife. Many people do not realize, however, that large spills and offshore blowouts account for only a small percentage of the oil polluting our coastal waters. In fact, most of the approximately four million tons of oil added each year to the world's marine environment comes from small spills and stormwater runoff.

Petroleum is the most common of several types of fossil fuel hydrocarbons --"oil"-- which find their way into Massachusetts Bays. These hydrocarbons enter the Bays from diverse sources. In addition to accidental spills, fossil fuel hydrocarbons enter the Bays from industrial and municipal wastewater, stormwater runoff, boats, and creosote-treated wood pilings.

Oil pollution may adversely affect much of the marine environment, but is especially threatening to stationary plants, sensitive species, and organisms in early life stages. Some economically and ecologically significant resources, such as shellfish and eelgrass beds, are especially vulnerable to oil pollution. Immediately after a spill, these resources generally experience a high mortality, and even those organisms that survive often suffer short-term stress and impaired metabolism. Residual toxic effects on individuals or populations may be evident long after the spill has dissipated. Damage is especially acute if the spill reaches a confined embayment, where slow flushing, prevailing winds, and on-shore currents keep the oil concentrated.

Although the Massachusetts Bays have so far avoided any catastrophic spills, tankers and barges carrying petroleum products through the Port of Boston, the Cape Cod Canal, and Salem Harbor pose a constant risk. The federal government has developed a broad regulatory framework to monitor and mitigate this risk. The keystone of this framework is the Oil Pollution Act of 1990, a comprehensive piece of legislation which addresses issues of liability and compensation, vessel manning and training, communication system requirements, and design specifications for tankers, including the compulsory phasing in of double hulls. The Act also requires the federal government to develop Area Contingency Plans and regularly update the National Contingency Plan.

The party responsible for an oil discharge that affects navigable waters is required to adequately respond under the Federal Water Pollution Control Act (FWPCA), as amended. The Coast Guard On-Scene Coordinator (OSC) and the State OSC from the Massachusetts Department of Environmental Protection will ensure that the responsible party adequately responds to such spills. If a response is not adequate, the Coast Guard and the State will direct response actions. The spiller is liable for all money spent by the Coast Guard or State during a response. The Coast Guard owns oil spill containment and recovery equipment and can call upon a spill response Strike Team for additional assistance, but will rely primarily on contracted resources. The spiller also is required to provide compensation to restore or replace natural resources damaged by a spill.

Nonpoint sources of oil pollution are less dramatic -- but more insidious -- than accidental spills. The culprits in this case are not giant corporations or irresponsible sea captains, but unthinking individuals. Lots of them. Countless car owners, perhaps ignorant of the harm they are doing, pour used motor oil down storm drains or throw it in their garbage to avoid the inconvenience of disposing of it properly. Eventually, most improperly disposed oil will pollute groundwater and/or surface waters, including coastal embayments.

Mitigating oil pollution in the coastal zone will require action aimed at both point and nonpoint pollution sources. Because spills cannot realistically be eliminated, an effective strategy for controlling this source of contamination should include a combination of prevention, early response, and mitigation. Nonpoint sources will be more difficult to control, but there *are* ways to put a dent in the problem. The recommended actions which follow are an effective starting point.

MUNICIPAL ACTION #6.1:

Municipalities should establish, maintain, and promote the use of *Used Motor Oil Collection Facilities* to ensure the proper permanent collection and management of used motor oil from do-it-yourself oil changes.

RATIONALE:

According to a 1996 study conducted for the Executive Office of Environmental Affairs (EOEA), 2.9 million gallons of used motor oil are generated annually in the Commonwealth by do-it-yourself oil changers. EOEA estimates that up to 80% of this amount may be disposed of improperly by dumping it on the ground, throwing it in the trash, or pouring it down a storm drain. Used motor oil contains petroleum hydrocarbons and heavy metals which can contaminate drinking water supplies and living resources habitat. While the Massachusetts Used Oil Retention Act (MGL Ch. 21, s52a) allows the return of used motor oil to the place of purchase, the requirement that do-it-yourselfers retain their receipts, the reluctance of small convenience stores to collect used oil, and inadequate state enforcement have combined to severely limit the effectiveness of this measure. Most used motor oil continues to be disposed of improperly due to the lack of convenient, *local* collection facilities.

Due to the many concerns expressed over the current collection law, EOEA is working with interested parties to develop new legislation. Legislation based on a proposal developed by EOEA will be introduced by the Natural Resources and Agriculture Committee during the 1996 legislative session. A consensus on this proposal has been reached by the following groups:

- Massachusetts Petroleum Council;
- American Petroleum Institute;
- Retailers Association of Massachusetts;
- Environmental League of Massachusetts;
- MassPIRG;
- New England Service Station and Automotive Repair Association; and
- Convenient Automotive Services Institute.

If passed, this legislation will make significant improvements in the collection of used oil from do-it-yourself oil changers (DIYers). The legislation would make current collection requirements more flexible and pay recycling incentives to collection centers and to DIYers who return used oil for recycling. It also would provide needed resources (through payments made by motor oil manufacturers) for public education programs, reimbursement of collection centers for costs of disposing of contaminated oil, and expansion of current Department of Environmental Protection (DEP) municipal recycling grants for used oil storage tanks.

RESPONSIBLE AGENT(s):

Local Public Works Departments and Boards of Health will be responsible for this action, with input and assistance from the Fire Departments and recycling committees. Assistance on siting and equipment requirements, as well as facility operation, is available from the DEP Division of Hazardous Waste and the Regional Planning Agencies. The MWRA offers guidance to member communities in the MWRA service area.

IMPLEMENTATION STRATEGY:

The above departments and boards should consult recent DEP and EPA guidance documents on used oil collection. These provide helpful information on the steps communities can take to establish and operate a successful used oil collection facility. Topics include:

- Selecting and preparing a suitable collection site;
- Obtaining state and local approvals;
- Staffing and operating the site;
- Purchasing collection equipment (e.g., above-ground, double-walled used oil storage tank);
- Publicizing the facility and educating the public; and
- Contracting with a licensed used oil transporter.

Municipalities are responsible for management of the collected oil from municipality-run facilities. Most used oil transporters will remove the collected oil at no or low cost (less than 20 cents/gallon). As an alternative, municipalities may, with DEP authorization, burn the used oil in an approved space heater during the heating season. Some communities are doing this as a means of defraying the cost of heating their DPW garages and other municipal buildings.

Wherever feasible, municipalities also should encourage the establishment of private oil collection facilities by

appropriate local businesses, such as gas stations and marinas.

LEGISLATION REQUIRED:

Construction and operation of a municipal used oil collection facility requires the prior approval of the local fire and building departments and of the DEP Hazardous Waste Compliance office. In addition, either a state (DEP) or federal (EPA) identification number must be obtained to allow tracking of the movement of the used oil from the municipal collection site to its final reuse or disposal destination.

ESTIMATED COST:

Oil collection program costs can vary, depending on facility size, hours of operation, staffing needs, and amount of oil collected/removed. In general, however, the costs are low to moderate and should not prove prohibitive for any community. Based on existing collection programs, average costs are as follows:

Site preparation (one-time cost)	- $2,500 - $3,000
Oil storage tank (one-time cost)	- $2,000 - $4,000*
Site attendant (assumes on-duty DPW staff)	- 0 -
Transporter Disposal Fee (annual) (assumes 1,000 gal. @ $0.20/gal.)	- $ 0 - $200
TOTAL (first year)	$5,000 - $7,500

* Note: EOEA/DEP grants have paid for over 50 municipal tanks in the past two years.

POTENTIAL FUNDING SOURCES:

DEP recycling equipment grants; local revenues; modest "tipping" fee to participating oil changers; area business and service organization sponsors.

TARGET DATE:

1997/1998. This is a high priority action from a water quality standpoint and should be implemented by municipalities as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Div. of Hazardous Waste (Regulations)
(617) 292-5853
DEP Div. of Solid Waste (Grants)
(617) 292-5984
MWRA Toxic Reduction & Control Dept.
(617) 242-6000

DEP ACTION #6.2

The Department of Environmental Protection, in collaboration with the U.S. Coast Guard, EPA, and NOAA, should implement the recently-developed *Policy on the Use of Oil Spill Chemical Counter Measures (Dispersants)* to protect coastal resources from the adverse effects of oil spills.

RATIONALE:

There are many ecologically, economically, and culturally-important resources along the Massachusetts coast that may not always be adequately protected from spilled oil by conventional physical cleanup methods, such as booming and skimming. Under certain spill scenarios, these conventional methods would either be infeasible or would not afford the desired level of protection for the particular resources at risk. When conventional methods are not possible or appropriate, the use of chemical dispersants may be required. Chemically dispersed oil remains for a time in the water column (where it is eventually degraded), but because it does not beach or sink into the sediments, its overall persistence in the marine environment is generally reduced.

Recently, an environmentally sound policy governing the use of chemical dispersants in Massachusetts coastal waters, developed by the U.S. Coast Guard (with assistance from other federal and state agencies, including DEP), was accepted by EOEA and incorporated into the state's Area Contingency Plans for use during oil spill response.

RESPONSIBLE AGENT(s):

The DEP Bureau of Waste Site Cleanup will be responsible for implementing this policy, with assistance from DEP's Bureau of Resource Protection (BRP), Office of Watershed Management (OWM). The OWM will continue to provide guidance on environmental issues that need to be addressed in implementing the policy, and is taking the lead in acquiring pertinent information from state and federal resource agencies (DFWELE, CZM, USFWS, USCG, EPA, and NOAA) and private marine science organizations, such as the New England Aquarium and the Center for Coastal Studies.

IMPLEMENTATION STRATEGY:

Now that the policy is developed, DEP will continue to work with the U.S. Coast Guard Area Committees, EPA, and NOAA to develop an effective implementation strategy.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

DEP staff time.

POTENTIAL FUNDING SOURCE(s):

DEP's annual operating budget.

TARGET DATE:

1996 for developing an implementation strategy.
Implementation of the policy on dispersants will be ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Bureau of Waste Site Cleanup
(617) 292-5852

USCG ACTION #6.3:

The U.S. Coast Guard, in collaboration with other federal, state, and local agencies, should continue to update and implement the Massachusetts coastwide *Area Contingency Plans* to assure the rapid and effective response to discharges of oil and hazardous substances into the marine environment.

RATIONALE:

Despite increasingly rigorous oversight and enforcement of pollution prevention regulations by the U.S. Coast Guard and other regulatory authorities, occasional oil and hazardous materials pollution incidents continue to occur. The potential for such incidents is ever present when petroleum products and hazardous materials are moved or stored in bulk quantities on or near the water. In recent years, oil shipments have increased, and tank vessels and shoreside terminals have grown in size and capacity. Over the last decade alone, the Coast Guard has responded to dozens of significant oil spills in the Massachusetts Bays region. Fortunately, none of these was a *major* discharge (over 100,000 gallons). Recent oil spills of note in the Metro Boston area include the following:

- In May 1991, the tankship *DELPHINA*, en route to the Citgo Oil terminal in Braintree, struck a rock in the Weymouth Fore River. The ship's #1 and #2 cargo tanks ruptured, spilling 16,000 gallons of No.2 fuel oil into the river.

- In July 1987, 13,800 gallons of insulating oil leaked into the Mystic River through a corroded electrical conduit at Boston Edison's Mystic Station.

- In December 1991, the tankbarge B-NO-105 leaked 4,200 gallons of No.4 fuel oil into the Chelsea River.

- In February 1987, 1,000 gallons of No.6 oil was discharged into the Mystic River from a storage tank at Boston Edison's Mystic Station. Tank #3 was being loaded from Exxon Everett when a meter malfunctioned, overfilling the tank. The spilled oil flowed into the Mystic River through nearby storm drains.

- In March 1986, 1,000 gallons of No.4 oil leaked into Boston Harbor from an underground oil tank at the Hoffman Building, Boston.

These and other oil pollution incidents underscore the need for a rapid, coordinated, and effective response to potentially harmful releases of oil and hazardous materials into the marine environment. To address this need, the U.S. Coast Guard, in collaboration with the Department of Environmental Protection and designated Area Committees, has been developing a coordinated response capability, and recently completed a two-volume comprehensive oil spill contingency plan -- ***Area Contingency Plan for Oil and Hazardous Substance Spills and Releases*** -- for the Massachusetts coast. One volume of the *Area Contingency Plan (ACP)* covers the coast from Salisbury to Plymouth (Manomet Point); the second volume covers the remainder of the coast from Plymouth to the Rhode Island border, and includes Cape Cod and the Islands.

RESPONSIBLE AGENT(s):

The U.S. Coast Guard Marine Safety Office, the Department of Environmental Protection, and designated Area Committees will share the responsibility for planning, developing, and implementing incident response actions. The Area Committees serve as "planning and preparedness" bodies, and are comprised of experienced environmental and emergency response representatives from a broad range of federal, state, and local agencies. Advising and assisting the Area Committees are facility owners/operators, shipping company representatives, cleanup contractors, environmental consultants, environmental advocates, and concerned citizens.

IMPLEMENTATION STRATEGY:

The first iterations of the two *Area Contingency Plans (ACPs)* were recently released, and will be reviewed and updated annually through 1997, and then every 5 years thereafter. The *ACPs* prescribe specific notification and response procedures that are to be followed by the Federal and State On-Scene Coordinators, the "responsible party", and others when responding to a spill or discharge from a vessel, an offshore facility, or an onshore facility operating in or near the coastal zone. The *ACPs* are intended to cover spills of all sizes and, when implemented in conjunction with the *National Contingency Plan*, "shall be adequate to remove a worst case discharge of oil or a hazardous substance, and to mitigate or prevent a substantial threat of such a discharge...". The plans identify available resources and prescribe response

procedures for all aspects of a spill incident, including:

- Initial notifications and subsequent communication;
- Identification and mobilization of response personnel and equipment;
- Identification of launching and staging areas;
- On-water mechanical recovery of pollutant(s);
- Cleanup of shoreline;
- Identification and protection of ecologically and economically sensitive areas;
- Identification and protection of wildlife;
- Assessment of damage to, and restoration of, natural resources;
- Training requirements;
- Site safety and health procedures; and
- Media interaction and community relations.

To assist responders in the protection of ecologically-sensitive resources, the *Area Contingency Plans* describe and map the locations of each community's shellfish beds, anadromous fish runs, endangered species habitat (piping plover nesting sites, for example), and other sensitive natural resources. Derived from the coastal atlas entitled "Sensitivity of Coastal Environments and Wildlife to Spilled Oil--Massachusetts", prepared by Research Planning Institute, Inc., under contract to NOAA's Office of Oceanography and Marine Services, this information will be updated and refined as additional living resources data become available.

To assess the effectiveness of the *Area Contingency Plans*, the Coast Guard and DEP will conduct periodic drills of spill response capabilities. These drills are expected to include participation by federal, state, and local emergency response authorities, owners and operators of vessels and facilities in the area, and private cleanup contractors.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Not applicable.

POTENTIAL FUNDING SOURCE(s):

U.S. Coast Guard.

TARGET DATE:

The first iterations of the *Area Contingency Plans for Oil and Hazardous Substance Spills & Releases* for the Massachusetts coast were printed and distributed in 1994. These plans will be reviewed and updated annually until 1997, and then every 5 years thereafter. Exercises to test response preparedness will be conducted by the Coast Guard as deemed necessary.

FURTHER INFORMATION:

For further information and assistance, contact:

U.S. Coast Guard Marine Safety Office
(617) 223-3000
DEP Bureau of Waste Site Cleanup
(617) 292-5500

ACTION PLAN #7

MANAGING MUNICIPAL WASTEWATER

Significant improvement in water quality has been achieved over the past 20 years through implementation of the Clean Water Act and the construction of new and upgraded wastewater treatment facilities. Nonetheless, there are sections of inland and coastal waters that either do not yet meet water quality criteria designed to protect aquatic life, or are otherwise degraded, and the challenge remains as to how best to provide adequate treatment and disposal of sewage as population and development pressures mount in the coastal region.

Wastewater facilities have the potential to cause a local decline in water quality. However, in many instances, both the larger centralized wastewater treatment facilities operated by municipalities and the smaller on-site systems of homeowners also cause *regional* water quality impairment, resulting in a decline in the overall health of the Bays' coastal and inland ecosystems. For example, toxic substances, pathogens, and nutrients in wastewater from both types of facilities have rendered certain receiving waters unfit for drinking and have forced the closure of many acres of valuable shellfish beds and swimming beaches. Clearly, both centralized and on-site systems have advantages and disadvantages related to characteristics such as operation and maintenance, accountability, and environmental protection. No one approach provides the ideal solution. Centralized facilities, described in greater detail in Action Plan #7A, can be an appropriate solution to water quality problems in certain situations; on-site systems, described in Action Plan #7B, may be an appropriate management measure in others.

The extent to which municipal wastewater adversely affects water quality and living resources in the Bays region depends on many factors, including the volume of wastewater generated, its quality of treatment, and the location of its effluent disposal. Because wastewater impacts may be felt over long distances from the origin of discharge, it is essential that wastewater be managed on a comprehensive (i.e., watershed) basis. Through the Executive Office of Environmental Affairs' innovative ***Watershed Approach*** and the model work of the Massachusetts Bays Program, this approach is beginning to take hold in Massachusetts. However, this has not always been the case. Traditionally, densely developed urban areas have turned almost exclusively to public centralized collection and treatment systems for their wastewater management needs, while rural areas have relied almost solely on private, standard-design individual on-site disposal systems. While both methods employ a range of technologies and, for a given area and need, may well be the best alternative, they also can create negative impacts, sometimes unforeseen. Use of these methods may preclude other management options that might prove more protective environmentally and less costly socially in the long run. Indeed, throughout the Bays region, there are many geographic settings - especially suburban communities and neighborhoods - where wastewater management needs fall "in between" centralized treatment and standard design on-site disposal. In these areas, a mix of *decentralized* wastewater managment options, including package treatment plants, innovative/alternative on-site systems, waste grinder/ STEP systems, and/or management districts, may be preferable. The phrase, "decentralized wastewater management," refers to coordinated management of dispersed on-site or 'near-site,' individual, or neighborhood and community, small-scale, wastewater treatment systems. Please refer to Action Plan #7C for additional discussion of this wastewater management approach.

Managing wastewater wisely and efficiently in the developing coastal watersheds of the Massachusetts Bays region is a major challenge for the region's decisionmakers and its citizens, now and in the future. It is critically important, therefore, that all levels of government work closely and cooperatively to explore the full range of available planning and wastewater management alternatives, and to adopt and implement those that are best suited to a given area and its surrounding watershed's particular wastewater and environmental resource needs.

When choosing among wastewater management options, municipalities should give careful consideration to current and future growth management strategies based on their natural resource capacities and local commitment to achieve and maintain a certain minimum level of environmental quality.

The recommendations presented in the following three action plans - ***Managing Centralized Wastewater Treatment Facilities***, ***Managing On-Site Sewage Disposal Systems***, and ***Decentralized Wastewater Management and Treatment*** - are a step in this direction.

7A. ACTION PLAN

FOR

MANAGING CENTRALIZED WASTEWATER TREATMENT FACILITIES

Almost everyone has a morning ritual that involves, among other things, turning on a faucet and flushing a toilet. There is no perceived need to think about where the water comes from, or where it goes after it flows down the drain. Because our water comes and goes so easily, it is easy to forget that the water we use must in some manner be disposed.

In some areas, the water that goes down our drains enters a centralized sewage system for treatment. A sewage system consists of the pipes which collect the wastewater, pumping stations which transport it through the pipes, and a treatment plant (or plants) that remove some of the contaminants before the wastewater is returned to the environment.

There are three levels of sewage treatment:

- *Primary treatment:* the least expensive and most common type of treatment relies exclusively on physical straining and settling to remove solids from the wastewater. During primary treatment, wastewater is screened to remove large solids and then passes to a storage tank where smaller particles are allowed to settle to the bottom. Primary treatment typically removes about one third of the organic solids from the wastewater stream. Chemically enhanced primary treatment is sometimes used, where chemicals are added to the wastewater to enhance solids removal.

- *Secondary treatment:* employs a combination of physical and biological processes that together are much more effective than primary treatment at removing most contaminants. A settling tank is first used to remove suspended particles. Microorganisms are then used to degrade organics which are dissolved in the wastewater. Secondary treatment removes approximately 80-85 percent of the organic matter in the wastewater stream. Many sewage treatment authorities have been required to install secondary treatment facilities to comply with the Clean Water Act.

- *Advanced treatment,* also knows as tertiary treatment: includes a variety of more advanced treatment processes currently available. Advanced waste treatment processes can remove nutrients such as nitrogen and phosphorus, which when allowed to remain in the effluent may cause eutrophication of receiving waters.

Before being discharged, the effluent from a treatment plant is usually disinfected with chlorine or some other chemical to kill harmful pathogens. The effluent then passes through an outfall and into a receiving water body.

All treatment plants produce a semi-solid byproduct called "sludge", which is disposed of separately from the effluent. The quality of this sludge depends in large measure on the concentration of contaminants in the wastewater that reaches the plant. Sludge with low concentrations of toxic materials can be composted and used as a soil additive. Advanced sludge processing facilities -- such as the Massachusetts Water Resources Authority's (MWRA) new facilities at the Fore River Shipyard -- can convert sludge into high-grade fertilizer pellets. If the sludge has high concentrations of toxic contaminants, however, it has no beneficial use. Incineration or disposal at a landfill can be very expensive. For this reason, source reduction programs, designed to minimize initial contaminant loadings, are an important element of most sewage treatment programs. For example, sludge from the MWRA treatment facility has elevated molybdenum concentrations during the summer months, which occasionally precludes its use for production of fertilizer pellets. The source of the molybdenum has been traced to anti-fouling agents in industrial cooling towers and large air conditioning units. The MWRA TRAC (Toxic Reduction and Control) group is working with clients to find substitute compounds to alleviate this problem.

Sewage outfalls are often the single greatest point source of pollution in coastal waters. Not surprisingly, the quality of the treatment plant's discharged effluent can have a dramatic impact on the quality of the receiving waterbody and its living resources. This is especially true if the receiving waterbody is a poorly-flushed embayment, or if the volume of effluent is especially large. In Boston Harbor, for instance, nearly one-third of the freshwater inflow comes from the MWRA's sewage treatment facilities. Discharges of this magnitude can have impacts that reach far beyond the point of discharge.

However, as subsequently described in this section, centralized treatment can be the most viable option for a community, given the community's particular circumstances. In these cases, the impacts of an effluent discharge can be identified, managed, and mitigated.

State and federal agencies regulate discharges from sewage treatment facilities through permits granted under the National Pollutant Discharge Elimination System (NPDES). These permits set thresholds for contaminant concentrations in the effluent. Discharge permits generally set limits for suspended solids, biochemical oxygen demand (BOD), fecal coliform bacteria, and chlorine. They may also set limits on specific chemicals or metals, especially if the sewer system serves industries which use or produce toxic chemicals or if there has been a problem with contaminants in the past. All permits require self-monitoring by the discharger in order to demonstrate compliance with the permit requirements.

In addition, while NPDES permits for municipalities discharging to marine waters typically set limits on BOD, solids, and other convential pollutants (as described above), it is not common for these permits to include limits on nitrogen and phosphorus, even though these nutrients can adversely impact receiving waters. For example, for marine discharges, the ambient data to support establishing these thresholds is insufficient for large-scale application. Nonetheless, discussions are currently underway with some Massachusetts communities (e.g., Scituate) to set nutrient limits in their permits to discharge wastewater effluent to coastal areas. Further, NPDES permits must ensure compliance with both technology-based requirements and water quality standards, including designated uses and criteria to meet those uses. In addition, in Massachusetts, the NPDES must satisfy, and is otherwise supplemented by, the antidegradation provision of the Commonwealth's Water Quality Standards. This provision acknowledges the Commonwealth's commitment to: (1) protect existing uses and the water quality necessary to maintain such uses; (2) where the water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, maintain and protect such water quality unless a variance is granted based on a finding that there are no reasonable alternatives and the lowering of water quality is necessary to accommodate economic or social development; and (3) maintain and protect without qualification the outstanding resource waters designated by the state.

As the population of the Massachusetts Bays region continues to grow, the pressure on existing wastewater treatment facilities will grow as well. Unfortunately, some centralized sewage systems in the Massachusetts Bays region will not be able to handle increased flows. Some have antiquated or undersized collection systems, and others are connected to stormwater drains; these result in infiltration and inflow that dramatically reduce the overall effectiveness of the treatment system. Facility improvements almost always require heavy capital outlays that are passed on to the sewage district's ratepayers.

In some instances, there may be no alternative to constructing new centralized wastewater treatment facilities. The MWRA, for example, is required by court order to construct a new secondary treatment plant in order to comply with the Clean Water Act. Fast-growing towns such as Plymouth may need to increase plant capacity to keep up with population growth. But the cost of constructing new sewage facilities can be exorbitant. Other, less expensive options, such as land application and alternative technologies, will need to be evaluated and implemented to help treat and safely dispose of increased sewage flows in the Massachusetts Bays region.

DEM ACTION #7A.1:

The Department of Environmental Management, in collaboration with other state and federal agencies, should continue to implement the Ocean Sanctuaries Act by closely monitoring all facilities plans which propose increased wastewater treatment plant discharges into an ocean sanctuary.

RATIONALE:

With the notable exception of the metropolitan areas south of Lynn and north of Marshfield, most of the Massachusetts Bays coastline below mean low water lies within one of five designated ocean sanctuaries. Under the Ocean Sanctuaries Act (OSA), these sanctuaries must be protected for their "ecological" and "aesthetic" interests. The OSA is designed to protect coastal waters by prohibiting activities that could be environmentally or aesthetically damaging. Prohibited activities include new or increased wastewater discharges; building of any structure on the seabed; mining or removing sand, gravel, or minerals; dumping or discharging of commercial or industrial wastes; incineration of solid waste on vessels; construction of offshore electric stations; and commercial advertising. Some of the prohibited activities *may* be allowed if the project proponent receives a Chapter 91 permit from the Department of Environmental Protection (DEP) and also meets the conditions defined in the regulations as the "public necessity and convenience" standard.

In 1989, the OSA was amended to establish a variance procedure for proposed increases in municipal wastewater discharges into a sanctuary. Prior to the amendment, a community with an existing municipal wastewater discharge into an ocean sanctuary could not correct outstanding pollution problems (increased sewer use or combined sewer overflows, for example) if it meant increasing the volume of effluent or relocating the point of discharge. Effluent volumes had to remain at the original (permitted) volume even if the increased discharge were to be cleaner due to a higher level of treatment.

With the variance procedure in place, increased wastewater discharges are now possible. However, the strict environmental requirements of the variance procedure will ensure that increased discharges remain a last resort. Rigorous scrutiny of wastewater facilities plans will continue to ensure that alternative disposal technologies are fully explored and that increased discharges will not adversely affect marine water quality or living resources.

RESPONSIBLE AGENT(s):

The Commonwealth's ocean sanctuaries have been placed under the "care and control" of the Massachusetts Department of Environmental Management. Acting as a caretaker rather than a permitting authority, DEM is responsible for reviewing all other state agencies' licensing, permitting, and approval activities in ocean sanctuaries to ensure compliance with the Act. It is the responsibility of all state agencies to conduct their activities in a manner consistent with the provisions of the Act and to confer with the Ocean Sanctuaries Coordinator at DEM.

IMPLEMENTATION STRATEGY:

To implement the Ocean Sanctuaries Act, DEM will continue to assure strict adherence to the environmental review process required under the variance procedure. Variances will be granted only if the proposed wastewater discharge is determined to be the only feasible alternative and receives a *minimum* of secondary treatment. Multiple prerequisites will need to be met and plans developed for pretreatment, water conservation, and the control of infiltration/inflow, sewer connections, and CSOs. DEM will emphasize the requirement that land application and other alternative disposal technologies be fully examined prior to consideration of an ocean discharge, and that water conservation measures be implemented to their fullest practicable extent. DEM also will inform the public that any project in an ocean sanctuary must comply with the "public necessity and convenience" standard set forth in the Ocean Sanctuaries Act and defined in Massachusetts regulations 302 CMR 5.00.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of implementing this action is for the DEM staff time involved, and will be borne by DEM.

POTENTIAL FUNDING SOURCE(s):

DEM annual operating budget.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Ocean Sanctuaries Program
(617) 727-3267

EPA ACTION #7A.2:

The Environmental Protection Agency should support the control of combined sewer overflows in the Massachusetts Bays watersheds, especially the lower Charles River, and should target National Pollutant Discharge Elimination System (NPDES) permitting to implement technology- and water quality-based requirements in the Merrimack River watershed.

RATIONALE:

Combined sewer overflows (CSOs) occur in drainage systems which carry both stormwater runoff and raw sewage, typically during times of high volume flow in what are usually undersized and outdated systems. Without separation and traditional treatment of the sewage component, CSOs can be major sources of harmful pathogens, toxics, and debris. The presence of numerous CSOs in the Massachusetts Bays and their watersheds has led to limitations on human contact through swimming, the closure of economically important shellfish beds, and a general decline in environmental quality. This is especially true in the lower Charles River, where this important urban resource is currently neither swimmable nor fishable due to both CSOs and a number of cumulative nonpoint sources of water pollution (e.g., stormwater runoff).

Additional water quality problems resulting from inadequately treated and managed wastewater and CSOs include high levels of toxic pollutants and metals which surpass the ability of the receiving water to assimilate and dilute these contaminants to concentrations below acceptable limits. Reduction of the sources of these pollutants (e.g., via pollutant-specific limits, BMPs) is a proven solution to these problems. The need to manage these water quality problems is especially pressing in the Merrimack River watershed, which is known to be a major contributor of toxic pollutants and metals to the Massachusetts Bays.

The water quality problems noted above result partially from wastewater discharges, which are subject to the NPDES program. Under this program, such discharges into wetlands, waterways, and waterbodies are required to obtain a permit which sets limits for various contaminants in the discharge. These permit limits are typically met through a variety of remedial and preventive measures which are implemented at or by the wastewater treatment plant.

RESPONSIBLE AGENT(s):

NPDES permitting and compliance for wastewater discharges is the joint responsibility of the EPA and the Department of Environmental Protection (DEP). Permitting actions will be developed and implemented with the coordination and cooperation of involved agencies such as the Massachusetts Water Resources Authority (MWRA). Further, any NPDES permitting will be integrated with existing, holistic efforts to better manage and protect the Charles River Watershed (e.g., EPA's Lower Charles Initiative). Finally, this action will be implemented in accordance with EPA's Combined Sewer Overflow Policy, as published in the Federal Register on April 19, 1994.

IMPLEMENTATION STRATEGY:

No major organizational efforts are needed to implement this recommendation in the specified areas, since EPA staff resources dedicated to the NPDES program will be redirected to the lower Charles River and Merrimack River discharges, in coordination with the Massachusetts DEP.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Minimal, since the recommended action will be carried out by EPA staff who are already funded by the agency's operating budget.

POTENTIAL FUNDING SOURCE(s):

Agency operating budgets.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

EPA - New England
(617) 565-4422

EPA/EOEA/DEP/CZM PARTNERSHIP ACTION #7A.3:

The Environmental Protection Agency, Executive Office of Environmental Affairs, Department of Environmental Protection, and Coastal Zone Management Office should work collaboratively to develop and implement an effective program for monitoring and enforcing point source discharges from wastewater treatment plants and energy-producing facilities.

RATIONALE:

In Massachusetts, there are 32 municipal wastewater treatment plants (WWTP) and six energy-producing facilities with discharges to near coastal waters. These discharges have the potential to cause localized and regional declines in receiving water quality - with resultant adverse impacts to living marine resources and coastal habitats - unless closely monitored on a regular basis. Opportunities exist to improve the existing discharge permitting and enforcement structure so as to maximize facility compliance and pollutant removal effectiveness.

PROPOSED ACTIONS:

Accordingly, the following CCMP actions are proposed. These are expected to be developed and articulated more fully in future supplements to the CCMP.

1. **EPA/DEP Action**
   In order to develop a streamlined and concise permitting and enforcement strategy to manage point source discharges, EPA-New England should consider delegating the NPDES permit program to the Massachusetts Department of Environmental Protection (DEP).

2. **DEP/CZM/EPA Action**
   Consistent with the EOEA Basin Management Initiative, DEP and the Massachusetts Coastal Zone Management Office (CZM) should re-evaluate the effectiveness of the current NPDES program and, with EPA, redesign the program to achieve effective pollution reduction, including pollution trading and other innovative "offsets/credits" models; all to the extent authorized by existing law.

3. **EOEA/DEP/CZM Action**
   EOEA, DEP, and CZM should pursue state legislation to modify the Massachusetts Clean Waters Act to meet EPA requirements for NPDES delegation. Legislation has been before the state legislature for some time without additional action.

4. **CZM/DEP Action**
   CZM and DEP should assemble an interagency team to develop criteria for a routine comprehensive evaluation of coastal WWTP discharges. The evaluation should focus on permit compliance and pollution removal effectiveness to assist in prioritizing key issues within coastal watersheds. Priorities thus identified should be used to focus state agency program actions.

Monitoring plans developed by dischargers should be reviewed by appropriate agency staff (e.g., EPA, DEP, MBP, CZM) to ensure use of performance-based methodologies and inclusion of acceptable quality assurance/quality control procedures. Monitoring data should be reviewed periodically to ensure compliance with permit limits and to track trends in effluent and receiving water quality.

7B. ACTION PLAN

FOR

MANAGING ON-SITE SEWAGE DISPOSAL SYSTEMS

In areas that are not served by a centralized sewage treatment facility, wastewater generated by residents and businesses often must be disposed of on the premises. Homes and businesses in many areas of the Massachusetts Bays region dispose of their sewage through on-site systems, including parts of the South Shore, most of the Upper North Shore, and virtually all of Cape Cod. These same areas have generally experienced the greatest population growth over the last 20 years. As the population in unsewered rural and suburban areas continues to expand, it becomes increasingly important to find ways to limit the adverse impact of these systems on the coastal environment.

On-site sewage disposal systems (OSDS), such as septic tanks and cesspools, remove pathogens from waste by two mechanisms -- physical straining and adsorption or adherence to soil particles. Most of these systems temporarily store wastewater and then gradually allow it to leach into surrounding soils. As the sewage percolates through the soil, much of the bacteria is filtered out, allowing relatively clean water to pass through to the groundwater below.

Three physical factors govern the placement of a septic system:

(1) the elevation of the site above groundwater;

(2) the lateral distance between the leaching component of the system and a point of water use (e.g., drinking water well); and

(3) the suitability of the soils or sediments into which the effluent will be discharged.

In Massachusetts, all of these factors are addressed by the Title 5 regulations of the State Environmental Code, most recently revised in March, 1995. Unfortunately, many on-site systems pre-date both the current Title 5 regulations and the previous (1978) regulations, and are severely degrading coastal habitat and nearshore waters in the Massachusetts Bays region.

There are three ways in which pathogen contamination from on-site systems can reach the coast. The most obvious threat is outright system failure, which occurs when a system component is blocked by accumulated solids or when receiving soils become saturated. With no place else to go, sewage collects on top of the septic system, cesspool, or leaching structure. If it breaks onto the surface of the ground, the sewage may eventually be carried to receiving waters by stormwater runoff or gravity. Systems installed before the promulgation of the 1978 Title 5 may have little or no separation from groundwater and may therefore cause contamination even if the sewage does not emerge onto the ground. These "covert" system failures are especially insidious because they give no obvious visible indication of the harm being done.

During dry weather, system failures probably contribute only a small amount of pathogen contamination to the Bays. During periods of wet weather, however, system failures are more frequent and may be a locally significant source of coliform bacteria in some coastal areas. Wet weather also triggers overflows in some older systems. Although they are illegal now, many pre-Title 5 systems were equipped with overflow pipes to prevent aesthetically unpleasant system failures. When the wastewater in these systems backs up to a critical level, it is diverted through the overflow pipe, which usually empties directly into a surface waterbody or a connecting ditch. Existing overflow connections are thought to contribute significantly to pathogen contamination in coastal waters and their tributaries.

Even when they meet current design standards, are operating properly, and are properly maintained, however, on-site sewage disposal systems may threaten water quality. Studies suggest that, in most instances, soils filter bacteria out of wastewater over a distance of a few yards. However, viruses -- which are typically much smaller than bacteria -- may pass through these soils and enter the groundwater. They subsequently contaminate resource areas (aquifers, shellfish beds, swimming beaches) which intersect the groundwater flow. Depending on the horizontal distance between an on-site sewage system and the shore, sewage-derived pathogens may contaminate coastal waters and habitat.

In addition, on-site sewage disposal systems can be a significant source of nitrogen. Soil infiltration generally does not remove nitrogen effectively from the effluent. Instead, the soil merely converts ammonia nitrogen to potentially harmful

nitrates. Excessive nitrates not only can contaminate drinking water supplies, but also can stimulate excessive growth of algae in nitrogen-sensitive embayments.

On-site sewage disposal systems also may contribute toxic and corrosive contaminants from household cleaning and maintenance products. While quantitative data are not available to conclusively establish the relative magnitude of septic systems as a source of toxicants to water resources, efforts need to be made to reduce the use of household contaminants in order to better protect the environment and to increase the longevity of the disposal systems.

Prior to their recent revisions, the Title 5 regulations were not sufficient to prevent serious coastal degradation from on-site sewage disposal systems. Originally, the Title 5 regulations were adopted as *minimum* standards of protection. Many homeowners and real estate developers, however, misconstrued them as *adequate* standards of protection. In light of scientific gains made since Title 5 was promulgated in 1978, the regulations have been substantially revised to better protect public health and the marine environment. Some of the positive changes include:

- Required system inspection by a certified inspector at the time of property transfer, change of use that results in increased sewage flow, or increase in the number of bedrooms.

- Clarified definition of a failed system - i.e., a system exhibiting obvious hydraulic failures (breakout or backup of sewage); systems located within Zone I of public water supply wells, within 100 feet of public water supply reservoirs, or within 50 feet of surface water bodies; cesspools without at least a half-day capacity; systems found to be a specific health or environmental threat.

- Nitrogen loading limits for new systems to be served by both on-site systems and private wells, and for systems located in nitrogen-sensitive areas (zones of contribution of public drinking water supply wells). Designation of other nitrogen-sensitive areas will occur through the surface water quality standards process.

- A comprehensive system for review and approval of alternative technologies, based on the level of information available about the proposed technology. For example, recirculating sand filters are approved for general use, and humus/composting toilets, already approved wherever a conventional system could be used, are approved for upgrades, with use of existing leaching systems under some conditions.

No matter how positive these and other changes to the state regulations, mitigating the impact of on-site sewage systems will require the broad cooperation of municipalities and individual homeowners. Fortunately, some remediation measures are easy to implement. Many conventional system failures, for example, can be prevented simply by pumping out the solids that collect in the septic tank during routine system maintenance.

New technologies also promise to mitigate the impact of on-site sewage systems. Innovative on-site treatment systems have shown considerable promise in removing significant amounts of nitrogen from wastewater. Some of the most promising technologies include:

- *Humus/composting toilets:* composting of sanitary wastes has been used since the dawn of civilization. Its principle is simple. If sanitary wastes are allowed to sit long enough, perhaps with a little added organic matter such as leaves or sawdust, it will eventually degrade to a soil-like material. There have been several drawbacks to this approach, however. Odors, exposure to pathogens, and general unsightliness have historically limited its use to situations where these objections could be overcome. Recently, Clivus Multrum has packaged this technology to address health and aesthetic concerns. Clivus's composting technology is presently approved for use in Massachusetts under certain conditions. This technology has been combined elsewhere with other technologies such as sand filters and standard leaching facilities; however, this "combined" approach has not yet been tried in Massachusetts

- *Peat filters:* in these systems, peat bed filters are placed after the septic tank and function as both a filter and leach field. As wastewater moves through the peat, microscopic fungi transform nitrates to harmless nitrogen gas. Peat beds require little maintenance and can remove more than 90 percent of the total nitrogen in the wastewater flow.

- *Recirculating sand filters (RSFs):* these systems are equipped with a series of sand filters. Wastes from the house are first discharged into a septic tank, where solids are separated from the liquid portion of the wastes. Effluent from the septic tank then flows into a pump chamber. From there, the wastes are periodically pumped to the top of a sand filter. After percolating through the sand filter, the effluent is collected by an underdrain and either recirculated back to the pump chamber or discharged to a standard leaching facility. The majority of the effluent collected at the bottom of the sand filter is usually returned to the pump chamber by gravity flow. RSFs are typically designed to recirculate effluent three to five times before discharging to the leaching facility.

- *RUCK systems:* like filter systems, the RUCK system relies on bacteria to convert ammonium first to nitrate and then to nitrogen gas. It incorporates separate septic tanks for black and gray water. A special filter aerates

and nitrifies the black water, which is then mixed with the gray water in an anaerobic environment. At this stage, bacteria draw carbon from the gray water, allowing them to convert nitrate to nitrogen gas. The combined effluent is then discharged to a standard leaching facility.

While the cost of these systems may be beyond the immediate reach of many home owners, low-interest "betterment" loans are expected to become increasingly available as more and more communities take advantage of the recent betterment law that enables communities to offer loans for on-site system upgrades, lead paint abatement, and removal of underground fuel tanks. Additional assistance is available from a $10 million loan program, to be administered by the Executive Office of Communities and Development (EOCD), the Farmers Home Administration (FmHA), the Massachusetts Housing Finance Agency (MHFA), and some private lending institutions. Also, with increased use of alternative systems, costs should fall. In the meantime, homeowners need to be educated about their on-site sewage systems in order to keep them functioning properly. At the same time, town officials, particularly local Boards of Health and health agents, need reliable up-to-date information on alternative technology systems and direct "hands-on" technical assistance in evaluating on-site systems proposals and monitoring alternative systems performance. Working together, state officials, local officials, and private homeowners can ensure that our coastal resources are not degraded by sewage-derived contaminants.

MUNICIPAL ACTION #7B.1:

Municipalities should identify resource areas sensitive to wastewater and develop management plans appropriate to these areas, focusing on the capacities of natural systems to assimilate wastewater.

RATIONALE:

In many Massachusetts coastal communities, groundwater is both a source of drinking water and a receptor for wastewater. Septic systems located in areas of high groundwater, in recharge areas to freshwater ponds, and in recharge areas to sensitive coastal embayments can seriously degrade water quality, resulting in an array of problems, including closed shellfish beds and excessive plant growth and odor in ponds and coastal waters.

By identifying their wastewater-sensitive resource areas (e.g., wellhead protection areas, potential public water supply areas, recharge areas to freshwater ponds, recharge areas to nitrogen-sensitive coastal embayments, areas where groundwater has been degraded by point and nonpoint source pollution), municipalities can better manage wastewater and minimize adverse impacts on groundwater and surface water quality.

Once these individual resource areas are identified, municipalities can develop appropriate sub-area management plans that specify permissible and prohibited activities based on the specific resource and public health interests to be protected. For example, specific limits can be set on nitrogen discharges from new development or redevelopment sites in order to protect the quality of drinking water supplies in wellhead protection areas or to prevent excessive plant growth in coastal waters. Strategies to achieve and maintain safe nitrogen levels may include: zoning changes to increase minimum lot sizes, restrictions on selected land uses that generate high nitrogen loads, use of denitrifying wastewater treatment systems, and land acquisition.

One important note: This recommendation can and should be considered a *minimum* level of planning needed to protect specific embayments and other sensitive areas from wastewater-related nutrient and pathogen impacts, especially for existing development. In many cases, municipalities will need to undertake a more comprehensive level of planning related to wastewater management and the potential impacts associated with wastewater discharge. This is particularly true for impacts from new development or in densely developed areas adjacent to sensitive resource areas. Please refer to Action Plan 7C regarding Decentralized Wastewater Management for additional information on these broad criteria.

RESPONSIBLE AGENT(s):

Planning Boards and Boards of Health would share most of the responsibility for this action, with assistance from local Conservation Commissions and Water Departments, Regional Planning Agencies, and the Massachusetts Departments of Environmental Protection (DEP) and Environmental Management (DEM). Where management areas cross town boundaries, municipalities should work cooperatively with their neighboring communities and RPAs to ensure the effective management of wastewater at the regional level.

IMPLEMENTATION STRATEGY:

Local boards, assisted by the RPAs, should obtain and evaluate relevant information on sensitive resource areas in the community. Sources of such information include local records and file data developed by the Departments of Environmental Protection and Environmental Management (e.g., Areas of Critical Environmental Concern, wellhead protection areas, potential public water supply sites, Outstanding Resource Waters, wetlands). Information on existing and potential wastewater problem areas may be obtained from Board of Health septic system pumping and repair records, local water table maps, local land use maps, and Planning Board records on existing and proposed development sites.

The local boards and RPAs should involve the citizenry in discussions of wastewater management alternatives and of the treatment level needed to achieve and maintain a specified environmental quality under different development scenarios, so that costs and benefits can be properly weighed by the community as a whole. Each alternative will carry with it certain public and/or individual resident costs and benefits. Understanding these costs and benefits can be key to obtaining public support for a particular management scheme.

Technical assistance in developing the sub-area management plans may be obtained from the RPAs, the DEP Division of Water Pollution Control, the Massachusetts Bays Program, the Massachusetts Coastal Zone Management Office, the EPA's Small Flows Clearinghouse, and the Massachusetts Water Resources Authority (for member municipalities). In

addition, helpful information may be available from EPA's two regional demonstration projects -- the City of Gloucester and the Waquoit Bay National Estuarine Research Reserve -- on alternative on-site wastewater technologies and other strategies for minimizing the impacts of wastewater on groundwater and surface water quality.

LEGISLATION REQUIRED:

New legislation is not required at this time.

ESTIMATED COST:

The costs of this action can vary widely depending upon the level of information available. For municipalities with computerized assessor's records, digitized parcel information, and completed water studies, this action could cost under $50,000. If such information is not available, costs could exceed $250,000. (Although not as detailed or reliable, the so-called "MacConnell land use data" could be used in place of parcel data.)

The cost also is dependent upon the specific resources to be protected. For example, it may cost significantly more to define and map the recharge area of a nitrogen-sensitive embayment than to delineate the wellhead protection area around a single well site.

POTENTIAL FUNDING SOURCE(s):

Currently, funds for the development of local sub-area management plans must come largely from local revenues. Technical assistance (and in the case of the Cape Cod Commission, limited funding) may be available from the RPAs. Some s.319 (Nonpoint Source Program) funds may be available on a competitive basis from the DEP. Additional state funding may be available in the future if proposed legislation to provide funding for the preparation of Local Comprehensive Plans passes. A local sub-area management plan could be part of a Local Comprehensive Plan.

TARGET DATE:

1996 - 2001.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency

MUNICIPAL ACTION #7B.2:

Municipalities, in cooperation with DEP, should develop and implement regular inspection and maintenance (I/M) programs for on-site wastewater systems.

RATIONALE:

Improperly operated and maintained septic systems can pollute groundwater and streams, ponds, and coastal waters. Such pollution can result in the closure of shellfish beds and noxious water quality conditions in ponds and coastal waters. Over the long term, chronic pollution of water resources from on-site septic systems can force a municipality to construct costly water and wastewater treatment facilities that would not have been necessary had the community's septic systems been properly maintained.

Preventive measures, such as a regular septic system inspection and maintenance (I/M) program can help assure the proper operation of septic systems and protect environmental quality and public health. It also provides an opportunity to educate homeowners about the proper use and disposal of household chemicals that are harmful to septic systems and groundwater. An inspection and maintenance program can be an effective tool for improving the overall quality and performance of on-site wastewater systems within a given resource area or in the community as a whole. Depending upon the nature of the areas in which systems are located, required upgrades might include denitrifying systems or community systems where lot size limitations preclude constructing conventional systems to code.

RESPONSIBLE AGENT(s):

A septic system I/M program may be conducted by either an individual community or a group of communities (the latter by establishing an institutional mechanism for joint management and funding, such as a groundwater protection district). In either case, the I/M program should be conducted in consultation and cooperation with the Department of Environmental Protection (DEP). In some regions, organizing a program through the wastewater treatment facility or a county entity may be desirable. Individual programs would generally be administered by the Board of Health and/or DPW. Regardless of how a program is organized, each community would be individually responsible for issuing the appropriate enforcement orders to homeowners whose systems warrant pumping, repair, or an upgrade.

IMPLEMENTATION STRATEGY:

A municipality should decide how it wants to conduct its I/M program - on its own or in cooperation with other local or regional governments. The municipality also should evaluate the capacity of the local or regional wastewater treatment facility to handle additional septage. Once these are accomplished, establishment of an inspection and maintenance program is a relatively straightforward matter.

The I/M program would notify each homeowner prior to an inspection, and the homeowner would be expected to expose the manhole cover of the septic tank or cesspool. The inspection would involve examining the system for visible signs of failure, inspecting the tees and depth of the manhole cover, measuring the thickness of the scum and sludge layers relative to the volume of the septic tank or cesspool, and recording the pH. The inspector would be available to discuss the inspection results with the homeowner and to provide educational materials on proper system operation and maintenance.

Within 3 weeks or so of an inspection, a formal findings letter and a copy of the completed inspection form would be mailed to the property owner. The notice would state if the system is in compliance with applicable local and state regulations or whether pumping or an upgrade is required. The local boards of health would be responsible for implementing enforcement orders issued as a result of the inspections.

The I/M program staff would maintain a computerized database of all inspections and pumping data, and this information would be readily available to local boards of health and health officers. Inspections would be scheduled such that each residential system would be examined once every three years. Commercial systems, such as restaurants and laundromats, would be inspected more frequently, perhaps once every 6 months to a year, depending on local factors.

Other considerations would include current inspection and maintenance related efforts (e.g., a paper describing I/M options) by the DEP.

LEGISLATION REQUIRED:

The adoption of a uniform annual fee for all owners of on-site systems requires special state legislation. The establishment of a regional groundwater protection district between or among municipalities also requires special state legislation.

ESTIMATED COST:

Variable, depending on number of on-site systems and institutional mechanism selected (i.e., local program vs. share intermunicipal program).

POTENTIAL FUNDING SOURCE(s):

Local sources of funds include: property tax revenues, treatment plant discharge fees, and system user fees. As an example, under the City of Gloucester's Wastewater Management Program, each on-site system owner is charged an annual fee ("on-site monitoring fee") that appears on the water bill. The collected fees are deposited into an enterprise fund which is used exclusively for activities associated with the Wastewater Management program. At the end of each fiscal year, any money left in the fund does not revert to the General Fund but remains available for increased program staff or services, rate reduction, or for repairs of on-site systems performed on behalf of an owner experiencing an emergency or financial hardship.

TARGET DATE:

1996 - 1998.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Division of Water Pollution Control
(617) 292-5673
Your Area's Regional Planning Agency

MUNICIPAL ACTION #7B.3:

Municipalities should employ full-time, professionally-trained public health staff to provide ongoing technical and administrative support to the local Boards of Health.

RATIONALE:

Local Boards of Health have both a broad responsibility and far-reaching authority to protect the health, safety, and welfare of a community's residents. Their broad regulatory authority has thrust them into the forefront of public health and environmental protection at the local level. Indeed, Boards of Health can adopt regulations for virtually any activity that might endanger public health or contaminate the soil, air, or water, including groundwater. Major oversight responsibilities include, but are not limited to:

- Regular sanitary inspection of all food handling establishments, schools and day care centers, hospitals, convalescent facilities, and nursing homes, summer camps, and theaters;
- Investigation of all complaints of nuisance or unsanitary conditions;
- Local enforcement of the state's "Right-To-Know" law;
- Siting and regulation of solid waste facilities, including landfills and recycling centers;
- Review of subdivision and site plans (drainage and waste disposal considerations);
- Water quality testing of public swimming beaches; and
- Review and permitting of septic system installations and upgrades (including witnessing of percolation and deep hole tests).

With respect to the latter responsibility alone, the complexities and demands of the recently revised Title 5 regulations are expected to place an extremely heavy burden on many local health boards, requiring an investment of time and a technical understanding of on-site systems, including alternative systems, that are generally not available through a board's all-volunteer members or a part-time health agent. For this reason, Boards of Health should hire full-time professionally trained staff (preferably a registered sanitarian or engineer) who can devote full attention to carrying out the Boards' multiple environmental and public health mandates.

RESPONSIBLE AGENT(s):

The Boards of Health, supported by other municipal boards, would have primary responsibility for this action.

IMPLEMENTATION STRATEGY:

The Board of Health, in consultation with the community's finance board and chief governing body, would request approval of an expanded annual operating budget to accommodate the new staff position(s). Approval would be by either town meeting or city council vote, depending on the local government structure.

The Massachusetts Association of Health Boards, the Massachusetts Public Health Association, and the Massachusetts Municipal Association can offer guidance in developing job descriptions and advertising the new position(s) to attract qualified candidates.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost associated with hiring a full-time health agent (registered sanitarian or engineer) is $35,000 - 40,000 per year including benefits, overhead, professional membership fees, travel, and other expenses.

POTENTIAL FUNDING SOURCE(s):

Local revenues and fees from sanitary inspection services.

TARGET DATE:

1996/1997 to hire full-time staff.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Association of Health Boards
(508) 643-0234
Massachusetts Public Health Association
(617) 524-6696
Massachusetts Municipal Association
(617) 426-7272

COASTAL RPA ACTION #7B.4

Coastal Regional Planning Agencies should establish a Title 5 and alternative systems technical assistance program directed to local Boards of Health and health agents, systems engineers/installers, and homeowners.

RATIONALE:

In 1994, the Massachusetts Bays Program convened a "focus group" meeting on the local management of on-site sewage disposal systems. The purpose of this meeting was to learn first hand from local Boards of Health and others about the problems they encounter in administering Title 5 and the types of outside assistance that would prove most beneficial to them.

The participants noted the lack of direct ("hands-on") technical assistance available to local boards on a regular and timely basis to help set up inspection and maintenance (I/M) programs, perform technical reviews of advanced on-site wastewater treatment systems plans, develop protocols for local oversight of the operation and maintenance of alternative wastewater treatment technologies, and provide training for on-site systems installation and monitoring.

To address this need, it was recommended that the Regional Planning Agencies establish a direct and ongoing technical assistance service in each of the coastal regions where on-site sewage disposal is the dominant or a significant mode of wastewater management.

An excellent model for this latter service is already in place on Cape Cod. Since April 1994, the Barnstable County Department of Health and the Environment (BCDHE) has employed a part-time registered sanitarian, paid for by the MBP, to provide ongoing technical assistance to Boards of Health, installers, and others on alternative technologies and related matters. During this brief period, this individual has:

- developed expertise and compiled a reference library on alternative systems technologies;
- provided technical assistance to Boards of Health and engineers in the review of plans for non-proprietary systems;
- assisted in the installation of a peat system (Cotuit);
- assisted in the monitoring program for a recirculating sand filter (Bourne);
- developed standardized monitoring requirements for the provision of performance data on alternative systems; and
- developed fact sheets for Boards of Health, homeowners, and engineers/installers on composting and recirculating sand filter systems.

Building on the first year's accomplishments, BCDHE plans to offer additional services in several other areas as well, including:

- conducting hands-on training on alternative technologies with each Board of Health;
- working directly with Boards of Health to adopt standardized monitoring requirements for alternative technologies;
- developing additional fact sheets on peat systems, determination of system efficiencies, and the denitrification process; and
- developing and distributing newsletters offering timely information and advice on on-site systems issues.

From the local perspective, hands-on assistance of this kind is indispensable and can only be provided by trained personnel physically located in or near the communities to be served. For this reason, it is important that these same technical services be made available in the other coastal regions where undertrained and overburdened Boards of Health are attempting to grapple with a broad range of difficult on-site sewage systems management problems.

RESPONSIBLE AGENT(s):

The three RPAs serving the non-sewered coastal communities of the North and South Shores [Merrimack Valley Planning Commission (MVPC), Metropolitan Area Planning Council (MAPC), and Old Colony Planning Council (OCPC)] would be responsible for providing the direct technical assistance, training, and educational outreach to local Boards of Health, health agents, on-site systems engineers/installers, and homeowners. As mentioned above, Cape Cod communities are already offered these services by the Barnstable County Department of Health and the Environment.

IMPLEMENTATION STRATEGY:

The three coastal RPAs should adopt the successful model program established by the Barnstable County Department of Health and the Environment.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost to the coastal RPAs of providing ongoing technical assistance to local Boards of Health and others on on-site systems matters, including alternative technologies, is expected to be about $25,000 - $35,000/RPA per year. This would support the part-time position (approximately 20 hrs/wk) of a trained specialist (e.g., environmental engineer or registered sanitarian) to provide ongoing professional assistance to the non-sewered coastal communities on the North and South Shores.

POTENTIAL FUNDING SOURCE(s):

Potential funding sources include Section 319 (nonpoint source) funds and RPA matching funds.

TARGET DATE:

Due to the scope and immediacy of on-site system problems and needs in many of the region's coastal communities, planning for the RPA technical assistance services should begin as soon as possible, with full implementation proposed for 1996/1997.

FURTHER INFORMATION:

For further information and assistance, contact:

Your Area's Regional Planning Agency:

Merrimack Valley Planning Commission
(508) 374-0519
Metropolitan Area Planning Council
(617) 451-2770
Old Colony Planning Council
(508) 583-1833

DEP ACTION #7B.5:

The Department of Environmental Protection should evaluate and build upon the centralized statewide repository for testing information on alternative technologies, to be established as part of the Buzzards Bay Project's two-year Environmental Technology Initiative Project.

RATIONALE

Keeping informed about the efficiency and site-specific applicability of on-site alternative technologies poses a special challenge to local officials administering Title 5. Boards of health and other community representatives have identified the need for a centralized bureau or service that they can consult for reliable, up-to-date information and advice on evaluating and choosing appropriate alternative technologies to protect nitrogen-sensitive embayments and groundwater.

To address this problem, a state/local focus group convened in 1994 by the Massachusetts Bays Program recommended that the state (preferably DEP) establish a central clearinghouse for all relevant information on alternative technologies. The information to be collected should be comprehensive, up-to-date, and easily accessible (i.e., user friendly). Moreover, to the extent possible, the clearinghouse should be linked electronically to other data sources, researchers and users (e.g., the National Small Flows Clearinghouse at West Virginia University, Waquoit Bay National Estuarine Research Reserve) to facilitate information transfer and use.

In the summer of 1995, the Buzzards Bay National Estuary Project, in collaboration with Barnstable County Department of Health and the Environment (BCDHE), the Massachusetts Department of Environmental Protection, Woods Hole Oceanographic Institution, and Waquoit Bay National Estuarine Research Reserve, was awarded an EPA Environmental Technology Initiative (ETI) grant for $459,000. The funding will support a two-year project involving the development of a testing and demonstration facility for alternative design systems in the Buzzards Bay area. The project will provide a centralized testing facility which will demonstrate the technologies to local boards of health and system design professionals. The project will also provide a centralized statewide repository for testing information on alternative technologies, which will help encourage their use and acceptance regionally and perhaps even nationally. This project can serve as a model for the DEP alternative technologies clearinghouse recommended by our local focus group participants.

RESPONSIBLE AGENT(s):

During the two-year ETI project, the Barnstable County Health and Environment Department will serve as the statewide repository for testing information on alternative technologies. The information will be available both electronically and in hard-copy format. At the conclusion of the project, DEP should evaluate the effectiveness of and demand for a centralized clearinghouse, and should accept the responsibility for maintaining the service statewide.

IMPLEMENTATION STRATEGY:

DEP/DWPC should work closely with the Buzzards Bay Project and the other ETI partners throughout the two-year project. At the conclusion of the project, DEP should convene a small working group of representative "stakeholders" to help evaluate the effectiveness of the types of information provided by the ETI project's statewide repository of testing information and the delivery system used.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The overall cost of DEP's establishing and maintaining a central clearinghouse of on-site systems technologies is yet to be determined. Evaluation of the level of effort necessary to maintain the ETI project's centralized statewide repository for testing information should help determine the cost of a long-term centralized clearinghouse.

POTENTIAL FUNDING SOURCES:

Potential funding sources include: DEP's annual operating budget and Section 319 (nonpoint source) funds.

TARGET DATE;

The ETI model project will begin in 1996 and conclude in 1998. DEP evaluation of the clearinghouse function will take place throughout the project, with a follow-up DEP implementation strategy in place at the conclusion of the project.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Division of Water Pollution Control
(617) 292-5673

7C. ACTION PLAN

FOR

DECENTRALIZED WASTEWATER MANAGEMENT AND TREATMENT

NOTE TO THE READER: THE FORMAT OF THIS PLAN DOES NOT FOLLOW THE FORMAT OF THE OTHER ACTION PLANS, AS THE BASIS FOR THE DECENTRALIZED ACTIONS IS UNDER DEVELOPMENT. UPON COMPLETION OF THIS WORK, AS DESCRIBED IN THIS PLAN, MORE SPECIFIC ACTIONS WILL BE RECOMMENDED BY THE MASSACHUSETTS BAYS PROGRAM.

BACKGROUND

As described in the previous Action Plans (Managing Centralized Wastewater Treatment Facilities and Managing On-Site Sewage Disposal Systems), the disposal and subsequent treatment of wastewater in most communities and regions of Massachusetts occurs via either centralized sewage treatment plants or standard design on-site sewage disposal systems (OSDSs). While each method employs a range of technologies, the methods themselves can possibly create impacts or otherwise be limiting.

The possible effects of centralized systems are summarized as follows:

- hydrologic imbalances in watersheds where water use is far upstream from its ultimate discharge as treated effluent;
- end-of-pipe controls are the norm and are more expensive than a pollution prevention approach;
- land is opened for development which might not have been otherwise developable, and which may contain or is protective of sensitive natural resources; and
- eutrophication of receiving waters, due to nutrient enrichment of the effluent.

The potential impacts of standard design OSDSs are summarized as follows:

- contamination by bacteria, viruses, and/or nutrients of downgradient or downstream receiving water, resulting in shellfish bed closures and eutrophication; and
- inadequate inspection and maintenance, which are critical to optimal OSDS functioning.

Recognizing that these methods work best in specific and somewhat limited situations, the Ad Hoc Task Force for Decentralized Wastewater Management (the "Task Force") began meeting several years ago to explore wastewater management methods which fall "in between" centralized treatment and standard design OSDSs. These decentralized methods can include package treatment plants; waste grinder/STEP systems; innovative/alternative OSDSs; and/or management districts to oversee the regular operation and maintenance of these technologies. The Task Force consists of representatives from the MBP, Massachusetts DEP, coastal communities, wastewater engineers, and a number of non-governmental organizations (NGOs). Similarly, the Task Force has sought funding and support from a number of sources; grantors include the MBP and EPA's Environmental Technologies Initiative (ETI). Finally, in exploring and articulating decentralized methods, a principal goal of the Task Force has been to insure that its efforts complement and otherwise fit with the existing permitting and financing frameworks which apply to centralized systems and standard design OSDSs. As previously noted, these two methods currently in use in Massachusetts for managing wastewater will continue to be viable options for managing wastewater in many areas.

The following sections describe the Task Force's efforts in greater detail, including expected benefits, progress to date, remaining work, and recommended actions.

DESCRIPTION:

A decentralized approach to wastewater management can include a range of methods to collect and treat wastewater, as well as to manage these methods. The decentralized approach provides a municipality (ies) with the ability to address environmental and health concerns with technological and management systems specific to those concerns. For example, portions of a community currently serviced by standard design OSDSs may continue using those technologies, while more densely developed areas of the community may be serviced by a collection and treatment system. Further, all of the community or only portions of it may be

serviced by a management district that has the responsibility for inspection and maintenance of the systems, and for assessing fees to pay for these services. This contrasts with the centralized approach in which the community may identify specific environmental and health concerns; however, one wastewater treatment facility is usually constructed to address these concerns, with the entire municipality sewered to transport all or most of its wastewater to that one facility. The Task Force recognizes that when choosing among wastewater management options, municipalities should give careful consideration to current and future growth management strategies, based on their community's natural resource capacities and the local commitment to achieve and maintain a certain minimum level of environmental quality. Decisions about growth management and development will influence what wastewater treatment solutions are viable, desirable, allowable, and environmentally appropriate within a particular community.

To date, the Task Force has funded the development of two major "white papers" on the needs assessment and management aspects of the decentralized approach. In addition, the Task Force held a major regional conference in December, 1995, whose goal was to provide attendees the opportunity to hear national experts speak on the assessment, management, and siting/design aspects of the decentralized approach. The following subsections characterize the papers and summarize the conference outcomes; further efforts planned by the Task Force are described in the "Work to be Completed" section.

Needs Assessment and Evaluation of Decentralized Wastewater Treatment Alternatives

As articulated in this paper, the goal of assessment and evaluation should be the production of a comprehensive "Facilities and Management Plan" (FMP). The FMP considers the physical, social, economic, environmental, and other related characteristics in making decisions regarding the construction, operation, maintenance, and financing of a wastewater management system for the study area. The components of the process leading to adoption of the FMP are summarized as follows:

- development of a plan of study, to guide the efforts by parties responsible for the FMP, including local officials, federal and state regulators, regional representatives, and the affected public;
- assessment of wastewater treatment needs, which is a major and thorough evaluation of the study area's demographic, environmental (e.g., geology, soils, water resources, etc.), and infrastructure (e.g., wastewater treatment) conditions - existing and future;
- development and screening of wastewater treatment options for the study area, addressing various technologies, technological and administrative considerations, and screening of criteria such as regulatory, management, environmental, and financial; and
- detailed evaluation of options and development of a plan for the study area, assessing the criteria from the previous step, and recommending a plan and its components.

Managing Wastewater: Prospects in Massachusetts for a Decentralized Approach

The white paper for management of decentralized wastewater technologies describes the issues and elements applicable to this aspect of the decentralized approach. In particular, once a community has accepted its FMP, it can use these management approaches to facilitate the operation and maintenance of the selected decentralized technologies. Accordingly, the potential utility for these management approaches in Massachusetts is also discussed. The following bulleted items summarize the major considerations related to management of decentralized technologies in Massachusetts:

- a wastewater management entity may take several different forms, such as an administrative or governmental body, and it may be public and/or private;
- a management entity will have financial responsibilities (e.g., administration of capital and operating costs) and regulatory responsibilities, such as permit monitoring, inspection, pumping, maintenance/repair, record keeping, and enforcement;
- in selecting a management entity, considerations relate to both the outcomes of the FMP (e.g., demographics, location of sensitive areas) and institutional issues, such as political acceptability and accountability to members of the management entity; and
- statutory, especially that legislation does not exist to enable management of wastewater technologies.

Managing Small-Scale, Alternative and On-Site Wastewater Systems: Opportunities, Problems, and Responsibilities.

This conference was held in Worcester, Massachusetts on December 1 and 2, 1995, and featured both national and regional experts in the field of decentralized wastewater management. The over 200 attendees (local officials, nonprofits, regulators, and designers) were provided with the opportunity for large and small group discussions of decentralized wastewater management solutions. These discussions identified the following major needs in Massachusetts:

- continued communication and coordination among regulators, communities, and designers, especially regarding the need for broad enabling legislation. (Many felt the conference was just a start to communication);

- technical assistance, particularly to communities, by a neutral (i.e., non-regulatory) third party; and
- a "trail blazer" community or organization to overcome existing barriers by establishing some type of wastewater management district, within current state law.

Overall, Conference attendees supported the decentralized approach, and encouraged the Task Force to pursue fulfillment of the needs identified above, since attainment of these is critical to the success of decentralized wastewater techniques and, ultimately, to improved environmental protection.

EXPECTED BENEFITS

The advantages to adopting a decentralized approach to wastewater management include financial, environmental, and social benefits.

With respect to the environmental advantages of a decentralized approach, a community can identify its sensitive natural resources and utilize technologies appropriate for the needs of those areas. For example, a coastal area adjacent to an embayment which may be prone to eutrophication should employ nitrogen-reducing techniques rather than use standard design OSDSs, which can create unacceptable nitrogen loads to receiving waters.

Social benefits of a decentralized approach include increased responsibility for those who own a wastewater treatment structure, since they may be required to regularly maintain certain components, participate in governance of the management entity, or even pay increased costs. Often with either centralized or standard design OSDSs, an "out-of-sight, out-of-mind" mentality exists on the part of the owner.

Financial benefits result when communities can apply more resource-intensive management techniques to those areas which require it (e.g., downtown areas with high density/poor soils and a high rate of OSDS failure), while applying more standard techniques in other areas. This is in contrast to a centralized collection and treatment system which would apply to a much larger area at a much higher overall cost.

PROGRESS TO DATE

As previously described, the Task Force has succeeded in bringing together all levels of government, consultants, and NGOs in developing a decentralized approach to wastewater management. This approach will provide wastewater treatment and management alternatives to those widely used in Massachusetts at present: centralized collection/treatment and standard design OSDSs. In its current form, the decentralized approach includes two white papers regarding the assessment and management aspects of the approach, as well as the major regional conference held in December 1995.

WORK TO BE COMPLETED

Upon completion of the two white papers and the conference, the Task Force is planning three additional efforts to support the decentralized approach. First, two more papers will be written: one to outline site design and engineering considerations for decentralized systems, and another to review the conditions under which management entities around the country are held accountable for the performance of OSDSs. Second, an Executive Summary of all four papers will be written and widely distributed. Third, extensive followup is planned, in the form of workshops to be held across the state for local officials and consultants.

RECOMMENDED ACTIONS

The following recommendated actions should be considered both general and preliminary. The MBP intends to continue supporting the development and implementation of this approach and plans to review these recommendations, with the responsible agency, to insure their utility and appropriateness.

- The US Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) should evaluate their existing permitting and financing programs in order to identify opportunities for the inclusion of decentralized methods;
- The Massachusetts Executive Office of Environmental Affairs (EOEA) should assess current laws and propose changes to the Legislature where needed to enable decentralized management approaches;
- The Massachusetts DEP should foster decentralized approaches through their ongoing work with communities and consultants in managing wastewater; and
- Communities should consider decentralized methods in municipal or area-wide wastewater planning, encouraging citizens, local officials, and consultants to become involved.

ACTION PLAN #8

MANAGING BOAT WASTES AND MARINA POLLUTION

Tens of thousands of commercial and recreational boats ply the waters of Massachusetts Bays. Discharges of untreated or minimally treated sanitary wastes from these marine craft can be a locally significant source of pathogens in the Bays system. The chemicals used to deodorize and disinfect this sewage -- alcohol, formaldehyde, zinc and ammonium salts, and chlorine -- also degrade marine water quality.

Boat heads (toilets) can either be installed or uninstalled. Uninstalled heads (otherwise referred to as porta-potties), most often used on boats between 18 and 26 feet, are typically self-contained units with a holding capacity of two to five gallons. The head simply stores waste until the boat returns to its slip, where the head can easily be carried off the boat and emptied into a toilet. Unfortunately, these heads can also be easily (and illegally) emptied overboard.

Installed marine heads, which are not removable, are regulated by the U.S. Coast Guard under the terms of the Federal Water Pollution Control Act Amendments of 1972 (FWPCAA). Federal regulations require installed heads to be serviced by one of three types of marine sanitation devices (MSDs). Type I and Type II MSDs both macerate and disinfect waste with chemical disinfectants, although the Type II device provides better treatment of fecal coliform and suspended solids. Type III MSDs are holding tanks that allow waste to be stored and released away from shore. These systems typically use formaldehyde, alcohol, or both to deodorize waste while it is stored in the holding tank. Boats larger than 65 feet must use either a Type II or Type III MSD.

Through Title 5 of the State Sanitary Code, the Massachusetts Department of Environmental Protection (DEP) prohibits direct discharges of sewage from portable heads into any marine or fresh water. The Coast Guard permits direct discharges from Type I and Type II MSDs in coastal waters, but prohibits discharges from Type III MSDs in marine waters within three miles of shore.

Unfortunately, illegal discharges from all types of marine heads commonly occur in nearshore waters and harbors. Neither DEP nor the Coast Guard has the personnel to adequately enforce their existing discharge regulations. Boaters with uninstalled heads, thinking it inconvenient to carry the head from the boat to an onshore toilet, often dump their waste overboard. Boaters with installed heads often do not want to invest the time and effort to get the boat to a marina's pump-out facility. Although the Commonwealth's Chapter 91 regulations give DEP's Division of Wetlands and Waterways (DWW) authority to develop design standards for pump-out facilities at all marinas, DWW has not strictly enforced annual permit requirements and many marinas do not have these facilities. Siting pump-out facilities can be problematic, since few marinas are tied into sewer systems and DEP policy prohibits the discharging of boat waste into a septic system.

Even those marinas that do have pump-out facilities report that the facilities are seldom used. Many boaters simply find it more convenient and less expensive to discharge their waste directly into nearshore waters. Apparently, they do not think that boat wastes seriously degrade water quality, or believe that their own incremental addition is too small to be significant.

While a boat's sewage may *seem* insignificant, the cumulative wastes from many boats may be a significant source of contamination in parts of Massachusetts Bays. However, because of the intermittent, transient, and sometimes covert nature of these discharges, the overall impact of boat wastes to the Bays system is difficult to assess. Generally, the impact tends to be site-specific, although pathogens and chemical disinfectants from boat discharges almost certainly impair water quality to some degree throughout large parts of the Bays system. The greatest impacts occur in embayments and other poorly flushed areas with low dilution.

The Massachusetts Bays Program has launched an initiative to educate boaters about the effects of sewage discharges on water quality in the Bays. While education is helpful, it is not enough. Federal, state, and municipal officials must find effective ways to prevent or minimize boat sewage discharges into Massachusetts Bays. Toward this end, the Federal Clean Vessel Act of 1992 established an opportunity for states to set up grant programs for the construction, renovation, operation, and maintenance of boat pump-out and waste reception facilities at both public and private marinas. CZM

and DFWELE (through its Division of Marine Fisheries [DMF]) completed a needs assessment and developed a plan for the state program according to U.S. Fish and Wildlife Service (USFWS) guidelines. Proposals for funding have been solicited from coastal communities and approximately $1 million has been released for project construction and implementation.

At the same time, there is a need to control non-sewage contaminants that are generated "land-side" at boatyards and marinas. In particular, stormwater runoff from impervious areas can be a significant water quality concern. Because activities in these areas include the regular transport and launching of boats, and the servicing of hulls and other boat components, runoff containing oil and grease, metals, paint, and other pollutants has the potential to seriously degrade coastal waters. In recognition of this, CZM and DEP are collaborating on the development of guidance documents that will specifically help marinas and harbormasters to implement the Chapter 91 requirements regarding control of non-point source pollution.

The following recommended actions support these initiatives and provide the framework for more effective management of boat wastes and marina runoff within the Massachusetts Bays region.

MUNICIPAL ACTION #8.1:

Municipalities should work cooperatively with neighboring communities, private boatyards and marinas, and state agencies (DFWELE and CZM) to establish, promote, and maintain *Boat Pump-out Programs* in targeted embayment areas.

RATIONALE:

According to the Division of Marine Fisheries, sewage from boats is discharged regularly into the nearshore waters of Massachusetts Bays. This sewage, together with the chemicals used to deodorize and disinfect it, degrades water quality and contributes to the closure of shellfish beds and swimming beaches. Insufficient pump-out facilities are available to boaters to remedy this problem, and the use of these facilities is currently very low. The reasons for this include inconvenience, cost, and inadequate education and enforcement. Until boat pump-out facilities are available to the boating public at convenient locations and at low or no cost, the problem of unauthorized boat waste discharges is likely to continue.

RESPONSIBLE AGENT(s):

Local Harbormasters, Boards of Health, and Shellfish Wardens would share much of the responsibility for this action. Yacht club, boatyard, and marina owners are responsible in the case of privately-sited facilities.

IMPLEMENTATION STRATEGY:

Establishment of a successful *Boat Pump-out Program* can be a significant undertaking demanding the full commitment of the Harbormaster, Board of Health, and Shellfish Warden. It requires a comprehensive approach involving equal parts facilities siting and operation, public education, and enforcement. It also requires the technical and financial assistance of several state and federal agencies. Toward this end, DFWELE is offering federal pass-through grants to selected municipalities, yacht clubs, boatyards, and marinas to establish *Boat Pump-out Programs* along the coast. DFWELE and CZM have compiled a detailed list of targeted embayments and their individual pump-out needs, based on a survey of existing pump-out facilities, intensity of boat traffic, tidal flushing conditions, presence of marine sanctuaries, proximity to shellfish harvesting areas, and other factors. Municipalities, boatyards, and marinas have been invited to apply for these grants. Grant applications proposing the establishment of mobile, waterborne pump-out facilities, rather than fixed shoreside units, are favored. This is based in part on the successful use of pump-out boats in a number of harbors in the state, and on the utility and economy of providing pump-out facilities that can be shared by multiple municipalities and/or marinas.

Guidance in establishing an effective local or embayment-level *Boat Pump-out Program* is available from DFWELE, CZM, and DEP.

LEGISLATION REQUIRED:

New legislation is not required. However, in the case of shoreside facilities, several permits and/or licenses will be necessary. For example, sewer connections and/or extensions require a permit from the appropriate DEP Regional Service Center. Holding tanks also require DEP approval, as well as a "Disposal Works Construction Permit" from the local Board of Health.

Installation of a pump-out facility also requires authorization from DEP's Waterways Regulation Program under Massachusetts General Law Chapter 91. This program reviews waterfront construction in or over public waterways and on filled tidelands. A pump-out facility established on a previously licensed site will be considered a minor modification and will not require the submittal of a waterways application if the work is limited to the existing footprint of the licensed facility. Construction of a pump-out facility on an *unlicensed* site will require an application review by the Waterways Regulation Program.

Construction of a shoreside boat pump-out facility also requires some level of review by the local Conservation Commission under the Massachusetts Wetlands Protection Act (WPA), and if applicable, under a local wetlands protection bylaw. Although most work associated with pump-out facilities will take place within protected wetland resource areas or their buffer zones, installation of these facilities will generally not impact resource areas because the facilities will be constructed on existing wharfs, piers, or docks.

ESTIMATED COST:

Boat Pump-out Program costs can vary widely depending on the types of facilities employed, area serviced (i.e., size of harbor and volume of sewage collected), staffing require-

ments, and ultimate disposal costs.

As an example, DFWELE has estimated the following costs for pump-out facilities proposed for Salem Sound (Marblehead, Salem, and Beverly Harbors):

TARGET DATE:

1996/1997. This is a medium to high priority action from a water quality standpoint and should be implemented by targeted municipalities and marinas as soon as federal grant funds permit.

Pump-out Units for Salem Sound (Proposed)	Cost ($)	Operation and Maintenance ($)	Waste Reception Units	Cost($)	Operation and Maintenance ($)	Total by Embayment(s)
3 pump-out boats	75,000	2,400	2 floating units	5,000	1,000	111,000
3 shoreside pump-out stations (one with tank, two connected to sewer lines)	(1)11,000 (2)10,000	5,000 4,000				16,000 24,000
						151,000

Most of the cost is the one-time cost of purchasing the pump-out boats and related equipment. The costs of staffing and waste disposal are essential when calculating grant amounts, as these can be used as in-kind expenses.

POTENTIAL FUNDING SOURCE(s):

Section 5604 of the Clean Vessel Act (CVA) authorizes the Director of the U.S. Fish and Wildlife Service, through the DFWELE, to provide grants to coastal and inland states. These grants are be used to develop and refine survey information that identifies the number and location of recreational boats with type III MSDs in Massachusetts during the boating season, as well as the location of existing pump-out and waste reception facilities. These grants also provide up to 75% funding for the construction of new pump-out and waste reception facilities and for a statewide boater education program. To date, CVA grants have resulted in the placement of over 50 new pump-out facilities in the coastal waters of Massachusetts. However, according to the DFWELE, there is only one more year of funding left in the CVA grants program.

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(617) 727-3193
Coastal Zone Management (CZM)
(617) 727-9530
DEP Division of Wetlands and Waterways
(617) 292-5695

MUNICIPAL ACTION #8.2:

Municipalities, with assistance from CZM and DEP, should require private boatyards and marinas to implement effective stormwater runoff control strategies which include the use of pollution prevention measures and the proper design and maintenance of hull servicing areas.

RATIONALE:

Stormwater runoff occurs from launching ramps, parking lots, and other impervious areas associated with boatyards and marinas. Because activities occurring in these areas include the transport and launching of boats, parking for boaters, and maintenance areas for servicing hulls and other boat components, runoff from these impervious areas may contain oil and grease, metals, paint, and other pollutants which can degrade coastal waters.

RESPONSIBLE AGENT(s):

Local Harbor Commissions, Harbormasters, and Conservation Commissions, with guidance from CZM and DEP, would generally be responsible for assuring implementation of this action. EOEA's Office of Technical Assistance (OTA) can provide technical assistance and outreach to boatyard and marina operators.

IMPLEMENTATION STRATEGY:

Chapter 91 regulations require that all existing marinas and boatyards, and any expansions to same, provide adequate facilities for trapping oil and grease, sediment, and paint resulting as by-products from boat servicing, repairs, and construction to prevent discharge to adjacent surface waters [310 CMR 9.39]. These facilities must be described in the application for a Chapter 91 license.

The original statute for Chapter 91 allows the DEP Waterways Program to issue annual marina licenses, although DEP does not presently do so. This mechanism could serve to require stormwater controls for boat maintenance areas through the licensing process. Such a mechanism should not be necessary, however, because the regulations link the licenses and permits to all other environmental programs and requirements [310 CMR 9.33] and all the requirements are already covered.

All of the practices listed in CZM's s.6217 guidance as options for controlling stormwater could be a part of any marina's efforts to meet the license requirements. The DEP Office of Watershed Management, through it s.319 Nonpoint Source Program, is developing an *Urban Best Management Practices for Massachusetts*, which will provide technical details and design recommendations for acceptable stormwater control practices. The guidance also provides performance standards that must be met, including standards for reducing annual loadings of total suspended solids by 80 percent. The guidance does not mandate the implementation of specific practices, however. All of the DEP performance standards have been established to be consistent with CZM's s.6217 management measure requirements, and the development of this document is being closely coordinated with CZM and other agencies.

The EPA General Stormwater Permit applies only to certain marinas with point source discharges of stormwater, even though the operations and conditions might otherwise be similar to marinas that have overland runoff conditions.

Although not covered by any of the management measures or suggested practices, flooding during high water conditions has the potential to contribute to water quality degradation from contaminants used in marina and boatyard operations. Many marinas and boatyards are located in areas that are flood-prone during spring tide and storm events. Guidance from a CZM-coordinated Flood Plan Task Force has attempted to minimize the potential for pollutant contributions from activities in the coastal flood plain. These standards will be adopted into the marina guidance document on stormwater controls currently being prepared by CZM.

Adequate statutory authority exists to implement marina stormwater runoff controls. To improve implementation, CZM will include information in its marina guidance on stormwater controls and will reference the DEP *Urban BMP Manual*. In addition to coordinating with agency staff, CZM and OTA will provide technical assistance and outreach to marinas on stormwater control efforts. Through a Transportation Bond Bill passed by the Massachusetts legislature, CZM has established a small grants program (the Coastal Pollution Remediation Program) to help communities address stormwater runoff from roads, highways, bridges, and marinas. This program began during 1995 and can provide financial assistance to implement stormwater controls at marina facilities. It is not anticipated that the Waterways

Program will need to use its authority to issue formal annual marina licenses, although this authority will be used to encourage marinas to develop pollution control plans to avoid the necessity of requiring an annual Chapter 91 license.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of implementing and enforcing boatyard/marina stormwater runoff control strategies locally will vary depending on the number, size, and character of the marina operations within the community.

POTENTIAL FUNDING SOURCE(s):

DEP s.319 Nonpoint Source funds and CZM Coastal Pollutant Remediation (CPR) funds.

TARGET DATE(s):

1996/1997 to develop and issue nonpoint source control guidance for marina operators.

2002 to bring marinas into compliance with site-specific pollution control plans.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP/OWM Nonpoint Source Program
(617) 292-5500
CZM Coastal Nonpoint Program
(617) 727-9530
EOEA Office of Technical Assistance for
Toxics Use Reduction (OTA)
(617) 727-3260

ACTION PLAN #9

MANAGING DREDGING AND DREDGED MATERIALS DISPOSAL

Massachusetts has a strong maritime tradition. Wherever the shore provides adequate protection from the turbulence of the open ocean, one is likely to find boats. Harbors up and down the Massachusetts Bays coast -- from Plum Island Sound to Provincetown Harbor -- support commercial and recreational navigation. The smaller embayments may harbor fishing boats and pleasure craft, while larger ports frequently receive large tankers and barges. All of this navigation contributes to the economic well-being of the region and provides recreational opportunities for the region's residents.

Most harbors receive freshwater inflow from one or more tributaries, all of which carry loads of suspended sediment. Where a tributary reaches the still water of an embayment, it slows and drops this sediment load. Over time, the accumulated sediment can obstruct navigation channels. To prevent serious impediments to navigation, periodic dredging may be necessary to clear the sediment from these channels.

Although some dredging projects are designed to create new navigation channels, most dredging in Massachusetts is *maintenance* dredging, designed to merely retain the width and/or depth of an existing channel. Two dredging methods -- hydraulic and mechanical -- are commonly used to remove marine sediments. Hydraulic dredging uses a centrifugal pump to pick up a slurry of sediment and water, which is then transported through a pipeline directly to a nearby beach or to a barge which will carry it to some other nearshore disposal site. Hydraulic dredging is employed primarily when the dredged material is to be used for beach nourishment or dune creation. Mechanical dredging must be used when the sediments in question cannot be used for beach nourishment or dune creation. Large bucket scoops or shovels lift material from the ocean floor and place it in a barge or scow. The material is then usually transported to an offshore disposal site and deposited by opening doors on the bottom of the vessel, or is placed upland for dewatering and disposal.

Not surprisingly, removal of marine sediments can have adverse impacts on marine organisms, especially in areas where water circulation is limited and where bottom sediments are rich in organic matter. Most obviously, dredging removes the organisms which live in and on the sediments being dredged. Dependent marine species may be adversely impacted if such removal significantly reduces the diversity of species or disrupts food webs in the project area. Dredging also increases turbidity in and around the project area, and may trigger the release of toxics which have accumulated in the disturbed sediments. In sensitive marine environments, such as estuaries or salt marshes, these changes may exceed the tolerance levels of resident organisms. For instance, suspended sediment in the water column can block the sunlight necessary for photosynthesis in marine plants and algae, and can clog the gills and siphons of fish, molluscs, and other marine fauna. The effects may be limited to individual organisms or may encompass an entire local population or ecosystem.

Of course, once sediments are removed from the ocean floor, they must then be relocated somewhere else. Disposal of marine sediments often poses its own set of environmental problems. In some instances, dredged material can be used beneficially -- for instance, to cap a landfill or to nourish a beach. Dredged material that has no beneficial use due to contamination, for example, must be dumped at an ocean disposal site or shipped to a landfill. Because land-based disposal is typically many times more expensive than ocean disposal, and often presents greater environmental risks, ocean disposal is usually the preferred disposal option. The U.S. Environmental Protection Agency (EPA) recently designated an open water disposal site in the deep water of Massachusetts Bay (see *Massachusetts Bays Disposal Site* (MBDS) discussion in Chapter IV). The MBDS is currently designated for the disposal of only uncontaminated dredged material. There is also an undesignated disposal site in Cape Cod Bay.

The EPA and the U.S. Army Corps of Engineers (ACOE) share responsibility for all dredged materials management. The ACOE issues permits for individual disposal actions, which must conform with the Ocean Dumping Criteria set forth in 40 CFR Part 227. The EPA has authority to veto an ACOE permit, and is also responsible for site monitoring. Over the past several years, surveys at the Massachusetts Bay Disposal Site (MBDS) have been conducted to determine the composition, distribution, and movement of disposed sediments, food chain interactions in and around the site, and bioaccumulation of contaminants in selected benthic species. By 1997, EPA will develop a long-term management plan for all of its open water disposal sites, including the MBDS.

Unfortunately, not all marine sediments are appropriate for ocean disposal. The same tributaries which deliver sediments to a coastal embayment also deliver a wide array of industrial pollutants. Because urban harbors and ports act as catchbasins for these pollutants, their sediments are often highly contaminated. If these sediments are dredged and then reintroduced to a clean site, the contaminants may have a severe impact on marine biota.

The disposal of contaminated sediments therefore poses an especially thorny set of problems. In some cases, the contaminated sediments may be "capped" with clean sediments to prevent bioaccumulation. However, capping has not yet been conducted in water as deep as that found at the Massachusetts Bay Disposal Site. Until the capping technique has been effectively demonstrated in deep water, and the legality of such an approach has been established, EPA has prohibited all contaminated sediments from that site.

It has been estimated that port dredging projects in the Massachusetts Bays region will generate at least 15 million cubic yards of dredged material in the next fifty years. Much of that material will be heavily contaminated. Long-range planning is necessary to ensure that affordable and environmentally sound disposal options are available. Under the supervision of the Massachusetts Executive Office of Environmental Affairs (EOEA), the Massachusetts Office of Coastal Zone Management (CZM), and the New England Division of the ACOE recently collaborated on a dredged materials management study. The study report, a draft of which is due in 1996, is a positive first step to balancing the economic benefits and environmental risks of dredging projects in Massachusetts Bays.

The future of port dredging in Massachusetts Bays will also be shaped by an ongoing federal initiative to coordinate and simplify the administration of the more than 60 laws and executive orders regulating port dredging. Currently, as many as six federal agencies participate with state and local authorities in the permitting of a port dredging project. In January 1994, the Department of Transportation's Maritime Administration (MARAD) convened an Interagency Working Group on the Dredging Process. A major goal of this Working Group will be to articulate a national policy on port dredging and simplify the existing regulatory framework.

ACOE ACTION #9.1:

The Army Corps of Engineers, in coordination with EPA and other appropriate federal and state agencies, should continue to monitor dredged material disposal sites in the Massachusetts Bays region and to initiate the planning necessary to begin a capping demonstration project at the Massachusetts Bay Disposal Site.

RATIONALE:

The environmental aspects for disposal of dredged material have been regulated since the passage of both the Clean Water Act and the Marine Protection, Research, and Sanctuary Act. Criteria for determining the suitability of dredged material for open water disposal have been established. Certain sites such as the Massachusetts Bay Disposal Site (MBDS) and the Cape Cod Disposal Site have been designated for dredged material disposal. In order to determine the impact of dredged material disposal on the aquatic environment, the New England Division of the U.S. Army Corps of Engineers (ACOE) instituted the Disposal Area Monitoring System (DAMOS) in 1977 to monitor physical, chemical, and biological changes from dredged material disposal. However, no established dredged material disposal sites exist for the disposal of dredged material determined to be unsuitable for unconfined open water disposal. Accordingly, research to determine if capping at the MBDS is feasible - technically, environmentally, legally, and financially - should be encouraged.

RESPONSIBLE AGENT(s):

The ACOE will be responsible for continued implementation of the DAMOS program and for initiating the coordination and planning necessary to begin a capping demonstration project at the MBDS. Coordination with appropriate federal and state agencies, as well as solicitation of input from environmental advocacy groups and others, will be undertaken.

IMPLEMENTATION STRATEGY:

The ACOE will begin coordination with appropriate agencies and groups to determine the criteria necessary to demonstrate capping at the MBDS. In addition, the DAMOS program will continue to monitor the MBDS to determine impacts from dredged material disposal.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$1,700,000 (includes monitoring for the next ten years and a capping demonstration at the MBDS).

POTENTIAL FUNDING SOURCE(s):

The ACOE's DAMOS program, as well as other appropriate federal agencies (e.g., EPA) and state agencies.

TARGET DATE:

Coordination can begin immediately.

FURTHER INFORMATION:

For further information and assistance, contact:

ACOE Planning Directorate
(617) 647-8231
ACOE Regulatory Division
(617) 647-8291

EOEA ACTION #9.2:

The Executive Office of Environmental Affairs should coordinate the development of a comprehensive *Dredging and Dredged Materials Disposal Plan* to improve and maintain access to the Commonwealth's ports, harbors, and channels, and to minimize adverse impacts to the marine environment.

RATIONALE:

The harbors and ports of Boston are New England's gateways to overseas markets, providing the opportunity to strengthen our economic ties to foreign countries. The Commonwealth's smaller waterways are valuable for commercial and recreational purposes as well. They are a focal point for cargo and tourist traffic and, thus, are generators of jobs and economic growth for the region. In order for these gateways to reach their full potential, they must be easily accessible to shippers. Unfortunately, many area ports and harbors are not deep enough to accommodate the large modern vessels that must traverse them.

For example, the U.S. Army Corps of Engineers (ACOE) and the Massachusetts Port Authority have determined that Boston Harbor is approximately five feet too shallow to accommodate today's cargo ships. Dredging the Harbor would prevent tidal delays, maintain the flow of ships and cargo, and substantially reduce transportation costs.

However, several challenges are associated with dredging and the disposal of dredged materials. For example, dredging can not only disrupt aquatic life, but may also allow contaminants to filter into and degrade surrounding waters. The impact of dredging activity, therefore, must be minimized.

Another challenge is finding suitable disposal sites for clean and contaminated materials, a task all the more complex for Boston Harbor because of the sheer volume of recoverable materials. In the Inner Harbor alone, a volume of 3.3 million cubic yards of material needs to be dredged and disposed of safely, 1.3 million cubic yards of which is contaminated.

Related dredging and dredged materials disposal problems exist elsewhere along the Massachusetts coast. Because these problems entail a variety of environmental and economic issues, Massachusetts is in the process of developing a comprehensive *Dredging and Dredged Materials Disposal Plan* for all state ports and harbors.

RESPONSIBLE AGENT(s):

The Office of Coastal Zone Management (CZM) is the lead agent for this action, and is coordinating the efforts of the Department of Environmental Management (DEM), the Department of Environmental Protection (DEP), and the Department of Fisheries, Wildlife and Environmental Law Enforcement (DFWELE).

IMPLEMENTATION STRATEGY:

The *Dredging and Dredged Materials Disposal Plan* will be developed and implemented as follows:

1. Volume Projections. Projections of the volume of dredged material that will be generated over the next 50 years are being prepared by the ACOE based on the need for dredging to maintain shipping channels. This effort is being conducted in conjunction with DEM and CZM under an ACOE study.

2. Site Identification and Permitting. EOEA will use the projections of future dredged material generation, as well as the projections for the Boston Harbor Dredging Project, to identify and permit disposal sites. The EOEA Dredging Work Group will evaluate upland, nearshore, and ocean sites as potential disposal areas.

3. Site Selection. EOEA will decide whether to site state-sanctioned disposal areas on a regional basis or to develop criteria for proponents' use in siting project-specific disposal areas on an ad hoc basis. If EOEA decides to site state-sanctioned disposal sites, EOEA will proceed with site selection through the Massachusetts Environmental Policy Act (MEPA) process. Federal roles in both site selection and permitting are established under both the Clean Water and Ocean Dumping Acts, and are carried out by the ACOE and the U.S. Environmental Protection Agency (EPA).

4. Project Prioritization. EOEA will develop a method for prioritizing dredging projects in order to more efficiently allocate state resources. The EOEA Dredging Work Group will investigate expanding the traditional economic cost/benefit analysis to include the value of natural resources affected by dredging projects.

5. Disposal Regulations. DEP is currently developing new regulations that will govern the disposal of dredged material. With the exception of the limited disposal now permitted in state waters under 314 CMR 9.00, dredged material disposal is being regulated by DEP on a case-by-case basis. The suitability of dredged materials for ocean disposal at the MBDS will continue to be evaluated in accordance with the USEPA *Green Book* under the regulatory auspices of the federal Ocean Dumping Act (40 CFR 220-228).

6. Project Guidelines. EOEA is currently developing guidelines to help project proponents understand what permits will be required and what programs are available for their dredging and disposal activities. The guidelines will provide the framework for future DEP regulations.

7. Financing Plan. EOEA will develop a plan to finance the siting and management of state-approved disposal areas, if the policy for state-approved disposal sites is pursued. Since such costs are substantial ($250,000 for the recently designated Cape Cod Disposal Site, not including ongoing monitoring), creative financing mechanisms will need to be considered. One option may be a revolving fund based on user fees for individual disposal actions.

LEGISLATION REQUIRED:

New legislation is not required. The authority to promulgate new regulations governing dredging and dredged material disposal currently exists under MGL Chapter 21A, section 14. The DEP will use this authority to develop new regulations, as stipulated in the law's rule-making process.

ESTIMATED COST:

Undetermined as yet.

POTENTIAL FUNDING SOURCES:

The 1996 Seaport Bond contains language authorizing $5 - $10 million for the scientific and planning studies necessary to develop the comprehensive dredging plan. Other potential funding sources include state agency accounts and user fees.

TARGET DATE:

A draft *Dredging and Dredged Materials Disposal Plan* is due in 1996.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management Office
(617) 727-9530, ext. 403

ACTION PLAN #10

REDUCING BEACH DEBRIS AND MARINE FLOATABLES

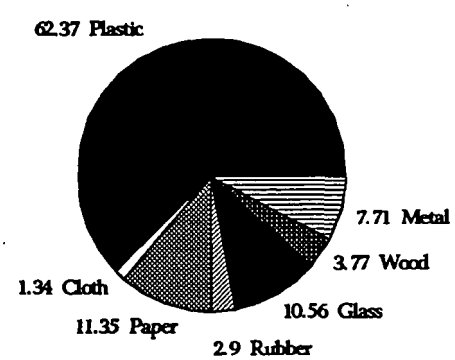
The beaches and nearshore waters of Massachusetts and Cape Cod Bays attract tens of thousands of bathers, hikers, boaters, and fishermen every year. This places these areas among the region's most important aesthetic, economic, and recreational resources.

Unfortunately, unsightly beach and marine debris detract from the full use and enjoyment of these resources. Like other coastal areas in the Commonwealth, the beaches and nearshore waters of the Massachusetts Bays region are fouled by a broad array of litter, including cigarette filters; glass and styrofoam pieces; plastic lids, straws, and wrappers; food bags; discarded fishing gear; tampon applicators; and metal beverage cans. The exact sources of this debris are often difficult to pinpoint. Some of it enters the marine environment from commercial and recreational fishing vessels. However, much of the debris appears to come from land-side sources. Local beachgoers, in particular, are a major source of beach debris. Other land-side sources include storm drains, sewage treatment plants, and combined sewer overflows. Once land-side debris reaches the coastal waters, the wind, tides, and currents of the Bays system generally keep it on or near shore.

Local economies which rely on coastal tourism suffer when beaches become cluttered with water-borne litter. Fishermen and other boaters lose thousands of dollars in fishing time and mechanical repairs when floatable debris wraps around propellers and propeller shafts. But debris is not only an eyesore and an inconvenience -- it also can pose a serious threat to marine organisms. Fish, birds, marine mammals, and turtles all can ingest or become entangled in floatable debris, often with dire consequences. Plastics, which consistently account for about two-thirds of all the debris collected on Massachusetts beaches, pose a particularly serious threat to marine organisms. An animal tangled in plastic debris can strangle, suffocate, or exhaust itself. Large pieces of ingested plastic can cause death by blocking the animal's digestive tract.

To ensure that Massachusetts beaches and nearshore waters become and remain clean enough for the humans and wildlife that depend on them, state and local officials must work in concert to reduce beach debris and marine floatables. The following action will provide a positive first step in that direction.

PERCENT COMPOSITION OF MASSACHUSETTS' BEACH DEBRIS



MASSACHUSETTS' 1993 DIRTY DOZEN

	Debris Type	Total Number Reported	Percent of Total Debris Collected
1.	Cigarette butts	61,259	31.66
2.	Plastic pieces	10,366	5.36
3.	Plastic food bags	10,206	5.28
4.	Glass pieces	9,923	5.13
5.	Foamed plastic pieces	9,367	4.84
6.	Paper pieces	7,667	3.96
7.	Plastic caps/lids	6,859	3.55
8.	Plastic straws	6,819	3.52
9.	Plastic rope	4,521	2.34
10.	Lumber	3,479	1.80
11.	Foamed plastic cups	3,292	1.70
12.	Metal beverage cans	2,924	1.51
	TOTAL	**136,682**	**70.64**

Source: *COASTSWEEP 1993*, Massachusetts Coastal Zone Management Office

MUNICIPAL ACTION #10.1:

Coastal municipalities should work cooperatively with the Massachusetts Coastal Zone Management Office (CZM), neighboring communities, and waterfront users to design and implement *Beach and Marine Debris Reduction Programs.*

RATIONALE:

Beach and marine debris poses a significant health threat to marine organisms, impairs recreational uses of the shore, and may hamper the economies of coastal communities which rely on tourism. Environmental, aesthetic, and economic concerns in Massachusetts Bays necessitate a comprehensive program which will identify sources of beach and marine debris and implement measures to reduce its impact on the marine environment.

Some successful beach and marine debris reduction programs have already been implemented in the United States and in Canada. In many West coast ports, for example, commercial dock operators have found that recycling can reduce the costs associated with disposal of marine refuse. In Halifax, Nova Scotia, the Maritime Fishermen's Union began a "Ship to Shore" trash campaign to educate commercial fishermen about the impacts of marine debris and to encourage them to bring their trash to port. Most recently, Portland, Maine launched a pilot program to serve as a model for future marine debris reduction projects in the Gulf of Maine.

The problem of beach and marine debris has not yet reached crisis proportions in the Massachusetts Bays region, in part because of existing clean-up efforts. At the end of each summer, for instance, the Massachusetts Coastal Zone Management Office (CZM) coordinates an annual *COAST-SWEEP* campaign during which thousands of volunteers turn out to remove debris from Massachusetts beaches. A few communities in the Bays region, such as Marblehead, have organized their own spring cleanups to supplement CZM's *COASTSWEEP*.

While these cleanup efforts help preserve the aesthetic integrity of Massachusetts' coastline, they are only a start. An effective debris reduction strategy must focus on preventing debris from reaching the shore as well as removing the debris which already exists. A few isolated debris reduction programs are now being established in the Massachusetts Bays region. Provincetown, for example, has worked cooperatively with CZM and others to develop a comprehensive local debris reduction program. (See *Strategies to Reduce Marine Debris - Provincetown, MA*, Provincetown Marine Debris Task Force, 1994.) Among other things, this program is setting up a fishing net recycling program to encourage fisherman to return damaged gear to port rather than throwing it overboard.

Of course, marine debris circulates on ocean currents and tides, and debris which originates in one town may eventually end up on the shores of another. Because the problem transcends municipal boundaries, isolated debris reduction programs will not alone be effective. To ensure that beach and marine debris does not impair the traditional uses of the shoreline or endanger marine wildlife, all coastal communities throughout the Bays region should take steps to reduce beach and marine debris.

RESPONSIBLE AGENT(s):

Coastal communities will have to initiate their own beach and marine debris reduction programs. In most cases, the success of these programs will depend on an enthusiastic municipal coordinator, perhaps from the town's Community Development Office or Public Works Department. The municipal coordinator should work collaboratively with commercial and recreational users of the waterfront, neighboring communities, and CZM to devise and implement a comprehensive debris reduction program.

IMPLEMENTATION STRATEGY:

1. Form a local Beach and Marine Debris Task Force. The first and most obvious step is to convene the stakeholders who share an interest in reducing beach and marine debris. Interested parties may include:
   - Local officials (e.g., harbormasters, beach managers);
   - Wharf owners;
   - Fishermen/fishing trade association representatives;
   - Recreational boaters;
   - Environmental advocacy groups;
   - Cargo transport companies and other commercial users;
   - Waste management experts;
   - Chamber of Commerce representative; and
   - Officials from appropriate state and federal agencies (CZM, DEP, Massport, Coast Guard).

Formal letters of invitation should be sent to the appropriate people at least one month before the first scheduled meeting of the Task Force. It is essential that the Task Force include experts on marine vessel operations, waste management and disposal, and public outreach. If adequate funding is available, the city or town should consider hiring a project coordinator to oversee the project.

2. Assess the existing situation. Before it can devise an effective debris reduction program, the Task Force must first determine the volume and sources of beach and marine debris, and evaluate existing disposal programs. Initial assessment surveys will help provide the foundation for an effective marine debris reduction strategy, and will also establish a baseline by which to evaluate the program's effectiveness.

3. Design a debris prevention/collection/disposal strategy. Once waste disposal problems have been identified and prioritized, the Task Force should evaluate options to address those problems. Specific strategies might include placing trash bins on wharves; providing separate collection bins to facilitate recycling; establishing a port-wide disposal site; providing used oil recycling containers; organizing volunteer clean-up efforts; and/or reducing the use of disposable products and plastics along the waterfront.

4. Promote public awareness. The success of a beach debris reduction program will depend to a large degree on the public's acceptance of the program's objectives and methods. Therefore it is essential to educate the public about the impact of beach debris, proper recycling and disposal methods, and how to reduce the use of disposable products which typically become marine debris. Depending on the available funding, the Task Force may decide to distribute brochures or flyers, organize workshops for targeted user groups, or contact local media.

5. Implementation and on-going evaluation. Using the initial assessment survey as a baseline, the Task Force or project coordinator should track the aesthetic, economic and other material benefits of the project. Careful evaluation will suggest how the program might be refined and, by establishing evidence of the program's effectiveness, may generate additional support and funding.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of a beach and marine debris reduction program will vary according to the extent of the debris problem and the nature of the actions which are required to address it. The initial assessment and design of the program should generally be accomplished at relatively low cost to the city or town. Implementation costs may be more substantial, although a coastal community should be able to support these costs. Considerable savings may be realized by recruiting volunteers or, if the local Task Force decides to hire a project coordinator, by procuring the services of a graduate student seeking experience in environmental policy or waste management.

POTENTIAL FUNDING SOURCES:

Start-up funds for a beach and marine debris reduction program must generally originate as appropriations from a municipal budget. In order to be successfully implemented, the program must become self-supporting after a short time. Implementation funds could possibly be raised through creative partnerships with waterfront users and charitable foundations. For instance, stakeholder corporations, including waste management specialists, might be persuaded to contribute free services to the project. Similarly, community groups may "adopt" specific waterfront sites and assume responsibility for stewardship of these sites.

TARGET DATE:

1997. It should take approximately six to nine months to assemble a local Task Force and design a beach and marine debris reduction program that is tailored to a community's specific needs. Implementation of such a program would be ongoing, but could possibly begin as early as 1998.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Coastal Zone Management Office
(617) 727-9530
Center for Marine Conservation
(202) 429-5609
Your area's Regional Planning Agency

ACTION PLAN #11

MANAGING NITROGEN-SENSITIVE EMBAYMENTS

Nitrogen is important plant nutrient in coastal waters, necessary for the proper growth and reproduction of individual organisms and for the general productivity of the Bays ecosystem. Excessive nitrogen, however, may stimulate an undesirable explosion of algal growth or "bloom" that might otherwise not occur. (Note: some "blooms" are naturally-occurring; for example, we observe a "spring bloom" and a "summer bloom" in Massachusetts Bay every year.) Major algal blooms can dramatically alter the conditions in a coastal embayment and thereby disrupt its natural ecology. They may, for instance, limit the penetration of sunlight and disrupt the photosynthetic processes of other marine flora. Or, as they decompose, they may deplete dissolved oxygen in the water column, killing fish and other fauna. These cumulative adverse impacts caused by an increase in nitrogen are often referred to as coastal "eutrophication" or "nutrient enrichment."

Nitrogen is conveyed to Massachusetts Bays coastal waters by various pathways, including ocean water inflow, sewage outfalls, groundwater flow, atmospheric deposition, and stormwater runoff. A study sponsored by the Massachusetts Bays Program indicated that point source discharges account for somewhere between 43 and 66 percent of the total nitrogen entering the Bays (*Sources and Loadings of Pollutants to the Massachusetts Bays,* Menzie-Cura and Associates, 1991). Ocean water inflow, river discharges, atmopheric deposition, and runoff also contribute significant nitrogen loadings. In unsewered areas, including large parts of the Upper North Shore, the South Shore, and Cape Cod, groundwater contaminated by poorly maintained septic systems may be the most significant source of nitrogen to nearshore waters.

The relative impact of various nitrogen sources in any embayment depends largely on land use patterns in the surrounding drainage basin. Volume, flushing time, bathymetry, and water quality all determine the nitrogen loadings a particular embayment can absorb without becoming eutrophic. In general, the effects of nitrogen loading are localized around the point of nitrogen discharge. Most of the serious effects of nitrogen loading occur in shallow, nearshore embayments.

In order to ensure the health of nearshore waters and the living resources they support, specific actions need to be taken to identify nitrogen-sensitive embayments and limit nitrogen loadings. An effective management strategy will combine restrictions on the types and patterns of development and the use of denitrification technologies.

The following recommended actions are a positive step toward reducing or preventing nitrogen pollution in the Bays' coastal waters and groundwater.

DEP ACTION #11.1:

The Department of Environmental Protection should strengthen *Massachusetts Water Quality Standards* to enhance and protect nitrogen-sensitive coastal embayments.

RATIONALE:

Excessive fertilization (high nitrogen loading) can impair the quality of coastal waters and the living resources they support. Shallow, poorly flushed embayments with proportionately large watersheds are especially at risk. When overloaded with nitrogen, these waters can suffer depressed oxygen levels, nuisance growth of algae and other aquatic vegetation, and the decline or loss of eelgrass beds.

Contributing to the problem of nitrogen-enrichment are a variety of point and nonpoint pollution sources, including wastewater treatment plants, septic systems, urban and agricultural runoff, and even atmospheric deposition. While no single source may itself be problematic, the cumulative nitrogen loadings from many sources can exceed an embayment's critical loading limit. The current *Massachusetts Water Quality Standards* are not adequate to protect nitrogen-sensitive coastal waters from excessive nitrogen inputs. Therefore, the DEP should amend the *Massachusetts Water Quality Standards* to include embayment-specific nitrogen-loading limits that will protect these sensitive embayments from the cumulative impacts of both point and nonpoint sources of pollution. Any proposed changes to the Massachusetts Water Quality Standards must be reviewed and approved by the U.S. Environmental Protection Agency (EPA).

RESPONSIBLE AGENT(s):

DEP's Division of Water Pollution Control will have primary responsibility for this action. Formal designation of nitrogen-sensitive embayments and nitrogen loading limits will be proposed by DEP with information and guidance provided by the Regional Planning Agencies, municipalities, and the yet-to-be-formed interagency work-ing group (made up of state and federal agency representatives and marine scientists). While DEP will designate the embayments at risk, much of the responsibility for implementing measures to protect these waters will ultimately fall on the particular embayment (and surrounding watershed) communities. Accordingly, an outreach effort designed to educate and gain the support of local officials will be an important part of this action.

IMPLEMENTATION STRATEGY:

DEP will begin to designate nitrogen-sensitive embayments in the 1998 revisions to the *Massachusetts Water Quality Standards*. Because of the significant management and cost implications associated with such designations, it is imperative that the designations have as sound a scientific basis as possible. To accomplish this, DEP will work closely with the Regional Planning Agencies, municipalities, and the interagency working group (see RPA/DEP/Municipal Action #11.2). Based on information provided by these groups, DEP will identify those embayments predicted to be at risk for designation as nitrogen-sensitive and will set critical loading limits.

LEGISLATION REQUIRED:

This action requires amending the *Massachusetts Water Quality Standards* to include critical loading limits for nitrogen-sensitive embayments.

ESTIMATED COST:

This action can be implemented by existing DEP staff.

POTENTIAL FUNDING SOURCE(s):

DEP's annual operating budget (for staff time).

TARGET DATE:

Initial proposal(s) for designating nitrogen-sensitive embayments - 1998 revisions to *Massachusetts Water Quality Standards*.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Division of Water Pollution Control
(617) 292-5673

RPA/DEP/MUNICIPAL ACTION #11.2:

The Regional Planning Agencies, in collaboration with the Department of Environmental Protection and municipalities, should expand upon current Massachusetts Bays Program efforts to identify nitrogen-sensitive embayments, determine critical loading rates, and recommend actions to manage nitrogen so as to prevent or reduce excessive nitrogen loading to coastal waters and groundwater.

RATIONALE:

Coastal eutrophication is an ecological response to the accumulation of high nutrient concentrations in an embayment or nearshore area. Environmental effects of eutrophication include degradation of water and sediment quality, loss of submerged aquatic vegetation, shellfish habitat and, in extreme cases, fish kills. Elevated nutrient levels (especially nitrogen) in marine waters can lead to excessive algal growth, which in turn can lead to depletion of dissolved oxygen, adversely affecting the organisms that live and grow in an embayment. Anoxia (i.e., the absence of oxygen) is the most extreme endpoint of nutrient enrichment, but there are other concerns as well. Increased algal growth also can cause a reduction in water clarity, which in turn can affect the distribution and abundance of aquatic organisms and cause changes in species composition. Die-off of algal blooms can result in increased organic matter deposition to bottom sediments, depleting sediment oxygen concentrations and adversely affecting benthic organisms and submerged plants.

The processes controlling coastal eutrophication are complex, and the specific factors contributing to the eutrophication potential can be variable among sites. The eutrophic status of coastal embayments depends on many factors, primarily nitrogen loading, flushing rates, and the biological productivity of an embayment. The sensitivity of an embayment to nitrogen loading depends on a combination of biological, physical, and chemical processes, both on land and in the water column. This complexity makes it difficult to accurately predict the level of nitrogen loading that will cause a specific embayment to become eutrophic. Nonetheless, it is important to develop a methodology to determine the potential for embayments to become eutrophic because of the detrimental impacts that can occur. For these reasons, the Department of Environmental Protection's recently promulgated Title 5 revisions address the importance of protecting nitrogen-sensitive waters (including groundwater), and the Massachusetts Bays Program has developed a measurable goal to identify embayments at risk of eutrophication.

Several efforts are underway to develop nitrogen management plans for those embayments in Massachusetts and Cape Cod which may have a high potential for becoming eutrophic. Nitrogen loading is seen as the critical parameter to control since it is the primary variable affecting algal biomass and productivity, and because a significant amount of the loading is from anthropogenic sources (e.g., lawn fertilizers and septic systems). Reduced loadings of nitrogen can be achieved through proper land management and wastewater management practices.

In March 1995, the Massachusetts Bays Program convened a working group to review work that has been undertaken in other parts of the state and to help take the first steps in applying this information to the embayments in the Massachusetts and Cape Cod Bays region. The participants in the working group include scientists from the University of Massachusetts, representatives of the Massachusetts Bays Program and Buzzards Bay Project, Massachusetts Coastal Zone Management Office, and the Massachusetts Department of Environmental Protection. Based on the recommendations of this group, the Massachusetts Bays Program has funded a first-tier analysis project. This project will catalogue existing flushing information (or estimate flushing rates where data are not available), delineate zones of contribution for nitrogen to selected embayments along the coast, determine nitrogen sources, estimate loading based on land-use categories, and calculate oceanic nitrogen loading to the embayments. The results of this project, due in March 1996, will be a first approximation of the coastal embayments in Massachusetts and Cape Cod Bays that are likely to be at risk of eutrophication.

To date, most of the efforts to define nitrogen loading to Massachusetts' embayments have occurred on Buzzards Bay and Cape Cod. These areas, compared with areas north of the Cape, are thought to be more susceptible to eutrophication due to the predominance of well-drained glacial soils, heavy reliance on individual on-site sewage disposal systems, and lower tidal range and flushing rates.

The Buzzards Bay Project has been at the forefront in developing a methodology and criteria to identify nitrogen management areas in the Buzzards Bay region (BBP, 1994). The Cape Cod Commission has been applying a similar methodology while assisting with the collection of information with region-wide implications under the Waquoit Bay

National Estuarine Research Reserve Land Margin Ecosystem Research Project (WBNERR-LMER). Nitrogen loading assessments have been completed for a number of watersheds, but correlation of observed effects with nitrogen loading rates has been somewhat limited. In general, the methodology begins with the delineation of an embayment watershed. This is followed by a nitrogen loading assessment of existing and potential future land uses within the watershed. The loading rates determined in this way are then compared with a critical loading rate that has been determined for the embayment as a result of a flushing study. Eutrophication indices have been developed for the Buzzards Bay and Cape Cod embayments. These indices are used to help set priorities for allocating resources to address nitrogen management issues.

Through efforts at WBNERR, a computer model has been developed incorporating the three methodologies used on the Cape to determine nitrogen loading and nitrogen management areas. These models have been developed specifically for permeable glacial soils and do not consider overland flow from areas underlain by bedrock or from large urban areas. While modifications may need to be made if these models are to be applied to other areas in Massachusetts, they provide an excellent starting point for other regions in Massachusetts that need to begin developing priorities for nitrogen management.

RESPONSIBLE AGENT(s):

The Regional Planning Agencies' technical staff, in cooperation with the DEP and local departments and boards (Planning Boards, Conservation Commissions, Boards of Health) would share responsibility for this action. Technical and financial support could be provided by the DEP through its watershed management and nonpoint source programs. Additional technical support, including training of RPA and municipal personnel, could be provided by the Buzzards Bay Project, the Cape Cod Commission, and WBNERR. Implementation of nitrogen control measures would be largely a local responsibility, to be achieved through actions by Town Meeting/City Council vote and promulgation of land use and health regulations by the local Planning Boards, Conservation Commissions, and Boards of Health.

IMPLEMENTATION STRATEGY:

Using the general approach developed by the Cape Cod Commission, Buzzards Bay Project, and Waquoit Bay National Estuarine Research Reserve, the Regional Planning Agencies, DEP, and municipalities should collaborate on the following implementation strategy:

1. Review results of the Massachusetts Bay Program-funded project to rank embayments at risk of eutrophication; target embayments identified as potentially sensitive to nutrients.

2. Determine flushing rate of each estuary/embayment and subembayment. Where flushing rate has not been defined, collect necessary data and determine the flushing rate for each potentially sensitive estuary/ embayment and subembayment.

3. Define subwatersheds to the more poorly flushed portions of the selected estuaries/embayments, as necessary.

4. Work with the MBP working group to identify appropriate indicators of eutrophication, such as dissolved oxygen levels, extent of algae and other aquatic plants, concentrations of chlorophyll-a in the water column, and depth of light penetration; develop a process to determine critical nitrogen loading rates.

5. Estimate and compare critical loading rates to cumulative nitrogen loads from both existing and projected ("build-out") development scenarios, based on current zoning.

6. Identify and implement appropriate management strategies, including both preventive and remedial actions as necessary, for each estuary/embayment (or portions thereof) deemed to be at risk of eutrophication.

Public education and participation will be essential throughout this process, and the RPAs and the municipalities should establish working committees around each estuary/embayment. As needed, these committees should invite the participation of representatives from other municipalities who have already begun to implement specific nitrogen-management actions - for example, the Buzzards Bay towns of Bourne, Carver, and Plymouth, which have rezoned the recharge area of Buttermilk Bay to limit nitrogen loading to that estuary.

LEGISLATION REQUIRED:

No legislation is required at this time; however, ultimately, stricter local zoning and land use regulations may be required in the recharge areas of waters determined to be nitrogen-sensitive.

ESTIMATED COST:

Based on Cape Cod Commission estimates, total costs per estuary/embayment could range between $90,000 - $200,000. If current (1990) MacConnell land use data are not available for an embayment area, the costs of obtaining these data could range from $10,000 - $20,000.

POTENTIAL FUNDING SOURCE(s):

Potential funding sources include DEP 319 (nonpoint source) grant funds and local property tax revenues.

TARGET DATE:

MBP, in conjunction with DEP and CZM, will begin identifying and prioritizing nitrogen-sensitive embayments in 1996/1997. The development and implementation of appropriate local and areawide nitrogen management measures should begin in 1997/1998.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Bays Program
(617) 727-9530
Buzzards Bay Project
(508) 748-3600
Cape Cod Commission
(508) 362-3828
WBNERR-LMER
(508) 457-0495

ACTION PLAN #12

ENHANCING PUBLIC ACCESS AND THE WORKING WATERFRONT

The Massachusetts Bays Program is concerned with the effect humans have on the sea, but it is also concerned with the effect that the sea has on humans. Few would argue that the sea has a mysterious power to invigorate our souls and refresh our spirits. Massachusetts Bays has a particularly diverse and beautiful shoreline, encompassing rocky headlands, sandy beaches, and just about every coastal landform in between. The shoreline is among the region's most important economic and recreational resources. It is hardly surprising, then, that people want to visit the coast for recreation and relaxation -- or that oceanfront property is among the region's most valuable real estate.

Nobody owns the ocean, of course; but individuals *do* own shorefront property and can use the rights of ownership to restrict public access to the shoreline. The tension between private property rights and public access to the waterfront is as old as the Commonwealth itself. Although the settlers who founded the Massachusetts Bay Colony brought with them from England a strong tradition of private property rights, their legal tradition tempered those property rights by recognizing that some resources -- such as air and water -- were held in common by all people. The idea that certain resources are owned in common, often called the Public Trust Doctrine, actually dates back to Roman law. The emperor Justinian codified the doctrine in 529 A.D. by declaring: *"By natural law itself these things are the common property of all: air, running water, the sea, and with it the shores of the sea."* In 1641, when the Massachusetts Bay colonists adopted a Colonial Ordinance to guarantee public access to the colony's Great Ponds, they codified the Public Trust Doctrine for the first time in America. Subsequent amendments to the Colonial Ordinance extended private land ownership to the low tide line, but expressly reserved the public rights of "fishing, fowling, and navigation" in the intertidal zone. At the time, these three activities represented the only significant public uses of the foreshore.

The Commonwealth of Massachusetts still reserves a public easement for purposes of "fishing, fowling, and navigation" between the high and low water marks. But today, of course, the public engages in a much wider array of recreational activities. Some shorefront recreation, such as swimming, jogging, and kite-flying, are active. Other recreational uses, such as beachcombing, birdwatching, sunbathing, or simply gazing at the distant horizon, are more passive. Whatever activity attracts people to the shore, it is clear that the lure of the sea is strong, and that people in ever greater numbers are turning to the sea's edge for a respite from our fast-paced, complex society. The Massachusetts Bays watershed averages more than 5400 people per square mile. More than three quarters of the state's population lives within an hour's drive of the coast. Crowding and conflicting uses of the shorefront have heightened the age-old tension between public access and private ownership.

Although the Commonwealth has more than 1,500 miles of shoreline, only 363 miles are owned by and accessible to the public. The remaining shoreline is privately owned and unavailable for public use except for the narrow purposes of "fishing, fowling, and navigation" within the intertidal zone - and even these purposes are often difficult to pursue. For example, recreational fishing access and opportunities have declined markedly in recent years, especially in the Metropolitan Boston area. Increasing population on the coast along with associated changes in waterfront development and use have severely limited the options of the average angler. The Massachusetts Public Access Board has attempted to address this problem in recent years by constructing and repairing boat ramps in the Bays region. While these efforts are to be applauded, far greater support is needed. Little progress has been made, for example, in establishing shorefront access sites for anglers desiring to fish from shore. Recreational fishing piers and other public waterfront sites are needed to enhance these opportunities.

Beach access is also a problem. On any hot summer weekend, the demand for sandy public beaches within two hours of Boston is likely to exceed the supply. Those with transportation may travel to more remote beaches on the North and South Shores, or on Cape Cod. But many beach parking lots fill up before 10:00 a.m., effectively excluding those who

live beyond a certain distance or whose leisure time comes later in the day. Access is further restricted by communities which establish quotas on the number of out-of-town cars or which set exorbitant parking fees for non-residents.

While recreational pressures mount, development in coastal communities has further impeded public access to the shore. Waterfront development in coastal towns continues to inhibit both physical and visual access to the sea. Many coastal communities have lost historic rights of way. In some cases, the communities have failed to maintain accurate, up-to-date inventories of the public accessways that were incorporated into private land deeds, and over the years these access points have been lost through transfers of ownership. In other instances, abutting property owners have intentionally extended their lawns or driveways over a public way, deterring public use of the accessway by making it indistinguishable from their own property.

While some communities have responded positively to encroachment on recorded town ways by posting signs or constructing boardwalks, other communities simply maintain a list of local accessways at the town hall. Residents of coastal communities often prefer this approach, since posting signs may attract unwelcome visitors and add to existing problems of cramped parking, vandalism, and litter.

Because coastal communities do not always seem able or willing to enhance public access to the shore, the Commonwealth recently launched its own initiative to establish the right of public passage along the intertidal zone. Many states have already established this right. California, for example, amended its constitution to make its beaches public in 1873. Texas opened its coast to the public in 1959, and Oregon followed suit as a result of a State Supreme Court ruling in 1969. Most recently, the New Jersey Supreme Court recognized public recreational rights on the foreshore, and even on the dry sand above the high tide line. The goal of the Massachusetts initiative is to establish the right of public passage along the high tide line. Since the right of passage would "take" one stick from the landowner's traditional bundle of property rights, the state may be required to compensate landowners under the "just compensation" clause of the Fifth Amendment.

The Commonwealth's Department of Environmental Management has recently launched a Coastal Access Program whose goal is to promote the general public's access to the coast. The program's two main components are the Sea Path Program and the Coastal Access Small Grants Program. Based on the statutory mandate of legislation adopted in 1991, the Sea Path Program's goal is to acquire legal rights-of-way along the intertidal zone for the public to walk, hike, and stroll during daylight hours. In almost all other coastal states, the intertidal zone is held in the public trust and is the moral and legal foundation for many of the public's coastal access rights. Though a number of shoreline landowners allow the public to use the intertidal zone for a variety of recreational purposes, many assert their private property rights by actively excluding such public use. Sea Path rights-of-way can either guarantee for the future the public's right to walk in areas where informal access is currently allowed, or they can potentially open up new areas to walkers. The Program is designed to work with local partners (e.g., citizens, public officials, nonprofits, and shoreline landowners) to identify potential sites, negotiate with landowners, develop management strategies, and acquire rights-of-way. The Sea Path Program is complemented by the Coastal Access Small Grants Program, which has been established to support and inspire "coastal access" projects conducted by municipalities, nonprofits, and regional entities. The program's goals are defined more broadly than the Sea Path Program, and generally fall into the four categories of: 1) planning and establishing new coastal pathways or access points; 2) reclaiming historic rights-of-way; 3) enhancing existing coastal access facilities; and 4) conducting associated educational/outreach initiatives. The program helps tie together fragmented but complementary efforts into a unified, coastwide movement towards increased and enhanced public access to the coast.

Another major access initiative spurred by the recent water quality improvements to Boston Harbor is the proposed Boston Harbor Islands National Recreation Area. The Boston Harbor Islands represent the last frontier of recreational open space in coastal Massachusetts. No other place in the United States has so many islands - offering so much untapped opportunity - so close to a major city. This could soon change with the passage of federal legislation that would create a Boston Harbor Islands National Recreation Area. The legislation calls for the 50 square miles of Boston Harbor, currently a 31-island state park, to be managed by the National Park Service under cooperative agreements with state, local, and private owners. The recreation area plan would allow some islands to remain pristine and others to be developed recreationally. Plans include improved public access to the islands, using new or restored piers, visitor orientation and environmental education centers, educational programs, and year-round rangers to manage the islands and facilitate their enjoyment by the public.

Of course, recreationists are not the only people concerned about access to the coast. Access to the waterfront is also essential to marine-dependent commercial and industrial users. Commercial fishing, cargo shipping, boat yards, and ferry services all contribute to the "working waterfront" -- a legacy of the Bay State's longstanding maritime tradition and a major component of the region's economy. Ports have special industrial needs at the waterfront, including piers and berths, off-loading and warehouse space, fuel storage facilities, dredged shipping channels, and deep-water turning basins. However, marine-dependent industries are facing increasing competition for limited waterfront space. Although recreational uses account for some of this competi-

tion, the more serious threat comes from non-marine-dependent uses of the waterfront such as residential development, hotels and restaurants, office buildings, and shops. Encroachment of non-marine-dependent uses into Designated Port Areas (DPAs) can impair a port's primary maritime functions. These kinds of conflicts are occurring in Designated Port Areas all along the Massachusetts Bays coast.

Resolving these conflicts will not be easy. Nevertheless, some guidelines have emerged from the State Legislature's changes to Chapter 91, the Public Waterfront Act. Updated waterways regulations promulgated in 1990 contain numerous initiatives to enhance the state's stewardship of coastal waterways by:

- *Ensuring that the immediate waterfront is used primarily for water-dependent uses;*
- *Supporting public/private partnerships to revitalize the waterfront;*
- *Providing public access for use and enjoyment of the waterfront;*
- *Strengthening state programs for shoreline conservation and utilization;*
- *Strengthening local controls and encouraging harbor planning; and*
- *Ensuring accountability to public interests.*

These initiatives demonstrate the state's commitment to putting its waterfront to the highest and best use. But, of course, not all coastal areas can -- or should -- accommodate human uses. Encroachment on sensitive coastal habitats, such as eelgrass beds and sand dunes, must be carefully managed to avoid adverse effects on commercially and ecologically important fish and wildlife populations.

As more and more people compete for the limited Massachusetts shorefront, human uses will need to be simultaneously enhanced and managed to protect the coastal environment. Only rational planning and a keen awareness of the long-term public interest will ensure that our coastal heritage is preserved for the generations to come. The following recommended actions are a starting point for achieving this.

MUNICIPAL ACTION #12.1:

Municipalities should develop and implement *Municipal Harbor Plans* which: 1) promote marine-dependent waterfront uses, 2) enhance public access to the water, and 3) protect habitat of shellfish and other living resources.

RATIONALE:

Shoreline property is among the most economically valuable real estate in the Massachusetts Bays region. Economic pressures have brought dramatic changes in the use of the shoreline. Intensive residential development has limited access to beaches and shellfishing areas. Water-dependent uses such as boatyards and marinas which generally provide facilities for the fishing industry are being displaced by non-water-dependent uses such as restaurants, condominiums, and offices. As the traditional working waterfronts are replaced by such uses, the historic maritime character of these areas is lost, along with important economic and recreational opportunities.

With nearly 50 percent of the citizens of Massachusetts living within five miles of the coast, pressures along or near the shoreline consume much of the time and attention of municipal boards and planners. Indeed, the task of reviewing and permitting development proposals alone can be almost overwhelming, and affords little opportunity for sound, proactive coastal planning. By completing a *Municipal Harbor Plan*, a community establishes a mechanism for addressing major land-side and water-side issues - many of which may be in conflict - in a thoughtful and coherent manner.

RESPONSIBLE AGENT(s):

Harbor commissions, harbor committees, or other core working groups will be responsible for this action. Such groups should represent the diverse interests of the waterfront, and include local officials (selectmen, planners, harbormasters, etc.), agencies with jurisdictional interests in the waterfront (port authority, redevelopment authority, etc.), waterfront businesses and land owners, and recreational users. Planning and advisory assistance, along with inventory data and maps, are available from CZM and the Regional Planning Agencies.

Key issues to be addressed include: 1) designation of "working waterfront" overlay zones to ensure the preservation of boatyards and other traditional maritime uses; 2) development of a public access strategy, including accompanying guidelines that will indicate how any future Chapter 91 licensing projects should contribute to the implementation of the strategy when meeting their associated access benefits requirements; 3) establishment of watersheet zoning to protect sensitive coastal resources and minimize use conflicts on the water; 4) designation of federal No Discharge Areas (NDAs) to minimize boat waste impacts on shellfish harvesting areas; 5) adoption of strict design and construction standards to minimize impacts to public safety and the economy resulting from coastal storms; and 6) identification of the plan's recommended implementation measures that the community proposes for substitution or amplification of the state waterways regulations.

IMPLEMENTATION STRATEGY:

The harbor planning process should be an open, interactive process that invites the participation and input of diverse sectors of the community. CZM has developed harbor planning regulations (301 CMR 23.00) and guidelines (*Harbor Planning Guidelines*, May 1988) to help communities through this process and the process of gaining state approval for their *Municipal Harbor Plans*. Consistency of the local plans with the Harbor Planning Guidelines, CZM policies, and the state's tidelands policies, objectives, and associated waterways regulations are the principal standards for state approval of the plans. Development of a Request for a Scope explaining how the Harbor Planning Guidelines will be applied is the first critical step of the planning process. Upon CZM's issuance of a Scope, communities may begin the plan development process. While particular waterfront issues identified in the Scope may vary from one harbor to another, communities should adhere to the same planning process as follows:

Form Core Planning Group
↓
Develop Community Participation Program (ongoing)
↓
Define Harbor Boundaries
↓
Inventory, Map, and Analyze Existing Harbor Conditions and Trends (ongoing)
↓
* Identify and Prioritize Issues
↓

* Establish Vision, Goals and Objectives
↓
Develop Policies
↓
* Analyze and Select Action Alternatives
↓
Prepare Draft Harbor Plan
↓
Hold Public Workshops
↓
Prepare Final Harbor Plan
↓
Submit *Municipal Harbor Plan* to CZM for Approval
↓
Implement the *Municipal Harbor Plan* (ongoing)

* denotes key points for holding community meetings and soliciting public comment

LEGISLATION REQUIRED:

Development of a *Municipal Harbor Plan* will not require new legislation. However, *implementation* of the plan will likely require some legislative changes locally, including amendments to the zoning bylaw and building code, and new or revised waterways regulations.

ESTIMATED COST:

The cost of developing a *Municipal Harbor Plan* can vary widely, depending on harbor or embayment area size, patterns of development and use, and complexity of issues. Comprehensive plans for large, intensively-used harbors with multiple competing interests can cost $100,000 or more. However, the average cost for a plan is much lower at about $25,000 -$30,000.

POTENTIAL FUNDING SOURCE(s):

CZM offers communities matching funds through its Harbor Planning Grant Program (HPGP). HPGP funds are reserved for the development of plans that are submitted for state approval in accordance with the harbor planning regulations.

TARGET DATE:

1996 - 1999. A *Municipal Harbor Plan* is an integral part of a community's overall planning program and may require several years or more to complete. (*Implementation* of the plan is, of course, an ongoing process.) Accordingly, communities should begin the harbor planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

CZM Harbor Planning Program
(617) 727-9530
Your area's Regional Planning Agency

CZM ACTION #12.2:

The Coastal Zone Management Office should enhance the Designated Port Area (DPA) program with new planning and promotional initiatives.

RATIONALE:

More than 15 years ago, the Commonwealth adopted a common sense policy for accommodating marine industrial development - i.e., development that depends on proximity to a waterway for either the transportation of goods/ passengers or the withdrawal/discharge of large volumes of process water. The basic premise was this: it makes good environmental and economic sense to steer new and expanded water-dependent industrial use into harbor areas that have already been altered dramatically -- at public expense -- to meet the special infrastructure and operational requirements of water-related commerce. Accordingly, in consultation with municipal planners and leaders of the marine business community, CZM identified 12 specific Designated Port Areas (DPAs) as the primary "host" sites to meet both the foreseeable and unanticipated space needs of the maritime commerce and industry.

Designated Port Areas

*1. Gloucester
*2. Salem Harbor
*3. Beverly Harbor
*4. Lynn
*5. Mystic River
*6. Chelsea Creek
*7. East Boston
*8. South Boston
*9. Weymouth Fore River
*10. Plymouth Cordage Park
11. New Bedford-Fairhaven
12. Mt. Hope Bay

*Denotes location within Massachusetts Bays Region

Although each of the 12 DPAs is unique in certain ways, all are characterized by the presence of three types of infrastructure that are fundamental to the viability of maritime pursuits. These are:

- a waterway and associated waterfront that have been developed for commercial navigation;
- backland space that is conducive in both physical configuration and use character to the siting of industrial facilities and operations; and
- land-based transportation and public utility services appropriate for general industrial purposes.

The limited supply of areas having this special combination of attributes has diminished steadily over the years as a result of irretrievable conversion of land to nonindustrial and nonwater-dependent uses. This trend should be halted because such uses have far more siting options than marine industry, and because the cost of replacing port infrastructure has become prohibitively high in both monetary and environmental terms. The most efficient and politically acceptable way for Massachusetts to maximize future development opportunities in the maritime sector of the economy is to preserve what remains of its industrialized coast, which lies predominantly within the DPAs. These areas are among the Commonwealth's most endangered economic habitats, and they should be accorded the highest level of regulatory protection at both the state and local levels.

Since 1979 the waterways (Ch. 91) regulations promulgated by the Department of Environmental Protection (DEP) have sought to prevent development activity that is likely to have an exclusionary effect upon maritime commerce in DPAs. In 1990 those regulations were strengthened to categorically prohibit certain uses such as housing, hotel, and recreational boating facilities; but flexibility was also provided in the case of nonwater-dependent industrial and commercial uses, which may be licensed in a DPA only if there is no significant alteration to the predominantly "working" character of the area and if the project offers some form of support to existing or prospective maritime uses. For this strategy of flexible protectionism to be effective, it should be applied in the context of a master plan for each DPA -- developed locally but subject to state review and approval -- in which specific arrangements are set forth to both preserve key sites for maritime development and achieve a compatible mix of supporting uses. Unfortunately, in many communities the DPAs are still relatively unplanned and zoning ordinances applicable to the working waterfront pre-date the 1990 improvements to the waterways regulations, resulting in the potential for significant inconsistency between state and local controls. Accordingly, it is important for the state to encourage sound DPA planning at the municipal level by offering significantly more technical and financial assistance than has been available in recent years.

In addition to developing a stronger planning basis for regulatory decisions, state policy on the use of DPAs should be enhanced with a vigorous effort to promote water-dependent industrial enterprise. Although the DPAs are officially listed as priority areas for state and federal funding, over the years such financial assistance has been limited to a few relatively small grants awarded under CZM's Coastal Facilities Improvement Program (CFIP). Further, this program has not been funded since 1988 and even then did not assign preference to infrastructure improvements in DPAs (other than allowing a somewhat higher per-project expenditure). This grants program should be revitalized to support DPA interests in a more vigorous manner, and CZM should work closely with the state's economic development agencies to ensure that DPA property owners and businesses benefit as much as possible from existing assistance programs. Among the programs that seem most applicable to DPA industries are:

- the Water-related Use Fund of the Massachusetts Industrial Finance Agency;
- the Economic Opportunity Target Area and Tax Increment Financing Programs of the Massachusetts Office of Business Development (MOBD), undertaken pursuant to the Economic Development Incentive legislation (Ch. 19) enacted in 1993; and
- the Local Partnerships for Economic Development Program within the Executive Office of Communities and Development (which also offers grants both for planning studies and actual development projects, with funding from a variety of sources such as the Commonwealth's Community Development Block Grant allocation).

Finally, CZM should collaborate with these and other agencies, particularly Massport and local port and harbor authorities, to identify new initiatives to encourage and support maritime business development within DPAs. This should occur in the context of the Governor's new seaport action plan which, in turn, is based on the October 1994 report of a special Port Commission convened to develop an integrated, statewide port development strategy. The plan's recommended strategy was designed to capitalize upon the new opportunities the state's ports present in today's global economy, opportunities that are expected to grow with the completion of NAFTA, GATT, and potential new trade agreements. As the Governor stated: "We can make the decision to respond aggressively... [by "Choosing to Compete" with a port development strategy]..., or we can sit back and watch one of our prize resources fade away."

The plan recommended 53 actions to be carried out on a five-year timetable, and the Governor has acted immediately on the plan's primary recommendations by:

- Signing an executive order establishing a Seaport Council to provide for ongoing coordinated decision-making on port planning, development, and marketing, and the infrastructure essential to keeping the state's ports competitive - i.e., dredged navigation channels, and efficient rail and truck access and intermodal connections.
- Filing a $300 million seaport bond bill to provide the capital funding necessary to implement the recommended port-related projects, including $110 million to bring double stack trains closer to the Port of Boston, $100 million for dredging, $45 million for public port facilities, $20 million for a fisheries development program, $10 million for a Seaport Economic Development Fund, and $3 million for port planning.

The seaport action program is important. Many of its goals -- port planning and infrastructure improvement, and maintenance of our navigation channels -- are central to the mission of CZM.

RESPONSIBLE AGENT(s):

CZM should assume lead responsibility for this action, insofar as it represents an extension of the DPA and Harbor Planning Programs already being implemented by that agency. Even so, the effort should be conceived as a joint venture with significant cooperation and support provided by DEP, Massport, the Executive Offices of Economic Affairs and Communities and Development, and local economic development agencies within the respective DPA communities.

IMPLEMENTATION STRATEGY:

In order to stimulate the development of DPA master plans, CZM should work toward the goal of offering substantial grant funds to coastal municipalities for this purpose. Certainly one avenue to pursue is to encourage and facilitate applications for planning grants submitted to other state agencies; however, the primary task should be to enhance in-house programming at CZM in order to ensure greater predictability and maximum impact. Fortunately, the Seaport Bond earmarks DPA communities as a primary target audience for a special $5 million round of harbor planning grants and proposes to reduce the required local match to 20 percent.

To further promote maritime business development in DPAs, the Seaport Bond includes $45 million in planning grants through CFIP for public port facilities primarily in DPAs (with local match reduced to 20 percent). Also, the Bond provides for the implementation of a statewide program that provides a real and lasting solution to statewide dredged materials management. The proposed DPA Dredging Program provides the Secretary of Environmental Affairs with the means to take a leading and proactive role in maritime economic development in Designated Port Areas

through the responsible environmental management of contaminated sediments. The proposal provides CZM with $10 million for the preparation of a state DPA Dredging Plan, including Environmental Impact Reports, the identification of long term disposal sites, and economic analysis for dredging projects in all of the state's DPAs.

Greater interagency coordination will be an essential element of this implementation strategy. Accordingly, CZM should be an active participant in all deliberations of the Seaport Council, and should coordinate fully with representatives of DEP, DEM, Massport, MOBD, and other state agencies with relevant planning and development expertise.

LEGISLATION REQUIRED:

Long-term funding of CZM harbor planning grants to municipalities will depend on the Seaport Bond recently passed by the Legislature.

ESTIMATED COST:

Full and effective implementation of this action over a five-year timetable will require approximately two full-time staff at CZM to coordinate with the Seaport Council, administer planning and construction grants, and provide technical a assistance to municipalities. The estimated cost of such personnel is approximately $1.5 million. As identified in the Seaport Bond, CFIP funds for infrastructure grants to DPA municipalities total $45 million, while grants for local development of DPA master plans and management of the plan development process total $3 million.

POTENTIAL FUNDING SOURCES:

As noted above, some funding would be derived from a variety of existing planning and economic development programs, but the primary source would be the five-year Seaport Bond.

TARGET DATE:

Initial steps toward development of a DPA Planning/Promotion Program should be given high priority within CZM during the 1996-1997 fiscal year.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management Office
(617) 727-9530

CZM ACTION #12.3:

The Coastal Zone Management Office should establish a new technical assistance program to accelerate municipal efforts to identify and legally reclaim historic rights-of-way to the sea.

RATIONALE:

In days of yore when the Massachusetts population relied heavily upon the sea for food and transportation, and when a network of pathways leading to and along the shore was an essential part of the coastal life-support system, most shorefront communities took steps to establish public rights-of-way to the sea. These public ways were written into the deeds of private property owners, often when the land was first platted, in order to secure for all citizens the perpetual benefit of access to the water's edge. Many of these historic town ways subsequently disappeared from private land deeds as transfers of ownership took place in the absence of municipal vigilance and accurate record-keeping, even in cases where public use continued without interruption. Other accessways are still "on the books" but are hidden and unknown, even to local residents, as a result of deliberate concealment by abutting property owners who have become expert in the dubious art of access concealment.

The importance of locating and legally reclaiming town ways is not always apparent in cases where activity patterns have shifted to other locations or uses. For example, the demand for an accessway for fishing purposes may have declined temporarily due to deterioration in a locale's water quality. However, town ways are seldom truly obsolete. For example, certain nearshore waters where shellfishing is currently prohibited have seen a dramatic rise in windsurfing, ocean kayaking, and use of other light watercraft -- all requiring access to safer, more sheltered launching sites than are provided at public motorboat ramps. Similarly, with waterfront strolling an ever-popular pastime, historic footpaths could be joined with newly-acquired public rights-of-way to form coastal trail networks for pedestrian use and enjoyment in previously unapproachable areas. Finally, unlike other approaches to obtaining shoreline access for the public, the process of reclaiming and preserving historic rights-of-way is generally straightforward and relatively inexpensive (except, of course, where litigation is required to settle a contested case).

This is not to say that it is a trivial matter to reestablish and protect public rights-of-way. One threshold impediment is attitudinal in nature, insofar as some communities have a longstanding political tradition of avoiding confrontation with influential owners of waterfront property, a tradition commonly supported by nearby residents who already know where the neighborhood ways to the sea are and prefer to keep the information to themselves. And even with the moral support of community leaders and citizens-at-large, an effective rights reclamation program cannot be developed without at least some assistance from legal professionals on a fee-for-service basis. Moreover, a cadre of volunteers must be available to carry out the painstaking research that is often needed to support negotiations with affected property owners as well as litigation that may be necessary to resolve continuing disputes.

Reclaiming historic rights-of-way is a considerable challenge, and to date municipalities have been left almost completely on their own to tackle it. Indeed, only a handful of communities have succeeded to any significant degree (e.g., Rockport and Gloucester). Therefore, it is essential that the state begin taking a more active role in facilitating local access reclamation efforts, by developing the capability to provide substantial and ongoing technical assistance.

RESPONSIBLE AGENT(s):

In keeping with its history of encouraging and supporting public access initiatives at all levels of government, CZM should assume lead responsibility for this action.

IMPLEMENTATION STRATEGY:

This action should be implemented in two phases, beginning with the mobilization of a variety of support resources for municipal use. Key elements to be pursued in this first phase would include: preparation of case histories and an educational video to tell the story of the success achieved in Rockport and Gloucester; preparation of a practitioner's handbook with "how to" guidance on carrying out the legal and other tasks commonly required to reclaim historic rights; development of a lawyer network/referral service to assist municipalities in obtaining professional assistance on a pro bono basis; and completion of a series of "incubator" workshops in all regions of the coast to promote campaigns for rights-of-way reclamation and to provide initial training for campaign participants.

In the second phase, CZM should develop a permanent outreach capability by creating a staff position for a "special counsel for public access." This attorney would provide ongoing technical assistance to municipal access programs as well as facilitation services to help resolve user-owner disputes, in cases where litigation might be avoided through objective third-party intervention. Complaints that could be referred to the special counsel include those of members of the public who feel they have been inappropriately excluded from public accessways, together with those of aggrieved property owners who seek to ensure that public access occurs in a manner that recognizes the legitimacy of their own interests as well. Finally, it should be the responsibility of the access attorney to develop and maintain a "Register of Protected Coastal Rights-of-Way" for purposes of keeping track of all shoreline access entitlements that have been secured for the public as a result of municipal reclamation programs, as well as by various programs of regulation and acquisition being carried out by other agencies within the CZM network.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of implementing the first phase of this action over the period of one fiscal year is estimated to be $85,000. This would cover the salary of a full-time contract person, expenses for production of resource and training materials, and the costs of presenting a series of educational workshops coastwide. Subsequent annual expenditures associated with a permanent ombudsman position would be approximately the same.

POTENTIAL FUNDING SOURCE(s):

Funds for the enhancement of coastal access programs are available to CZM under the Section 309 portion of its annual budget, and such funds should be assigned to this action.

TARGET DATE:

Phase One should be completed during FY 1996; Phase Two should be initiated in the following fiscal year.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management Office
(617) 727-9530

CZM ACTION #12.4:

The Coastal Zone Management Office (CZM), in collaboration with the Department of Environmental Management and MassGIS, should prepare and distribute a statewide *Coastal Access Guide* to facilitate public access to the shoreline.

RATIONALE:

Many coastal states -- including neighboring Rhode Island -- have published handsome and informative access guides to public recreational facilities along the entire state shoreline. In the mid-80s, the Massachusetts Coastal Zone Management Office began a comprehensive effort of this kind, resulting in the publication of guidebooks for two regions (Boston Harbor and the North Shore); but funding limitations did not allow the project to extend to other areas of the coast and, with the passage of time, the original guides are now both out of date and out of print.

In the absence of a statewide access document, individual agencies have attempted to fill the informational gap by producing a variety of maps, booklets, and brochures describing their own facilities. A leading example of this is the guide to state boat launching ramps compiled by the Public Access Board within DFWELE (Public Access to the Waters of Massachusetts, undated). As a group, however, these assorted materials are not sufficiently plentiful or up to date, do not synthesize all relevant information for the coastal zone specifically, and are distributed in what might be called a passive manner (i.e., only in response to phone inquiries or walk-in requests at various field locations). Here again, deep cuts in the state budget have had a devastating effect. In 1991, for example, all public information staff positions were eliminated from the state's primary parks agency, the DEM Division of Forests and Parks.

Despite these fiscal constraints, several important strides have been made in recent years which indicate that the time has come to renew efforts to prepare a statewide coastal access guide. First, in 1990, DEM completed a comprehensive inventory of publicly-owned land along the coastline, which characterized each site not only in terms of ownership (federal, state, local, and non-profit), but also according to fees charged, parking facilities provided, and other attributes affecting availability to the public at large. Second, in 1992, DEM initiated a follow-up effort to incorporate these and other data on protected coastal open space into the Massachusetts Geographic Information System (MassGIS). In the not very distant future, this system is scheduled to be upgraded by including the database developed for the most recent State Comprehensive Outdoor Recreation Plan (SCORP). When these complementary efforts are complete, it should be a relatively straightforward matter to produce a high quality shoreline access guide based on up to date map products and attribute information directly retrievable from the GIS.

RESPONSIBLE AGENT(s):

Having successfully undertaken similar projects in the past, CZM should assume lead responsibility for this action, with support from DEM and MassGIS in the area of database development.

IMPLEMENTATION STRATEGY:

Implementation of the access guide project should satisfy the following four objectives:

- the guide should include as many sites as possible that are owned by federal, state, and local governments and are suitable for recreation, both active and passive (i.e., beaches, parks, scenic and conservation areas, public piers, and town landings); properties held by nonprofit land trusts that are available for public use and enjoyment also should be included where feasible and appropriate;

- the maps should be carefully designed so as to facilitate "getting there," by showing connections from the regional highway system and public transportation as well as by naming selected local roadways and landmarks in a way that allows routes to the shoreline to be plotted with a minimum of confusion; ideally, the guide should be the only map document the public needs to obtain accurate directions to the properties in question;

- the maps should be accompanied by site-specific information describing allowed and restricted activities, facilities provided and fees charged, type and availability of parking, and any other attributes of relevance to potential users in deciding whether to visit the site; and

- the guide should be user-friendly in a physical sense (i.e., it should be sized to fit easily in a glove compartment or jacket pocket, have pages that lie flat when opened to a particular map, and be constructed of durable material.)

As a final note, it is important that a serious effort be made to

ensure that the guide be kept in print, be updated periodically, and be distributed widely. This may require some form of "turn-key" arrangement whereby ongoing responsibility for publication and distribution of the guide is transferred to another organization, such as the state university press or a private producer of recreational literature.

LEGISLATION REQUIRED:

Legislation is not required.

ESTIMATED COST:

$150,000. The cost of preparing a three-part access guide for the entire shoreline of Massachusetts is estimated to be at least $100,000, exclusive of printing costs which would be approximately $50,000 for an initial printing of 10,000 copies.

POTENTIAL FUNDING SOURCE(s):

The Massachusetts Bays Program has already committed $15,000 to this project and another $55,000 has been allocated through the CZM and DEM budgets. Other sources within EOEA need to be identified to cover the remainder of the estimated project cost.

TARGET DATE:

The first volume of the public access guide (*The Massachusetts COAST GUIDE, Access to Public Open Spaces Along the Shoreline, Greater Boston Harbor and the North Shore*) was published during the summer of 1995. Other volumes should follow as soon thereafter as possible as the necessary GIS information becomes available.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management Office
(617) 727-9530

EOEA ACTION #12.5:

The Executive Office of Environmental Affairs, in collaboration with coastal municipalities, should develop and implement an *Access-Via-Trails* program to enhance public access along the coast.

RATIONALE:

In the 20 years or so since public access to the coast was first identified as a critical issue for the Commonwealth, the amount of tidal shoreline in government or quasi-government ownership has increased from 265 to 363 miles, which is approximately one-quarter of the total frontage in the state. Despite this substantial accomplishment in land acquisition, however, it is evident that the goal of having a coast that is truly "open to the general public" remains elusive and largely unfulfilled in Massachusetts, as strong legal and political traditions still beget extensive exclusion on the roughly 1,000 miles of shoreline not under public control. Perhaps the most telling indicator of our acute need for better coastal access is that a majority of Massachusetts residents do ***not*** visit the coast on a yearly basis, despite the fact that so much of the population (86 percent) lives in counties either entirely or substantially within 50 miles of the sea.

If we are to meaningfully expand public access opportunities, Massachusetts cannot continue to rely exclusively on the conventional approach of acquiring more public parks and conservation lands at the water's edge. Such an approach is not only costly, but is also slow to achieve results. To quicken the pace of access enhancement, the state should give equal, or *greater*, attention to obtaining rights-of-way and other small-scale, dispersed access entitlements that do not require outright ownership of waterfront acreage. As proposed recently by the CZM Office, the organizing concept for such an effort should be that of the "coastal hiking trail," consisting of interconnected pathways running along the shoreline as well as to and along near-shore roadways. The portions of the trail crossing private property would be open to public passage by virtue of easements, permit conditions, and other legal/regulatory means. Also, points of origination would be located at small public parking lots or where on-street parking is available; or, to obviate the need to use a car at all, the trails could become part of a network of inland walking and bike paths connected, in turn, to nearby bus routes and rail stations. Leading examples of this approach include the proposed Bike-to-the-Sea route between Malden and Revere Beach, and the Rails-to-Trails route being planned in Newburyport.

With proper layout and careful attention to management issues, public use of such trails could occur in a manner that respects the privacy and other interests of waterfront property owners. Although the volume of foot traffic on any one trail would be expected to be relatively low, development of a number of trails in each community would make the shoreline far more approachable in the aggregate, with a relatively low expenditure of public funds. Another advantage of this innovative acquisition technique is that parking facilities, if needed at all, would be limited in size and could be located away from the immediate shoreline, further reducing costs and allowing for greater siting flexibility to avoid adverse environmental impacts.

The "access-via-trails" concept is very much in keeping with recent access-related developments in both the legislature and certain EOEA agencies. For example,

- the Chapter 91 Regulations of the Department of Environmental Protection (DEP) now require that public lateral access be allowed along the water's edge whenever a private pier or other structure extends into Commonwealth tidelands (i.e., below the low water mark);
- a complementary effort to open up the intertidal zone has been authorized by the legislature in the form of a statute directing the Department of Environmental Management (DEM) to initiate eminent domain proceedings to purchase "strolling" rights for the public during daylight hours; and
- the state's Public Access Board -- an entity that has heretofore concentrated on the construction of state boat ramps -- has the statutory authority to "designate locations of public access to great ponds and other waters within the Commonwealth and locations of trails and paths for...hiking...or other uses..." and to "construct such...parking areas...trails...and related facilities as may be designated by the Board...".

These existing state programs could, and should, be knit together in a coherent way to implement the concept of a coastal trails network, a process that would complement actions taken at the municipal level to reclaim historic rights-of-way.

RESPONSIBLE AGENT(s):

DEM is the logical agency to assume lead responsibility for this action, insofar as it represents an extension of programs already being implemented by that agency (e.g., developing trails in general and acquiring intertidal strolling rights in particular). Significant cooperation and support for the action should also be provided by municipal planners as well as CZM, DEP, and the Public Access Board.

IMPLEMENTATION STRATEGY:

The basic tasks that should be carried out to implement this action are as follows:

- Develop a set of guidelines for selecting priority segments of the shoreline and potential properties for easement acquisition and development of associated infrastructure (parking, signage, information materials, etc.); this will require, among other things, that a geographic database be established to identify opportunities for linking existing public recreation facilities and nearby public thoroughfares and pedestrian rights-of-way;

- Establish a list of high priority trail projects to be carried out when adequate funds become available;

- Develop and field-test a set of management guidelines to balance use versus conservation and public versus private interests in a variety of circumstances where public trail easements are secured on private shorefront property; this should build on existing land management guidelines developed in recent years by the EOEA Interagency Land Committee.

Recognizing that effective management is key to the success of any trails program, a special effort should be made to enlist the assistance of local residents and organization in providing grassroots management services, such as through adopt-a-trail projects and other comparable arrangements.

LEGISLATION REQUIRED:

Long-term funding of this program can be achieved under the Open Space Bond recently approved by the Legislature.

ESTIMATED COST:

A two-year effort to establish and properly staff the program is estimated to cost approximately $85,000 per year. Subsequent expenditures would include the salary of at least one full-time staff person, together with capital costs that will vary depending on the number of projects carried out each year.

POTENTIAL FUNDING SOURCE(s):

Funds for the two-year startup phase, as well as for actual trail planning and development on an ongoing basis, will require a commitment of state monies from the Open Space Bond.

TARGET DATE:

A coastal trails program should be ready for full-scale operation by the end of fiscal year 1997.

FURTHER INFORMATION:

For further information and assistance, contact:

Department of Environment Management
(617) 727-3180

ACTION PLAN #13

PLANNING FOR A SHIFTING SHORELINE

Nature is never completely static. The earth and its resident organisms are constantly changing and evolving. Because humans can actually *see* biological systems change, we are used to thinking of them as dynamic --individual organisms mature and die, populations rise and fall, entire ecosystems change and evolve. Geological features such as land masses, rivers, and shorelines are also dynamic, even though the rate of change is so slow that for practical purposes humans usually act as if these features were immutable. They are not. In fact, as recently as the last ice age (a mere blink on the geological time scale), the southeastern Massachusetts land mass extended seaward to the area now bounded by Block Island, Martha's Vineyard, Nantucket, and George's Bank.

The shoreline of the Massachusetts Bays region is still shifting. Like all shorelines, it is constantly being shaped and reshaped by natural forces -- currents and tides, fluctuations in sea level, storm erosion, shifts of barrier materials, and other phenomena. In some instances, changes to the coastal landform are best measured on a human scale rather than a geological scale. A barrier beach, for instance, can form and dissipate in a single human lifetime. Sea level rise plays an important role in shoreline change. Tidal data collected over the last century indicate that global sea level has been rising at an average rate of approximately 0.3 - 0.5 feet per century. Locally, however, relative sea level has been rising at about twice that rate. Sea level rise may accelerate dramatically within the next 100 years as a result of global warming, causing loss of uplands and wetlands, increased flooding, saltwater intrusion, and elevated groundwater tables.

Engineering can sometimes prevent, or at least slow, a natural shift in the shoreline. Sea walls, dikes, and floodgates may hold back rising sea levels or deflect eroding storm waves. In many cases, however, the engineering "solution" merely creates a new set of problems. In some instances, deferential retreat -- rather than determined resistance -- may be the best response to a shifting shoreline.

The Massachusetts Coastal Zone Management Office (CZM) recently became one of the few agencies to address the issue of shifting shorelines by adopting a policy that requires developers in the 100-year floodplain to consider and plan for the effects of sea level rise. However, sea-level rise has not been completely addressed at the policy and management level, perhaps because the scientific basis for predicting the effects of global warming is uncertain.

However, even if the magnitude and timing of future shoreline shifts are uncertain, the fact that shorelines migrate is incontrovertible. Where development encroaches on unstable coastal landforms, property is certain to be threatened when the shoreline shifts from beneath it. Because an environmentally sound approach to shifting shorelines may at times conflict with the interests of oceanfront property owners, equity, property rights, and other social and legal issues will undoubtedly play a large role in management strategies for the shifting shorelines in the Massachusetts Bays region. A rational management plan, however, will give as much credence -- or more -- to existing scientific information which indicates that certain coastal areas are simply not suitable for development. The challenge will be to integrate social and scientific issues into an equitable and environmentally responsible management plan.

The following recommended actions are a starting point for achieving this.

MUNICIPAL ACTION #13.1:

Municipalities should adopt and implement strict development/redevelopment standards within FEMA A and V flood hazard zones and other areas subject to coastal flooding, erosion, and relative sea level rise.

RATIONALE:

Shoreline development can pose major environmental, economic, and public safety risks. The demand for waterfront property has resulted in inappropriate development in numerous high hazard areas - atop eroding coastal banks, adjacent to wetlands, on barrier beaches, and within floodplains. Such development has destabilized banks and dunes, accelerating problems of erosion and sedimentation. It costs the public millions of dollars annually in storm damage reconstruction, and threatens to impede the natural landward migration of essential tidal flats and wetlands as sea level rises relative to the land.

Although each coastal community has an evacuation plan, and local and state regulations limit some development in hazard areas, many communities have not adopted sufficiently strict construction and reconstruction standards to prevent the same types of development, and damage, from occurring in the future.

RESPONSIBLE AGENT(s):

A number of local authorities would be involved in this action, although primary responsibility would rest with the Planning Board, Board of Health, Conservation Commission, and local code enforcement officers (e.g., Health Agent, Building Inspector). Assistance is available from DEM's Flood Hazard Management Program, CZM, and the Regional Planning Agencies.

IMPLEMENTATION STRATEGY:

A core working group composed of representatives from the above boards should evaluate the adequacy of the community's existing regulations based on model performance standards for construction/reconstruction in high hazard areas, including areas subject to relative sea level rise. The performance standards should cover a broad range of building site, size, and setback considerations. Examples of performance standards include:

- *Except as specified to the contrary, no development or redevelopment shall be permitted in FEMA "A" and "V" flood zones. Existing structures may be reconstructed or renovated provided there is no increase in floor area or intensity of use. As an exception, where there is no feasible alternative, water-dependent structures and uses may be permitted subject to the approval of all permitting authorities.*

- *Development and redevelopment on or within 100 feet landward of a coastal bank or dune shall be designed to have no adverse effect on the height, stability, or the use of the bank or dune as a natural sediment source. In areas where banks or dunes are eroding, the setback for all new buildings and septic systems to the top of the coastal bank or dune crest shall be at least 30 times the average annual erosion rate of the bank or dune. This rate shall be determined by averaging the erosion over the previous 30-year period at a minimum. In instances where shoreline erosion rates are indicative of bank/dune erosion rates, CZM shoreline change maps may be used in determining the setback.*

Among other things, performance standards should address those portions of the 100-foot buffer zone from a vegetated resource area that would be affected by a likely shift in shorelines, and should incorporate the best available shoreline, erosion, and sea level rise data. In particular, such standards should prohibit the construction of sea walls, revetments, and groins in order to allow for the occurrence of natural wetland and sediment migration processes.

According to Federal Emergency Management Agency (FEMA) and CZM officials, all "critical" facilities (e.g., wastewater treatment facilities, power generating facilities, hospitals, emergency response facilities) should be elevated or floodproofed to the 500-year flood elevation. Actual experience around the country and here in Massachusetts (e.g., Humarock in Scituate) has shown that the mapped 100-year flood elevation is not always correct, and severe storms may exceed that elevation.

While the 500-year flood elevation is not actually specified in Federal Executive Order 11988, the intent to plan or reconstruct critical facilities to a higher level of protection permeates the E.O. A sound reason for choosing the 500-year flood elevation is that it is calculated and published in all community Flood Insurance Studies and thus is readily available. The published 500-year flood elevation does not

include wave height; however, a critical facility should not be located in a Velocity zone where a wave height calculation would be needed. If a critical facility already exists in a Velocity zone, the 500-year elevation including wave height should be calculated, and that subsequent height should be used for floodproofing and elevation criteria.

With respect to sea level rise, a one-foot relative sea level rise should be considered in all planning and construction in FEMA-mapped A-zones; however, a 2-foot relative sea level rise should be used in all Velocity zones.

For more detailed information and assistance regarding performance standards for development activities in coastal hazard areas, contact CZM and DEM's Flood Hazard Management Program.

LEGISLATION REQUIRED:

Implementation of this action will require amending existing municipal development/redevelopment regulations to incorporate stricter performance standards in high hazard coastal areas.

ESTIMATED COST:

In general, the cost of developing and adopting stricter performance standards should be modest. Model performance standards for high hazard areas are available from CZM, DEM, and the Regional Planning Agencies. These model standards can either be adopted in their present form or modified to reflect specific local needs.

The cost of delineating high hazard areas, including lands subject to sea level rise, on local assessor's maps is estimated to be $1,500 - $2,500 per community.

POTENTIAL FUNDING SOURCE(s):

TARGET DATE:

1996/1997. This is a high priority action from a public safety, environmental, and economic standpoint and should be implemented as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management (CZM)
(617) 727-9530
DEM Flood Hazard Management Program
(617) 727-3267
Your area's Regional Planning Agency

DEM ACTION #13.2:

The Department of Environmental Management should assist communities in the development of effective *Floodplain Management Regulations*.

RATIONALE:

Floodplains serve as a natural means of flood control by absorbing and retaining water during periods of excessive precipitation and runoff. Inappropriate development in floodplains can threaten public health and safety, destroy or degrade important riverine habitat, and impair water quality. By providing information and "hands-on" technical assistance on floodplain management to communities, the State's Flood Hazard Management Program can help communities guard against financial losses due to flooding while protecting public safety and natural resources.

As a requirement for participation in the National Flood Insurance Program (NFIP), communities must adopt locally enforceable floodplain zoning bylaws to regulate development activity in the 100-year floodplain. Local floodplain bylaws that do not meet FEMA's minimum standards for floodplain management can jeopardize a community's continued participation in the NFIP.

Participating communities also must adhere to several state regulations that in some instances are more restrictive than the federal guidelines. These include: 1) State Building Code (780 CMR 2102.0, "Flood Resistant Construction"); 2) Wetlands Protection Act Regulations (310 CMR 10.00); and 3) State Environmental Code, Title 5 (310 CMR 15.00). In order to ensure community compliance, DEM's Flood Hazard Management Program staff will review local floodplain bylaws and recommend changes consistent with prescribed NFIP and state regulatory standards.

RESPONSIBLE AGENT(s):

DEM's Flood Hazard Management Program (FHMP) staff will be responsible for this action.

IMPLEMENTATION STRATEGY:

In order to promote the sound use of floodplains and to help safeguard Massachusetts residents against possible losses to life, health, and property due to flooding, DEM:

- maintains a reference file of current Flood Insurance Rate Maps (FIRMs) which identify known flood hazard areas in Massachusetts communities. These maps help public officials and citizens identify flood-prone areas and learn of the risks local flooding may pose;
- conducts Community Assistance Visits (CAVs) and Community Assistance Contacts (CACs) with municipal officials to provide information and assistance on local floodplain management;
- distributes the State Building Code design regulations for floodplains (780 CMR 2102.0) and FEMA manuals of appropriate floodplain construction techniques to minimize flood damage to those structures permitted in the floodplain;
- provides information on how to properly evaluate and floodproof structures already in the floodplain and to discourage inappropriate structural development; and
- provides model bylaws encouraging communities to join the National Flood Insurance Program and adopt or update zoning overlay bylaws to regulate land use in floodplains.

As part of its Community Assistance Visits and Community Assistance Contacts, DEM's FHMP staff will obtain and review the floodplain district section of a community's local bylaws. Based on its findings, DEM will forward specific recommendations for bylaw changes in follow-up correspondence to the community. Bylaw development assistance is a specifically identified task in the FHMP's Statement of Work, negotiated with FEMA each fiscal year. Under this task, any community that has received recently updated Flood Insurance Rate Maps or has requested technical assistance will be helped with its floodplain management bylaw.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

When offered under the specific task of "bylaw review," the estimated cost to DEM of providing technical assistance is $375 per review. When provided as part of a CAV or CAC, the cost of assistance is folded into the total cost of that particular task. In both cases, the assistance is offered free of

charge to the community.

POTENTIAL FUNDING SOURCE(s):

Funding is available to DEM through the FEMA CAP program (75% federal, 25% state).

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Flood Hazard Management Program
(617) 727-3267

ACTION PLAN #14

MANAGING LOCAL LAND USE AND GROWTH

The preceding list of recommended actions clearly suggest that many beneficial uses of Massachusetts Bays are threatened by population growth and the appurtenant development of rural or agricultural land in the Bays' watershed. In order to protect the Commonwealth's coastal heritage, communities in the Bays' watershed must take action to manage local land use and growth.

The lure of the sea has attracted many residents to the coast. Approximately 3.8 million people now live in the Massachusetts Bay drainage basin, and the number is growing. A disproportionate amount of this growth is occurring in coastal communities. Between 1970 and 1990, population on the Upper North Shore grew by 20 percent, and population on the South Shore increased 57 percent. Residential development on Cape Cod has been particularly rampant -- in that same 20 year period, the Cape's population nearly doubled -- from 69,000 to 134,000. The number of permanent residents in the town of Brewster almost quadrupled. In all, the amount of land in residential use in the Massachusetts Bays drainage basin increased by more than 20 percent.

Population growth exacerbates a wide array of environmental problems, but perhaps nowhere more so than in the coastal zone. Residential development impacts the Bays in a number of ways. Impervious surfaces such as roofs, roads, and driveways increase the volume, velocity, and quality of stormwater runoff. More people produce more sewage, which in turn strains sewage treatment plants and contributes to septic system pollution. And greater populations put increased pressure on fragile coastal habitat and recreational resources. These human impacts are especially destructive in small embayments and other localized areas subject to intense human activity.

Without effective growth management and land use planning, regulations and pollution control technologies are likely to be of limited value. Responsible land use planning is predicated on the government's broad power to protect and enhance the health, safety, and welfare of the public.

Traditionally, land use planning and decision making have been the domain of municipal government. Communities have available a number of regulatory and nonregulatory tools with which they can protect coastal resources from the pressures of growth and development. These include but are not limited to:

- *Zoning bylaws and ordinances:* Massachusetts General Laws Chapter 40A (Zoning Act) defines the limit of a municipality's power to establish zoning districts. In order to reap full benefits from zoning ordinances, a community needs to determine its capacity to absorb future residential and commercial development. When used in conjunction with a carrying-capacity/buildout analysis, zoning can greatly enhance water quality protection.

- *Subdivision control:* unlike zoning bylaws, which focus on land use, the Commonwealth's subdivision regulations (Massachusetts General Laws Chapter 41) address engineering concerns associated with new development, such as street specifications, utility placement, and traffic patterns. Protecting water quality through subdivision regulations is therefore more limited than through zoning bylaws. There are, however, a few channels which should not be overlooked. For example, Planning Boards can adopt regulations which mandate on-site stormwater management or which restrict the application of lawn fertilizers. Similarly, local Boards of Health have the authority (under Section 81-U of the Subdivision Control Law) to negate subdivision plans that pose a significant risk to public health.

- *Buffers and water protection districts:* undeveloped land is generally more permeable and can accommodate stormwater more readily than developed land. To promote percolation and natural filtration of stormwater, communities may mandate a vegetated upland buffer adjacent to surface waters such as streams and ponds. Similarly, they may adopt an ordinance or bylaw which restricts potentially harmful activities near a waterway or wetland.

- *Performance standards:* if a certain resource area can absorb some contaminants without experiencing unacceptable levels of deterioration, a community may decide to limit pollutant loadings to that critical level. Performance standards allow individual development projects to contribute *some* pollutant loadings while ensuring that the cumulative loadings from the surrounding drainage area do not exceed the area's carrying capacity.

- *Cluster design:* the pattern of residential development in the Massachusetts Bays region is in some ways as troubling as its growth. Developers are consistently avoiding established urban centers in favor of rural or agricultural land, resulting in suburban sprawl that is more difficult to mitigate. Cluster design, an alternative to the standard grid-style development pattern, allows for more open space and larger buffer zones between residences and critical resource areas.

- *Transfer of ownership:* environmentally sensitive land areas are often best protected when they are publicly owned. A community may identify some parcels that are so significant as to warrant outright purchase using municipal funds. In order to accrue tax savings, the landowner may sell the land to the community below market value, or in certain cases, donate the property outright.

- *Tax deferments and easements:* land taxes are generally levied against the market value of a developable land parcel, regardless of the its use. Tax reductions can prompt land owners to reserve their land as open space. A land owner may also sell or donate an easement which restricts the owner's right to develop the land.

The following action provides the basis for a community to better manage its growth and sensitive environmental resources.

MUNICIPAL ACTION #14.1:

Municipalities should develop and implement *Local Comprehensive Plans* (LCPS) which: 1) direct development into areas in the community capable of absorbing the impacts of growth and its associated facilities; and 2) preserve and protect the community's important natural resources.

RATIONALE:

For years, the pattern and pace of development in many communities has been driven more by "market" conditions than by well-conceived plans for growth. Too often, local zoning regulations serve as blueprints for development that does not sufficiently recognize environmental sensitivities and constraints. Such development has resulted in the loss and fragmentation of valuable open space and wildlife habitat, and the pollution of coastal and inland waters. It also has destroyed irreplaceable scenic vistas and blocked public access to important waterfront areas. Further development can be expected to occur in an insensitive, ad hoc fashion unless well-conceived, coherent *Local Comprehensive Plans* are developed and implemented within the Bays' communities.

RESPONSIBLE AGENT(s):

A Local Planning Committee, under the direction of the Planning Board, would generally be responsible for this action. This committee should include representatives from a variety of local boards (e.g., Selectmen, Health, Conservation), as well as from the business community and general public. Planning assistance is available from the Regional Planning Agencies.

IMPLEMENTATION STRATEGY:

Local comprehensive planning should be an open, interactive process that invites the participation and input of diverse sectors of the community. The Cape Cod Commission has developed guidelines (*Local Comprehensive Plan Guidelines*, February 1993) to help Cape communities through this process, and other Massachusetts Bays communities can use these guidelines as a model in developing their own *Local Comprehensive Plans*. The guidelines prescribe a straightforward planning process, as follows:

Designate a Local Planning Committee
↓
Assess Available Planning Resources
↓
Outline the Planning Process
↓
Formulate a Work Program
↓
Prepare a Citizen Participation Program
↓
Develop a Community Vision and Goals
↓
Coordinate with Neighboring Communities
↓
Draft the *Local Comprehensive Plan* (LCP)
↓
Hold Public Hearings
↓
Complete and Adopt the final LCP
↓
Implement the *Local Comprehensive Plan* (ongoing)

At a minimum, *LCPs* should address each of the following subject areas: land use/growth management; natural resources (water resources, coastal resources, wetlands, plant and wildlife habitat); economic development; community facilities and services (transportation, solid and hazardous waste management, capital facilities/infrastructure, energy); affordable housing; open space and recreation; and historic preservation/community character.

Other local plans, such as Municipal Harbor Plans certified by CZM (see Action Plan #12.1) and Open Space Plans certified by the EOEA Division of Conservation Services (see Action Plan #3.1), should not be duplicative of the LPC, but, rather, should be a component of, and complement, the *Local Comprehensive Plan*.

LEGISLATION REQUIRED:

Once produced, a *Local Comprehensive Plan* is adopted by a vote of town meeting or other local legislative body. In the case of Cape Cod, the *LCP* must also be submitted to the Cape Cod Commission for certification of its consistency with the Regional Policy Plan. Implementation of the *LCP* may require a number of local regulatory changes, including amendments to the zoning bylaw, and adoption of new or revised land use regulations, performance standards, and

building codes.

ESTIMATED COST:

$50,000 - 200,000+. The cost of developing a *Local Comprehensive Plan* can vary widely, depending on the complexity of local growth patterns and development issues, and the availability of professional staff and qualified volunteers to perform the work.

POTENTIAL FUNDING SOURCE(s):

Funding and technical assistance for Cape Cod communities are available from the Cape Cod Commission. At present, the other Regional Planning Agencies are not able to provide funds to their member communities, but can offer limited technical assistance. A bill currently before the Legislature (the Growing Smart Bill), would provide state funding for Local Comprehensive Plans.

TARGET DATE:

1996 - 2001. A *Local Comprehensive Plan* is the cornerstone of a community's overall planning and development initiatives. It is an expression of the community's vision of its future and a guide to making the many public and private decisions that shape that future. Its development is a significant undertaking that may take several years or more to complete. Accordingly, communities should begin the local comprehensive planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
NRCS Community Assistance Unit
(508) 295-1481
Your County Conservation District

ACTION PLAN #15

ENHANCING PUBLIC EDUCATION AND PARTICIPATION

15A. EDUCATING TEACHERS, STUDENTS, AND THE PUBLIC ABOUT THE BAYS

The word "education" means different things to different people. What follows is a brief definition to help clarify what the word means in a particular context.

FORMAL EDUCATION is education that is highly organized and usually certified by government authority. Traditionally, it is divided by grade: kindergarten through grade 12. In the past, these grades have been subdivided into elementary and secondary, with secondary beginning at the 7th grade. More recently, three categories are recognized:

Primary school: kindergarten through grade 4
Middle school: grades 5 through 8
High school: grades 9 through 12.

"Pre-K" refers to schooling prior to kindergarten; i.e., nursery school and day care. "Post-secondary" refers to college and graduate school, and is also considered "formal."

NON-FORMAL EDUCATION refers to educational services usually provided by non-profit organizations such as museums, libraries, aquariums, galleries, private sites of significance, and government agencies (e.g., national and state parks, historical sites, wildlife refuges, monuments). These kinds of organizations frequently provide on-site programs for school groups and the general public. Many are involved in curriculum development and workshops for teachers.

There are also non-formal educational resources lying in a vast, ill-defined area offered by the media: newspapers, books, magazines, radio, and television. This is the main source of education for the general public. Further, there are "adult education" courses offered as non-credit courses by schools, colleges, and universities (e.g., Elderhostel and extension services).

Most people regard the concept of education from a "formal" point of view; but, in fact, most knowledge is imparted through the non-formal route, and this is particularly true of matters concerning environmental science and environmental issues. Environmental education, as such, has only recently entered the curriculum of public schools where motivated teachers have taken advantage of its integrating benefits. At the same time, there are encouraging efforts being made by the Executive Office of Environmental Affairs (EOEA) and the Department of Education (DOE) in clarifying the "Benchmarks of Environmental Literacy" presented by the Secretary's Advisory Group on Environmental Education (SAGEE). The Massachusetts Bays Program supports these state initiatives and encourages the introduction of the philosophy of the MBP into the classroom.

Meanwhile, the non-formal sector has been quick to recognize this unfilled niche and has developed some excellent programs for the public. While the non-formal sector will continue to provide focused educational programming, mechanisms must be provided to the public school systems to develop and enhance the role of environmental education during the brief period that children spend in a formal school setting. This is particularly true if the general population is to be expected to grasp the holistic, ecosystem-level concepts necessary to understand complicated Massachusetts Bays issues.

The action plans of the CCMP, therefore, require educational efforts "aimed at developing a citizenry that is aware of and concerned about the total environment and its associated problems and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward the solution of current problems, as well as the prevention of new ones" (*On the Way To Environmental Literacy:Report of the Benchmarks for Environmental Literacy Project of the Secretary's Advisory Group on Environmental Education*).

In each of the Action Plans presented previously, there is a significant role for a public education/information strategy. However, the specifics of such a strategy will depend upon the particular location of the actions to be taken, the resources available, the education level of the population involved, the extent of on-going efforts, and the commitment of the public. A specificity based on so many variables is obviously beyond the scope of this document, particularly since, in some cases, there are excellent efforts already in place.

Nevertheless, the Massachusetts Bays Education Alliance (MBEA) has developed a series of educational action plan

strategies, articulated below, which emphasize: 1) information that is easy to understand and can be applied to local situations; 2) individual responsibility for pollution of Massachusetts Bays watersheds and waterways; and 3) actions each person can take to minimize and control contaminants from reaching surface and groundwaters. Preventive methods include: developing and distributing relevant education materials; workshops for public officials, organizations, and educators; storm drain stenciling projects; and proper disposal of hazardous materials. Citizens should know what to look for with respect to polluted water and how to report water not meeting standards for its designated use. Toward this end, volunteer citizen groups should be educated and trained to monitor waterways and report data to authorities who can verify the data and set appropriate preventive and remedial actions in motion.

MBEA has developed the following recommendations and strategies, matched to the Action Plan categories previously covered. They fall under the general themes of protecting and enhancing natural resources, reducing or preventing pollution, managing wastes and human activities, and planning for shifting shorelines.

Protecting and Enhancing Shellfish Resources: Before citizens can take action to protect a vital resource, they must first know the resource exists and is important to the community. Each year local papers could publish a listing of shellfish resources and their yearly economic value to the community and region, along with potential pollution threats that might close shellfish areas and what is being done to keep these areas open. An education booklet might be given out with shellfish permits, placed in fish markets, and used in classrooms. This booklet could describe basic concepts related to shellfish biology, requirements for water quality and how it is tested, how individual actions and community decisions create potential pollution that leads to closures, and what actions are needed to re-open closed shellfish beds and keep them open.

Protecting and Enhancing Coastal Habitat: An inventory of coastal habitats with local photographs would help local Conservation Commissions educate community residents in the value of local habitats. A sense of pride in keeping these habitats healthy needs to be nurtured. Workshops and field trips on the biology and economic value of these habitats would prepare citizens for involvement in the planning, development, and implementation of bylaws and other measures for protecting water resources. The use of student monitoring studies, with reports to the community, would heighten student understanding of the need and mechanisms for protecting coastal habitats. For example, local fish runs could be a focus for research, monitoring, and planning for protection and maintenance.

Reducing and Preventing Stormwater Pollution: Educating citizens about the different sources, types, and effects of pollutants that enter and travel through storm drains to waterways can lead to changes in personal practices. For example, storm drain stencilling can alert people to the consequences of improper disposal of waste products, such as litter and used motor oil.

Reducing and Preventing Toxic Pollution: In addition to education, media strategies can help citizens and businesses understand and develop practices to reduce, reuse, substitute, store, and properly dispose of toxic wastes. The development and use of incentives, such as positive publicity for businesses and awards to schools or students who carry out successful projects, would magnify and multiply these efforts.

Reducing and Preventing Oil Pollution: Proper disposal of used oil offers economic and ecological benefits to the taxpayer. Outreach educators and media specialists can develop strategies to address the consequences of "what goes into the ground will probably enter the drinking water supplies or aquatic habitats." Community leaders and environmental advocates can provide citizens with mechanisms to elicit widespread support for community oil collection and monitoring programs.

Managing Municipal Wastewater: Education strategies are needed to increase citizen understanding of aquifers and groundwater, and how these may be affected by on-site sewage disposal systems. The value of the recent upgrading of Title 5 regulations, both to the individual and to a community's water resources, needs to be communicated. In turn, property owners with septic systems should receive information to enable them to maintain their systems properly and to practice household waste prevention. Everyone needs education on the understanding of, and need for, alternative technologies as viable options to replace or upgrade failing or substandard on-site systems.

With respect to centralized sewage treatment facilities, existing curricula and outreach materials are available that describe the character of specific pollutant threats, explain the responses that have been written into the environmental regulations, and encourage citizen involvement in, and support for, enforcement of discharge permits. Engineers and scientists from local wastewater treatment plants should be encouraged to cooperate with citizen groups and schools to provide access to the plants and engage the public in water testing projects.

Managing Boat Wastes and Marina Pollution: The MBP and CZM should continue to distribute timely materials that give the boater clear instructions on how to properly dispose of boat wastes. Power squadron courses, marinas, boat license mailings, and public service announcements can be the vehicles for disseminating this information. As a means of promoting public awareness, the volume of properly collected pump-out effluent that contributes to shellfish bed openings could be widely broadcast.

Managing Dredging and Dredged Materials Disposal: CZM should continue to provide print materials to the public, media, Local Governance Committees, and educators on the purpose, importance, and need for conducting and monitoring dredging activity.

Reducing Beach Debris and Marine Floatables: Everyone who lives within the Massachusetts Bays watershed can help reduce shoreline debris and marine floatables. Public participation programs and outreach materials coordinated by CZM through the annual statewide "CoastSweep" campaign, "Sponsor-a-Beach" programs by local schools or youth groups, municipal recycling projects, and recycling bins strategically placed on waterfronts all can contribute to ongoing beach clean-ups.

Managing Nitrogen-Sensitive Embayments: Public education programs can address the importance of the nitrogen cycle to all life, and what happens when that cycle becomes out-of-balance. The consequences of nitrogen-enrichment are particularly apparent in shallow embayments. Individual actions that contribute to this imbalance need to be understood. Proper household and business practices, as well as the use of alternative technologies, can help limit nitrogen inputs to the Bays. Organizations and educational institutions can work collaboratively to promote creative land-use planning, and to support local bylaws which protect water quality.

Enhancing Public Access and the Working Waterfront: The right of public and commercial access to a common resource where the impacts are controlled can be important to the economy of an area. It also builds appreciation that leads to the protection of a natural resource. Hence, an initiative is underway by CZM and DEM to complete a set of public access guides (*The Massachusetts COAST GUIDE*) to facilitate use and enjoyment of the coast. In addition, improved access to the intertidal zone from Provincetown to Salisbury, MA is being pursued through the Sea Path Program at DEM. Environmental educators and organizations, including the Massachusetts Bays Education Alliance, can use these initiatives to help provide meaningful outdoor experiences to students.

Planning for a Shifting Shoreline: This issue has been neglected at all educational levels due to a lack of consensus on: 1) the scientific explanations for the causes of coastal processes leading to erosion and accretion, and 2) how best to address the rights of those directly affected. The public needs to be better informed about the scientific aspects of erosion, sedimentation, and sea level change, as well as the impacts of engineered solutions versus letting nature "take its course." Enhanced public education could improve community and state responses to storm events, influence community long range planning strategies and the issuance of building permits, and heighten the public's understanding of the 100-year flood zone and related flood insurance rate maps and premiums.

Managing Local Land Use and Growth: Education programs can be developed that increase the public's understanding of local bylaws and regulations which serve the common good by promoting the economic and ecological sustainability of our rich and diverse Massachusetts Bays resources.

Following are some generalized statements of environmental literacy developed by the Massachusetts Bays Education Alliance. They apply to both the previous recommendations and strategies, as well as to the education action plans relating to the Massachusetts Bays.

- People should understand the role of the Massachusetts Bays in the economy and in the environmental health of the individual, the municipality, the watershed and region, the state, and New England.
- People should have a basic understanding of the hydrology of watershed systems, particularly the role of surface water and groundwater inputs to the Bays.
- People should understand that water and wastewater treatment procedures are costlier than preventing contaminants from entering the surface and groundwaters in the first place.
- People should understand that a sustainable ecological and economic environment can be achieved if human activities and land use practices are properly balanced with the needs of natural systems.
- People can best have a positive effect on the Bays environment by thinking globally and acting locally.
- People should understand the premise of the 2nd Law of Thermodynamics, wherein all systems tend toward disorganization and eventual collapse unless energy is invested to keep them functioning.
- People should understand what is meant by "pollution", what its effects are, and what actions individuals can take to enhance the effectiveness of a particular counteraction.
- People should understand and be capable of using the political process for the solution of environmental problems.
- People should understand the concepts of compromise in the political process with respect to "best management practices."
- People should be cognizant of the kinds of grass-roots organizations through which their interest and input can affect decision-making.

The following Action Plans developed by the Massachusetts Bays Education Alliance are an important first step toward educating the Bays' many citizens - teachers, students, and general public - about the Bays' resources and their own role in protecting them.

DOE ACTION #15A.1:

The Department of Education, in collaboration with the Executive Office of Environmental Affairs, should continue to develop and integrate environmental education as an important component of the curriculum in the public schools of the Commonwealth, making broad use of the Benchmarks for Environmental Education developed by the Secretaries' Advisory Group on Environmental Education (SAGEE).

RATIONALE:

The development and integration of environmental education into the schools would benefit from coordinated direction and leadership that recognizes the importance of environmental literacy to the Commonwealth.

RESPONSIBLE AGENT(s):

Massachusetts Department of Education

IMPLEMENTATION STRATEGY:

Provide resources, workshops, conferences, fact sheets, events, and media opportunities to facilitate the environmental education process for administrators and teachers.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$100,000

POTENTIAL FUNDING SOURCE(s):

Massachusetts Department of Education

TARGET DATE:

1996/1997 to develop program; program integration and implementation ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Education Coordinator
(617) 727-9800, x218
MBEA Coordinator
c/o 1-800-447-BAYS

EOEA ACTION #15A.2:

The Executive Office of Environmental Affairs should continue to work closely with the Department of Education through the Secretaries' Advisory Group on Environmental Education (SAGEE) in order to develop a strategy for the implementation of the "Benchmarks for Environmental Education". Further, EOEA should continue to place a priority on the role of environmental education and provide adequate staffing to insure that appropriate state leadership is maintained.

RATIONALE:

There needs to be a stong voice in the executive branch that can provide the leadership necessary to focus the already-present governmental resources on the role of environmental education on resource sustainability. The Benchmarks for Environmental Education would provide guidance for teaching resource protection and enhancement, pollution reduction, and watershed planning and management. This will provide a framework for using the CCMP Educator's Resource Guide, MBP research, and fact sheets in environmental stewardship in both formal and non-formal education settings.

RESPONSIBLE AGENT(s):

EOEA would be responsible for this action.

IMPLEMENTATION STRATEGY:

- Integrate the Benchmarks for Environmental Education into the CCMP resource materials, and materials provided by non-profit and non-government organizations, and government agencies;
- Integrate into formal and non-formal education the use of the CCMP Educator's Resource Guide, MBP print materials, and MBP/EOEA stewardship projects and programs such as: Shoreline Surveys, CoastSweep, water quality monitoring, storm drain stencilling, toxics use reduction and solid waste recycling programs, and SeaPath support; and
- Coordinate and promote watershed and Bays stewardship through regional workshops, conferences, events, media, and policy and regulatory enforcement.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Staff time for workshops, events, and material production; and the cost of materials.

POTENTIAL FUNDING SOURCE(s):

EOEA annual operating budget.

TARGET DATE:

1996 to develop strategy.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Education Coordinator
(617) 727-9800, x218
MBEA Coordinator
c/o 1-800-447-BAYS

EOEA ACTION #15A.3:

The Executive Office of Environmental Affairs, in cooperation with the Department of Education, should continue to develop a grant relationship with the National Science Foundation and other funding agencies in order to provide technological outreach aimed at enhancing environmental literacy. The goal is to make resource and curriculum materials widely accessible and to provide ongoing coordination among the various members of the education community. The Massachusetts Bays Program represents an important aspect of the total environmental picture and should play a key role in this effort, helping to establish a unified voice to speak for environmental education concerning the Bays region.

RATIONALE:

Coordinated efforts on behalf of environmental education are needed to strengthen the amount and quality of projects, materials, and activities available across the Massachusetts Bays region and the Commonwealth.

RESPONSIBLE AGENT(s):

EOEA , MBP, and UMass Extension would share responsibility for this action.

IMPLEMENTATION STRATEGY:

- Train teachers and educators how to access information on the Bays and their watersheds and how to communicate this information to students and the public; and
- Staff a position to keep Bays-related information current and accessible.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

$45,000/year.

POTENTIAL FUNDING SOURCE(s):

UMass Extension; National Science Foundation.

TARGET DATE:

1996

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Education Coordinator
(617) 727-9800, x218
MBEA Coordinator
c/o 1-800-447-BAYS

EOEA/DOE ACTION #15A.4:

EOEA and DOE should empower exemplary teachers, administrators, and/or schools, who demonstrate the competence, to carry out formal and non-formal environmental education initiatives that complement the Commonwealth's environmental education programs.

RATIONALE:

School workers in the environmental "trenches" need to be recognized and rewarded for their contributions to environmental education.

RESPONSIBLE AGENT(s):

EOEA and DOE would be responsible for this action.

IMPLEMENTATION STRATEGY:

- Continue the nomination process and the Secretariats' award ceremony during Earth Week/Month; and
- Provide local press opportunities for each award.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

To be determined.

POTENTIAL FUNDING SOURCE(s):

EOEA and DOE operating budgets.

TARGET DATE:

1996 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Education Coordinator
(617) 727-9800, x218
MBEA Coordinator
c/o 1-800-447-BAYS

MBEA ACTION #15A.5:

The Massachusetts Bays Education Alliance should continue and expand its current efforts to build a community of educators who can ably teach about and promote the protection of the Massachusetts Bays, their shores, and watersheds.

The Massachusetts Bays Education Alliance (MBEA) was formed in 1993 to help create a community of educators who can teach students and the public about the Massachusetts Bays, their shores, and watersheds, and how to responsibly use and protect these valuable resources.

The following policies agreed to by the MBEA steering committee can serve as actions to be accomplished under the aegis of the CCMP:

1. The Alliance should continue to encourage teachers and their schools to make use of their local watersheds, shores, and bays as teaching resources, guided by the CCMP and its Action Plans;

2. The Alliance should continue to focus its efforts on the educators of the region by promoting marine, coastal, and freshwater education;

3. The Alliance should continue to encourage innovative teaching based on the latest research as it relates to the Massachusetts Bays;

4. The Alliance should continue to facilitate the use of watersheds, shores, and bays by establishing working connections among the schools and appropriate local organizations, agencies, and municipal departments;

5. The Alliance should continue to promote the sharing of resource materials from the myriad of watershed, shores, and bays education sources that permeate the region but which are frequently difficult to locate and access;

6. The Alliance should continue to seek to achieve the goals of its mission statement in a coherent fashion and on a sustainable, cost-effective basis across the region of 161 cities and towns that comprise the watersheds of the Massachusetts and Cape Cod Bays; and

7. The Alliance should continue to support the State's educational reform by: 1) serving as a catalyst for school intervention strategies that integrate new education initiatives (e.g., PALMS Program) with a watershed, shores, and Bays-based education focus; 2) facilitating the use of Massachusetts Bays watershed concepts at a functional or operational level; and 3) encouraging the establishment of a full-time Environmental Education Coordinator position within the Department of Education to coordinate formal environmental education efforts.

Toward this end, the Massachusetts Bays Education Alliance is producing a resource guide that will include inter-disciplinary activities illustrating information from the CCMP. It will be written to the middle school level (grades 5-9), with suggestions for high school activities as well. Along with activities, it will feature a listing of MBP Action Grants and research materials, recommended curricula developed by host institutions, and helpful references and other resources characterizing the Bays' watersheds.

The Education Alliance also will contribute to the formation of partnerships among organizations and institutions with shared environmental education interests, such as the one established with U./Massachusetts Extension, Natural Resources and Environmental Conservation Program, and those recently formed with U./Massachusetts (Boston) - Urban Harbors Institute, Graduate School of Education, Institute for Learning and Teaching, and the Harbor Explorations Institute.

CAN ACTION #15A.6:

The Coastal Advocacy Network should continue to serve as a vehicle for bringing information to and from the government on environmental issues affecting the Bays, with a particular emphasis on proposed projects or regulatory changes.

The Coastal Advocacy Network presently serves as the primary vehicle for bringing information to and from all levels of government on various environmental issues, with a particular emphasis on proposed projects or regulatory changes. The Network's educational approach is open-forum and informal, serving to educate both citizens and government on priority, and relatively immediate, issues and actions affecting the environment.

The Coastal Advocacy Network was formed in 1993 in response to the Massachusetts Bays Program's need to bring citizen input into the development of the CCMP. The Network meets monthly to discuss priority issues, many of which have been brought to the MBP Management Committee for discussion and possible inclusion in the CCMP. The so-called "megaprojects", for example, were developed with the input of the Network through group meetings and focus group sessions, and consensus was reached among interested parties as to the language and action recommendations. The Network will continue to serve as a vehicle for information exchange among the citizenry and the government.

The Network's mission is as follows:

"Recognizing the Bays as an interconnected ecosystem that is shared and affected by the communities that surround it, the Coastal Advocacy Network is dedicated to the protection, restoration and celebration of the marine and coastal resources of Massachusetts and Cape Cod Bays. Consisting of local or regional environmental advocacy and educational non-governmental organizations from the communities surrounding the Bays, Network members are committed to improving the understanding and management of Massachusetts Bays and its constituent ecosystems. The Network has been formed in order to allow an exchange of information and ideas among members, to facilitate the identification and advocacy of issues and priorities that are shared by all members, and to develop common ground relative to potentially divisive policy disputes. The Network operates through a consensus process and is affiliated with the Massachusetts Bays Program, a local, state, and federal effort, under the National Estuary Program, focusing research, planning, and education efforts on protection and enhancement of Massachusetts and Cape Cod Bays."

BUG ACTION #15A.7:

The Massachusetts Bays Business and Users Group (BUG) should continue to provide a public forum for the exchange of information and ideas on CCMP development and implementation among the Bays' business community and resource users.

As its name implies, the Business and Users Group (BUG) includes representatives of the Bays' diverse business community (e.g., corporations, consulting firms, trade associations) and resource users, such as the New England Aquarium Divers' Club. Since its establishment early in the Massachusetts Bays Program, the BUG has been an active participant in the development of the CCMP, providing regular input on many of the action recommendations contained in the Plan. The technical expertise contributed by its business members in such areas as hazardous materials management (in particular, waste minimization and recycling), and the use of public/private partnerships have helped to shape various CCMP actions relating to toxic pollution prevention and control, oil pollution prevention and control, and stormwater runoff management. At the same time, BUG's resource user representatives have been strong advocates for improved public access to the coast, and have supported various CCMP initiatives, such as the Coastal Access Guide, that will enhance the public's use and enjoyment of the Bays' bountiful land and water resources (see Action Plan for Enhancing Public Access and the Working Waterfront).

As the Massachusetts Bays Program moves from the planning phase into implementation, it will be important for BUG representatives to continue to meet and to provide their input on the broad range of actions recommended in the CCMP. Many of the complex water quality and habitat problems articulated in the CCMP call for creative solutions and the active participation and collective talent of all sectors of the community, not just government. The meetings of the BUG offer an excellent public forum for exploring and formulating new and creative environmental management strategies, and for facilitating the kinds of public/private partnerships that will be needed to implement those strategies.

MARINE STUDIES CONSORTIUM ACTION #15A.8:

The Marine Studies Consortium should continue to offer undergraduate marine science and policy courses; and, through the bi-annual Massachusetts Marine Environment Symposium, bring together diverse marine interests to promote better understanding of marine policy issues.

The Marine Studies Consortium is a non-profit association of seventeen colleges, universities, museums, and marine research institutions whose mission is to educate students and the public about environmental, political, and social issues which impact the coastal waters of Massachusetts.

The Consortium promotes a science-based approach to environmental decision-making through a wide array of programs, including an undergraduate curriculum in marine science and policy, local community forums, the bi-annual Massachusetts Marine Environment Symposium, and participation in the development of and revisions to the Commonwealth's water policies.

ACTION PLAN #15

ENHANCING PUBLIC EDUCATION AND PARTICIPATION

15B. DEVELOPING A STATE NONPOINT SOURCE EDUCATION AND OUTREACH STRATEGY

Nonpoint source pollution (NPS) occurs when rainwater and snowmelt run over farm fields, city streets, timber lands, lawns, and other surfaces. Contaminants, such as soil sediments, nutrients from fertilizers and sewage, and chemicals from pesticide use and other sources, are picked up as the water runs over the ground and through the soil. The contaminated rainwater and snowmelt ultimately flow directly into a surface waterbody (such as the ocean, a river, or a lake), or they seep into groundwater or enter a drainage system, which eventually carries the contaminants to a surface waterbody.

When all of these individual pollutant inputs are taken together, the impacts on coastal waters are staggering. Many national studies identify NPS pollution as the largest single factor contributing to coastal water pollution. In addition, unlike point source pollution from industrial pipe discharges and other direct sources, the sources of NPS pollution are extremely diverse and widespread.

In the past, the NPS pollution resulting from human activities and natural processes (such as erosion and plant and animal decay) was not significant enough to impair the ability of aquatic ecosystems to handle these contaminants. As human activities have increased, however, the quantity and diversity of NPS pollutants entering waterbodies have also increased. Today, in many areas, the levels of NPS pollution have adversely affected the health and productivity of coastal ecosystems. In addition, NPS pollution can prevent these waterbodies from meeting water quality standards. Continual NPS pollution can alter the quality of wildlife habitats, which, in turn, can reduce species diversity.

NPS pollution affects coastal waters when contaminated rain water and snow melt run directly into the ocean or into other coastal waters, such as estuaries and salt marshes. Even rain and snow that fall many miles inland, however, can impact coastal waters by carrying NPS pollutants to rivers that ultimately run to the sea. Consequently, all activities in coastal watersheds (the geographic areas from which water drains into coastal waterbodies) can cause coastal NPS pollution problems. Coastal waters, therefore, are affected by the activities conducted within a very large land area. In Massachusetts, the coastal watershed includes just over half of the state.

One of the most costly results of coastal NPS pollution in Massachusetts is shellfish bed closings. More than 90,000 acres are currently closed. Over the past fifteen years, shellfish bed closings have increased dramatically, and many of these closings appear to be the direct result of NPS pollution from sources such as septic systems, as well as from domestic and farm animals. Because they are filter feeders, shellfish are very sensitive to water pollution. As they feed, they filter contaminants, as well as bacteria and viruses, out of the water and often store these substances in their body tissue. Consequently, shellfish that are contaminated with bacteria from human and animal wastes pose a serious threat to human health. If the bacterial count in coastal waters reaches a certain level (14 colonies per milliliter of water), shellfish beds must be closed, preventing people from harvesting the resource.

In addition, Massachusetts Bays Program research estimates that more than half of the oil and grease that enters the Bays is from nonpoint sources of pollution.

Clearly, the magnitude of the NPS pollution problem underscores the need for effective solutions. This ubiquitous pollution problem also suggests that the permit and compliance-oriented strategies used with point sources of pollution will be inadequate when addressing NPS issues. An effective education and information campaign that draws upon lessons learned through the Massachusetts Bays Program will be necessary to raise awareness of the NPS pollution problem and to empower communities, businesses, and individuals to take the necessary actions to reduce storm-water runoff and other types of NPS pollution.

In recognition of this need, the Coastal Nonpoint Pollution Control Program (s.6217), directed by the Massachusetts Coastal Zone Management office (MCZM) with the assistance of the Massachusetts Department of Environmental Protection (DEP), is aggressively pursuing outreach and technical assistance efforts on NPS issues throughout the Bays' watersheds. The outreach component of this approach focuses on raising awareness of NPS issues and educating the public about the seriousness of the problem

and available solutions. MCZM staff produce factsheets, brochures, newsletter articles, and other materials to spread this message. The purpose of the technical assistance component is to provide guidance and assistance to local governments, other state agencies, businesses, and individuals to assist them with the implementation of NPS controls, practices, and strategies. This assistance includes direct support in developing ordinances and regulations, technical guidance, training, financial incentives, demonstration projects, and other innovations to protect coastal water quality. MCZM also coordinates with a variety of other state agencies to ensure that education, information, and technical assistance needs on specific issues are met in the coastal communities.

DEP's Office of Watershed Management (OWM) is also involved with NPS outreach and technical assistance efforts statewide. OWM is responsible for implementing the state's Basin Approach to watershed management. DEP has divided the state into 27 major watersheds and basins, and assigned several technical staff people to serve as Basin Teams for each of these areas. DEP also has divided these basins into five separate groups. Each year, DEP works with the cities and towns within one of these groups to develop consistent and coordinated permitting strategies on point source and NPS pollution issues. Because the permits are effective for five years, this creates a continual cycle whereby every five years DEP returns to review and update all permits within each watershed.

OWM also employs a full-time outreach coordinator and technical assistance expert for the Basin Approach whose sole responsibilities are to inform communities and the public about the Basin Approach and to provide needed technical assistance to implement strategies. The Basin Teams also provide extensive technical assistance.

A wide variety of other state agencies also are involved with NPS outreach and technical assistance on specific topics. These agencies include:

- The Executive Office of Environmental Affairs (EOEA), which coordinates the Watershed Initiative and implements activities in the Neponset River Watershed, a model for other river basins throughout the state.

- The Department of Fisheries, Wildlife and Environmental Law Enforcement's Riverways Program, which focuses on NPS issues that relate to the state's rivers.

- The Department of Food and Agriculture, which looks at pesticides, soil erosion, fertilizers, and other NPS issues related to agriculture.

- The Department of Environmental Management, which focuses on forestry and other land use issues.

- The Metropolitan District Commission's Division of Watershed Protection, which concentrates its efforts on the Quabbin Reservoir and the Boston area.

- The Massachusetts Highway Department, which is involved with NPS pollution control from roads, bridges, and highways.

- The Massachusetts Bays Program, which provides education, information, and technical assistance on NPS issues to the 49 coastal communities along Massachusetts and Cape Cod Bays, and promotes the implementation of NPS pollution controls through its Comprehensive Conservation and Management Plan (CCMP).

- The Buzzards Bay Project, which also provides education, information, and technical assistance on NPS issues and promotes the implementation of NPS pollution controls through its CCMP for Buzzards Bay.

All of these agencies serve on the state's Nonpoint Source Outreach Coordination Committee. Other federal, local, and non-governmental members of the Committee include:

- University of Massachusetts Extension

- Massachusetts Water Watch Partnership

- U.S. Department of Agriculture, Natural Resource Conservation Service

- Metropolitan Area Planning Council

- Massachusetts Audubon Society

- Coalition for Buzzards Bay

The purpose of the Committee is to develop mechanisms to improve coordination among the agencies and organizations with major roles in NPS outreach and technical assistance and to identify and capitalize on opportunities for collaboration. The Committee is chaired by personnel from EOEA's Division of Conservation Services, State Commission for Conservation of Soil, Water and Related Resources.

Clearly, the Commonwealth of Massachusetts is positioned to provide extensive education and technical assistance on a variety of NPS pollution issues. The challenge for the state is to focus its energies on priority issues and to coordinate its efforts to provide adequate coverage, both by topic area and geography.

The following actions offer the means for meeting this challenge.

EOEA ACTION #15B.1:

The Executive Office of Environmental Affairs should develop and maintain a clearinghouse of NPS education, information, and technical assistance materials, as well as a database of available state NPS materials and programs.

RATIONALE:

A number of state agencies produce education, information, and technical assistance materials and/or offer programs on NPS pollution issues. In addition, numerous federal, local, and non-governmental groups also have NPS information and programs. Currently, however, no central repository for this information exists. Individuals looking for materials and programs on NPS issues must call each agency/organization individually, a task that is both time consuming and difficult because the appropriate contacts are often not easily identified.

An NPS clearinghouse/database would provide the following benefits:

- Copies of these materials would be available in a single location, improving research opportunities;
- Individuals would only have to contact one place to determine what NPS information the state has available; and
- Ultimately, the database could be made available on-line, which would allow broader access.

RESPONSIBLE AGENT(s):

All of the state agencies with NPS information/programs will be responsible for providing publications, other materials, and descriptions of their programs to the project. In addition, major federal, local, and non-governmental groups that opt to participate also will provide this information. The state's Nonpoint Source Outreach Coordination Committee will be responsible for overseeing the effort and will hire an intern to assemble the materials and create the database.

IMPLEMENTATION STRATEGY:

The state's Nonpoint Source Outreach Coordination Committee will conduct two separate surveys of state agencies with NPS responsibilities (and others represented on the Committee). The first survey will obtain information about the publications and other materials available on NPS issues. The second survey will obtain information about the technical assistance and other NPS programs that are maintained. The survey information and copies of publications will be compiled by an intern, hired through the Massachusetts Water Watch Partnership. The intern will then develop the clearinghouse library and database.

The library and database will be updated periodically by the Committee so that information remains current. The Committee also will look into options for marketing the availability of the clearinghouse/database and making it available electronically through Internet access.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The costs of this action will be minimal and will be assumed by the agencies involved.

POTENTIAL FUNDING SOURCE(s):

The Massachusetts Water Watch Partnership and DEP will fund the intern.

TARGET DATE:

1996

FURTHER INFORMATION:

For further information and assistance, contact:

Nonpoint Source Outreach Coordination Committee
The Executive Office of Environmental Affairs
Division of Conservation Services
State Commission for Conservation of Soil, Water and Related Resources
(617) 727-9800, ext. 235

EOEA ACTION #15B.2:

The Executive Office of Environmental Affairs should develop and maintain a matrix, by topic, of NPS education, information, and technical assistance materials produced by state agencies and associated organizations.

RATIONALE:

Although a number of state agencies, as well as federal, local, and non-governmental groups, produce publications and/or offer programs on NPS pollution issues, no tools exist for these organizations to identify gaps in available information or to facilitate opportunities for collaboration. A matrix that lists the available education, information, and technical assistance materials and programs by topic covered would allow the state's Nonpoint Source Outreach Coordination Committee to:

- Identify topic areas that are not covered so that materials could be developed to fill these gaps;
- Determine areas where more than one agency/organization is developing materials or maintaining programs, allowing these agencies/organizations to collaborate in the future; and
- Plan future efforts with an eye toward filling informational gaps and fostering collaboration to improve products/programs.

RESPONSIBLE AGENT(s):

All of the members of the state's Nonpoint Source Outreach Coordination Committee, along with any other groups that opt to participate, will be responsible for providing information to complete the matrix.

IMPLEMENTATION STRATEGY:

The Nonpoint Source Outreach Coordination Committee will establish a subcommittee that will develop the matrix. The subcommittee will design a matrix that will list the agencies and other organizations that are participating and the NPS topic areas covered. The subcommittee will then take the information from the surveys used to develop the NPS clearinghouse/database (see EOEA Action #15B.1) to complete the matrix. The Committee will periodically update the matrix to keep it a current and working planning tool.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The costs of this action will be minimal and will be assumed by the agencies involved.

POTENTIAL FUNDING SOURCE(s):

Not applicable.

TARGET DATE:

1996

FURTHER INFORMATION:

For further information and assistance, contact:

Nonpoint Source Outreach Coordination Committee
The Executive Office of Environmental Affairs
Division of Conservation Services
State Commission for Conservation of Soil, Water and Related Resources
(617) 727-9800, ext. 235

EOEA ACTION #15B.3:

The Executive Office of Environmental Affairs should expand upon Massachusetts Bays Program efforts and develop a strategy for NPS outreach and technical assistance statewide that would coordinate the development and production of NPS education, information, and technical assistance materials, and provide technical assistance in order to implement NPS pollution controls.

RATIONALE:

A strategy for coordination and collaboration of outreach and technical assistance on NPS issues is necessary because of the large number of state agencies and federal, local, and non-governmental organizations involved with these issues. Currently, there is significant overlap in what these organizations are trying to accomplish. Also, because these organizations are faced with time and budget constraints, coordination and collaboration will allow resources to be used more widely and efficiently in order to spread a common message.

The goals of the coordination and collaboration strategy should be to:

- Identify existing information (see EOEA Actions #15B.1 and 15B.2);
- Share agency and organization plans for producing information to identify and capitalize on opportunities for collaboration and to eliminate any redundancy of efforts;
- Ensure that NPS messages from the different state agencies are compatible; and
- Identify other key groups (e.g., federal, local, non-government) and bring them into the NPS outreach coordination process.

Coordination requires a significant effort up front to involve participants in the process and to develop a mutually-beneficial strategy. Since coordination can reduce duplication of effort and improve products and programs, the end result will amply justify the initial investment of time and resources.

RESPONSIBLE AGENT(s):

The state Nonpoint Source Outreach Coordination Committee will establish a subcommittee to develop the coordination and collaboration strategy. The full Committee will review the draft strategy and work to complete the final strategy. All members of the Committee will be responsible for implementing the strategy, and the Committee should expand its membership as more agencies and organizations are brought into the planning process.

IMPLEMENTATION STRATEGY:

The subcommittee will work together to develop a draft strategy to meet the goals listed above. The strategy would outline the necessary steps to ensure coordination and collaboration, along with the responsibilities of the different agencies and organizations involved. The full Committee will then review and comment on the draft strategy and work together to finalize the strategy. The final strategy would be approved by the Secretary of EOEA and implemented by the members of the Nonpoint Source Outreach Coordination Committee and their agencies and organizations.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The costs of this action will be minimal and will be assumed by the agencies involved.

POTENTIAL FUNDING SOURCE(s):

Not applicable.

TARGET DATE:

1996

FURTHER INFORMATION:

For further information and assistance, contact:

Nonpoint Source Outreach Coordination Committee
The Executive Office of Environmental Affairs
Division of Conservation Services
State Commission for Conservation of Soil, Water and Related Resources
(617) 727-9800, ext. 235

CHAPTER VI. IMPLEMENTING THE CCMP THROUGHOUT THE BAYS WATERSHED

Introduction

The Massachusetts Bays area is an estuarine system in transition. Increased development along its shores and in upland watershed areas, coupled with decades of discharging municipal and industrial wastes into its waters, has placed the Bays system in jeopardy. Fortunately, it is not too late to reverse the trend of declining water quality and to restore the Bays. Indeed, there are positive signs that his has already begun to occur in places, most notably Boston Harbor.

The action plans presented in Chapter V articulate a number of recommended steps that must be taken now and in the future to restore and protect the Massachusetts Bays ecosystem. The action plans also identify the organizations that are responsible for taking those steps. These organizations include regulatory and planning agencies at the federal, state, regional, and local levels; legislative bodies; business community representatives; and citizen groups.

For many of the recommendations, these organizations share overlapping responsibility, and close coordination will be required to ensure that the proper actions are taken without duplication of effort or wasting of limited resources. For other recommendations, a single organization can achieve the desired result. For still others, the implementing responsibility may belong to one organization, but another organization may be called upon to provide technical or financial assistance.

In working together to implement the CCMP, it will be important for all participants to view the Bays ecosystem as a *regional* resource to be shared and protected by many Massachusetts cities and towns (in all, 49 coastal communities and 112 inland communities). Achieving the Massachusetts Bays Program's principal goal - *the preservation and management of a healthy ecosystem of living resources, useable by the public* - will depend to a great extent on *regionally*-based implementation of the CCMP actions, while recognizing Massachusetts' strong home rule tradition and significant potential for environmental protection at the local level.

The purpose of this chapter is to articulate the MBP's strategy for implementing the CCMP, both regionally and locally. This strategy is based on a series of current and proposed initiatives, including several institutional and legislative actions. In addition to the current efforts, other specific actions have also contributed to the MBP strategy for regional implementation of the CCMP. The first was the Peer Review of the MBP (1992), which recommended analysis and development of a MBP position on regional governance; the second was the MBP-sponsored conference entitled, ***Protecting New England's Coastal Resources: Models for Intergovernmental Resource Management*** *(January 1994)*. The implementation strategy identified in this chapter was developed using results from the conference, direction from the MBP Management Committee, input from MBP staff and selected conference attendees, and MBP participation in the ongoing efforts of the Massachusetts Legislature's Subcommittee on Regionalism - all through meetings, discussion groups, and comment on written materials.

In addition, in the fall of 1995, the Watershed Initiative Steering Committee, consisting of members of the environmental community (including the MBP), business, state and federal government, and municipalities, unveiled an expanded approach to environmental assessment, planning, and decision-making which could be implemented in all of the state's 27 river and coastal basins. The Watershed Approach builds on the lessons learned by the MBP, with all watershed stakeholders participating in prevention and remediation of environmental pollution in their river basin through a Watershed Community Council (***The Massachusetts Watershed Approach and Its Implementation,*** EOEA, October, 1995.)

Participation in the state Watershed Initiative will improve management of the Bays' resources. By expanding watershed-based planning and implementation beyond the 49 coastal communities and into the entire Massachusetts and Cape Cod Bays watershed, pollution entering the Bays from inland sources will be reduced. Access to increased state technical assistance and funding will enhance local capacity to implement the CCMP. And, for each of the 11 basins listed in the following table, the CCMP will provide a blueprint for local action specific to the estuarine and coastal sub-basins.

EOEA Basin Schedule for Massachusetts Bays River Basins			
Basin	**Assessment**	**Planning**	**Implementation**
Nashua	1993	1994	1995
Merrimack	1994	1995	1996
Boston Harbor (Mystic, Neponset, Weymouth & Weir)	1994	1995	1996
Cape Cod	1994	1995	1996
Parker	1994	1995	1996
Ipswich	1995	1996	1997
Shawsheen	1995	1996	1997
Concord	1996	1997	1998
South Coastal	1996	1997	1998
Charles	1997	1998	1999
North Coastal	1997	1998	1999

Models for a Regional Approach to CCMP Implementation: Current Efforts

This section describes: 1) the underlying principles of the MBP's current efforts to support regional implementation of the Comprehensive Conservation and Management Plan; 2) the implementation of these efforts in three different ways; and 3) the common characteristics that these efforts share.

The MBP goals and objectives were and are a primary consideration in planning and carrying out the current regionally-based CCMP implementation efforts of the MBP. The MBP Management Conference, which includes wide representation from federal, state, regional, and local agencies, resource user groups, educators and scientists, and business and industry, established as the MBP's principal goal the creation and management of a healthy ecosystem of living resources, as previously noted. Specific objectives include use of the beaches; availability of uncontaminated seafood; public access to the waterfront; and protection of public health and marine habitats. In order to fulfill this goal and accompanying objectives, the CCMP identifies 15 action plans (e.g., Action Plan for Reducing and Preventing Stormwater Pollution; Action Plan for Protecting and Enhancing Shellfish Resources) which need to be implemented to improve coastal water quality.

The current efforts of the MBP in supporting regional implementation of the CCMP can be characterized as **models** in three ways:

- **Utilization of Regional Planning Agencies.** The Commonwealth's Regional Planning Agencies (RPAs) have historically provided regionally-based technical and planning assistance to communities and watershed organizations. In particular, through the RPAs, the MBP provides funds and staff support to the five Local Governance Committees (LGCs) geographically located throughout the 49 coastal communities in the Massachusetts Bays area. Members of each of the LGCs are appointed by the chief elected officials of each community. LGC staff currently assist these communities with pertinent activities such as water quality monitoring, bylaw development, grant writing, and public education - all with the ultimate goal of implementing CCMP actions. Using the geographical framework and expertise of the Commonwealth's RPAs, the LGCs have been successful in building local capacity to address coastal water quality issues through a combination of technical assistance, outreach/education, and implementation approaches.

  In a Bays-wide retreat held in January of 1996, the LGCs convened to explore and define their role in CCMP implementation, and affirmed their commitment to serve as liaison between the communities and the MBP, initiating and facilitating CCMP implementation actions at the local and regional levels.

- **Shellfish Bed Restoration Program.** Shellfish beds which are closed to harvesting, either temporarily or permanently, are an indicator of declining water quality in the Massachusetts Bays (and other marine waters). In October of 1993, an interagency team was formalized, recognizing that the actions needed to reopen these beds were not the sole responsibility

of any one agency, because no one agency has the resources to address the problems. This team includes representatives of and strong commitment by the MBP, Massachusetts Division of Marine Fisheries, Massachusetts Department of Environmental Protection, U.S.D.A. Natural Resources Conservation Service, County Conservation Districts, and municipalities with impacted beds. The MBP / RPA / LGC framework described previously is an integral part of the Shellfish Bed Restoration Program "team" approach, providing the local technical assistance and community participation key to the success of the Program.

To date, the coordinated work of the Shellfish Bed Restoration Program (SBRP) team has included securing grant funding for the identification of stormwater pollution sources and for mitigation of pollution problems at four of the 12 priority beds identified by the team. In addition, the SBRP is credited with the successful reopening of over 400 acres of beds. The team is seeking additional funds to support remediation measures which could result in the reopening of additional shellfish beds. Lastly, this effort also includes a commitment to proactive education and outreach in order to insure measures which will keep currently usable, but threatened, beds open.

- **Participation in the State Watershed Initiative.** The state Watershed Initiative builds upon the state's basin assessment schedule. For the purposes of assessing water quality and managing the state's water resources, the Massachusetts DEP conducts water quality assessment, planning, and implementation in the state's basins on a rotating five-year schedule. The Watershed Initiative expands this approach to create EOEA Basin Teams, made up of state and federal agency staff, who will perform watershed-wide water quality and habitat assessments for use by the Watershed Community Council in watershed planning. A pilot river basin (the Neponset) was selected in 1994 to explore and develop the coordinated river basin management approach. Within the Neponset Basin, local citizen/community sub-basin "stream teams" were developed to perform shoreline surveys and other local assessments and to help develop action plans for each segment of the river. The Massachusetts Bays Program assisted in the development of the estuarine sub-basin plan. The results of citizen efforts and the EOEA Basin Team for the Neponset are being combined to create a watershed management plan for the Neponset Basin.

The watershed management process, adapted from the Neponset model, is seen as consisting of a series of four steps, each building on the other and carried out in an ongoing fashion by the Watershed Community Council, Stream Teams, EOEA Basin Teams, municipal governments, and businesses. The steps are: outreach, education, and technical assistance; resource assessment; should be targeted for dedicated funding (refer to latter water resources planning; and plan implementation (including permitting, compliance, and enforcement). Through these steps, watershed stakeholders would collaborate in the identification of environmental problems, and in the development of Subwatershed Action Plans and Watershed Action Plans. The Action Plans would describe protection and restoration measures, assign responsibilities for these measures, and set forth a schedule for implementation.

In summary, the utilization of the Regional Planning Agencies, the Shellfish Bed Restoration Program, and the state Watershed Initiative can be partially or fully characterized by a number of desirable factors for a regional approach. These were identified at both the "Models" conference and a follow-up Planning Meeting held in June, 1994. These factors include:

- application of an appropriate **geographical scale** for the actions to be taken and the problems to be solved;
- use of existing structures and organizations, to **avoid redundancy** and the creation of a new bureaucracy;
- enhanced **coordination**;
- use of a **decentralized** structure from an organizational perspective;
- coordination with **ongoing statewide efforts** to create viable regional organizations;
- **financial support** from dedicated sources of funding or project-specific grants;
- adoption of **proactive/education/technical assistance** attributes;
- a high degree of active and committed **public participation and representation**; and
- participation in and support of ongoing and future **resource-based planning and monitoring**.

A Regional Approach to CCMP Implementation: Future Efforts

This section describes the position of the Massachusetts Bays Program regarding regional implementation of the Comprehensive Conservation and Management Plan for the Bays, through consideration of current efforts and by listing recommendations for future efforts:

- The MBP believes that the MBP/RPA/LGC Technical Assistance Team model described in the previous section should be institutionalized to ensure future CCMP implementation. This cooperative and mutually beneficial relationship portions of this section) and legislative recognition.

- The interagency technical assistance team approach developed for the Shellfish Bed Restoration Program should be applied to other "teams" which will be created to implement various CCMP actions, such as those relating to stormwater management, toxics control, and protecting nutrient sensitive embayments.

- Further, the MBP believes that the MBP/RPA/LGC model and technical team approach should be extended into the Massachusetts Bays drainage area (i.e., outside the 49 coastal communities), in order to be comprehensive in its efforts to improve and manage coastal water quality on a watershed basis. This could be accomplished through coordination of the existing coastally-based Local Governance Committees with the multi-town planning committees which currently exist within the RPA geographic areas, serving the Bays' watershed communities. Since these multi-town committees are typically general purpose, they could enhance their productivity with a specific agenda of CCMP implementation activities or possibly serve as the "umbrella" for a CCMP-specific subcommittee within that multi-town planning committee.

- Finally, by organizing these committees around issues on a subwatershed/watershed basis, they could serve as a key component of the Massachusetts Watershed Initiative. This initiative involves coordinating the efforts of multiple state agencies, communities, and citizen organizations to improve water quality planning and management. The technical assistance component of the MBP/RPA/LGC model could also serve to support implementation of the state's Coastal Nonpoint Source Pollution Control Plan.

Funding and Implementation

- Dedicated funding for continuing and expanding the RPA/LGC and Watershed Initiative models into the Massachusetts Bays watershed can be obtained through sources which could include federal funds targeted to CCMP priorities in program guidances; state bond funds (e.g., the Open Space Bond); a small percentage of appropriate state agency operating budgets; the State Revolving Fund; the proposed Clean Water Act provision for watershed planning; the Intermodal Surface Transportation Efficiency Act, which links transportation improvements with water quality implementation; or through establishment of a non-profit organization.

- For proposed federal projects in the Bays' watershed which have the potential to impact the Bays, the Massachusetts Bays Program should request Federal Consistency procedures by the Massachusetts Coastal Zone Management Office, with comments to be provided by the Massachusetts Bays Program (see full discussion in Appendix F).

- The regional approach to CCMP implementation also should be utilized to assist with implementation of the Commonwealth's Coastal Nonpoint Source Pollution Control Plan (also known as the "6217" program). Under §6217 of the federal Coastal Zone Act Reauthorization Amendments, the Massachusetts CZM program is required to develop and implement a NPS Control Plan, which contains many of the same coastal water quality management and improvement measures as the CCMP (e.g., stormwater management). The guidance for development of the NPS Control Plan includes the requirement to develop *enforceable* measures for controlling nonpoint sources of pollution.

- The regional approach also should be used to support the development and implementation of watershed plans within the river basins which drain into the Bays, an approach strongly supported by EOEA and currently being piloted in the Neponset River Basin as part of the Massachusetts Watershed Initiative.

  For purposes of assessing water quality and managing the state's water resources, the EOEA Basin Teams undertake water quality and habitat assessment, planning, and implementation in the state's major river basins on a rotating five-year schedule. As individual river basins in the Massachusetts Bays watershed go through the EOEA basin schedule, members of the MBP/RPA/LGC Technical Assistance Team will actively participate, providing ongoing support and guidance to Bays watershed communities. Initial steps to coordinate the coastal MBP/RPA/ LGC program with the EOEA basin teams are already underway.

Management Conference Structure and Role

- During the spring of 1996, the MBP Management Committee will begin to define in detail the post-CCMP processes which will be used to: review and update CCMP policy, goals, and objectives; approve annual workplans; and guide and closely monitor implementation, including the progress of the cooperative MBP/RPA /LGC Technical Assistance Teams.

- As a result of a Bays-wide retreat held in January, 1996, the LGCs have already affirmed their commitment to continue to serve as liaison between the communities and the Massachusetts Bays Program, initiating, prioritizing, and facilitating CCMP implementation actions at the local and regional levels. Specific LGC workplans defining implementation and monitoring strategies will be developed over the spring and summer.

- The other MBP advisory committees (e.g., Technical Advisory Committee) also will meet over the spring and summer to detail their future roles in CCMP implementation and monitoring.

- Following approval of the CCMP, the Massachusetts Coastal Zone Management Office will continue to provide leadership to the Management Conference. MBP staff, funded by the

National Estuary Program, will continue to provide guidance and technical assistance as the MBP moves into the implementation phase.

Implementation Priorities

The CCMP Action Plans reflect the overall priorities of the Management Conference. In turn, regional and community implementation of the CCMP will reflect the diverse environmental needs and priorities of the extensive Massachusetts Bays coastal area. For example, while Cape Cod communities confront groundwater pollution as a priority concern, stormwater runoff is a serious concern for Salem Sound communities. The geological, socioeconomic, and environmental diversity of the Massachusetts Bays region will be reflected in the regional and community implementation priorities and strategies developed within and by the LGCs.

Commitment to Implementation

The action recommendations in the CCMP represent five years of coordinated planning within and among the participating agencies and communities. As a result, they represent the priorities and commitments of the participants.

All four of the coastal Regional Planning Agencies have signed a resolution of support for, and commitment to, implementation of the CCMP. In December of 1995, LGC community representatives and MBP/RPA/LGC technical assistance staff began a series of ongoing meetings with the chief elected officials of the Massachusetts Bays' coastal communities. As a result of these meetings, many of the coastal communities have signed a formal resolution of support for the CCMP, which includes a voluntary commitment to implement the municipal actions appropriate to each community. In addition, each of the state and federal agencies has signed a letter committing to implement the CCMP action recommendations addressed to that agency. All of these documents are included in Appendix L.

Taking Legislative Action

Implementation of a number of CCMP recommendations will either depend upon, or would be facilitated by, certain legislative actions at the state and local levels. The following chart presents a preliminary list of recommended actions in the CCMP for which legislative action is either required or would be an important source of supporting funds. The need for legislation (existing and improved) to support CCMP implementation at both the state and local levels is documented in the Bowen (1993) report. Please refer to the Base Programs Analysis (Appendix E) for further explanation of this report and its results and conclusions.

Legislative Action Support to CCMP Implementation

Action Plan Recommendations	Legislative Action
Protecting and Enhancing Shellfish Resources	
Local Shellfish Management Plans	State legislation to establish Shellfish Management Grants Program
Interagency Shellfish Bed Restoration Program	Future bond authorization; EOEA budget line item as part of Coastal Resource Restoration and Monitoring
Protecting and Enhancing Coastal Habitat	
Municipal Riverfront District Designations	Town Meeting/City Council adoption
DEM acquisition of prime coastal properties	Future capital bond authorization

Legislative Action Support to CCMP Implementation	
Action Plan Recommendations	**Legislative Action**
Reducing and Preventing Stormwater Pollution	
Municipal stormwater management regulations	Planning Board adoption
Municipal mitigation of stormwater pollution	State enabling legislation for stormwater utility districts and associated fees
Reducing and Preventing Toxic Pollution	
Municipal hazardous materials, UST, floor drain regulations	Board of Health adoption
Managing On-Site Sewage Disposal Systems	
Municipal on-site sewage systems inspection and maintenance (I/M) programs	State legislation for uniform annual I/M fee for on-site systems owners
Planning for a Shifting Shoreline	
Municipal floodplain management regulations	Town Meeting/City Council adoption
Managing Local Land Use and Growth	
Local Comprehensive Plans (LCPs)	Pass state land use and growth management legislation, then pass a funding mechanism; Town Meeting/City Council adoption of plans
Implementing the CCMP	
Funding support for MBP/RPA/LGC technical assistance to municipalities	EOEA budget line item as part of Coastal Resource Restoration and Monitoring
Monitoring Water Quality	
Coastwide Marine Monitoring Plan implementation	EOEA budget line item as part of Coastal Resource Restoration and Monitoring

CHAPTER VII. FINANCING THE CCMP

Introduction

Early in its 5-year comprehensive planning efforts, the Massachusetts Bays Program (MBP) recognized the need to identify sources of financial assistance and revenues to support implementation of this CCMP. In particular, the CCMP identifies priority problems facing the Massachusetts and Cape Cod Bays, setting forth a number of actions for local, state, regional, and federal agencies to implement in order to solve these problems and improve water quality in the Bays. In a time of decreasing funding for environmental projects and increasing competition for remaining funds, detailed and sound financial information is a necessity for successful implementation of CCMP actions. Accordingly, the MBP contracted with Northbridge Environmental Management Consultants to inventory and compile this information. In December 1994, Northbridge produced a report entitled, *Financing the Massachusetts Bays CCMP: Federal, State, and Local Funding Sources and Mechanisms* (*Financing Report*, for short), with appendices and supplemental information added in early 1995.

The purpose of this chapter of the CCMP is to describe and summarize the contents of the *Financing Report*. A complete copy of the *Financing Report* can be requested from your Regional Planning Agency office or the Massachusetts Bays Program office. Further assistance with grant applications or other financial questions can be obtained from your community's representative to the Massachusetts Bays Program Local Governance Committee, or the staff to that Committee housed at your Regional Planning Agency office.

Financing Report Contents

Introduction. This section of the *Financing Report* describes and distinguishes among several fiscal options to support CCMP implementation: grants, revenue sources, and financing mechanisms. The first two categories provide or otherwise generate funds which can pay for the initiatives of the CCMP without borrowing, while the third provides a framework for managing the timing or collection of cash flows, but does not in and of itself generate cash.

Grants. As previously noted, grants are an option to pay for CCMP-related initiatives without borrowing, and this section of the *Financing Report* focusses on those grants that are available from either the state or federal government. The distinction is made between grants managed by federal agencies versus those administered by state agencies, even though the state grant source is often federal money. The reader is introduced to the report's format for this section - a table for each grant which provides program objectives and description, eligibility requirements, available funds, contacts, and examples of use. Additional narrative information includes the fact that while the report catalogs numerous grant programs, the funds are often sought after by many competing interests; also included are private foundation grants. (The appendices of the *Financing Report* include an introduction to these sources.) Finally, the majority of this section is comprised of the tabular summaries of 45 federal grant programs and 20 state grant programs. Federal programs include those managed by the Department of the Interior, U.S. Army Corps of Engineers (technical assistance only), and the U.S. Environmental Protection Agency. State grants are those managed by the Executive Office of Environmental Affairs, the Executive Office of Transportation and Construction, and the Executive Office of Communities and Development, among others.

Revenues. As with grants, revenues can provide a source of funding to finance CCMP implementation without borrowing, but differ in that they are collected by a government agency and pooled for public purposes. This section of the *Financing Report* describes six types of revenues, using both a tabular format similar to the grants approach and case studies. These six revenue categories are: **taxes** (e.g., boat excise, real estate transfer); **fees** (e.g., beach, boat mooring); **betterments** (i.e., assessments for capital property improvements); **permit/licensing fees** (e.g., shellfish license, wetlands permit); **fines, penalties, mandates, laws, regulations**; and **voluntary contributions** (e.g., corporate sponsorship, tax form check-off).

Financing Mechanisms. These financing methods can be used either to collect revenues (previously described) or to manage the timing of cash flows. While these mechanisms typically do not generate their own sources of funds, a few (e.g., low interest loans) combine the collection and timing features with aspects of revenue sources because they can provide a subsidy that reduces project cost just as a grant can. For those financing mechanisms which are directly related to a specific revenue source, the framework of the mechanism is described in this section of the *Financing Report*, while the revenue is described in the previous section. The report details two types of financing mechanisms in a combination of narrative text and case studies. These financing mechanisms are: 1) **special districts**, which include enterprise

funds (accounting to closely correlate expenses/revenues of a project), utility districts, water and wastewater authorities, storm and surface water utilities, betterment districts; and 2) **bonds and loans**, which include the state revolving loan fund program.

Appendices. The *Financing Report* contains several appendices: 1) Grants from Private Foundations; 2) Municipal (CCMP) Actions and Potential Funding Sources matrix; and 3) Municipal Actions Costs: Watershed-wide Costs for Implementing Massachusetts Bays CCMP Municipal Actions.

CHAPTER VIII. MONITORING CCMP IMPLEMENTATION

Introduction

The Massachusetts Bays estuary (i.e., Massachusetts Bay and Cape Cod Bay), its shoreline, and its watersheds have historically been utilized for a wide range of commercial, industrial, residential, recreational, and agricultural activities and uses. In support of these activities and uses, the overall goal of the MBP is *the preservation and management of a healthy ecosystem of living resources, useable by the public.* The MBP intends to achieve this goal through implementation of the Action Plans, and numerous other commitments, in this CCMP for the Bays. In order to determine whether and to what degree this goal has been achieved, both "scientific" (e.g., water quality) and "management" monitoring will be undertaken by the MBP.

Monitoring the effectiveness of CCMP actions will be an important role of the MBP staff and Management Conference as the Program moves into the implementation phase. Success will be measured through improvements in environmental quality and by tracking implementation of management actions. This will be accomplished through measuring pre-determined environmental parameters (e.g., pathogen concentrations at shellfish beds), and formulating a system to monitor the management actions adopted by communities. Details of monitoring frequency and reporting will be developed by MBP staff with assistance from the Management Committee, Local Governance Committees, and other advisory committees in the spring and summer of 1996.

Scientific Monitoring

Since 1990, the Massachusetts Bays Program has supported scientific research and management processes designed to improve marine environmental quality. Research has focused on the physical processes that affect distribution and transport of constituents in the Massachusetts Bays region, the quantification of sources of contaminants such as polynuclear aromatic hydrocarbons (PAHs), and the effects of contaminants on living resources. In addition, through the Mini-Bays Program, the MBP has funded three projects to provide in-depth analysis of embayments and their watersheds, each with unique natural attributes and different management needs. Through these projects, the MBP has been able to develop priority issues on which to focus its management efforts and to develop measurable goals for the Massachusetts Bays as a whole.

The Massachusetts Bays Program Monitoring Plan is designed to measure the effectiveness of the management actions taken as part of the CCMP. Fifteen Action Plans describing activities affecting or contributing to the priority problems in the Bays are presented in the CCMP. Nutrients, pathogens, toxic contaminants, and habitats have been identified as topics requiring focused and immediate attention due to the extensive occurrence of contaminants in coastal Massachusetts, as well as the environmental and economic consequences of habitat degradation caused by these contaminants. Because of the need to lessen the environmental impact caused by nutrients, pathogens and toxicants, measurable goals were developed for these topics and are discussed briefly in the following section. These measurable goals form the basis for one component of the monitoring plan, which is designed to measure the success of CCMP management actions. The first-tier monitoring activities associated with the measurable goals will be implemented this year. Long-term monitoring questions have been developed based on MBP-funded research projects, the Mini-Bays projects, and the need for special studies to accompany any long-term monitoring program.

In addition, a draft coastwide monitoring plan is under development by the Massachusetts Coastal Zone Management Office, which is currently seeking funding for implementation of the plan. An integrated approach to monitoring programs for the Commonwealth's marine waters is desired, and both the MBP's and the state's monitoring plans have been developed concurrently. However, in order to assess the success of CCMP implementation within a short time period (1-2 years) and within the available funding, the MBP's current monitoring program focuses on the Program's four measurable goals (see below). The state's monitoring plan focuses on collection of baseline data in specific embayments, long-term data collection, and ecosystem modelling. Monitoring results to date from the MBP will help formulate specific monitoring questions for the state. Data from all activities will be made available to both programs, and every effort will be made to coordinate monitoring and data collection.

The MBP marine monitoring program is also coordinated, to the extent possible, with marine and watershed monitoring efforts by other programs and agencies, including the Massachusetts Department of Environmental Protection's Office of Watershed Management (DEP/OWM), the Division of Marine Fisheries (DMF), and citizen groups. These parallel environmental monitoring efforts by agencies and citizen groups will allow the MBP to track improvements in the Bays due to CCMP implementation beyond the current funding. For example, a large-scale monitoring program is currently conducted by the Massachusetts Water Resources Authority (MWRA) to determine baseline conditions before sewage effluent is discharged to the Bays. In addition,

agencies (e.g., DMF) collect data as part of their routine operations that can be used by the MBP, while citizen groups are monitoring coastal waters and performing shoreline surveys throughout Massachusetts. Implementation of CCMP actions funded by EPA's s.319 and 104(b)(3) grants, state CPR grants, and federal ISTEA funds, among others, will each include a monitoring component, which will be evaluated by MBP staff as data become available.

The MBP Monitoring Plan does not include specific information about station location, QA/QC objectives, and monitoring parameters because these details often evolve during the proposal development and selection process. Proponents of projects involving scientific data collection are required to submit a Quality Assurance and Project Plan (QAPP) for review and approval by MBP and EPA staff. All QAPPs are available through the MBP office. All draft reports are peer reviewed and comments are incorporated into the final document. These steps ensure that high quality, scientifically valid data are collected and reported. For more information, please refer to the Data Management discussion at the end of this Chapter.

To the extent possible, the MBP Management Conference and staff will track scientific monitoring efforts and management achievements. Based on the availability of funds, reports will be released on a regular basis. The schedule for review and reporting will be developed through the spring and summer of 1996.

Measurable Goals

The four topics for which measurable goals have been developed were chosen as issues requiring scientific and management attention throughout the Massachusetts Bays (and, in particular, through this CCMP's Action Plans). Measurable goals were developed for the four issue areas by the MBP Measurable Goals Committee, and these form the cornerstone of the Monitoring Plan. The Technical Advisory Committee (TAC) has approved the goals and refined them as necessary based on the development of the Monitoring Plan. The goals will continue to be refined as new information and resources become available. Monitoring and data collection by other agencies will allow the MBP to continue to track environmental improvement resulting from CCMP implementation when MBP monitoring funds are no longer available. For example, the Department of Environmental Protection will provide sampling and analysis to verify the ranking of embayments at risk of eutrophication as part of their efforts to include nutrient criteria in the State's water quality standards. The Division of Marine Fisheries routinely monitors shellfish beds for pathogen concentrations to determine whether harvesting can occur. Toxic contaminant monitoring in the Bays ecosystem is accomplished in several ways by different agencies, including the MWRA and EOEA Office of Technical Assistance. Marine habitats are studied and monitored by several agencies, such as DMF, the Wetlands Restoration and Banking Program, EPA, as well as by certain non-profit groups such as the Massachusetts Audubon Society.

The first-tier monitoring and assessment activities are already underway, under the guidance of the MBP staff scientist with assistance from the TAC. The Management Committee, with input from its advisory committees, will decide upon a process for guiding future monitoring efforts. It is anticipated that MBP staff will continue to track the progress of monitoring activities. Over the next six months the advisory committees will explore their role in tracking changes in water and habitat quality. The details of this process will be worked out with these committees during the spring and summer of 1996.

Nutrients

Excess nutrient inputs to coastal waters can cause water quality degradation through eutrophication, low dissolved oxygen levels, changes in community structure, and habitat loss.
Measurable Goal: Identify embayments at risk of eutrophication.

Pathogens

Improper treatment and disposal of human wastes (or other sources of pathogens) in the marine environment pose a risk to human health through contamination of shellfish beds and swimming beaches. The closure of shellfish beds due to pathogen contamination results in substantial economic loss to a number of coastal communities.
Measurable Goal: Re-open 12 shellfish beds closed due to pathogen contamination from nonpoint sources of pollution.

Toxic Contaminants

Toxic substances in coastal waters and sediments may be present at levels that cause contamination, adversely impact living resources, and further degrade the coastal environment. These effects may result in significant economic loss through a decline in harvestable fish stocks and tourism, and through the need for expensive alternatives for disposal of dredged material.
Measurable Goal: Quantify the reduction in loadings from targeted toxicant sources contributing to an identified habitat location and monitor improvement in selected biological indicators - e.g., reduce body burdens of toxic contaminants in biological resources below levels of demonstrable population effects.

Habitats

Loss of habitat such as coastal wetlands and anadromous fish runs reduces important nursery and breeding grounds for many species of marine animals, including commercial and recreational species. The loss of these resources creates economic hardship through lost revenue from decreased tourism and reduction or elimination of local fisheries businesses. In addition, loss of habitat can impair water quality and impinge upon other valued coastal amenities, such as bathing beaches and aquaculture facilities.

Measurable Goals:

- Restore 12 coastal wetland areas that have been adversely impacted due to restricted saltwater flow.
- Monitor and report the number of acres of coastal wetlands every five years to ensure no net loss of wetlands.
- Work with the Division of Marine Fisheries to provide an updated list of the locations and condition of anadromous fish runs. Based on the inventory, restore and monitor 5 anadromous fish runs.
- Define the critical habitat for 5 to 10 important species and monitor habitat conditions suitable for these selected species.

Mini-Bays Program

The Mini-Bays Program provided the opportunity to perform in-depth analysis of three embayments: Plum Island Sound, Weymouth Fore River Estuary, and Wellfleet Harbor. Each embayment project has a different focus because the locations, environmental conditions, and management challenges of each embayment are unique. Extensive baseline information is available for the Mini-Bays sites, and management activities have been implemented in the sub-watersheds, providing the opportunity to develop monitoring plans to evaluate management actions over the long-term.

Potential hypotheses for the long-term monitoring projects for the Mini-Bays Program follow:

Plum Island Sound: What are the relative contributions of pathogens and nutrients from the major sources to Plum Island Sound, including the Parker River, the Ipswich River, and the Ipswich WWTP? Will the repairs to the Ipswich WWTP mitigate pathogen and nutrient flux to Plum Island Sound?

Weymouth Fore River: Certain projects are being implemented in the Fore River watershed (e.g., decommissioning of the Nut Island wastewater treatment facility, the Braintree-Weymouth Interceptor project) that have environmental implications. The success of these projects will be monitored with respect to reduced loadings of toxic contaminants, nutrients, and pathogens to Fore River and Hingham Bay sediments and organisms, and for the reopening of swimming beaches and shellfish beds.

Wellfleet Harbor: The Town of Wellfleet is developing a model to predict nitrogen loading to the embayment and the possible impacts of nitrogen on shellfish resources and habitats. The groundwork for this model (i.e., embayment flushing calculations, land-based and oceanic nitrogen loading estimates, and watershed build-out analysis) has been completed. However, additional field data may be needed to verify the model predictions and determine whether additional parameters should be included, such as nutrient flux from the sediments in Duck Creek. Additionally, the distribution and biomass of macroalgae in selected intertidal areas may need to be assessed and documented.

The monitoring plans for the Mini-Bays projects should be refined as the final project synthesis reports are completed this year.

Additional Monitoring

Follow-up monitoring of MBP-funded research projects can be revisited on a time-scale appropriate for a given project. For example, depending on the results of the nutrient dynamic study in the Bays (Gardner et al., in progress), a small-scale sampling of selected sites may be warranted to determine changes in the ecosystem. Other projects that may require follow-up monitoring include the Merrimack River study (Menzie-Cura, 1991), nonpoint source runoff study (Menzie-Cura, 1995), and atmospheric loadings study (Golomb et al., 1995). The data from these studies can be used to gauge progress toward attaining the stated measurable goals, in addition to providing a broader assessment of the status and trends of the Massachusetts Bays environment.

Special Studies

The Massachusetts Bays Program recognizes that outstanding questions remain to be answered which do not fit directly into one of the monitoring categories listed above but have relevance to the overall health and understanding of the functioning of the Bays ecosystem. As monitoring projects proceed, additional questions may arise that will need to be answered to allow proper interpretation of the collected data.

A draft of the Scientific Monitoring Plan was completed and distributed for review in June 1995, and the final draft was completed in September 1995. The complete Scientific Monitoring Plan is available through the Massachusetts Bays Program office.

Management Monitoring

The purpose of this section is to describe the MBP's approach to management monitoring of the CCMP. This approach allows for the periodic, qualitative examination of certain aspects of the CCMP in order to ascertain their effectiveness. These issues do not lend themselves to the technical monitoring of environmental indicators. Accordingly, this approach for management monitoring is intended to complement the approach to scientific monitoring which is outlined in the previous sections of this chapter. The MBP LGC technical assistance staff and the LGCs will take the lead role in developing an appropriate management action tracking matrix and will formalize a schedule for tracking implementation progress over the next six months.

What Gets Monitored?

The MBP Management Conference has identified the following sections of the CCMP which contain milestones, products, or other actions which will be subject to qualitative review:

Chapter III, "Overview of Coastal Subregions"

In Chapter III, each of the 5 subregions within the MBP area are described according to a variety of characteristics, including their physical attributes, land use, coastal resources, and resource management issues. In particular, these summaries include the results of the "Community Resource Management Survey," which tracks the status of individual communities' efforts related to planning, bylaw development, and resource use and protection. These are major activities which directly support implementation of CCMP Action Plans such as Protecting and Enhancing Coastal Habitat, Reducing and Preventing Stormwater Pollution, and Managing Local Land Use and Growth. Accordingly, the Community Resource Management Survey will be reviewed and updated as communities take action to protect and enhance water quality and the living marine resources of the Massachusetts Bays.

Chapter IV, "Projects of Regional Scope and Impact"

The so-called "megaprojects" which are described in Chapter IV are those projects which may have a greater-than-local effect on the ecosystem of the Massachusetts Bays. Although the MBP is not the proponent for any of these projects, it did attempt to develop and build consensus on those actions which are needed to ensure that each of the projects proceeds in a manner which maximizes benefits for the people of the region while posing the least risk to the Bays. In particular, each of the seven megaproject discussions includes action recommendations for the appropriate federal, state, regional, and local proponents so that the previously identified risk/benefit goal is achieved. For example, the Boston Harbor Project incudes recommendations for several federal agencies (among others), while the South Essex Sewerage District discussion establishes recommendations for the Massachusetts Department of Environmental Protection. The recommendations in all of the megaproject discussions will be evaluated to ensure that the appropriate actions have been taken, or to revise and otherwise update the goal of a given recommendation. The process and timeframe for re-evaluating regional projects and tracking the associated action plans will be developed by the Management Committee over the spring and summer of 1996.

Chapter V, "Action Plans"

The Action Plans can be considered the "heart" of the CCMP, and establish a broad blueprint of action by a number of agencies and organizations to meet the MBP's goals. The CCMP contains 15 major Action Plans, each of which contains at least one, if not a number of, individual actions to meet the stated criteria of the Action Plan. The successful implementation of a number of these actions can be evaluated through monitoring of specific water quality indices over time; for example, the reduction of toxic and oil pollution in the Massachusetts Bays resulting from implementation of the corresponding CCMP Action Plans. However, other Action Plans/individual actions do not lend themselves to this type of scientific approach. In particular, actions such as Planning for a Shifting Shoreline and Managing Local Land Use and Growth will be directly evaluated to assess whether implementation by the responsible agency(ies) has been successful. The LGCs and LGC staff will monitor the progress made in implementing action plans directed toward communities. MBP staff will be responsible for meeting regularly with environmental agencies to monitor the implementation of action plans associated with each agency.

Chapter VI, "Implementing the CCMP"

In Chapter VI, the MBP's "CCMP Implementation Strategy" is summarized. This chapter establishes a framework for the various agencies and organizations in undertaking their respective actions to implement the CCMP. In particular, this Strategy continues the current efforts by MBP's regional technical staff, who are housed within the four Regional Planning Agencies in the MBP area and who assist coastal communities with implementation of CCMP recommendations, as well as by facilitating and directing the work of other agencies responsible for implementation. Accordingly, the activities of these MBP/RPA/LGC "teams" will be tracked in order to evaluate their effectiveness in facilitating implementation of the CCMP's recommendations. From the perspective of agency participation, the model of the Shellfish Bed Restoration Project (SBRP) has been successful and will be

used as additional teams are developed. The SBRP has a Management Working Group, comprised of interested agency members, which meets regularly and tracks progress toward attainment of the project's goals.

Who Will Do This Monitoring, And How Will It Be Undertaken?

As previously noted, the Management Conference is the governing body for the MBP, and as such, it has overseen all aspects of the CCMP for the Massachusetts Bays. In particular, this includes establishing a network of committees who represent federal, state, and local agencies; scientists; business interests; the general public; educators; and user groups. These committees have supported development of the recommendations in the CCMP through scientific study and analysis, policy development, and education and outreach. Accordingly and following approval of the CCMP, the Management Conference will assess and establish its roles relative to the review and updating of CCMP policy, goals, and objectives, and in guiding MBP/RPA/LGC technical assistance team activities (all during the spring and summer of 1996). Additional efforts will include the tracking, review, and evaluation of activities identified in the previous section. The specific assessments to be undertaken by both the post-CCMP Management Conference, and by the MBP staff who report to the Conference, are summarized as follows:

Community Resource Survey: Poll communities in the Survey to identify recently undertaken, appropriate actions which may constitute or otherwise support CCMP implementation.

Megaprojects: Determine the extent to which the responsible party(ies) have implemented the recommended actions; also, assess whether the recommendations themselves continue to be appropriate.

Action Plans: Interview the various parties responsible for each action to determine the status of their efforts regarding implementation; this applies to Action Plans which do not lend themselves to quantitative assessment.

Implementation Strategy: Since this is the framework within which the above actions will be taken, the success of the Implementation Strategy will reflect the successful implementation of these actions.

When Will This Monitoring Be Undertaken?

As previously noted, the Management Conference, as the governing body for the MBP, will continue to exist upon completion of this CCMP and as such, will ultimately be responsible for evaluating the success of CCMP implementation. Further, with continuation of federal funding (albeit at reduced levels), and with potential funding through the Commonwealth of Massachusetts, staff support for the Management Conference also will continue. This aspect is particularly significant regarding the regional technical staff who assist the coastal communities in the MBP area, since a number of the CCMP actions identify local officials as the responsible implementing agents. These same staff also will work with state and federal agencies to facilitate additional implementation efforts.

In summary, implementation of the actions and recommendations found in this CCMP for the Massachusetts Bays can be measured using methods for both scientific and management monitoring. However, it should be noted that the Management Conference will not limit its oversight and evaluation of CCMP implementation to those portions of the document which are directly measurable through either quantitative or qualitative methods. The CCMP is a "living" document, and as such, the Management Conference intends to consider all aspects of it in its implementation of the CCMP and in the ultimate achievement of its goals for the Massachusetts Bays.

Data Management

All MBP data sets will be made available in widely used, standard desktop formats (comma-delimited ASCII format, Excel, and Quattro Pro), and will be accompanied by digital documentation that will include a description of each data file, Quality Assurance Plan, and the Final Research Report. These data file formats can be easily incorporated into any future data bases, and the documentation will make the files discernible to future users. The data and documentation will be available for viewing and downloading via CD-ROM and/or the Internet.

MBP data include:

1. MBP-funded research, demonstration projects, and Mini-Bays data sets;
2. Digital files of Massachusetts Bays community map overlays; and
3. New GIS data on Stellwagen Bank, Massachusetts Bays bathymetry, etc.

The MBP Data Management agenda has changed over the years from the initial vision of putting the data into a specialized, centralized structure like that of ORACLE or ODES, to an open data structure with detailed <u>documentation</u> and easy public <u>access</u> that will make the data easily available for years to come with little or no maintenance. Open formats will allow access for all potential users (e.g., Regional

Planning Agencies, community officials, the MWRA, other state agencies, and private organizations), regardless of software, analytical needs, or expertise. Any future monitoring programs in Massachusetts Bays could have very specific data standards and still easily incorporate MBP data into their structure from the open formats in the MBP data base.

For more information on the MBP data sets, contact the Massachusetts Bays Program office.

CHAPTER IX. MANAGEMENT CHARACTERIZATION (BASE PROGRAMS ANALYSIS)

The Massachusetts Bays estuary (i.e., Massachusetts Bay and Cape Cod Bay), its shoreline, and its watersheds have historically been used for a wide range of residential, commercial, and recreational activities. Not surprisingly, these potentially conflicting uses are subject to a vast number of decisions and actions by a complex institutional network. The Massachusetts Bays Program (MBP) has analyzed this network ("Management Characterization" or "Base Programs Analysis") relative to the Program's various goals, of which the overarching goal is the *preservation and management of a healthy ecosystem of living resources, useable by the public.* Specific supporting goals include: reduction of nutrients from point/ nonpoint sources, improved habitat quality, reduction of toxic contaminants, and reduction of pathogen pollution of shellfish beds. These goals will be met through implementation of the CCMP.

In accordance with EPA guidance, the MBP has undertaken various aspects of this Analysis since the Program's inception, such as:

- The CCMP's "State of the Bays" assessment (see Chapter II);
- Action Plans developed to correct priority problems and meet Program goals (see Chapter V);
- Chapter VI of the CCMP, "Implementing the CCMP Throughout the Bays Watershed"; and
- *The Massachusetts Bays Management Systems: A Valuation of Bays Resources and Uses and an Analysis of its Regulatory and Management Structure* (Bowen and Terkla, June 1993).

The development and ultimate implementation of the CCMP has been, and will continue to be, guided by the MBP's governing body, the Management Conference. The Management Conference's membership consists largely of the institutional network referenced above (e.g., representatives from appropriate federal, state, and local government agencies; regional planning agencies; various user groups; public and private education institutions; and the general public). The Analysis reflects the consensus approach of the Management Conference in that the institutional network which will implement the CCMP consists of both Conference member and non-member agencies which support the CCMP Action Plans needed to achieve the MBP's goals; in addition, the CCMP identifies agencies whose programs may need additional resources or efforts.

For the complete ***Management Characterization/Base Programs Analysis,*** please refer to Appendix E (available under separate cover).

Federal Consistency Analysis

chapter X

CHAPTER X. FEDERAL CONSISTENCY ANALYSIS

The Massachusetts Bays estuary (i.e., Massachusetts Bay and Cape Cod Bay), its shoreline, and its watersheds have historically been used for a wide range of residential, commercial, industrial, agricultural, and recreational activities and uses. Many of these activities and uses are supported or otherwise affected by a broad array of federal actions and decisions. In turn, these federally-sponsored activities have as wide a range of objectives as they do variety, and as such, some can be inconsistent with the goals of the Massachusetts Bays Program (MBP). The overall goal of the MBP is the *preservation and management of a healthy ecosystem of living resources, useable by the public*, to be achieved through implementation of the action plans in the CCMP.

In accordance with EPA guidance, the MBP has undertaken a "Federal Consistency Analysis" to address the potential inconsistencies between the CCMP and federal actions. In particular, this Analysis accomplishes the following:

- An inventory of those federal programs, actions, and decisions which could possibly affect the CCMP. This includes programs eligible for coverage under Federal Executive Order 12372 (Intergovernmental Review of Federal Programs), the Catalog of Federal Domestic Assistance, and other relevant sources.

- Evaluation of the inventory relative to the CCMP. This indicates that the CCMP, as currently written, is consistent with inventoried federal programs, actions, and decisions.

- Identification of an approach to address any inconsistencies between future implementation of the CCMP and federal programs, actions, and decisions. This approach uses the existing consistency process employed by the Massachusetts Office of Coastal Zone Management (MCZM), which insures that applications for certain federal actions or approvals in the Commonwealth's designated Coastal Zone, or which affect the Coastal Zone, are consistent with MCZM's enforceable program policies. In order to facilitate consistency with CCMP implementation, the MBP will have the opportunity to comment on proposed federal actions subject to MCZM review, as well as to recommend that a proposed federal action be reviewed by MCZM.

For the complete ***Federal Consistency Analysis,*** please refer to Appendix F (available under separate cover).

CHAPTER XI. PUBLIC PARTICIPATION/PUBLIC RESPONSIVENESS SUMMARY

Introduction

The principal goal of the Massachusetts Bays Program (MBP) is the *preservation and management of a healthy ecosystem of living resources, useable by the public.* The word "public" is operative in that public involvement has been, and will continue to be, a major component of the development and implementation of the CCMP. The CCMP provides the framework for meeting the MBP goal. Within the MBP Management Conference (the overall governing body), public involvement occurs through the Local Governance Committees (LGCs), the Technical Advisory Committee (TAC), and the Public Participation Program. All are members of and report to the Management Committee, the MBP's operating committee.

Local Governance Committees

The LGCs are 5 subregional committees (8 Towns and the Bay, Salem Sound 2000, Metro Boston, South Shore, and Cape Cod Coastal Resources Committee). They are made up of local officials and appointees from each of the 49 coastal communities in the MBP region. These committees serve as local forums to address water quality issues in support of the MBP goal, through the provision of technical assistance and demonstration grant monies. Typically, representatives of the LGCs provide input into and guidance on MBP decisions at Management Committee meetings. In one way or another, these decisions are related to the CCMP.

Technical Advisory Committee

The TAC, a committee comprised of marine scientists from academia, government, and non-profit organizations, serves two important functions for the MBP. First, it has overseen the approximately $1.6 million of research funded by the MBP, and has offered recommendations to the Management Committee regarding this research and its relationship to the CCMP. This research has provided valuable data regarding the status of living resources within the Bays, supporting the action recommendations in the CCMP. Second, the TAC advises the Management Committee on issues of technical significance, such as federal or state regulations which might affect the monitoring of marine water quality.

Public Participation Program

As developed by the Management Conference, the MBP's Public Participation Program is highly conducive to the involvement of and contribution by a broad spectrum of the public who use, benefit from, are advocates for, or are teachers about the Massachusetts and Cape Cod Bays. In particular, the Program's efforts and activities, with support from MBP staff, have directly contributed to the development of key elements of the CCMP (e.g., Action Plan for Reducing and Preventing Oil Pollution; Action Plan for Enhancing Public Education and Participation). Related efforts include outreach materials such as fact sheets and public service announcements. Following are descriptions of various committees and activities which comprise the MBP's Public Participation Program:

Business and Resource Users Group

As its name implies, members of the Business and Resource Users Group (BUG) include representatives of both the Bays' *business* interests (e.g., Massachusetts Bays Yacht Club, Massachusetts Lobstermen's Association), and *user* interests, such as the New England Aquarium Divers' Club. The BUG's purposes related to these groups include provision of a forum for the exchange of ideas and resources, and support for the development and use of environmentally protective technologies. With respect to the CCMP, an example of BUG's involvement is the recommendation for a state/municipal/private partnership regarding the minimization and recycling of hazardous materials, as contained within the Action Plan for Reducing and Preventing Toxic Pollution. Further, BUG has supported public access issues as a means to enhance user experiences (Action Plan for Enhancing Public Access and the Working Waterfront).

Education Alliance

As indicated by its name, the Massachusetts Bays Education Alliance (MBEA) is a group of teachers and educators who represent schools and organizations from across the Massachusetts Bays region (49 coastal communities plus 112 inland communities). The membership includes a significant number of both public and private grade school and high school teachers, as well as instructors and trainers from institutions and organizations which are involved in environmental education (e.g., Massachusetts Cooperative Extension Service). The goal of the MBEA is to educate as many residents and users of the Bays as possible about the importance of the Bays and their own everyday responsibilities in protecting the Bays. In addition to its direct involvement in developing and implementing the Action Plan for Enhancing Public Education and Participation within the CCMP, the MBEA been responsible for training teachers in the Bays-related curriculum: "Watershed Education Training."

Coastal Advocacy Network

The membership and purpose of the Coastal Advocacy Network (CAN) are somewhat self-explanatory; CAN members are those non-governmental organizations (NGOs) whose efforts in some way support the protection of Massachusetts and Cape Cod Bays. Examples of these advocates include the Conservation Law Foundation, the Cetacean Research Unit, the Association for the Preservation of Cape Cod, and Save the Harbor/Save the Bay. While CAN advises and updates the MBP regarding the status of advocacy efforts, such as changes to the state sanitary code/on-site disposal systems, it also has been entrusted with a somewhat separate role from the MBP such that its views do not always represent the MBP - for example, when it comments on controversial legislation. As a network of advocates for the protection of Massachusetts' coastal resources, CAN has reviewed and commented on most aspects of the CCMP, focussing on the Action Plans.

Related Activities

Examples of MBP activities which directly support the overall efforts of the Public Participation Program include:

- **Bays Action Grants**. The Bays Action Grants are small grants awarded to individuals, communities, organizations, and small businesses for educational programs regarding the public's role in preventing and reducing water pollution to the Massachusetts Bays.
- **Public Service Announcements**. The two recently developed "PSAs" outline the responsibilities of all members of the public in preventing water pollution, using a backdrop of easily recognized scenes of the Bays, both clean and polluted.
- **Local Governance Committee (LGC) Action Grants**. These grants are awarded to the five Local Governance Committees to fund local actions which support CCMP implementation. Examples include establishment of waste oil repositories and monitoring of sensitive embayments.

Summary

In summary, the MBP Public Participation Program strives to insure that all who are reached through the program learn the basic premises of the MBP; the importance of protecting the Bays; and what they can do, both individually and collectively, to improve the quality of the Bays' resources; all using the development and implementation of the CCMP as a framework. The Public Participation Program is broad and inclusive, reaching schoolchildren, teenagers, and adults who are residents, users, protectors, and managers of the Bays and their resources.

Public Responsiveness

The MBP's principal goal in establishing an approach to Public Responsiveness is to build on the Program's extensive advisory/public participation efforts, as documented in the previous sections of this chapter. Accordingly, and for purposes of this section, public responsiveness will document the opportunities for review of the CCMP by the public, as well as provide responses to submitted comments.

The MBP has solicited comments from the over 300 members of the Management Conference on the three previous drafts of the CCMP, the most recent being the Draft Final CCMP published in December of 1995. In turn, the input of these individuals has reflected an even broader scope of review. For example, as members of the Management Conference, the five LGCs have sought input on the CCMP from many of their fellow local officials, including: Selectmen/City Council members, Conservation Commissioners, Planning Board members, and Board of Health officials. In addition, all LGC meetings, as well as all other MBP meetings, are open to the public and provide an opportunity for regular public involvement.

Public review opportunities for this Final Draft of the CCMP included both the Management Conference, by repeating the process described in the previous paragraph, and a formal public review process. With respect to the latter and as advertised twice in the "Monitor" in mid- and late-December, 1995, a formal Public Meeting to review and comment on the CCMP was held on January 23, 1996, in the auditorium of the Commonwealth's Hurley Building, downtown Boston. The "Monitor" is published by the Massachusetts Environmental Policy Act (MEPA) office to announce the status of MEPA projects, as well as to advertise any pertinent environmental decisions and events. It is distributed free of charge to over 2,500 members of the public, government officials, non-profit organizations, and consultants who have an interest in environmental issues in Massachusetts. This Final Draft of the CCMP, and all its supporting appendices and documentation, was made available for public inspection at the MBP office in Boston and was mailed out on request. The MBP established a comment period for the CCMP, which ran through January 31, 1996.

Many constructive comments were received from a wide variety of governmental and public representatives. A summary of the comments received within the public comment period, with proposed responses, was reviewed and approved by the Management Committee on February 7, 1996. A few comments were received shortly after the January 31, 1996 closing date; the responses to these comments did not substantially change the content of the CCMP. Accordingly, all comments on the CCMP and the MBP's written responses are included in Appendix G.

Appendices

Appendix A.

The Management Framework

APPENDIX A.
THE MANAGEMENT FRAMEWORK IN MASSACHUSETTS BAYS

The wise management and use of the resources in Massachusetts Bays come under the purview of a variety of legislative mandates and regulatory agencies at the federal, state, regional, and local levels. In addition, there are a number of nonregulatory programs carried out by governmental entities, including regional planning agencies, that play a role in restoring and protecting Massachusetts Bays. This appendix provides both an overview of the existing governmental framework and a context for many of the recommendations described in the CCMP Action Plans. It also supports Appendix E, the Management Characterization for the Massachusetts Bays.

Federal Agencies

US Environmental Protection Agency

The US Environmental Protection Agency (EPA) operates under several important pieces of federal legislation of concern in Massachusetts Bays. These include: the Clean Water Act (CWA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the National Environmental Policy Act (NEPA); and the Marine Protection, Research, and Sanctuaries Act (MPRSA).

The CWA regulates "discharges" of "pollutants" from point sources into waters of the United States. Its coverage includes, among other things, effluent discharges from sewage treatment plants and industrial facilities, and discharges of dredged and fill material into wetlands, estuaries, and other waters.

Under the Clean Water Act, as amended by the Water Quality Act of 1987, EPA is responsible for:

- Coordinating the National Estuary Program, of which Massachusetts Bays is one of 28 "estuaries of national significance." EPA-New England has direct responsibility for the administration of the Massachusetts Bays Program.
- Regulating industrial discharges and publicly owned sewage treatment facilities under the National Pollutant Discharge Elimination System, which governs point source pollution.
- Reviewing and approving state surface water quality standards to ensure their consistency with federal law.
- Overseeing the states' primary responsibility for controlling nonpoint source pollution, such as agricultural and stormwater runoff.
- Protecting wetlands and other waters by co-administrating, with the US Army Corps of Engineers, a permitting program that regulates the discharge of dredged or fill material into waters of the United States.
- Administering the Construction Grants Program and the State Revolving Loan Funds.

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, and the amendment SARA, better known as Superfund, EPA provides emergency response and cleanup capabilities for chemical spills and releases from hazardous waste treatment, storage, and disposal facilities.

The National Environmental Policy Act of 1970 requires that an Environment Impact Statement (EIS) be prepared for all proposed legislation and all major federal activities that could significantly affect the quality of the human environment.

EPA's responsibilities under the Marine Protection, Research, and Sanctuaries Act include the development and implementation of regulatory programs to ensure that ocean disposal (e.g., of dredged material) will not adversely affect human health and the marine environment, among other considerations. In particular, EPA oversees the review and issuance of dredged material disposal permits, monitors the environmental effects of dredged material disposal jointly with the U.S. Army Corps of Engineers, and designates sites suitable for ocean disposal.

US Army Corps of Engineers

The U.S. Army Corps of Engineers (ACOE) provides engineering services and construction support for a wide variety of military and civilian projects. The ACOE's primary civil role is to develop and manage the country's waterways and wetlands. Its projects include reducing flood damage, improving harbors and navigation channels, protecting stream banks and shorelines, and other activities aimed at preserving and safeguarding the environment.

The ACOE issues permits (under the CWA and MPRSA) for discharges of dredged or fill material to wetlands and other waters, including ocean waters. In addition, under the Rivers and Harbors Act, the placement of structures (such as piers, docks, and ramps) or any dredging activities (including dredging and the discharge of dredged material) in or

affecting traditionally navigable waters may also require an ACOE permit.

As part of its navigational responsibilities, the ACOE develops, maintains, and improves harbors and waterways to meet commercial and recreational needs. For example, operating and maintaining the 17.5-mile-long Cape Cod Canal is under the jurisdiction of the ACOE. The ACOE also helps to protect and restore shores and beaches from erosion damage.

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) is part of the Department of Commerce. As the nation's lead marine science agency, NOAA's mission includes research, data collection and assessment, and management of the nation's marine, estuarine, and coastal resources. While many of NOAA's programs have some linkage to and support research and management activities in Massachusetts and Cape Cod Bays (e.g., the National Weather Service, the Coast and Geodetic Survey, the NOAA Fleet, the National Undersea Research Centers, the National Sea Grant Programs, and the many environmental research and monitoring programs supported by NOAA), the three NOAA programs that have the greatest connection to the Bays are the Northeast Regional Office of the National Marine Fisheries Service, the Stellwagen Bank National Marine Sanctuary, and the funding provided by NOAA for the Massachusetts Office of Coastal Zone Management.

The mission of the National Marine Fisheries Service (NMFS) is to "achieve a continued optimum utilization of living resources for the benefit of the nation." The Northeast Regional Office, located in Gloucester, and the NMFS Northeast Fishery Science Center, in Woods Hole, play a pivotal role in providing a better understanding of, and thereby better managing, the living marine resources of the Bays. The Northeast Regional Office reviews coastal development projects of regional significance and oversees the management of critical fisheries resources and protected species. The Northeast Fishery Science Center monitors the status of fish stocks and conducts critical research on fish and marine mammals that are the livelihood of many in the region.

The Stellwagen Bank National Marine Sanctuary is a 638 square nautical mile area located at the seaward edge of the Bays between Cape Cod and Cape Ann. It was designated by Congress in 1992 to protect the rich biological productivity and diversity of this important offshore bank in the Gulf of Maine. The Sanctuary oversees and helps to coordinate all federal activities that may affect Sanctuary resources, and conducts education and outreach, research, and management programs to assist the Sanctuary staff in this oversight role. Human activities that may affect Sanctuary resources are regulated both by the Sanctuary and by other federal agencies, in collaboration with the Sanctuary staff, that have regulatory authority over Sanctuary resources.

With respect to implementation of any CCMP Action Plans and recommendations which could affect a federally listed threatened or endangered species (or the designated critical habitat of a listed species), a federal agency which authorizes, funds, or otherwise carries out an implementation activity must consult with USFWS and/or NMFS to ensure that appropriate protections are in place, pursuant to Section 7 of the Endangered Species Act (ESA). In addition, federal agencies must "conference" with USFWS and NMFS, as appropriate under Section 7, to ensure that federal activities consider potential jeopardy to species which have been proposed for ESA listing but whose listing has not yet been finalized.

The Coastal Zone Management Act of 1972, administered by NOAA, provides funds, policy guidance, and technical assistance to coastal states to help them establish and maintain coastal zone management programs. Such programs are designed to promote the wise use and protection of coastal land and water resources. The Massachusetts Coastal Zone Management Program was the first state effort on the east coast and the fourth in the nation to receive federal approval in 1978.

As required by the Coastal Zone Management Act, the state program reviews all federally conducted or supported activities that directly affect the coastal zone. The purpose of the review is to ensure that these activities are in compliance with approved state environmental programs. This Federal Consistency review process is a powerful implementation tool to protect and manage the coastal zone in Massachusetts Bays.

The Massachusetts Bays Program is administered by the Massachusetts Office of Coastal Zone Management in conjunction with EPA-New England.

USDA Natural Resources Conservation Service

Formerly the Soil Conservation Service, NRCS is part of the US Department of Agriculture (USDA). NRCS supports local communities in the areas of agricultural waste and stormwater runoff management, which are two nonpoint pollution sources in Massachusetts Bays. In the past, NRCS focused primarily on agricultural practices. Recently, NRCS has redirected its efforts to provide technical assistance to communities experiencing impacts from development.

In addition, USDA is in the process of implementing a new program, the hydrographic unit initiative, in response to Presidential concern for the declining quality of the nation's

ground and surface water. Under this initiative, NRCS has begun a three-year program to provide education and technical assistance to reduce nonpoint source pollution from agricultural operations and stormwater.

US Fish and Wildlife Service

The US Fish and Wildlife Service has the principal federal responsibility for conserving the nation's fish and wildlife, including their related habitats. The Service operates under a variety of federal conservation statutes in implementing this mission; administers the National Wildlife Refuge System, a national system of fish hatcheries and research centers; and operates several hundred field offices involved in all aspects of wetlands protection, fish and wildlife surveys, contaminants cleanup, and endangered species protection.

Although the Service has no direct regulatory control concerning discharges of pollutants into waters of the United States or discharge of dredged or fill materials, the agency plays a direct advisory role in these regulatory practices. Under the Fish and Wildlife Coordination Act, the Service must assess the impacts on fish and wildlife of all water and water-related development projects that are funded by the federal government or constructed under a federal permit or license. The Service provides information to federal construction or regulatory agencies and to permit applicants. Such involvement includes analyzing and reporting on construction proposals and applications for dredge and fill permits issued by the ACOE, ocean dumping permits issued by the EPA, bridge and causeway permits issued by the Coast Guard, license applications submitted to the Federal Energy Regulatory Commission, and any proposed federal construction affecting fish and wildlife resources.

Actions authorized, funded, or carried out by federal agencies which may affect a federally-listed threatened or endangered species require the Service's review under the Endangered Species Act. All such federal or federally-authorized projects are reviewed to ensure that their activities do not jeopardize the existence of a threatened or endangered species or result in the destruction or modification of their critical habitat.

The Service is also a coastal landowner via its acquisition of significant migratory bird habitat (under the Migratory Bird Conservation Act), habitat for endangered species (under the Endangered Species Act), and recreation and wilderness areas (under the Land and Water Conservation Fund Act). All acquisitions become part of the National Wildlife Refuge System.

The Fish and Wildlife Service also exercises other conservation activities pursuant to the Oil Pollution Act; the Comprehensive Environmental Response, Compensation and Liability Act; the Coastal Barrier Resources Act; and the Coastal Wetlands Planning, Conservation and Restoration Act.

US Coast Guard

The U.S. Coast Guard ensures that vessels and marine transportation related facilities are in compliance with numerous federal regulations promulgated to reduce environmental impacts in the coastal zone. Pollution prevention and safety are critical to the safety of the marine environment. When accidents happen, the Coast Guard has responsibility under the Federal Water Pollution Control Act (FWPCA), as amended, and the Comprehensive Environmental Response, Compensation, and Liability Act to monitor and direct the removal of oil or hazardous substances from the coastal zone. The Coast Guard, under authority of amendments to the FWPCA, also ensures compliance with Marine Sanitation Device regulations. Certain vessel waste disposal policies set by the International Convention for Prevention of Pollution from Ships (MARPOL) are implemented in the U.S. through both the Act to Prevent Pollution from Ships and the Ports and Waterways Safety Act. The Coast Guard ensures that vessels and facilities meet the standards of the regulations through inspections, boardings, routine patrols, and investigations. Other Coast Guard missions, such as maintaining navigational aids, support marine environmental protection by ensuring the safety of life and property on the nation's navigable waters. Additionally, the Coast Guard enforces regulations promulgated by other agencies, such as the National Marine Fisheries Service, that ensure appropriate use of our marine resources.

US Food and Drug Administration

The US Food and Drug Administration is responsible for the safety of the nation's foods, including seafood. The FDA has authority to prescribe the level of contaminant that will render a food adulterated by establishing an **action level** (an informal judgment about the level of a food contaminant to which consumers may be safely exposed) or a **tolerance** (a regulation having the force of law).

The FDA also develops methods for detecting, quantifying, and identifying contaminants in shellfish and estuarine waters. The FDA supports the National Shellfish Sanitation Program (NSSP), a cooperative state/federal/industry program for the sanitary control of the shellfish industry. As part of the NSSP, FDA provides technical assistance to states, such as Massachusetts, in studying specific pollution problems, by providing data to establish closure levels for shellfish harvesting, by conducting applied research in various contaminants to assist in developing standards and criteria, and by evaluating the effectiveness of state shellfish sanitary control programs.

Advisory Council on Historic Preservation

The Advisory Council on Historic Preservation (ACHP) is an independent federal agency established by the National Historic Preservation Act of 1966. The ACHP reviews federally-assisted projects that affect historic properties and works with other federal agencies and the State Historic Preservation Officers (see state MHC) to avoid or reduce harm to those properties under 36 CFR 800, which are the regulations implementing Section 106 of the National Historic Preservation Act of 1966 as amended (16 USC 470f, 1992). The ACHP has published several guides to the federal historic preservation review process.

State Agencies

Executive Office of Environmental Affairs

The Executive Office of Environmental Affairs (EOEA) is a cabinet-level secretariat whose principal authority is to implement and oversee state policies that preserve, protect, and regulate natural resources and the environmental integrity of the Commonwealth of Massachusetts. Of the departments and units within EOEA, the following are most involved with management issues for Massachusetts Bays:

- Massachusetts Coastal Zone Management Office (CZM);
- Massachusetts Environmental Policy Act Unit (MEPA);
- Department of Environmental Protection (DEP);
- Department of Environmental Management (DEM);
- Department of Fisheries, Wildlife, and Environmental Law Enforcement (DFWELE); and
- Office of Technical Assistance for Toxics Use Reduction (OTA).

The responsibilities and activities of these agencies are described below.

Massachusetts Coastal Zone Management

The Massachusetts Coastal Zone Management Office (CZM) develops state policy to protect resources and manage development in the coastal zone. As officially defined, the Massachusetts Coastal Zone extends landward to 100 feet beyond specified major roads, rail lines or other visible rights-of-way and seaward to the edge of the territorial sea; it includes all of Cape Cod, Martha's Vineyard, Nantucket and Gosnold.

Developed under the authority of the federal Coastal Zone Management Act of 1972, the Massachusetts Coastal Zone Management Plan was approved in 1978 and established twenty-seven policies to protect and manage the Commonwealth's coastal zone and its valuable resources.

CZM is a planning and policy agency. To carry out its responsibilities, the agency relies upon existing state regulatory authority and the federal consistency review process. CZM also administers a number of local financial assistance grant programs and provides technical assistance to local communities. The primary areas of CZM concern include coastal hazards, marine environmental protection, energy, waterfront development and harbor planning, and recreation. CZM also supports scientific studies, mapping projects, and other activities that add to the knowledge of coastal resources and enhance planning and decision-making in Massachusetts. The Coastal Resources Advisory Board (CRAB) and various Citizens Advisory Committees add an essential citizen perspective to CZM's work.

Through the federal Coastal Zone Management Act, CZM is empowered to review all federal activities in Massachusetts which may affect the coastal zone to ensure they are consistent with state coastal policy. Any large coastal project requiring a federal license or permit, implemented by a federal agency, or carried out with federal funds must undergo this CZM consistency review.

The Coastal Facilities Improvement Program is administered by CZM to assist eligible coastal communities in the construction, reconstruction, repair, or maintenance of coastal facilities, as well as the preparation of municipal harbor plans.

Massachusetts Environmental Policy Act Unit

The Massachusetts Environmental Policy Act (MEPA) Unit directs state agencies, in their permitting and licensing of proposed development, to review, evaluate, and determine the impact on the natural environment of these works, projects, or activities and to use all practicable measures to mitigate their impacts and minimize damage to the environment. Regulations under Title 301 of the Code of Massachusetts Regulations (CMR) Chapter 11.00 define which projects are subject to MEPA review. Projects below thresholds are exempt, although larger projects or projects in sensitive areas are likely to trigger MEPA review.

Department of Environmental Protection

The Department of Environmental Protection (DEP) administers most of the Commonwealth's environmental regulatory programs. These programs address a variety of concerns including air and water quality, solid and hazardous waste disposal, and development of wetlands and waterways. The following discussion describes the divisions most closely related to the CCMP.

Division of Wetlands and Waterways

The Division of Wetlands and Waterways administers three programs -- the Coastal Wetlands Restoration Program (Massachusetts General Laws, Chapter 130, Section 105), Wetlands Protection Program (Massachusetts General Laws, Chapter 131, Section 40), and the Waterways Act (Massachusetts General Laws, Chapter 91).

- *Wetlands Protection* -- Conservation Commissions are the first line of defense in wetlands protection under the Massachusetts Wetlands Protection Act. They have primary authority to review projects proposed in or near wetlands, and issue Orders of Condition, which are written statements that control the impact of activities in wetlands by stating the conditions under which the activities must take place. Regulations and policies to guide the conditioning process are developed by the Division of Wetlands and Waterways. The division reviews local Conservation Commission decisions which have been appealed. All decisions by DEP may be appealed to an adjudicatory hearing.

- *Chapter 91 (Waterways) Licensing* -- Massachusetts General Law Chapter 91 requires that DEP review and license activity in state waterways. Activities which require Chapter 91 licenses include the placement of piers, wharves, and other structures or fill; changes in use of existing structures and fill; and dredging. Before a Chapter 91 license is issued, Wetlands and Waterways must determine that the proposed project will not interfere with navigation or the operation of public facilities; is structurally sound; promotes public access and will not diminish public rights or the rights of adjacent shoreline property owners; and finally, will not adversely impact environmental resources such as wetlands, fish runs, shellfish beds, and fish spawning and nursery areas.

Division of Water Pollution Control

The Division of Water Pollution Control (DWPC) is the lead unit for improved water quality and waterpollution prevention in accordance with the provisions of the Massachusetts Clean Water Act. Section 401 of the Federal Clean Water Act gives the State the authority to deny, grant, or condition certification of any federal license for an activity that involves a discharge, to ensure that the activity satisfies the water quality requirements of state law. The DEP's authority to issue, condition, or deny the water quality certification extends to, for example, NPDES permits issued by EPA; Rivers and Harbors Act s.10 permits issued by the Corps of Engineers for dredging activities; and CWA s.404 permits issued by the Corps for discharges of dredged of fill material. (The authority to issue s.401 certifications for s.404 permits resides with the DEP Division of Wetlands and Waterways.) NPDES permits are jointly issued by DEP and EPA, who develop discharge limits to ensure compliance with technology-based requirements and water quality standards. Groundwater permits are required for discharges greater than 10,000 gallons of sewage and for any industrial waste. In addition, the DWPC administers the Massachusetts Nonpoint Source Management Program.

Bureau of Municipal Facility Grants and Loans

The Bureau of Municipal Facility Grants and Loans administers the state/federal construction grants program which evolved from a previous federal and state combined grant program that once provided both state grants for planning, and federal and state grants for the construction of municipal sewage treatment plants. This program is now principally a loan program under a state revolving fund. A construction grants program is also available. This program is directed at wastewater projects that are not funded by the federal program or have lower priority in the federal system.

Division of Hazardous Waste

The Division of Hazardous Waste regulates transportation, storage, and disposal of waste materials within the Commonwealth, and monitors the environmental impact of these materials with regard to public health and safety. The Division licenses haulers of hazardous waste, uses computers to track waste disposal, and penalizes offenders of state and federal hazardous waste regulations. The Division also works to clean up existing hazardous waste sites, and assists communities in cleaning up oil and chemical spills.

Division of Solid Waste Management

The Division of Solid Waste Management regulates solid waste generated by municipalities, industry, commercial sources, and consumers. The Division assesses waste sites and waste facilities, and enforces all provisions of the Massachusetts Solid Waste Act. The Division also develops and manages programs for recycling, composting, and other technologies for waste minimization and source reduction.

Department of Environmental Management

The Department of Environmental Management (DEM) is responsible for preserving and protecting the natural resources of the Commonwealth and for managing state lands and waters. The programs of the following offices are most closely related to the CCMP:

Office of Natural Resources

The Office of Natural Resources provides for the long-term protection, and the public use and enjoyment, of natural resources. Activities include land acquisition, resource management planning for parks and trails, critical resource identification and protection, and municipal technical assistance and greenway grant programs. The Resource

Management Planning Program develops long range resource management plans ("GOALS" plans) for Massachusetts State Forests and Parks and identifies significant "Wildlands" areas of Forests and Parks for designation and protection. The Area of Critical Environmental Concern (ACEC) Program identifies critical resource areas for designation as ACECs, facilitates state agency actions and coordination to protect ACECs, and supports local and regional actions for long-term ACEC management and preservation. The Coastal Access - Sea Path Program coordinates, promotes, and implements the establishment of community shoreline pathways or "Sea Paths" along the intertidal zone for use of walkers or hikers. The Bikeways and Rail Trails Program acquires, plans for, and implements conversion of former railroad rights-of-way into long distance recreation trails.

Office of Water Resources

The Office of Water Resources has three priorities: to collect, refine, and update basic water resources data for dissemination to state, federal, and local agencies and the general public; to prevent loss of life and damage to property through flood control; and to facilitate the development of a comprehensive water resources management plan for Massachusetts.

The Office acts as state coordinator for the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA).

Also, the State's Ocean Sanctuaries Program is located in this Office. The Ocean Sanctuaries Act (Massachusetts General Laws Chapter 132A, Section 13-16 and 18) established sanctuary areas that must receive a special level of protection from "...any exploitation, development, or activity that would seriously alter or otherwise endanger the ecology or the appearance of the ocean, the seabed, or subsoil."

Office of Waterways

The Office of Waterways improves, develops, maintains, and protects the Commonwealth's inland and coastal waterways. Specific programs include the Rivers and Harbors Program, which identifies the need for renovations and improvement to the state's inland and coastal waterways; waterways projects, which include dredging to maintain navigable channels, beach nourishment, and the construction and rehabilitation of piers and other coastal facilities; the State Piers in Gloucester, New Bedford, and Fall River, which are administered by the Office of Waterways and leased to private operators and managers; recreational facilities projects, including capital improvements to existing state recreational facilities (beaches, etc) and construction of new ones; and public access projects, including the design and construction of marinas, boat ramps, and Public Access Board projects funded by the Department of Fisheries, Wildlife and Environmental Law Enforcement, but administered by the Office of Waterways as the contracting agent.

Department of Fisheries, Wildlife and Environmental Law Enforcement

The Department of Fisheries, Wildlife, and Environmental Law Enforcement (DFWELE) is responsible for the management and conservation of the Commonwealth's fresh and saltwater fisheries and its wildlife, including rare and endangered species. The Department enforces the state's wildlife laws and regulations, and conducts research on wildlife and the environmental factors that influence them. The Department also has jurisdiction over registration and operation of motorboats and off-road vehicles, and operates 140 public access sites statewide.

Division of Marine Fisheries

The Division of Marine Fisheries protects and enhances the state's living marine resources, especially commercially and recreationally caught shellfish, lobster, and finfish. As part of its management responsibilities, the Division issues permits for the taking, harvesting, and landing of fish for commercial purposes as well as permits for the recreational harvest of lobsters. A unique feature of the Massachusetts fisheries laws provides local control of shellfish, eels, sea worms, and alewives.

The Division administers the Shellfish Sanitation Program and determines the classification of shellfish areas within the state. It also works to promote and develop Massachusetts' commercial and recreational fisheries and to implement strategies that will maintain the integrity and future availability of the Commonwealth's valuable marine resources.

Riverways Program

The mission of the Riverways Program is to promote the restoration and protection of the ecological integrity of the Commonwealth's watersheds: rivers, streams, and adjacent lands. The Riverways Program was established within DFWELE in 1987 in recognition that river and stream corridors are a crucial component of the state's ecological infrastructure and that protection of these watershed resources could not be accomplished through land acquisition alone. The Riverways Program was created to encourage and support local river protection initiatives as a vital complement to state action.

The primary activity of the Riverways Program is to provide technical assistance and outreach to communities, citizens groups, and others on various aspects of river, stream, and watershed protection, restoration, and stewardship, including the following:

- assisting the formation/strengthening of watershed associations, "Adopt-a-Stream" groups, Stream Teams, and other citizen initiatives for the protection of specific rivers/streams;

- preparing and distributing a newsletter, workbooks, brochures, and other "how to" publications for river and watershed protection and maintaining a resource library of similar publications gleaned from across the U.S. and Canada;

- conducting training sessions for citizens on specific river conservation tools such as shoreline surveys, formulating action plans, and effective advocacy techniques;

- disseminating notices of permit reviews and other pending government actions affecting rivers to citizens groups and providing guidance on how to evaluate environmental impact and participate in government decisionmaking; and

- assisting communities in drafting and adopting river protection bylaws, ordinances, and other local regulatory techniques.

In addition, the Riverways Program serves as the primary advocate for rivers on a statewide basis and seeks to protect their natural integrity through a variety of means, such as:

- formulating and promoting statewide policies and legislation for river protection;

- encouraging increased recognition of the importance and necessity for river and watershed protection within other state and federal agencies and programs; and

- encouraging the establishment of public/private partnership and other joint ventures for river/watersheds protection in coordination with the Executive Office of Environmental Affairs.

Since its establishment eight years ago, the Riverways Program has helped to generate and/or sustain a number of successful river protection initiatives at the local and statewide level. Local efforts include:

- supporting watershed associations in each of the state's 28 major river basins and over 140 Adopt-a-Stream groups in the preparation of educational curricula, riparian land mapping, shoreline surveys, water quality monitoring, and other resource protection tools;

- negotiating the donation of land and conservation restrictions protecting several miles of river frontage in conjunction with watershed associations and land trusts, enhancing their ability to attract additional land gifts;

- providing planning and organizational support for Federal Wild and Scenic River studies and designations on the Farmington, Westfield, and Sudbury/Assabet/ Concord rivers; and

- providing staff support and serving as repository for all documents relating to the Merrimack River Initiative.

Office of Technical Assistance for Toxics Use Reduction

The Office of Technical Assistance for Toxics Use Reduction (OTA) is responsible for planning and facilitating the safe and efficient management of hazardous waste in Massachusetts. The OTA formerly sponsored the Household Hazardous Waste Program, which funded community collections of household hazardous waste. OTA works to increase public awareness of the larger problem of hazardous waste disposal statewide. It conducts projects on source reduction and recycling within industry. This program employs technical audit teams -- a free multi-media, nonregulatory service provided to businesses with industrial discharges.

Department of Public Health

The Massachusetts Department of Public Health, which is housed within the Executive Office of Human Services, is the state agency responsible for disease prevention. This administrative mandate encompasses a broad spectrum of public health issues relating to environmental health, communicable disease control, community health, health care quality, and health education. The divisions within the Department whose activities most closely relate to the goals and objectives of the CCMP are highlighted below.

Division of Communicable Disease Control

The Division of Communicable Disease Control conducts epidemiological investigations of foodborne illnesses to determine their source, and implements disease prevention strategies to minimize further transmission of disease.

Division of Food and Drugs

The Division of Food and Drugs is the regulatory branch of the Department. The Division enforces state and federal regulations regarding the wholesomeness of food products, performs inspections of food establishments for compliance with hygienic standards, and conducts field investigations of foodborne illnesses.

State Laboratory Institute

The State Laboratory Institute analyzes fish, shellfish, and biological fluids for bacterial contamination and marine biotoxins. The laboratory data are useful for determining the

cause of an acute foodborne illness and for ensuring compliance with existing regulatory limits. In the past, the laboratory also tested food, environmental, and biological samples for a variety of chemical contaminants of chronic health concern.

Division of Environmental Epidemiology and Toxicology

The Division of Environmental Epidemiology and Toxicology evaluates the risk of exposure to chemical contaminants by performing quantitative risk assessments, health assessments, and epidemiological studies. The Division may recommend a variety of exposure reduction strategies including regulatory action and public health advisories.

Massachusetts Historical Commission

The Massachusetts Historical Commission (MHC) was established in 1963 to assist in protecting and preserving the state's significant historic and archaeological resources. The passage of the National Historic Preservation Act in 1966 created a broad, national historic preservation program, and directed each state to appoint a State Historic Preservation Officer (SHPO), who is responsible for implementing the provisions of the NHPA at the state level; for coordinating local, state, and federal preservation efforts; and for developing comprehensive, statewide historic preservation planning. In Massachusetts, the SHPO is the Executive Director of the MHC. In carrying out its mandates under both state and federal law, the MHC has developed a number of historic preservation programs, including: compiling and maintaining a statewide inventory of historic and archaeological resources; nomination of significant properties to the National Register of Historic Places; technical assistance to municipalities, state and federal agencies, and the public; involvement in environmental review and historic preservation planning for state and federally-assisted projects; grants-in-aid programs for historic preservation activities; and a broad public information program.

MHC reviews projects that require federal or state funding, licenses, permits, and approvals under Sections 106 and 110 of the National Historic Preservation Act of 1966 as amended (16 USC 470f & 470h-2, 1992), and its implementing regulations (36 CFR 800), and MGL c.9, ss. 26-27C (950 CMR 71). This review process identifies historic and archaeological resources that may be affected by new construction, demolition, and rehabilitation, and provides a formal consultation process that seeks alternatives to avoid, minimize, or mitigate impacts to significant cultural resources.

The MHC is also the Office of the Massachusetts State Archaeologist, who issues permits for archaeological investigations on public lands and projects under review by municipalities, counties, and state and federal agencies, under the provisions of MGL c.9, ss. 26A and 27C (950 CMR 70). The permit process ensures the conservation of archaeological resources and the highest quality of archaeological research. The State Archaeologist reviews permit applications for archaeological investigations to evaluate the qualifications of archaeological research teams and the soundness of archaeological research programs.

MHC has developed a revised *Massachusetts State Historic Preservation Plan* (1995), and has published regional overviews of the historic and archaeological resources that are relevant to the coastal regions. These include: *Historic and Archaeological Resources of the Boston Area, Historic and Archaeological Resources of Southeast Massachusetts,* and *Historic and Archaeological Resources of Cape Cod and the Islands.*

Regional Planning Agencies

Regional planning in Massachusetts is carried out by 13 Regional Planning Agencies (RPAs) formed under Chapter 40B of Massachusetts General Laws. The RPAs represent the participating cities and towns in each region and employ professional staff that carry out planning activities. The RPAs compile data, conduct research, and prepare comprehensive plans for their area's physical, social, and economic development.

Four RPAs represent the 49 coastal communities of the Massachusetts Bays area. These are: Merrimack Valley Planning Commission (MVPC), Metropolitan Area Planning Council (MAPC), Old Colony Planning Council, and Cape Cod Commission (CCC). Planning staff from each of these RPAs provide a broad range of technical assistance to their respective communities and produce regional plans in the areas of environmental protection, housing, and transportation.

A significant new approach toward regional planning may be on the horizon for Massachusetts. Beginning in 1986, the then Cape Cod Planning and Economic Development Commission (CCPEDC), predecessor to the Cape Cod Commission, embarked on an innovative approach to planning for the future of Cape Cod. Through a process of consensus-building, citizens of the Cape identified a need to have more effective land use planning, and to have greater authority to regulate land use, control urbanization, and better manage shared resources. The result was a proposal to create a Cape Cod Commission with certain regulatory and regional powers. In November 1988, 76% of Cape Cod

voters supported a non-binding referendum to establish the Cape Cod Commission. In January 1990, state legislation was passed to create the Cape Cod Commission. This legislation was ratified by the voters of Cape Cod in a special countywide election on March 27, 1990.

Through grants from the Massachusetts Bays Program, the four coastal RPAs in the Bays region have established a highly effective water quality technical assistance program. RPA staff provide support for the regional local governance committees, guide demonstration projects, and assist in obtaining funds for local implementation of the CCMP. Continuation of this technical assistance program is a key part of the long-term implementation strategy for the CCMP.

Local Agencies

The Commonwealth of Massachusetts has a long-standing tradition of local self-determination or home rule. But it was not until 1966, with the adoption of the Home Rule Amendment to the state's constitution, that this philosophy changed the thinking and actions of legislation and court decisions in Massachusetts. Generally, municipalities are authorized to exercise through the "adoption, amendment, or repeal of local ordinances or by-laws...any power or function...not denied" by the State. This is one of the strongest declarations in this country of the right to local control. The legislature, while it has the authority, has rarely used its power to preempt local initiative.

Home rule authority is highly valued and strongly defended in Massachusetts communities. Land use controls, in particular, are viewed as a local prerogative. In the Massachusetts Bays region, attention to land use issues is of vital importance to environmental quality and conservation of resources. However, towns and cities must follow ground rules for local governments as stipulated in state law. Legal decisions that strike down local controls are most likely to be based on procedural problems than on the substance of what the community is attempting to accomplish.

Boards of Health

Towns elect a Board of Health (most have three members), or the selectmen can act in this capacity. A Board of Health has far-reaching authority in exercising its responsibility to protect the health, safety and welfare of the community. Their broad regulatory authority has thrust them into the forefront of environmental protection on the local level. Boards of Health can adopt regulations for any activity that might endanger public health or contaminate surface or groundwater. In many communities, the chief duties of Boards of Health have become the regulation of landfills and approval of septic system installations. Under Title 5 (State Sanitary Code), health boards issue permits for any septic system receiving up to 10,000 gallons per day (e.g., a large condominium project); larger systems must be approved by DEP. In granting or denying a permit, the Board relies primarily on two tests: a percolation test to see if the soil will pass liquid through at a reasonable rate, and a deep-hole test to determine the level of groundwater.

Boards of Health have a major role in subdivision review. They have special authority over drainage and waste disposal in proposed subdivisions. Every definitive subdivision plan must be submitted to the board for its recommendations to the Planning Board. If the Board of Health rejects a plan, providing specific reasons why areas are not suited for building, the Planning Board cannot override the decision. However, there must be evidence that a serious pollution problem is likely to occur if the development goes forward.

Conservation Commissions

The Conservation Commission Act of 1957 enabled local towns to establish a special commission to protect natural resources, serve as an advisor in municipal decision-making, accept gifts of money and land, and regulate local wetland use. When the DEP developed its regulations for the Wetlands Protection Act in 1978 and 1983, most municipalities that had not yet established a Conservation Commission found it necessary to do so in order to administer new and relatively stringent state wetland regulations. Commissions consist of three to seven members appointed by the selectmen.

Conservation Commissions determine if a proposed project will alter wetland resources and what conditions are required to protect statutory wetland interests such as protection of water supplies, prevention of storm drainage, prevention of pollution, and protection of fisheries and wildlife habitat. Commissions have the authority to order modifications of a proposed project if they determine that it will damage or destroy a wetland resource. Conservation Commissions have authority to regulate activities within 100 feet of inland and coastal wetlands, and land under water bodies and waterways.

Home rule allows the municipalities to expand state regulations by adopting local wetland bylaws. These bylaws may give Conservation Commissions the authority to adopt regulations, tighten permit requirements, and add wetland values to be protected. Conservation Commissions also have the authority to accept and hold permanent or temporary conservation restrictions. These restrictions authorize and enable the Commission to prevent landowners from using their land in a way that damages natural resources. Conservation Commissions can also acquire outright conservation lands that are valuable for habitat protection, aquifer protection, open space, or any other environmental value.

Harbormasters

Harbormasters have broad powers to regulate uses and activities of waterways. The Harbormaster is typically appointed by the Selectmen to oversee harbor activities and enforce Massachusetts General Laws Chapter 90B Section 15B. These regulations authorize towns, through their Harbormasters, to regulate vessels in municipal waterways. The regulations address the safe operation of boats, boat speed limits, channel obstructions, boat seaworthiness, fishing, swimming, diving, and refueling. Some municipalities have harbor regulations that limit the number of moorings to avoid crowding and boat pollution in certain areas. Harbor regulations may also prohibit the discharge of trash, oil, and untreated sewage into town waters.

Planning Boards

Planning Boards are authorized by Massachusetts General Laws Chapter 41 (containing the municipal planning and subdivision control acts) to plan for the "resources, possibilities, and needs" of their communities, including the protection of natural resources. Planning Boards contain from five to nine members. Towns have the option of deciding by town meeting vote whether the Board shall be appointed by the Selectmen or elected by the voters.

Planning Boards are generally responsible for community development through the adoption and implementation of zoning and subdivision ordinances or bylaws. Zoning is one of the basic powers conferred on local government under home rule. Zoning in Massachusetts is employed to guide the physical development of a community by dividing the municipality into zones and specifying the permissible land use (e.g., residential, commercial, industrial).

Subdivision regulations govern the process of dividing a parcel of land into two or more lots. Under these regulations, Planning Boards generally require each developer to submit a subdivision plan for approval prior to the start of any construction. Approval or nonapproval is based on compliance of the proposed development with standards as provided in the local subdivision regulations.

Zoning Boards of Appeals

Boards of Appeals were established by Massachusetts General Laws Chapter 40A to authorize zoning variances to alleviate individual hardship from subdivision control and zoning by-laws or ordinances. In addition, decisions may also be appealed to the Superior Court. The Mayor (subject to confirmation of the City Council) or Board of Selectmen appoint the three or five-member Zoning Board of Appeals. Under the law, no variances can be granted unless three circumstances existing on a property create a hardship for the owner and entitle that owner to a variance: soil conditions, shape of lot, and topography. The other major duty assigned to Boards of Appeals is to hear and decide applications for special permits. Often this involves permits in special zoning areas, such as an overlay protection district. The Boards of Appeals also are empowered to issue comprehensive permits under the affordable housing provisions of Chapter 40B.

Local Historical Commissions

Local historical commissions are public agencies within municipal government established pursuant to GL c. 40 ss. 8D or special legislation. They are responsible for community-wide historic preservation planning. Their duties include compiling a comprehensive inventory of historic and cultural resources, developing recommendations to protect these resources, and advising the city or town on historic preservation matters.

Local Historic District Commissions

Local historic district commissions are public agencies within municipal government established under GL c. 40C or special legislation. They administer local historic districts or local landmarks through regulatory design review authority over alterations, demolitions, and new construction affecting designated local historic districts or landmarks.

Appendix B.

Acronyms

APPENDIX B. ACRONYMS

A

ACEC	Area of Critical Environmental Concern
ACOE	Army Corps of Engineers
ACP	Area Contingency Plan
ASP	Amnesic Shellfish Poisoning

C

CAC	Citizens Advisory Committee of the MBP
CA/T	Central Artery/Tunnel Project
CCC	Cape Cod Commission
CCMP	Comprehensive Conservation and Management Plan
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
cfs	cubic feet per second
CSO	Combined Sewer Overflow
CZM	Coastal Zone Management Office

D

DEM	Department of Environmental Management
DEP	Department of Environmental Protection
DFWELE	Department of Fisheries, Wildlife and Environmental Law Enforcement
DMF	Division of Marine Fisheries
DPA	Designated Port Area
DPH	Department of Public Health
DSP	Diarrhetic Shellfish Poisoning
DWPC	Division of Water Pollution Control

E

EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EOEA	Executive Office of Environmental Affairs
EPA	Environmental Protection Agency

F

FDA	Food and Drug Administration

M

MAPC	Metropolitan Area Planning Council
MassGIS	Massachusetts Geographic Information System
MBDS	Massachusetts Bay Disposal Site
MBP	Massachusetts Bays Program
MDC	Metropolitan District Commission
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
mgd	million gallons per day
MSD	Marine Sanitation Device
MVPC	Merrimack Valley Planning Commission
MWRA	Massachusetts Water Resources Authority

N

NAS	National Academy of Sciences
NETSU	Northeast Technical Services Unit
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSSP	National Shellfish Sanitation Program
NWR	National Wildlife Refuge

O

OCPC	Old Colony Planning Council
ODES	Ocean Data Evaluation System
ODMDS	Ocean Dredged Material Disposal Site
OWOW	Office of Wetlands, Oceans and Waterways

P

PAC	Port Area Committee
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PSP	Paralytic Shellfish Poisoning

R

RDOA	Request for Determination of Applicability
RPA	Regional Planning Agency

S

SESD	South Essex Sewage District

T

TAC	Technical Advisory Committee of the MBP

U

USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

W

WBNERR	Waquoit Bay National Estuary Research Reserve
WPA	Wetlands Protection Act

Appendix C.

Glossary

APPENDIX C. GLOSSARY

Action Plan. A compilation of agreed-upon goals and objectives, and a list of specific strategies or actions indicating who, what, where, and when the objectives will be achieved.

Aerobic. Living, active, or occurring only in the presence of oxygen.

Algae. Aquatic, non-flowering plants that lack roots and use light energy to convert carbon dioxide and inorganic nutrients such as nitrogen and phosphorus into organic matter by photosynthesis. Common algae include dinoflagellates, diatoms, seaweeds, and kelp.

Algal Bloom. A condition resulting from nutrient levels or other physical and chemical conditions that enable algae to reproduce rapidly.

Amnesic Shellfish Poisoning (ASP). An illness associated with the consumption of shellfish contaminated with domoic acid (an amino acid produced by a diatom). Symptoms of ASP usually develop within 24 hours of eating contaminated shellfish. The acute illness is characterized by gastrointestinal symptoms of vomiting, abdominal cramp, and diarrhea. Within 48 hours, neurological symptoms such as confusion, disorientation, or memory loss may develop. There may be chronic effects associates with ASP which include permanent loss of short-term memory and central nervous system dysfunction.

Anadromous Fish. A species, such as salmon, alewives, or river herring, that is born in fresh water, spends a large part of its life in the sea, and returns to freshwater rivers and streams to reproduce.

Anaerobic. A process occurring in the absence of free oxygen.

Anoxic. A condition in which oxygen is absent.

Antidegradation provision. A provision in the State Water Quality Standards, required by the federal Clean Water Act, which forbids the degradation of existing water quality except in very narrow circumstances.

Aquaculture. The controlled cultivation and harvest of aquatic plants or animals (e.g., edible marine algae, clams, oysters, and salmon).

Area of Critical Environmental Concern (ACEC). An area encompassing land and water resources of regional, statewide, or national importance, designated by the Secretary of the Executive Office of Environmental Affairs (in accordance with 301 CMR[1] 12:6.40-6.55), to receive additional protection and management.

Aromatic Hydrocarbons. Compounds that contain at least one 6-carbon ring; often important components of oils.

Attenuation. The process by which a compound is reduced in concentration over time or distance through absorption, degradation, or transformation.

Barrier Beach. A narrow, low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish, or saline water, or by a marsh system.

Beneficial Uses. Water uses designated in Massachusetts Surface Water Quality Standards -- for public water supply, for protection and propagation of fish and other wildlife, and for primary and secondary contact recreation -- and any other uses that do not impair these designated uses.

Best Management Practice (BMP). Practices used to prevent or reduce adverse water quality impacts resulting from an activity, such as soil erosion and sediment movement from a construction site. The term originated from rules and regulations in Section 208 of the Federal Clean Water Act. Specific BMPs are defined for each pollution source.

Bioaccumulation. The process by which a contaminant accumulates in the tissues of an individual organism. For example, certain chemicals in food eaten by a fish tend to accumulate in its liver and other tissues.

Biochemical Oxygen Demand (BOD). The quantity of oxygen-demanding materials present in a sample as measured by a specific test. A major objective of conventional wastewater treatment is to reduce the biochemical oxygen demand so that the oxygen content of the receiving water body will not be significantly reduced. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Board of Health. A municipal authority, elected or appointed, responsible for administering bylaws addressing health, safety, and welfare issues covered in the State Environmental Code, including Title 5.

[1] CMR=Commonwealth of Massachusetts Regulation

Bordering Vegetated Wetlands (BVW). As defined in 310 CMR 10.55, the Wetlands Protection Act Regulations, freshwater wetlands that border on creeks, rivers, streams, ponds, and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps, and bogs. They are areas where the topography is low and flat, and where the soils are saturated at least part of the year.

Buildout Analysis. A parcel-by-parcel analysis to estimate the total number of existing and developable units, based on current zoning and other land-use regulations. Such an analysis is essential for managing and limiting impacts of growth.

Carcinogen. A substance that causes cancer.

Carrying Capacity. The limit of a natural or man-made system to absorb perturbations, inputs, or population growth.

Cesspool. A covered pit with a perforated lining in the bottom into which raw sewage is discharged: the liquid portion of the sewage is disposed of by seeping or leaching into the surrounding porous soil; the solids, or sludge, are retained in the pit to undergo partial decomposition before occasional or intermittent removal. Cesspools are no longer permitted for waste disposal under Massachusetts Law.

Chlorinated Hydrocarbons (CHCs). All aromatic and nonaromatic hydrocarbons containing chlorine atoms. Includes certain pesticides, polychlorinated biphenyls, and solvents.

Coastal Bank. As defined in 310 CMR 10.30(2), the Wetlands Protection Act Regulations, the seaward face or side of any elevated landform, other than a costal dune, which lies at the landward edge of a coastal beach, land subject to tidal action, or other wetland. A typical working definition is "the first major break in slope above the 100-year flood elevation," but this definition may not apply in certain special circumstances.

Coastal Wetland. As defined in Massachusetts General Law Chapter 131, Section 40, the Wetlands Protection Act Regulations, any bank, marsh, swamp, meadow, flat, or other low land subject to tidal action or coastal storm flowage and such contiguous land as the Commissioner of the Department of Environmental Protection deems necessary.

Coastal Zone. As officially defined in 301 CMR 20.00, the zone that extends landward to 100 feet beyond specified major roads, rail lines, or other visible rights-of-way; includes all of Cape Cod, Martha's Vineyard, Nantucket, and Gosnold; and extends seaward to the edge of the state territorial sea (typically, 3 miles from shore).

Coastal Zone Management (CZM) Program. A federally-funded and approved state program under the Federal Coastal Zone Management Act of 1972. The program reviews federal permitting, licensing, funding, and development activities in the coastal zone for consistency with state policies.

Combined Sewer Overflow (CSO). Any intermittent overflow, bypass, or other discharge from a municipal combined sewer system which results from a flow in excess of the dry weather carrying capacity of the system.

Combined Sewer System. A sewer system which, by design, collects and conveys both wastewater and storm water runoff.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A federal law administered by the Environmental Protection Agency, dealing with the assessment and remediation of hazardous material disposal sites. Superfund activities are performed under this Act.

Conservation Commission. An appointed municipal agency responsible for administering the Wetlands Protection Act at the local level.

Contaminant. A substance that is not naturally present in the environment or is present in unnatural concentrations that can, in sufficient concentration, adversely alter an environment. Federal regulations (40 CFR 230) for the discharge of dredged or fill material into navigable waters regulated by Section 404 of the federal Clean Water Act define a contaminant as a chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment.

Cumulative Effects. The combined environmental impacts that accrue over time and space from a series of similar or related individual actions, contaminants, or projects. Although each action may seem to have a negligible impact, the combined effect can be serious.

Department of Environmental Management (DEM). The state agency responsible for managing natural resources including, but not limited to, water resources. DEM administers the Massachusetts Ocean Sanctuaries Act.

Department of Environmental Protection (DEP). The state agency, formerly known as the Department of Environmental Quality Engineering, responsible for administering laws and regulations protecting air quality, water supply, and water resources, such as Chapter 91 and Title 5, and for administering programs such as the Wetlands Protection Program and Wetlands Restriction Program. It is also responsible for overseeing the cleanup of hazardous waste sites, and responding to hazardous waste emergencies and accidents.

Department of Public Health (DPH). The state agency responsible for disease prevention. Its administrative mandate encompasses a broad spectrum of public health issues relating to environmental health, communicable disease control, community health, health care quality, and health education. The State Laboratory Institute within the Department analyzes fish, shellfish, and biological fluids for bacterial contamination and marine biotoxins. The laboratory data are useful for determining the cause of an acute food-borne illness and for ensuring compliance with existing regulatory limits.

Designated Port Areas. As defined in Chapter 91 Regulation, that portion of certain urban harbors where maritime-dependent industrial uses are encouraged to locate. This concentration of uses maximizes public investments in dredging, bulkheads, piers, and other port facilities.

Diarrhetic Shellfish Poisoning (DSP). An illness caused by eating shellfish contaminated with okadoic acid (which is produced by several species of dinoflagellates of the genus *Dinophysis*). The symptoms of DSP are diarrhea, nausea, vomiting, abdominal cramp, and chills.

Diatom. Minute unicellular or colonial algae with silicaceous cell walls consisting of two overlapping symmetrical parts.

Dinoflagellate. Minute marine algae which move by whipping a thread-like projection; some forms are luminescent, others form toxic "red tides."

Dissolved Oxygen. Oxygen that is present (dissolved) in water and therefore available for fish and other aquatic animals to use. If the amount of dissolved oxygen in the water is too low, then aquatic animals may die. Wastewater and naturally-occurring organic matter contain oxygen-demanding substances that consume dissolved oxygen.

Division of Marine Fisheries (DMF). The agency within the Massachusetts Executive Office of Environmental Affairs responsible for managing the Shellfish Sanitation Program, overseeing shellfish relays, depuration plants, commercial fishing licenses, and management and stock assessment of Massachusetts fisheries.

Drainage Basin. The land that surrounds a body of water and contributes fresh water, either from streams, groundwater, or surface runoff, to that body of water.

Dredging. Any physical digging into the bottom sediment of a water body. Dredging can be done with mechanical or hydraulic machines, and it changes the shape and form of the bottom. Dredging is done in parts of Massachusetts Bays in order to maintain navigation channels that would otherwise fill with sediment and block ship passage.

Ecosystem. A community of living organisms interacting with one another and with their physical environment, such as a salt marsh, an embayment, or an estuary. A system such as Massachusetts Bays is considered a sum of these interconnected ecosystems.

Eelgrass (*Zostera marina*). A marine flowering plant that grows subtidally in sand and mud. Eelgrass beds are an important habitat and nursery for fish, shellfish, and waterfowl.

Effluent. The outflow of water, with or without pollutants, usually from a pipe.

Embayments. A small bay or any small semi-enclosed coastal waterbody whose opening to a larger body of water is restricted.

Enterococcus. A group of bacteria found in the feces of warm-blooded animals indicative of the presence of sewage.

Environmental Protection Agency (EPA). The federal agency principally responsible for administering the Clean Water Act, National Estuary Program, CERCLA, Superfund, and other major federal environmental programs.

Estuary. A semi-enclosed coastal body of water having a free connection with the open sea and within which seawater is measurably diluted with fresh water.

Eutrophication. The process of nutrient enrichment in aquatic ecosystems. In marine systems, eutrophication results principally from nitrogen inputs from human activities such as sewage disposal and fertilizer use. The addition of nitrogen to coastal waters stimulates algal blooms and growth of bacteria, and can cause broad shifts in ecological communities present and contribute to anoxic events and fish kills. In freshwater systems and in parts of estuaries below 5 parts per thousand salinity, phosphorus is likely to be the limiting nutrient and the cause of eutrophic effects.

Executive Office of Environmental Affairs (EOEA). A cabinet-level secretariat whose principal authority is to implement and oversee state policies that preserve, protect, and regulate natural resources and the environmental integrity of the Commonwealth of Massachusetts. (For more information, see Appendix A.)

Fecal Coliform Bacteria. Fecal coliform bacteria are those coliform bacteria that are found in the intestinal tracts of mammals. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces. These organisms may also indicate the presence of pathogens that are harmful to humans. High numbers of fecal coliform bacteria therefore limit beneficial uses such as swimming and shellfish harvesting.

Floodplain. The area of shorelands extending inland from the normal yearly maximum stormwater level to the highest expected stormwater level in a given period of time (e.g., 5, 50, 100 years).

Flushing Time. The mean length of time for a pollutant entering a water body to be removed by natural forces such as tides and currents; also referred to as residence time or turnover time.

Food and Drug Administration (FDA). The federal agency that is responsible for, among other things, administering the National Shellfish Sanitation Program.

General Bylaws. Local laws that can be adopted with a simple majority vote at town meetings. Cities adopt ordinances by a simple majority vote of the city council.

Goal. A general statement describing what is to be achieved in the future. Goals reflect a consensual vision for a specific or general resource.

Grandfathering. A provision from Massachusetts General Law Chapter 40 that allows existing land uses or structures to remain without coming into compliance with upgraded zoning or building requirements.

Habitat. The specific area or environment in which a particular type of plant or animal lives. An organism's habitat must provide all of the basic requirements for life and should be free of harmful contaminants. Typical Massachusetts Bays habitats include beaches, marshes, rocky shores, bottom sediments, intertidal mudflats, and the water itself.

Holding Tank. An enclosed container used as part of a sewage disposal system on a boat. The tank is used to temporarily store sewage for later pumpout at a marina pumpout facility.

Hypoxia. A condition in which oxygen is deficient.

Impervious Material. With respect to Title 5 regulations, a material or soil having a percolation rate greater than 30 minutes per inch; including, but not limited to, bedrock, peat, loam, and organic matter.

Impervious Surface. A surface that cannot be easily penetrated. For instance, rain does not readily penetrate asphalt or concrete pavement.

Industrial Pretreatment. The removal or reduction of certain contaminants from industrial wastewater before it is discharged into a municipal sewer system. Reduced loading of contaminants from industries can reduce contaminant loads to the environment and allow beneficial reuse.

Infiltration. The penetration of water through the ground surface into subsurface soil. Some contaminants are removed by this process.

Leaching Facility. An approved structure used for the dispersion of septic-tank effluent into the soil. These include leaching pits, galleries, chambers, trenches, and fields as described in 310 CMR 15.11 through 15.15.

Loading. The total amount of material entering a system from all sources.

Marine Sanitation Device (MSD). A device installed on a boat to treat or hold sewage. Section 312 of the federal Clean Water Act requires all vessels with installed toilets to have approved MSDs. Federal regulations describe three types of MSDs: Type I and Type II MSDs are treatment devices, while Type III MSDs are holding tanks.

Massachusetts Environmental Policy Act (MEPA). Under Massachusetts General Laws Chapter 30, the state law, administered by the MEPA unit within the Executive Office of Environmental Affairs, establishing a uniform system of environmental impact review.

Massachusetts General Law Chapter 40. The state zoning law for which the municipal Planning Boards and the Zoning Boards of Appeal are responsible.

Massachusetts General Law Chapter 41. The state law governing subdivisions, administered by municipal Planning Boards and Zoning Boards of Appeal.

Massachusetts General Law Chapter 91. The Waterways Licensing Program governing waterfront development in Massachusetts, administered by the Department of Environmental Protection and the Office of Coastal Zone Management.

Massachusetts General Law Chapter 111. State law (Section 40) that vests municipal Boards of Health with the broad authority for maintaining the health, safety, and welfare of the public. Regulations are promulgated under this act through 310 CMR 10.0.

Massachusetts General Law Chapter 131, Section 40. The Wetlands Protection Act (WPA) administered by Conservation Commissions on the municipal level and by the Department of Environmental Protection on the state level.

Massachusetts Ocean Sanctuaries Act. Administered by the Department of Environmental Management, the state law governing activities and structures in the ocean, seabed, or subsoil that would have an adverse affect on the "ecology or appearance" of the ocean sanctuary.

Mean High Water. The average height of the high tides over a 19-year period.

Mean Low Water. The average height of the low tides over a 19-year period.

Metals. Elements found in rocks and minerals that are naturally released to the environment by erosion, as well as generated by human activities. Certain metals (such as mercury, lead, zinc, and cadmium) are of environmental concern because they are released to the environment in excessive amounts by human activity. They are generally toxic to life at certain concentrations. Since metals are elements, they do not break down in the environment over time, and can be incorporated into plant and animal tissue.

National Estuary Program (NEP). A state grant program within the U.S. Environmental Protection Agency established to designate estuaries of national significance and to incorporate scientific research into planning activities.

National Pollutant Discharge Elimination System (NPDES). A permit system established by the federal Clean Water Act, which regulates the discharges of pollutants (except for dredged and fill material) from point sources to water of the U.S. EPA and DEP are currently responsible for jointly administering this program in Massachusetts.

Natural Resources Conservation Services (NRCS). A branch of the U.S. Department of Agriculture that, among other things, provides technical assistance in resource management and planning and implementation of agricultural BMPs.

Neotropical Migrants. Birds that breed in North America and winter in Central and South America. These birds generally migrate through the Massachusetts Bays region.

Nonpoint Source Pollution. Pollution that is generated over a relatively wide area and dispersed rather than discharged from a pipe. Common forms of nonpoint source pollution include stormwater runoff, failed septic systems, and marinas.

Notice of Intent. A form submitted to the municipal Conservation Commission and DEP which serves as the application for an Order of Conditions under the Wetlands Protection Act. It includes information on the site's wetland resources and the proposed work.

Nutrients. Essential chemicals needed by plants and animals for growth. For example, excessive amounts of nutrients, nitrogen, and phosphorus can lead to degradation of water quality and growth of excessive amounts of algae. Some nutrients can be toxic at high concentrations.

Objective. A short term target that, as achieved, incrementally attains goals.

Order of Conditions. The document, issued by a Conservation Commission, containing conditions that regulate or prohibit an activity proposed in the resource area defined in MGL Chapter 131 Section 40.

Paralytic Shellfish Poisoning (PSP). An illness, sometimes fatal to humans and other mammals, caused by a neurotoxin produced by a type of plankton called *Alexandrium*. During certain times of the year and at certain locations, these organisms proliferate in "blooms" (sometimes called red tides) and can be concentrated by clams, mussels, and other bivalves. The nervous system of shellfish is unaffected. Consumption of the shellfish can cause paralysis in humans and other mammals.

Pathogen. An agent such as a virus, bacterium, or fungus that can cause diseases in humans. Pathogens can be present in municipal, industrial, and nonpoint source discharges into Massachusetts Bays.

Performance Standards. Federal, state, or local codified specification that condition development activities to limit the extent to which a structure or activity may affect the immediate environment.

Petroleum Hydrocarbons. The mixture of hydrocarbons normally found in petroleum; includes hundreds of chemical compounds.

Phytoplankton. Minute, floating aquatic plants.

Point Source Pollution. Pollution originating at a particular place, such as a sewage treatment plant, outfall, or other discharge pipe.

Polychlorinated Biphenyls (PCBs). A class of chlorinated aromatic compounds composed of two fused benzene rings and two or more chlorine atoms; used in heat exchange, insulating fluids, and other applications. There are 209 different PCBs.

Polycyclic or **Polynuclear Aromatic Hydrocarbons (PAHs).** A class of complex organic compounds, some of which are persistent and cancer-causing. These compounds are formed from combustion products and unburned fossil fuels, and are ubiquitous in the environment. Gasoline and other petroleum products are common sources. PAHs often reach the environment through atmospheric fallout and highway runoff.

Porous Pavement. A hard surface that can support some vehicular activities, such as parking and light traffic, and which can also allow significant amounts of water to pass through.

Primary Treatment. A wastewater treatment method that uses settling, skimming, and (usually) chlorination to remove

solids, floating materials, and pathogens from wastewater. Primary treatment typically removes about 35 percent of BOD and less than half of the metals and toxic organic substances.

Publicly Owned Treatment Works (POTW). Any sewage treatment system operated by a public agency.

Pumpout. The process through which septage is removed from a septic tank or boat holding tank, usually by a mobile tank attached to a truck, and taken to a wastewater treatment plant for disposal.

Request for Determination of Applicability. A written request made by any person to a Conservation Commission or to the Department of Environmental Protection for a determination as to whether a site or work on that site is subject to the Wetlands Protection Act.

Runoff. The part of precipitation that travels overland and appears in surface streams or other receiving water bodies.

Salt Marsh. A coastal wetland that extends landward up to the highest high tide line (i.e., the highest spring tide of the year), and is characterized by plants that are well adapted to living in saline soils.

Secondary Treatment. A wastewater treatment method that usually involves the addition of biological treatment to the settling, skimming, and disinfection provided by primary treatment. Secondary treatment may remove up to 90 percent of BOD and significantly more metals and toxic organics than primary treatment.

Septage. The semi-solid waste material removed from any part of an individual sewage disposal system.

Septic System. A facility used for the partial treatment and disposal of sanitary wastewater, generated by individual homes or small businesses, into the ground. The system includes both a septic tank and a leaching facility.

Septic Tank. A watertight receptacle that receives the discharge of sewage from a building sewer and is designed and constructed so as to permit the retention of scum and sludge, digestion of the organic matter, and discharge of the liquid portion to a leaching facility.

Sewage. The water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such ground water infiltration and surface water as may be present.

Sewer System. Pipelines or conduits, pumping stations, force mains, and all other structures, devices, appurtenances, and facilities used for collecting and conveying wastes to a site or works for treatment or disposal.

Shellfish. An aquatic animal, such as a mollusc (clams and snails) or crustacean (crabs and shrimp), having a shell or shell-like exoskeleton.

Shellfish Bed. An area identified and designated by the Division of Marine Fisheries or Conservation Commissions as containing productive shellfish resources. Shellfish bed maps are based upon written documentation and field observations by the shellfish constable or other authoritative sources. In identifying such an area, the following factors are taken into account and documented: the density of all species of shellfish, the size of the area, and the historical and current importance of the area to recreational or commercial shellfishing. Protecting designated shellfish beds may be an important consideration when local boards and state agencies review projects.

Shellfish Resource Area. An area, designated by the Division of Marine Fisheries, that contains productive shellfish beds, and is used for establishing shellfish resource area closure boundaries.

Shellfish Resource Area Closures. Closure, due to potential health risks, of shellfish resource areas to shellfish harvesting. Closure decisions are made by the Division of Marine Fisheries, using a current standard that specifies that if the geometric mean of 15 samples equals or exceeds 14 fecal coliform per 100 milliliters of sample water or if 10% of the samples exceed 49 fecal coliform per 100 milliliters of sample water, the station can be closed. The five shellfish bed classifications are Approved, Conditionally Approved, Restricted, Conditionally Restricted, and Prohibited.

Sludge. Solid or semisolid material resulting from potable or industrial water supply treatment or sanitary or industrial wastewater treatment.

Spring Tides. Higher than normal high tides observed every two weeks when the earth and moon align.

Storm Drain. A system of gutters, pipes, or ditches used to carry stormwater from surrounding lands to streams, ponds, or Massachusetts Bays. In practice, storm drains carry a variety of substances such as oil and antifreeze which enter the system through runoff, deliberate dumping, or spills. This term also refers to the end of the pipe where the stormwater is discharged.

Stormwater. Precipitation that is often routed into drain systems in order to prevent flooding.

Subdivision. A means for dividing a large parcel of land into more than one buildable lot, administered under MGL Chapter 41.

Superseding Determination. A Determination of Applicability issued by the Department of Environmental Protection

deciding whether or not the area and activity are subject to the regulations under the Wetlands Protection Act.

Superseding Order of Conditions. A document issued by the regional office of the Department of Environmental Protection containing the conditions necessary for a project to proceed and still protect the interests and resource areas specified in the Wetlands Protection Act. These conditions supersede Orders of Conditions set by the local Conservation Commission unless the local order is also issued under the authorization of a local bylaw. These superseding orders can be requested by a number of people who may not be satisfied with the local Order of Conditions.

Suspended Solids. Organic or inorganic particles that are suspended in and carried by the water. The term includes sand, mud, and clay particles as well as organic solids in wastewater.

Swales. Vegetated areas used in place of curbs or paved gutters to transport stormwater runoff. They also can temporarily hold small quantities of runoff and allow it to infiltrate into the soil.

Tertiary Treatment (Advanced Waste Treatment). The wastewater treatment process that exceeds secondary treatment; may include nutrient and/or toxics removal.

Tidal Flat. Any nearly level part of the coastal beach, usually extending from the low water mark landward to the more steeply sloping seaward face of the coastal beach or separated from the beach by land under the ocean, as defined in 310 CMR 9:04.

Tidelands. All lands and waters between the high water mark and the seaward limit of the Commonwealth's jurisdiction, as defined in 310 CMR 9:04. Tidewaters are synonymous with tidelands.

Title 5. The state regulations (CMR 15) that establish minimum standards for the protection of public health and the environment when circumstances require the use of individual systems for the disposal of sanitary sewage. The local Board of Health is responsible for enforcement of these regulations.

Total Nitrogen. A measure of all forms of nitrogen (for example, nitrate, nitrite, ammonia-N, and organic forms) that are found in a water sample.

Toxic. Poisonous, carcinogenic, or otherwise directly harmful to life.

Wastewater. Water that has come into contact with pollutants as a result of human activities and is not used in a product, but is discharged as a waste stream.

Waterbirds. A group of birds that utilize wetland habitats during their life cycle, including waterfowl (ducks and geese), seabirds (terns and gulls), and wading birds (herons and egrets).

Water Column. The water in a lake, estuary, or ocean which extends from the bottom sediments to the water surface. The water column contains dissolved and particulate matter, and is the habitat for plankton, fish, and marine mammals.

Watercourse. Any natural or man-made stream, pond, lake, wetland, coastal wetland, swamp, or other body of water. This includes wet meadows, marshes, swamps, bogs, and areas where groundwater, flowing or standing surface water, or ice provide a significant part of the supporting substrate for a plant community for at least five months of the year, as defined in 310 CMR 15:01. Boards of Health can adopt the definition of wetlands in 310 CMR 10.0 or broader language in Title 5 as a "watercourse" in determining setbacks for wastewater permitting purposes.

Watershed. The total land area (including subsurface waters) that drains into a stream, river, estuary, bay, or other waterbody.

Wetlands. Habitats where the influence of surface water or groundwater has resulted in the development of plant or animal communities adapted to aquatic or intermittently wet conditions. Wetlands include tidal flats, shallow subtidal areas, swamps, marshes, wet meadows, bogs, and similar areas.

Wrack. Algae, plant and animal matter, and drift material (including solid wastes and other pollutants) that accumulate on beaches, usually at the high tide mark.

Zoning Bylaws. Local laws that designate areas of land for different uses at established densities. These bylaws require a two-thirds majority vote of town meeting or city council.

Appendix D.

Bibliography

APPENDIX D. BIBLIOGRAPHY

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Appendix E.

Management Characterization/ Base Programs Analysis

Available Under Separate Cover

APPENDIX E. MANAGEMENT CHARACTERIZATION (BASE PROGRAMS ANALYSIS)

Appendix E has been issued as a separate companion document to the CCMP. For a copy, please contact the Massachusetts Bays Program Office.

Appendix F.

Federal Consistency Analysis

Available Under Separate Cover

APPENDIX F. FEDERAL CONSISTENCY ANALYSIS

Appendix F has been issued as a separate companion document to the CCMP. For a copy, please contact the Massachusetts Bays Program Office.

Appendix G.

Public Comments and MBP Responses

APPENDIX G.
PUBLIC COMMENTS AND MBP RESPONSES

The following pages are reproductions of the comments made on the Final Draft CCMP. These letters are noted where responses were generated, and are followed by the MBP's narrative response. Refer to Chapter XI for additional information regarding the review and comment process for the Final Draft CCMP.

Received from Army Corps of Engineers - Cathy Demos et al.

SPECIFIC COMMENTS

1 **Page II-7, 4th para., last sentence**: This sentence could easily mislead the reader. It implies that the Massachusetts Bay Disposal Site (MBDS) is highly contaminated because MBDS violates proposed EPA sediment criteria. The technical data used to make this statement is based on proposed sediment criteria and not the criteria currently used to evaluate dredged material for open water disposal. The Public Record of Decision for the Final Environmental Impact Statement for the designation for the MBDS indicated that "The MBDS has been previously used without any significant adverse effects to the marine ecosystem or human health and the proposed future use of the modified MBDS should have no such effects either."

A suggested statement would indicate that the MBDS is not a significant impact to the habitat of Massachusetts Bay, based on the findings of the MBDS EIS and Disposal Area Monitoring System (DAMOS) research.

2 **Page II-7, 5th para**: In addition to dredged material disposal projects, which do not add contaminants to the aquatic ecosystem (i.e. only moves sediment from one area to another), other contaminant sources should also be included, such as point (NPDES permits) and non-point sources (runoff, air pollution, etc.), to provide the reader with an overall picture of different contaminant sources.

3 **Page II-17, 4th para**: Typo "Cur-rently".

4 **Page II-17, "Recommended Actions"**: The Massport, U.S. Army Corps of Engineers (Corps), EPA, NMFS and the Massachusetts Executive Office of Environmental Affairs (EOEA) should all be responsible for the last "Recommended Action" - "begin planning now for disposal of contaminated maintenance material..."

MBP Response to Cathy Demos, U.S. Army Corps of Engineers

1 Please note the expanded discussion on the MBDS in the Chapter II subsection, "Concentrations of Toxic Pollutants in the Water Column and Sediments."

2 Contaminant sources other than dredged materials - e.g., wastewater, atmospheric deposition, stormwater runoff - are described in the Chapter II discussion, "Sources of Pollutants to Massachusetts Bays."

3 Spelling corrected as noted.

4 Please note the revised "Recommended Actions" section in the Chapter IV megaproject discussion, "Boston Harbor Navigation Improvement Project."

MASSPORT MARITIME DEPARTMENT, EAST BLDG. II, FISH PIER,
NORTHERN AVENUE, BOSTON, MA 02210 (617) 973-5354 FAX: (617) 973-5357

massport

January 26, 1996

Margaret M. Brady, Director
Office of Coastal Zone Management
Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202

Dear Peg:

The Massachusetts Port Authority (Massport) has taken an active role in commenting on the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months, Massport has evaluated the goals, objectives, and commitments outlined in the draft CCMP. Based on this review, we believe than many of the goals of the CCMP can be met by the cooperative relationship of Massport, state agencies, local environmental offices, and federal agencies such as the Corps of Engineers and EPA.

As you know, Massport is the local sponsor of the Corps of Engineers' Boston Harbor Navigation Improvement Project, known also as the Boston Harbor dredging project. As project partners, Massport and the Corps have moved the project in tandem, through the state and federal environmental review processes. The project, as currently proposed, reflects environmental, economic, and engineering concerns of both the project partners and many interested parties, including the state environmental agencies.

As a matter of federal law, the Corps will prepare the contract bid documents and issue the construction contracts necessary to complete all aspects of the Boston Harbor dredging project. The contracts will certainly require compliance with all environmental permits. In the development of the construction bid documents, Massport will continue to work with the Corps to encourage including other appropriate
1 environmental performance standards into the construction contracts. Massport will, in all likelihood, have no formal contractual relationship with the dredging contractor. Even in the privately-owned berths, it is expected that the Corps will maintain control over the dredging contractor. Consequently, it remains a Massport priority to have enforceable performance standards included in the dredging contract.

It is expected that the Corps will include specific monitoring requirements in the construction contract. In addition, Massport will work with the Corps to assure that adequate independent monitoring of the dredging and disposal work during construction and to assure periodic monitoring of the cap is conducted. Post-construction monitoring is the sole responsibility of the Corps of Engineers.

Massport will provide planning assistance to the Commonwealth for future disposal of contaminated maintenance material. In the Final Environmental Impact Report submitted to the Commonwealth in June 1995 Massport provided the results of a major information-gathering exercise in the area of alternative technologies. We will continue to work with the state in pursuit of long-term solutions.

Massport takes these commitments very seriously. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Very truly yours,

Ralph F. Cox
Maritime Director

MBP Response to Ralph Cox, Massport

1 Please note the amended language on both the permitting process and agency responsibilities in the Chapter IV megaproject discussion "Boston Harbor Navigation Improvement Project." This updated material is based on recent conversations with, and information provided by, Janeen Hansen (Massport) and Cathy Demos (ACOE).

Also, please note the revisions to the "Recommended Actions" section in the same megaproject discussion.

Received from Scott R. Lundgren, Commander First Coast Guard District - Marine Safety Division

Alan-

1 I have taken a look at your letter and agree that the information on the Coast Guard could be improved. I found a fax that I sent to you (a while back) with updated information for several parts of the plan, which included a more accurate description of the Coast Guard's missions in the environmental arena, which I have included on the next page; please incorporate this into Appendix A.

I need to talk to you about paragraph 6 of the "Action Plan for Reducing and Preventing Oil Pollution", which is inaccurate. I supplied an accurate description of oil spill response in the fax mentioned above, but it referenced other sections from the 12/91 comprehensive plan. I'm sorry that I missed this when Dan and I came to UMass Boston - I think we were concentrating on the specific actions, which are accurate.

2 Below is some of the wording from my comments on the 91 plan which seems to fit here and accurately describes our response to oil spills:

The party responsible for an oil discharge that affects navigable waters is required to adequately respond under the Federal Water Pollution Control Act (FWPCA), as amended. The Coast Guard On-Scene Coordinator (OSC) and the State OSC from the Massachusetts Department of Environmental Protection will ensure that the responsible party adequately responds to such spills. If a response is not adequate, the Coast Guard and the State will direct response actions. The spiller is liable for money spent by the Coast Guard or State during a response. The Coast Guard owns oil spill containment and recovery equipment and can call upon a spill response Strike Team for additional assistance, but will primarily rely on contracted resources. A spiller is also required to provide compensation to restore or replace natural resources damaged by a spill.

3 While you are on that page, it is Exxon Valdez vice Valdeez

U.S. COAST GUARD - APPENDIX A "MANAGEMENT FRAMEWORK"

1a The U. S. Coast Guard ensures that vessels and marine transportation related facilities are in compliance with numerous federal regulations promulgated to reduce environmental impacts in the coastal zone. Pollution prevention and safety are critical to the safety of the marine environment. When accidents happen, the Coast Guard has responsibility under the Federal Water Pollution Control Act (FWPCA), as amended, and the Comprehensive Environmental Response, Compensation, and Liability Act, to monitor and direct the removal of oil or hazardous substances from the coastal zone. The Coast Guard under authority of amendments to the FWPCA ensures compliance with Marine Sanitation Device regulations. Certain vessel waste disposal policies set by the International Convention for Prevention of Pollution from Ships (MARPOL) are implemented in the U.S. through the Act to Prevent Pollution from Ships and the Ports and Waterways Safety Act. The Coast Guard ensures that vessels and facilities meet the standards of the regulations during inspections, boardings, routine patrols, and investigations.

Other Coast Guard missions, such as maintaining navigational aids, support marine environmental protection by ensuring the safety of life and property on the navigable waters. Additionally, the Coast Guard enforces regulations promulgated by other agencies, such as the National Marine Fisheries Service, that ensure appropriate use of our marine resources.

MBP Response to Scott Lundgren, First Coast Guard District

1 Please note expanded U.S. Coast Guard mission description in Appendix A - Management Framework.

2 Please note revised discussion on oil spill response in introduction to Action Plan #6 (*Reducing and Preventing Oil Pollution*).

3 Spelling corrected as noted.

Massachusetts Sierra Club 3 Joy Street Boston MA 02108 (617)227-5339

January 31, 1995

Ruth Kuykendall
Massachusetts Bays Program Office
Room 2006
100 Cambridge St.
Boston, MA 02202

RECEIVED
By

Comments Submitted on the CCMP on Behalf of the Massachusetts Chapter of the Sierra Club

General Comments

This letter contains the comments of the Massachusetts Chapter-Sierra Club on the Massachusetts Bays 1995 Comprehensive Conservation and Management Plan (CCMP) final draft document. This plan is well written and contains a good description of the four priority areas chosen by the Massachusetts Bays Program for emphasis: shellfish bed closings, nutrient enrichment of coastal embayments, reductions of toxics inputs, and restoration of 12 wetlands with restricted tidal flow. These reflect the major manmade stressors in the inshore region of Cape Cod Bay and Massachusetts
1 Bay. It might be useful to address the major offshore anthropogenic stressor in these waters which is the direct and indirect effects of fisheries harvesting (Pearce and Wallace, 1995). The other general observation is that although it is obviously true that these problems have to be approached through actions of the general citizenry, local town government units, state agencies, and their Federal counterparts, there is no mechanism described in the CCMP to coordinate these actions, so that they move forward smoothly in an organized fashion. A model might be the Gulf of Maine Council for the Marine Environment which coordinates actions on a regional scale between state/provincial/Federal governments while involving NGO (non government organization) participants. In the short run Chapter 6 suggests that the Mass Bays program may provide this coordination function.

In the assessment of which embayments are nitrogen sensitive, it would be helpful to also identify the major sources of nitrogen loading for the regional authorities that will have to remediate. Mass Bays should think more about the structure for regions and communities to address their nitrogen loading
2 problems to prevent squabbling amongst authorities and to give them guidance. This would also be a very good way to start addressing watershed-wide nitrogen loading problems.

The CCMP suggests that DEP take over the NPDES program and we are not sure that DEP can handle this. Adding another task to the understaffed and underfunded agency seems destined for problems,
3 unless funding is provided as well. EPA Region 1 might have a better understanding of Gulf of Maine sources and make better long term choices to manage the problem.

Fisheries Harvesting

As pointed out by the Water Resources and Coastal and Marine Environmental Research Subcommittee of the National Science and Technology Council (NSTC) resource use (fisheries) must be related to ecosystem stability (Boesch and Urban, 1995). Similarly McIntyre (1995) pointed out that
4 more damage has been done to marine organisms in the ocean from excessive fishing activity than by pollution. In the Gulf of Maine (which subsumes the Massachusetts Bays Program area) fisheries

harvesting has impacted the abundance and species composition of both targeted species (cod, haddock, yellow tail flounder, winter flounder, lobsters, etc.) and non-targeted species (harbor porpoises, benthic invertebrates, noncommercial fish species, undersized commercial fish species, etc.) (Pearce and Wallace, 1995). For example the National Marine Fisheries Service has estimated the incidental mortality of harbor porpoise due to primarily the sink gill net fishery was 1200 to 2000 animals between 1990 and 1993 (which is more than 2% of the estimated population level). Efforts have been made to list this species on the Federal Endangered Species list (Blaylock and Waring, 1995). The multispecies groundfish harvesting has depleted cod, haddock, and yellowtail flounder populations, while enhancing the population size of skates, dogfish, sea herring, and Atlantic mackerel. This dramatic change in the composition of the fish community is likely to have impacts on other components of the ecosystem such as marine mammals and seabirds which utilize many of the same prey items as do fish. Recent research has also detected impacts of bottom trawling on benthic invertebrates (especially epibenthic forms) which is likely to have impacts on the demersal food chain (Auster and Malatesta, 1995). Thus the ecological sustainability of the offshore region of the Massachusetts Bays area is threatened by the direct and indirect effects of excessive fisheries harvesting.

Potential actions that the Massachusetts Bays Program could support to help alleviate some of the direct and indirect affects of fisheries harvesting include:

• Support the Stellwagen Bank National Marine Sanctuary's call for a 100 square mile no fishing zone in the sanctuary to study the impacts of otter trawls on the benthic invertebrates.

• Encourage the New England Fishery Management Council to establish a non-extractive reserve (Auster and Malatesta, 1995) on Georges Bank which would cover the spawning areas for cod and haddock. This would represent an expansion of Area II that is proposed for seasonal closure under Amendment 7 to the New England multispecies groundfish plan. A non-extractive reserve area would be permanently closed to fishing, thus allowing a recovery area that could provide a source for replenishing groundfish stocks elsewhere (source and sink concept for metapopulations).

• Support the National Marine Fisheries Service in the establishment of a Take Reduction Team that would develop methods to reduce the mortality of harbor porpoises from the New England sink gill net fishery.

• Encourage the Massachusetts Division of Marine Fisheries in its efforts to close fishing in areas occupied by important habitats such as kelp beds and sea grass beds.

Specific Comments

The following specific comments refer to pages in the text of the CCMP.

5 • III-58: The pollution plumes at the Massachusetts Military Reservation (MMR) are not all moving towards Vineyard Sound, in fact the Landfill Plume has just entered Buzzards Bay.

6 • V-3: The CCMP emphasizes the closure of shellfish beds due to pathogens, but does not examine the role of biotoxins (such as paralytic shellfish poisoning) in closing shellfish beds in the Massachusetts bays region. Even though the exact cause of the red tide events that produce biotoxin contamination of shellfish is not known, the biotoxin problem has been spreading down the coast of the Gulf of Maine for years, with red tide events now occurring periodically in Cape Cod Bay. Although the cause and effect relationship is not known, it should not be overlooked that some evidences suggest that anthropogenic influences may exacerbate red tide events. Also there are transport mechanisms that can bring these events into the Massachusetts Bays region from other source areas where red tide events are more common.

7 • V-33: Municipal Action #3.4 should address vernal pools as well as permanent wetland types, since many state listed species on Cape Cod are associated with either vernal pools or seasonally variable ponds (such as Mary Dunn Pond in Hyannis). Many vernal pools are threatened by nutrient enrichment from septic systems, while Mary Dunn pond has gone dry in some years due to excessive water pumping by the water company. The CCMP includes watershed controls on nonpoint sources of pollution to Massachusetts and Cape Cod bays and thus it should also look at wetlands protection in a more holistic fashion (especially given their role in supporting listed species).

8 •V-57: Municipal Action #4.1 will require that the coordination of multiple jurisdictions for its successful implementation. For example, when the Black Beach District of Critical Planning Concern (DCPC) was designated the boundaries didn't include the major sources of upland water quality problems, Route 28A (state highway department jurisdiction) nor Hamblin Hills development (Falmouth Planning Board jurisdiction), which means that the Falmouth Conservation Commission will need help in protecting this barrier beach/salt marsh system from both excessive construction activities and water quality problems.

9 • V-67: Massachusetts Highway Department Action #4.6 emphasizes incorporating storm water impacts into the *Highway Design Manual*, but it is equally important to incorporate impacts on wetlands. Many highway projects in wetland areas alter the hydrology which results in standing water which can result in loss of the wetland vegetation from the accumulation of hydrogen sulfide in the soil pore water and changes in the discharge of sediments which can impact the integrity of the wetland. Intact wetlands provide important benefits as wildlife habitat, controlling flooding, and reducing the input of nonpoint sources of pollution. It is not clear why the targeted advocacy groups didn't include the Massachusetts Chapter-Sierra Club, since we have had a long term involvement in issues related to highway development impacts on air quality (Central Artery/Third Tunnel) and wetlands (Route 2).

10 • V-133: U.S. Army Corps of Engineers (ACOE) Action #9.1 in relation to the Massachusetts Bay Disposal Site (MBDS) capping experiment, it needs to utilize nontoxic sediments in this trial. The Massachusetts Chapter-Sierra Club is generally opposed to the offshore disposal of contaminated dredge spoils. The ACOE standards for dredge spoil disposal are based upon the characteristics of the dredge spoils in order to decide whether the sediments are operationally defined as being safe for offshore disposal. The U.S. Environmental Protection Agency (EPA) should develop sediment quality criteria (SQC) for the receiving sediments offshore, so that the sediments at the MBDS do not exceed the SQCs as a result of "clean" dredge spoil disposal, much less the potential impact of attempting to cap "contaminated" dredge spoils in deep water.

11 • V-139: Municipal Action #10.1 on implementing a marine debris reduction program needs to be supplemented by action by the New England Fisheries Management Council (NEFMC) to deal with the problem of abandoned fishing gear which goes on "ghost fishing " after its disposal offshore. This "ghost fishing" gear can harm or kill fish, marine mammals, sea turtles, and seabirds.

12 • V-141: The discussion of the total nitrogen entering the Massachusetts Bays region appears to ignore the fact that the major source of nitrogen to the Gulf of Maine is inflow of water through the Northeast Channel (Christensen et al.., 1992), thus the percentages from point sources listed should probably be identified as manmade sources of nitrogen to the system.

13 • V-146: The identification of nitrogen sensitive embayments by Regional Planning Agencies/Ma. Dept. of Environmental Protection/Municipalities from nitrogen loading models is likely to require expertise and data that are not readily available to these organizations. Since the response of the system to nitrogen loading is the area of public concern, the secchi disc depth test might serve only as an early indicator of system eutrophication. While this test is not ideal for these purposes, it would be easy and inexpensive to measure by the shell fish wardens. A long term record might give a measure of decreased water transparency resulting from increased chlorophyll abundance in coastal abayments. Areas would need to be identified where existing conditions, such as other suspended solids or pollutants, might render this test inaccurate to avoid false positives. Also, the data would need to be separated from increased turbidity due to other events (i.e. storm or spill) mixing sediments into the water column.

When a diminishment of water quality has been noted, then it might be useful to analyze the sources of nitrogen and develop more detailed predictive nitrogen loading models than those utilized by the Waquoit Bay National Estuarine Research Reserve (on a site specific basis). We emphasize that the secchi depth test would serve as only a trigger to conduct more in-depth modeling studies.

14 • V-164: Executive Office of Environmental Affairs (EOEA) Action #12.5 on using the Sea Paths Program to gain public access to the intertidal areas of the Massachusetts coast that are in private hands is probably an endeavor that is doomed to failure. The Cape Cod Group-Sierra Club had representatives at a meeting in Brewster on the Sea Paths program and it generated much anger between the homeowners that owned beach front property and the general public which desired increased access. Many beach front property owners were concerned about the lack of a state enforcement effort for this program and damage to their land or liability for injuries suffered by hikers. Traditionally towns people have been able to walk along the intertidal areas in Brewster on an informal basis, but the Sea Paths program perceived threats has caused many shoreline owners to post their property. It is unlikely that enough property owners would agree to easements to allow a coastal hiking path to be developed. It is also likely that homeowners granting easements would be at war with neighbors that didn't desire to do so. Thus the Sea Paths Program appears to be exacerbating the lack of public access to the shoreline.

In closing, we commend Mass Bays for recommending not only educational programs within the schools, but for also exploring non-traditional means to educate non-coastal residents as to their role in coastal problems. Thank you for considering our comments on the CCMP.

Yours truly,

James McCaffrey

James McCaffrey, Director
Massachusetts Chapter-Sierra Club

encl: references

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MBP Response to James McCaffrey, Massachusetts Chapter Sierra Club

1 The CCMP discusses the issue of overfishing of major commercial finfish species in Massachusetts Bays and the resultant severe economic hardship on traditional fishing-dependant communities such as Gloucester. It states that "...overfishing is generally considered to be the primary cause of the current crisis in the fishing industry", but also recognizes that "...pollution and habitat loss are thought to play a role as well, especially among fish that spawn nearshore or are anadromous." In order to shed further light on this complex issue, the MBP has funded the development of a White Paper and will be hosting a workshop which will explore the factors impacting the region's declining offshore fish stocks. Please refer to the discussion on "fishing" in The Human Habitat section of Chapter II (The State of the Bays).

With respect to coordination of the various CCMP implementation actions, the CCMP describes a multi-agency implementation mechanism that is based on several highly successful Massachusetts models, including the MBP's innovative MBP / Regional Planning Agency / Local Governance Committee partnership. Please refer to Chapter VI (Implementing the CCMP Throughout the Bays Watershed) for a detailed discussion of the CCMP implementation strategy.

2 Based on the recommendations of a working group convened by the MBP in March of 1995, the MBP has funded a first-tier nitrogen analysis project which is determining nitrogen sources, estimating nitrogen loading based on land use categories, and calculating oceanic nitrogen loading for selected embayments. The results of this project will be a first approximation of the coastal embayments likely to be at risk of eutrophication. Once the major sources are identified, more refined loading estimates and appropriate reduction strategies will be developed. Please refer to RPA / DEP / Municipal Action #11.2 in Action Plan #11 (*Managing Nitrogen-sensitive Embayments*) of Chapter V.

3 The CCMP recommendation that DEP assume responsibility for administering the NPDES program was developed by DEP personnel in consultation with EOEA and CZM officials, and has the strong support of each of these agencies.

4 Please refer to Response #1 above regarding the fisheries over-harvesting issue. As demonstrated by the MBP's funding of the offshore fisheries White Paper and workshop, the MBP is concerned about threats to the ecological diversity and sustainability of the offshore waters and sediments of Massachusetts Bays, and will seek out opportunities to work cooperatively with other interested parties (e.g., Stellwagen Bank National Marine Sanctuary program, New England Fisheries Management Council, National Marine Fisheries Service, and Massachusetts Division of Marine Fisheries) to explore potential actions to alleviate these threats.

5 The CCMP has been revised to reflect the various flow directions of the multiple pollution plumes emanating from the Massachusetts Military Reservation (MMR) on Cape Cod. Please refer to the amended "Water Quality" discussion in the Cape Cod Region section of Chapter III.

6 The discussion on shellfish bed closures due to pathogen contamination has been expanded to include a brief description of the periodic problem of paralytic shellfish poisoning (PSP), a naturally-occurring biotoxin. Please refer to the "Shellfish Bed Contamination" discussion in Chapter II (The State of the Bays).

7 The CCMP has been revised to include a reference to vernal pools and seasonally variable ponds, as well as permanent wetland types. Please refer to Municipal Action #3.4 in Action Plan #3 (*Protecting and Enhancing Coastal Habitat*) of Chapter V.

8 The CCMP has been revised to include a discussion of the need for multi-jurisdictional coordination and implementation whenever stormwater

sources and impacts cross municipal boundaries. Please refer to Municipal Action #4.1 in Action Plan #4 (*Reducing and Preventing Stormwater Pollution*) of Chapter V.

9 The Massachusetts Highway Department's proposed comprehensive *Environmental Manual* will not be limited to addressing stormwater impacts only. Highway and bridge construction impacts to wetlands, water supplies, and other sensitive resource areas will be covered as well.

10 An approved capping demonstration project for the Massachusetts Bay Disposal Site (MBDS) would employ only sediments which meet EPA's established Ocean Dumping Criteria. In evaluating and approving the suitability of sediment for disposal at the MBDS, the U.S. Army Corps of Engineers (ACOE), the U.S. Environmental Protection Agency (EPA), and the Commonwealth of Massachusetts utilize the federal tiered testing protocol. This protocol requires testing for both sediment chemistry and biological effects (e.g., toxicity and bioaccumulation). Results from these tests are compared to similar tests performed on clean reference sediments near the MBDS according to the Ocean Dumping Criteria. In addition, the Commonwealth also compares project sediment chemistry concentrations to those of existing State guidelines. Finally, any capping demonstration project at the MBDS would utilize forthcoming guidance currently being developed under a EPA / ACOE national effort related to capping design and implementation.

With respect to sediment quality criteria, EPA has adopted five of these criteria for selected polycyclic aromatic hydrocarbons (PAHs) and pesticides, and is currently developing additional standards for a number of metals. At this time, EPA and ACOE have not determined how existing and future criteria will be used in the regulatory review process applicable to dredging projects.

11 Actions to be taken by the New England Fisheries Management Council (NEFMC) relative to abandoned fishing gear and other offshore fisheries management issues were beyond the scope of the current Massachusetts Bays Program.

12 The discussion on nitrogen inputs to Massachusetts has been amended to include a reference to ocean water inflow as a significant nitrogen contributor. Please refer to the introductory section of Action Plan #11 (*Managing Nitrogen-sensitive Embayments*) of Chapter V.

13 The coastal Regional Planning Agencies and DEP have competent technical staff with broad expertise in water quality, land use, and related environmental issues. Any specialized additional training that might be required to develop and apply nitrogen loading models to the region's watersheds and embayment areas can be arranged on an as-needed basis through the MBP and the interagency working group.

14 According to DEM's Coastal Access Planner, the comments regarding the Sea Path Program contain several factual errors - e.g., "Traditionally towns people have been able to walk along the intertidal areas in Brewster on an informal basis, but the Sea Paths program perceived threats has caused many shoreline landowners to post their property." In fact, according to both Brewster citizens and officials responsible for the coastal zone, there have been no additional postings since the issue was raised in the community. All agree that it would be difficult to post the intertidal zone at all. Furthermore, owners expressing their concerns at the Brewster public meeting did not refer publicly to liability, and did not express an interest in more state enforcement of Sea Paths. (In fact, misgivings were expressed about formal beach staff.)

The larger issue is how best to address the complex and emotionally charged issue of improving public coastal access. There is no question that many shoreline landowners react negatively to the idea of either formalizing existing public use or opening beaches to walkers. However, such reactions are not unusual. They are voiced in response to nearly any type of proposed trail, reflecting general fears of the impact of outsiders and government control of their land. Over the last few decades, the coastline in Massachusetts has experienced an enormous fragmentation of lots and ownership, huge increases in property values, expanding non-resident ownership, and a growing population. While some landowners say that they will continue to informally allow public use, they, and the subsequent owners of the land, are simply not bound to do so. The implication of this hits home when citizens are shocked to find areas closed to them that they traditionally enjoyed - in certain areas of Brewster (the focus of the Sierra Club's comment), in neighboring communities like

Dennis, in Island communities such as Edgartown, in north shore communities like Rockport, and many others.

The Sea Path Program cannot address these issues by itself. To be effective, such a program needs to be one of an assortment of planning, acquisition, and regulatory tools, integrated into a comprehensive approach that includes a variety of public and private project proponents. For its own part, the Sea Path Program is slowly building partnerships with nonprofits and municipalities regarding particular areas of concern. It may be slow to establish legal rights-of-way due to the significant barriers faced, but there is no evidence that the program is "exacerbating the lack of public access to the shoreline." The Department of Environmental Management has indicated that it is open to suggestions about how to address this complicated issue, and invites the Sierra Club and other groups to work with Department personnel to help achieve the goal of improved, secure, well-managed public coastal access.

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

January 30, 1996

Peg Brady
Director
Coastal Zone Management
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202

RE: Massachusetts Bays 1995 Comprehensive Conservation & Management Plan. MHC #16075.

Dear Ms. Brady:

Thank you for your letter of January 17, and a copy of the Draft Final Plan for the Massachusetts Bays Program. Staff of the Massachusetts Historical Commission have reviewed the information you submitted.

1 For MBP-funded or assisted projects, applicants might not be aware of the requirement for MHC review of projects with federal or state funding, licenses, permits, and approvals. As an alternative to the procedures you suggested, MHC recommends that CZM have its grant applicants submit to the MHC a Project Notification Form (PNF, 950 CMR 71, Appendix A), which would include a photocopy of the relevant section of a USGS quadrangle map that clearly shows the boundaries of the proposed project area, as well as larger scale plans. MHC would review this information to determine whether or not the project is likely to impact any significant historic or archaeological resources. CZM could include the submittal of the PNF on a checklist on its grant application materials, similar to that used by other agencies (e.g., Army Corps of Engineers, Division of Conservation Services, DEP, etc.).

In preparing the Final Plan, MHC recommends that additional information be provided. Feel free to use the text of this letter in preparing revisions to the sections indicated.

2 Chapter II, The State of the Bays, should include a section on Cultural Resources. This section could briefly summarize the human use of the bays first by Native American groups beginning approximately 12,000 years ago (when the continental shelf was exposed as a broad coastal plain), and continuing into the present. A recent survey of data at the MHC indicates that the coastal region has the highest density of ancient archaeological sites in the state. Marine resources have been a significant part of Native American subsistence strategies for millennia. European explorers were initially attracted to the bays for its fishing potential in the 15th century, and much of the early colonial settlement was oriented there. Important aspects of Massachusetts' history are related to its sea-faring industries, and dependence on the maritime trades and economies. Important historic and archaeological resources are present in the coastal areas and in the bays, including habitation areas (some now submerged), historic shipwrecks, marine-dependent structures (wharves, lighthouses, etc.), and archaeological sites located in the coastal areas, such as Native American habitation areas and villages, historical settlements, historical marine industries (historic ships, shipyards, saltworks, fish flakes, etc.). These resources define the character of the region's cultural heritage, and provide a better understanding of its historical development. Cultural resources are both finite and non-renewable, but sustainable.

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Implementation of projects that involve excavation, new construction, demolition, and rehabilitation have the potential to affect historic and archaeological resources, and need to be carefully planned to take into account their effects on the region's cultural resources.

Chapter V, Action Plans, should include a section on protecting and enhancing historic and archaeological resources in the bays. This could include a discussion of the need to locate and identify historic properties, evaluating their significance in terms of the local, regional, and statewide historical
3 contexts developed by the MHC, evaluating proposed project impacts to these resources, and planning new projects to avoid, minimize, or mitigate adverse impacts to cultural resources. Protecting and preserving the historical, character-defining elements of the bays adds to the state's aesthetic and cultural environment, encourages the traditional uses of the coast and bays for fishing, transportation, recreation, etc., and fosters an appreciation of coastal resources for residents and tourists. New projects proposed that will require federal or state funding, licenses, permits, and approvals, require review by the MHC.

Appendix A, The Management Framework in Massachusetts Bays, should include a short description of the Advisory Council on Historic Preservation under federal agencies; the MHC and the
4 Massachusetts Board of Underwater Archaeological Resources under state agencies; and, Local Historical Commissions and Local Historic District Commissions under local agencies.

For federal agencies, you should add the Advisory Council on Historic Preservation (ACHP). The ACHP is an independent federal agency established by the National Historic Preservation Act of 1966. The ACHP reviews federally-assisted projects that affect historic properties and works with other federal agencies and the State Historic Preservation Officers (see MHC) to avoid or reduce harm to those properties under 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act of 1966 as amended (16 USC 470f, 1992). The ACHP, which has published several guides to the federal historic preservation review process, is headquartered at 1100 Pennsylvania Avenue NW, Suite 809, Washington, DC 20004, Tel. 202-606-8505.

For state agencies, add a section on the MHC. A brochure of MHC's programs is enclosed. The MHC was established in 1963 to assist in protecting and preserving the state's significant historic and archaeological resources. The passage of the National Historic Preservation Act in 1966 created a broad, national historic preservation program, and directed each state to appoint a State Historic Preservation Officer (SHPO), who is responsible for implementing the provisions of the NHPA at the state level, for coordinating local, state, and federal preservation efforts, and for developing comprehensive, statewide historic preservation planning. In Massachusetts, the SHPO is the Executive Director of the MHC. In carrying out its mandates under both state and federal law, the MHC has developed a number of historic preservation programs, including: compiling and maintaining a statewide inventory of historic and archaeological resources; nomination of significant properties to the National Register of Historic Places; technical preservation assistance to municipalities, to state and federal agencies, and to the public; involvement in environmental review and historic preservation planning for state and federally-assisted projects; grants-in-aid programs for historic preservation activities; and a broad public information program.

MHC reviews projects that require federal or state funding, licenses, permits, and approvals, under Section 106 and 110 of the National Historic Preservation Act of 1966 as amended (16 USC 470f & 470h-2, 1992) and its implementing regulations (36 CFR 800), and MGL c. 9, ss. 26-27C (950 CMR 71). This review process identifies historic and archaeological resources that may be affected by new construction, demolition, and rehabilitation, and provides a formal consultation process that seeks alternatives to avoid, minimize, or mitigate impacts to significant cultural resources.

The MHC is also the Office of the Massachusetts State Archaeologist, who issues permits for archaeological investigations on public lands, projects under review by municipalities, counties, and state and federal agencies, under the provisions of MGL c. 9, ss. 26A and 27C (950 CMR 70). The permit process ensures the conservation of archaeological resources and the highest quality of archaeological research. The State Archaeologist reviews permit applications for archaeological investigations to evaluate the qualifications of archaeological research teams and the soundness of archaeological research programs. The State Archaeologist also responds to the accidental discovery of human remains believed to be 100 years old or older under MGL c. 9, s. 27C and c. 38, s. 6B, and assists in the preservation of ancient burial places under MGL c. 7, s. 38 and c. 114, s. 17.

MHC has developed a revised Massachusetts State Historic Preservation Plan (1995), and has published regional overviews of the historic and archaeological resources that are relevant to the coastal regions. These include Historic and Archaeological Resources of the Boston Area, Historic and Archaeological Resources of Southeast Massachusetts, and Historic and Archaeological Resources of Cape Cod and the Islands.

Also under state agencies, you should add a section on the Massachusetts Board of Underwater Archaeological Resources (BUAR). I understand that you have sent the BUAR a copy of the draft plan for their review and comment. Information on the BUAR's legislative history, review authority, and programs of BUAR can be obtained from its Director, Victor Mastone at EOEA. Coordination under the Federal Abandoned Shipwreck Act (43 USC 2101-2106) and Guidelines (55 Fed. Reg. 50116-50145) might be included in this section.

For local agencies, you should add Local Historical Commissions (established under MGL c. 40, s. 8D) and Local Historic District Commissions (established under MGL c. 40, s. 40C). I am enclosing a broadsheet that explains the different roles and responsibilities for these two different kinds of commissions. Local historical commissions vary widely in the role they may have in reviewing and commenting on local projects, while local historic district commissions undertake regulatory design review within established local historic districts. Addresses for local historical commissions and historic district commissions can be provided by the MHC.

Thank you once again for the opportunity to review and comment on the draft plan. If you have any questions or need further assistance, please feel free to contact me.

Sincerely,

Edward L. Bell
Senior Archaeologist
Massachusetts Historical Commission

xc: Victor Mastone, EOEA/Board of Underwater Archaeological Resources
Susan Coin, EPA, Region 1

Enclosures (Program brochure, pub. list, SHPP, LHD/LHDC/LHS info)

MBP Response to Edward Bell, Massachusetts Historical Commission

1 For MBP-funded projects, MBP will require applicants to submit to MHC a Project Notification Form, as requested. In addition, when Massachusetts Bays Program project staff provide grant-writing assistance to community applicants seeking other sources of funding from the state or federal government, MBP will work with the applicants to ensure compliance with the requirement for MHC review. Please refer also to Appendix K, "National Historic Preservation Act."

2 Please note addition of "Cultural Resources" discussion to Chapter II.

3 The Action Plans in Chapter V address the specific priority issues identified by the MBP Management Conference at the outset of the Program. These issues relate primarily to water and sediment quality, habitat, and living marine resources protection. Nevertheless, to the extent that future CCMP implementation activities may involve or impact any of the region's historic and cultural resources, MBP will explore opportunities to work collaboratively with local and state preservation officials to help preserve and enhance these resources.

4 Please note addition of descriptions of the referenced federal, state, and local historic preservation entities to Appendix A - The Management Framework, including: the Advisory Council on Historic Preservation (ACHP), the Massachusetts Historical Commission (MHC), Local Historical Commissions, and Local Historic District Commissions.

The Commonwealth of Massachusetts
Division of Marine Fisheries
Leverett Saltonstall State Office Building
100 Cambridge Street
Boston, Massachusetts 02202
727-3193

PHILIP G. COATES
DIRECTOR

February 1, 1996

Ms. Diane Gould, Director
Mass Bays Program
Coastal Zone Management
100 Cambridge Street, 20th Floor
Boston, MA 02202

Dear Diane,

The Division has reviewed the revisions and excepts from the December 1995 draft CCMP for the Mass Bays Program. We have several comments on the revisions some of which are minor in nature. The comments are as follows:

1. On page Roman Numeral-V, paragraph 2 under "Estuaries as Fish and Waterfowl Habitat". It is noted that Massachusetts Bay and Boston Harbor support some of the largest anadromous runs of rainbow smelt in our coastal waters. In recent years most of the state's smelt fisheries have sharply declined. Presently Boston Harbor is one of the few regions where viable smelt fishery still exists. The three top rivers for smelt production in Massachusetts bay are the Neponset River, Back River and Fore River. The enclosed report is offered for your review and may provide a useful citation on anadromous fish in either this section or Section C of the chapter on the Metro Boston region.
2. On page Roman Numeral V-3, item 2.2. This appears to be a new recommended action for the Division of Marine Fisheries. While we agree that it would benefit the Commonwealth and cities and towns, we note that we are already assisting cities and towns in the development of shellfish management plans and that our current priority is to fully fund and staff our own shellfish management program before providing financial assistance to cities and towns. If new funds became available for a grant program we would certainly support that effort but only after full funding of our shellfish program.
3. On Page Roman Numeral V-4, action item 3.11. We support the item to provide an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region but we point out that this should be a cooperative effort between the Division of Marine Fisheries and the Riverways Program within the

Department, since the management authority rests with the Division of Marine Fisheries under Chapter 130.

4. On page Roman Numeral V-65,V-85 and V-103, action numbers 4.5, 5.5, 7a.2. All of these action items involve the NPDES permit program which is jointly administered with EPA and DEP. We suggest that the action items also include DEP as a cooperator.

5. On page Roman Numeral V-126, paragraph 1, last sentence. It should be noted that proposals for funding have been solicited from coastal communities and approximately $1 million dollars has been released for project construction and implementation.

6. On page Roman Numeral V-149 and 150, action item 12.1. This action item discussed the need to enhance public access along the shoreline but includes no mention of recreational fishing access. The nearest reference is of the colonial ordinance and that reserves the public's rights of "fishing, fowling, and navigation" in the intertidal zone. We are concerned that the inference could be drawn that there is adequate recreational fishing access and opportunities in Massachusetts Bay when in fact fishing access has been greatly diminished in recent years especially for the metropolitan Boston area. The increasing population on the coast along with associated changes in waterfront development and use have severely limited the options of the average angler. Massachusetts Public Access Board has attempted to address the problem in recent years by construction and repairing of boat ramps in the Massachusetts bay region. These efforts should be applauded but greater support is needed to continue the program. The other part of the problem is that there is little access for those anglers who fish from shore. Little progress has been made to gain greater shorefront access for this type of activity. We strongly recommend that the topic of recreational fishing access be recognized in action plan 12.1 and that the construction of recreational fishing piers should be highlighted as a public access initiative.

If you need further information on our comments please contact either myself or Brad Chase at Cat Cove Marine Laboratory (telephone 617-727-3958) for assistance. We appreciate the opportunity to comment on the draft.

Sincerely,

W. Leigh Bridges
Assistant Director

cc: Jim Fair
Brad Chase
Mike Hickey
Ruth Kuykendall, MBP

MBP Response to W. Leigh Bridges, Division of Marine Fisheries

1 Please note expanded discussion on anadromous fish in "Estuaries as Fish and Wildlife Habitat" section of Chapter II.

2 DMF action item #2.2 (*The Division of Marine Fisheries should develop and administer a local Shellfish Management Grants program to help communities finance the development and implementation of effective local shellfish management plans*) was developed in collaboration with DMF personnel in 1994. Its continued strong support by DMF was reaffirmed by James Fair, DMF Assistant Director, in a recent conversation with MBP staff..

3 Please note addition of Riverways Program as a cooperator in DMF action item #3.11 (*The Division of Marine Fisheries, in cooperation with the Riverways Program, should prepare an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region and develop a strategy to prioritize, restore, and maintain these runs*).

4 Please note inclusion of DEP as a cooperator under the "Responsible Agents" listed for each of the action items referenced.

5 Please note addition of grant figure (approximately $1 million) to introductory section of Action Plan #8 (*Managing Boat Wastes and Marina Pollution*).

6 Please note expanded discussion on recreational fishing access in introductory section of Action Plan #12 (*Enhancing Public Access and the Working Waterfront*).

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OCEAN AND COASTAL RESOURCE MANAGEMENT
SANCTUARIES AND RESERVES DIVISION
Stellwagen Bank National Marine Sanctuary
14 Union Street
Plymouth, Massachusetts 02360
(508) 747-1691 (508) 747-1949 FAX

16 January, 1996

Diane Gould, Ph.D., Executive Director
Massachusetts Bays Program
100 Cambridge Street, Room 2006
Boston, Massachusetts 02202

Transmitted via FAX (617-727-2754)

Dear Diane:

I have reviewed a copy of the changes to the 1995 Draft Final CCMP and was disappointed to discover that none of my comments, provided to Tara Tracy via FAX on 28 September, 1995, appear to have been incorporated into the most recent draft. I recognize that the MBP seems to have made the determination to focus on nearshore environments and activities, but where the offshore resources are discussed, I believe it is important to be a thorough, complete, and correct.

I include a copy of the letter I FAX'd to Tara here in hopes that you will reconsider including them in the final CCMP. The substantive comments on page 2 of the letter are little more than clarifications and what we feel are necessary additions. While these do nothing to speak to the policy issues surrounding the neglect of the offshore environments in the CCMP, their addition would help to make the CCMP more complete and accurate.

1 While we may ultimately agree to disagree on whether the exclusion of some of the more critical offshore issues is appropriate for what is purported to be a *Comprehensive* Conservation and Management Plan for Massachusetts and Cape Cod Bays, one of the results of this coastal and watershed focus is that we lose the opportunity for Stellwagen Bank National Marine Sanctuary to be one of the principal implementing agencies for the CCMP, an outcome I view as unfortunate indeed. In the abstract, the linkage between the MBP and SBNMS would have been a logical one. In fact, our EIS/MP indicated that we were ready and willing to collaborate with the MBP. However, the appropriate nexus was never discovered, for whatever reason. We applaud the CCMP for helping to establish a firm foundation for enhancing the protection the coastal resources of the Bays, and the Sanctuary will surely benefit from the implementation of the CCMP as currently devised, but I can

only wonder how much better it could have been if we had found the means and the will to establish a successful partnership.

We remain ready to work with the MBP staff if you feel it appropriate. I greatly appreciate your continuing to send copies of the CCMP drafts for our comment, and hope you accept these comments as constructive input. It is, after all, in the Sanctuary's interest that any CCMP developed be a positive and significant contribution to the governance of the waters adjacent to the Sanctuary. If you have any comments or questions regarding the issues raised in either this of the previous letter, please give me a call.

Sincerely,

Bradley W. Barr
Sanctuary Manager

cc: Tara Tracy, EPA Coordinator/MBP (via FAX 617-565-4040)

Suggested Revisions to draft CCMP...BWB (22 Jan 96)

2 p. IV-20/¶1/2nd Sentence

"...with its own policies. Projects will also be reviewed by NOAA, under the Sanctuary Consultation provision of the National Marine Sanctuaries Act (to insure that the activity will not adversely affect the resources or qualities of the Sanctuary) as well as under Section 7 of the Endangered Species Act (for protected species issues). "

3 p. IV-20/"Issues of Concern"/"Impact on Marine Biota"

"endanger any protected species that may occur in the area."

p. IV-20/"Issues of Concern"/"Stellwagen Bank"

4 retitle "Stellwagen Bank National Marine Sanctuary"

"The Stellwagen Bank National Marine Sanctuary (SBNMS) is located only around 200 meters from the northeastern perimeter of the MBDS. The regulations of the National Marine Sanctuary both prohibit disposal of dredged material within the Sanctuary, and prohibit disposal outside the Sanctuary that is likely to enter the Sanctuary and harm a Sanctuary resource of quality. Given the proximity of the Sanctuary to the disposal site, it is therefore critical that barges disposing dredged material at MBDS be certain that were they are dumping material as close as possible to the permitted disposal location. Recent research conducted by the US Geological Survey and SBNMS has indicated that past disposal activities have been less than precise, and are working with the US Coast Guard to insure that disposal operations are more carefully monitored by enforcement personnel."

****

Appendix A/NOAA/¶1

5 "...lead marine science agency, NOAA mission includes research, data collection and assessment, and management of the nation's marine, estuarine, and coastal resources. While many of NOAA's programs have some linkage to and support research and management activities in Massachusetts and Cape Cod Bays, including the National Weather Service, the Coast and Geodetic Survey, The NOAA Fleet, the National Undersea Research Centers, the National Sea Grant Programs, and the many environmental research and monitoring programs supported by NOAA, the three NOAA programs that have the greatest connection to the Bays are the Northeast Regional Office National Marine Fisheries Service, the

Stellwagen Bank National Marine Sanctuary, and the funding provided by NOAA for the Massachusetts Office of Coastal Zone Management.

The mission of the National Marine Fisheries Service (NMFS) is to "achieve a continued optimum utilization of living resources for the benefit of the nation." The Northeast Regional Office, located in Gloucester, and the NMFS Northeast Fishery Science Center, in Woods Hole, play a pivotal role in providing a better understanding of, and thereby better managing the living marine resources of the Bays. The Northeast Regional Office reviews coastal development projects of regional significance, and oversees the management of critical fisheries resources and protected species. The Fishery Science Center monitors the status of fish stocks and conducts critical research on fish and marine mammals that are the livelihood of many in the region.

The Stellwagen Bank National Marine Sanctuary is a 638 sq. nmi. area located at the seaward edge of the Bays between Cape Cod and Cape Ann, designated by Congress in 1992 to protect the rich biological productivity and diversity of this important offshore bank in the Gulf of Maine. The Sanctuary oversees and helps to coordinate all federal activities that may affect Sanctuary resources, and conducts education and outreach, research, and management programs to assist the Sanctuary staff in this oversight role. Human activities that may affect Sanctuary resources are regulated by the Sanctuary, and by other Federal agencies, in collaboration with the Sanctuary staff, that have regulatory authority over Sanctuary resources.

The Coastal Zone Management Act of 1972,..."

6 Suggest that the CG section (p. A-3) be modified to reflect that they enforce all laws applicable to the use of the waters of the US, including (in addition to what you cite) the fisheries laws, the laws and regulations of the Stellwagen Bank National Marine Sanctuary, and the Marine Mammal Protection act and the Endangered Species Act. They play a larger role than the small section included in the CCMP implies. Might want to check with the CG for their input.

MBP Response to Brad Barr, Stellwagen Bank National Marine Estuary

1 The priority issues of the Massachusetts Bays Program and CCMP were established at the outset of the Program by the MBP Management Conference. It was agreed that the Program would focus principally on the multiple nearshore and landside threats to the Bays' water and sediment quality, habitat, and living marine resources. Toward this end, 15 separate action plans have been developed in the CCMP which prescribe a broad range of actions aimed at preventing and mitigating pollution, protecting and restoring degraded habitat, promoting responsible land use, and enhancing public access to and enjoyment of the coast. The enhancement of estuarine and sediment quality and habitat is expected to have a positive impact on the offshore marine environment and living resources of Massachusetts Bays.

The problem of declining offshore commercial fish species has not been overlooked. The CCMP discusses the issue of overfishing of major commercial finfish species in Massachusetts Bays and the resultant severe economic hardship on traditional fishing-dependant communities such as Gloucester. It states that "...overfishing is generally considered to be the primary cause of the current crisis in the fishing industry," but also recognizes that "...pollution and habitat loss are thought to play a role as well, especially among fish that spawn nearshore or are anadromous." In order to shed further light on this complex issue, the MBP has funded the development of a White Paper and will be hosting a workshop which will explore the factors impacting the region's declining offshore fish stocks. Please refer to the discussion on "fishing" in The Human Habitat section of Chapter II (The State of the Bays).

2 Please note the amended language in the concluding paragraph of the "Project Description" section of the "Massachusetts Bay Disposal Site" discussion in Chapter IV.

3 Please note addition of phrase "endanger any protected species that may occur in the area" to the "Issues of Concern/Impact on Marine Biota" in the MBDS discussion in Chapter IV.

4 Please note the expanded title and description of the SBNMS in the bulleted item previously labeled "Stellwagen Bank" in the MBDS discussion in Chapter IV.

5 Please note the revised and expanded description of NOAA (including NMFS and SBNMS) in Appendix A - Management Framework.

6 Please note the revised and expanded description of the U.S. Coast Guard in Appendix A - Management Framework.

KEITH K. DAVISON
37 Hastings St., #206-ME
West Roxbury, MA 02132
(617) 327-5761

January 30, 1996

Ruth Knykendall
Massachusetts Bays Program Office
100 Cambridge St., Room 2006
Boston, MA 02202

fax 727-2754

RE: CCMP - Draft Final Plan (Dec 1995)
Massachusetts Bays Comprehensive Conservation and Management Plan

This valuable and informative document is obviously the result of a great deal of work by many people. The challenge over the coming years will be to keep it updated, a living document - and to make it effectively accessible. (It is common for such documents to soon become "out of print".)

Considering that this proposed plan has been five years in the making, the stated bare month between the close of the public comment period and publication of the final draft is inadequate to meaningfully incorporate public comment in the plan. The announcement in the 24jan96 EM of an overlapping (separate?), intervening MCZM comment period is confusing.

Keith K. Davison

p.III-35

1 The stated per capita average sewage flow for the MWRA system is over twice that of the Lynn system. What explains this glaring discrepancy?

Most regions covered in Section III list detailed directories. Oddly, the Metro Boston region does not. Groups such as SH/SB & BHA don't seem to even be included indirectly in "citizen group efforts" (p.III-41).

p.IV-3

2 The very brief introduction to the origin of the MWRA seems confused/confusing. The two sentences introducing the MWRA obscure the fact that it is the successor agency to the MDC with regard to sewage treatment (and seem to downplay the role of lawsuits and the court in the existence of the MWRA).

p.IV-5 Sludge Processing

Full beneficial reuse is still just a goal. Molybdenum contamination is an ongoing challenge. Fore River is being upgraded/enlarged.

3 The major tunnel project associated with Fore River and the sewage upgrade in that area don't seem to be mentioned in this section. Current exploration of a marine pipeline alternative raises new harbor impact issues, in addition to the unacknowledged excavate disposal impacts of the default design.

Megaprojects, esp. this one, entail significant levels of injury and death among construction workers. It would be fitting to acknowledge this.

p.IV-11 CA/T

Most of this section seems to be over two years old, a long time for this immense, ever-changing project. The tunnel is open, Spectacle Island is being fought over (the
4 configuration of docking and other final facilities, completion and operations funding), CRC and the new Charles park are evolving. Changes have been made to stormwater plans north of the Charles, and the details of the destruction and mitigation of Miller's River have just been completely re-planned.

This section should be substantially re-written to bring it up to date; I'd like an opportunity to review it before final publication.

5 p.IV-17

Is the Navigation Improvement Project actually a 50-year planning framework?

6 p.IV-21 MBDS

In a few places throughout the text, words appear with extraneous hy-phens separating syllables.

As long as the MBDS is "authorized" for "consideration", it will be used. There must of an ongoing process larger than individual projects -- monitoring impacts, developing and exploring alternatives.

7 p.IV-31 Plymouth Sewage

The CDM documents include a fine discussion of water reuse, which deserves specific mention here as a conservation/efficiency measure.

8 Chapter V Action Plans

Each action has associated estimated cost and target date(s). These are worth attempting to incorporate in short form in the summary table.

9 Plan #1 - Public Health

Collecting test results is a basic requirement. But analyzing data and developing accurate and usable predictive models seems equally important.

10 Plan #3 - Coastal Habitat

I find no mention of the history of mosquito control and current salt marsh restoration/management plans.

11 #3.10

There should be an effort to make GIS data effectively available to local officials, non-profit organizations, and citizens.

12 Plan #4 - Stormwater Pollution

I find no mention of snow dumping/BMP.

Plan #5 - Toxic Pollution

13 #6 - Oil Pollution

DEP is actively promoting municipal collection programs for oil and paint.

HHW programs have not made notable progress over the last decade. Only permanent, year-round programs have any chance of significant impact. There is also a need for uniform, simple labeling of all potential toxics at point-of-sale.

Mercury should be removed from commerce (e.g. batteries) so that it doesn't end up in the water.

Rationally, restaurants that serve seafood could effectively inform the public about seafood safety.

p.V-77

14 LEPC's are supposed to facilitate the public right to know and public participation. This is not happening, certainly not in Boston.

There are no local, regional, or state programs that annually survey the worst toxic spills and plan on appropriate future prevention, with public participation.

p.V-84

15 "Targeted" niche HHW collections may be more cost-effective, but I fear they are less convenient for the public and thus result in more inappropriate hazardous waste disposal.

No private sector actions are recommended. Major vendors and retailers of paint should be encouraged to set up paint take-back programs.

The availability of private HHW disposal facilities, such as Clean Harbors in Natick ($4/lb) is an oddly well-kept secret, deserving of wider publicity and emulation. If the fact can be brought home to citizens that many substances cost more to dispose of properly than to purchase, perhaps they will start taking purchase decisions more seriously.

Plan #6 - Oil Pollution

16 Is natural gas significantly cleaner for the environment than fuel oil heating, on the whole? Should public policy tip the scales more towards natural gas?

What percentage of Massachusetts Bays oil shipments are double-hulled?

The City of Boston has a permanent used oil collection program which needs wider publicity and a more conveniently distributed neighborhood presence. It would be logical for fire stations to become more responsive to a spectrum of such local needs.

The used oil retailer take-back program has not been a success. A deposit/tax system to support a more effective program should be considered. More encouragement, publicity, and accolades should be given to service stations that accept used oil from the public. Perhaps public policy should also do more to emphasize the "environmental correctness" of having your oil changed by a responsible, properly equipped "professional". (It is not easy to know which service stations actually implement "best management practices" for the various wastes - or will provide recycled antifreeze, for example). It seems to me that if motor oil were retailed as a bulk fluid, people who change their own oil would be more naturally inclined to return/exchange the bulk used fluid.

17 p.V-91

The listed costs seem so low, compared to the benefit, that the MWRA should consider subsidizing such programs.

18 p.V-95

What spills of note have occurred since 1991?

A major oil spill has just occurred off Rhode Island, weather-related, or at least weather-aggravated. What is being done to avoid vulnerable toxic material shipments during bad weather?

Is it really beyond our technical capacity to totally enclose a foundering barge or tanker - or do we merely lack the will?

19 Plan #7 - Municipal Wastewater

I suggest mention of beneficial reuse of biosolids vs. incineration/landfill disposal, and discussion of black vs. grey water and water reuse.

It is not necessary to mix human biosolids with vast quantities of water, and this wasteful standard practice is vastly expensive - and polluting. Composting toilets are available. (As you note on p.V-108. Besides Clivus, other compact, self-contained residential systems are available. Perhaps you should describe currently available convenience and de-emphasize past drawbacks. Don't obscure the underlying fact that this may be the most responsible alternative, and in some cases perhaps the truly cheapest on the whole.)

20 p.V-99

You might mention molybdenum sludge contamination issues and the controversy over chlorine.

21 p.V-121

No contact is given for the ad hoc task force for decentralized wastewater management. How do I get on their mailing list?

22 Plan #8 - Boat Wastes

All standard boating waste disposal practices seem environmentally irresponsible. No model BMPs are in sight.

What do pump-out facilities do with these toxic materials?

Yacht club memberships, docking fees, etc. should <u>include</u> pump-out privileges, to avoid an economic incentive for improper disposal.

You don't mention the use of "dissolving" chemicals, or deal with the variety of other boating wastes.

23 Plan #9 - Dredged Materials Disposal

- Is it possible to convey disposed materials to the bottom without distributing them in the water column?
- Is it possible to inject disposed materials under the ocean bottom?
- Is there any long-term statewide mechanism for matching disposal of clean dredged or inland excavate with shoreline erosion-control needs?

24 Plan #10 - Marine Flotables

Are cigarette butts (one-third of total items) a hazard to wildlife?

Apparently, laws prohibiting ocean plastic disposal are widely ignored. Perhaps commercial docking fees should include trash disposal.

25 Plan #12 - Waterfront

- Boston HarborWalk
- No approved Ft. Point Channel Master Plan
- No S. Boston Marine Industrial Park Master Plan - Impending sale
- Lack of adequate rail freight connections to ports

Plan #15 - Public Participation

26 Chapter XI

An effective public participation program is extremely difficult to implement, and there are no adequate Massachusetts models to emulate.

The Internet should be an important part of future plans to make information available and promote dialog.

The CCMP is clearly the product of many meetings, of many groups. Most such "public" meetings are public in name only. Access to agendas and meeting minutes are critical to public participation, but the key is just becoming aware of the very existence of an ongoing series of meetings. Every such group should be listed at least annually, ideally quarterly, in the Environmental Monitor.

Only a small fraction of citizens potentially interested in the CCMP are likely to know it exists.

27 p.V-189 CAN

List member organizations and contacts.

28 Chapter IX

I am surprised that the statement of the overarching goal does not include the word "restoration".

29 Chapter XI

The terms "draft final" and "final draft" are confusing.

One month is inadequate for consideration and incorporation of public comments in the plan itself. Better not to pretend.

Providing copies of public comments to the public is a vital mechanism of dialog. "Summarizing" the comments may be necessary as a practical matter, but is likely to adversely impact true diversity of authentic public opinion. Delaying such material until the very end of the process greatly detracts from its value. Such delayed, formal "written responses" are a minimal form of meaningful dialog.

30 p.A-6

My understanding is that RPA's/counties in Massachusetts are relatively weak and powerless. "Home rule" seems to be more a mechanism of legislative obstruction than local empowerment.

MBP Response to Keith K. Davison, West Roxbury

1 The MWRA's average sewage flow of 500 mgd includes the sewage flows from all 43 MWRA communities, not just the eight Metro Boston coastal communities listed. A note to this effect has been added to the "1995 Metro Boston Municipal Sewage Treatment Information" chart in the Metro Boston Region section of Chapter III.

A "Directory of Coastal Projects, Programs, and Sources of Assistance" has been added to both the Metro Boston and the South Shore Region sections in Chapter III.

2 The brief discussion of the origin of the MWRA has been clarified. Please refer to the "Background" section in the Boston Harbor Project: Upgrading Sewage Treatment in the Metro Boston Area discussion in Chapter IV.

3 Please refer to MBP response #19, following, for a discussion of biosolids (e.g., sewage sludge) reuse. With respect to the ongoing challenge of molybdenum contamination, please refer to the introductory section of Action Plan 7A (Managing Centralized Wastewater Treatment Facilities) in Chapter V.

The MBP acknowledges that certain construction projects of the size and scope of the "megaprojects" described in the CCMP may indeed involve issues of construction worker health and safety, but these issues are beyond the MBP's focus on water quality, living resources, and habitat preservation.

4 The Central Artery/Tunnel (CA/T) Project description in Chapter IV has been updated to reflect recent milestones (e.g., dedication and opening of the Ted Williams Tunnel) and the project's current status.

5 The U.S. Army Corps of Engineers estimates maintenance dredging requirements over a 50-year period in order to evaluate a project's long-term benefit/cost ratio. The brief discussion on maintenance dredging in the "Issues of Concern / Source Control" section of the Boston Harbor Navigation Project writeup in Chapter IV is intended to inform the reader of the ongoing nature of sediment accumulation in Boston Harbor's navigation channels, and of the value of controlling pollution at the source to minimize sediment contamination and future dredged materials disposal costs.

6 The extraneous hyphens inadvertently placed in the text of the MBDS discussion of Chapter IV have been removed.

7 MBP staff will review the referenced CDM discussion on water reuse as a conservation/efficiency measure for the Plymouth Sewage Treatment Project, and as appropriate, may summarize or cite it in a future update to the CCMP.

8 As it moves into the implementation phase of the Program, the MBP plans to produce companion documents to the CCMP, through its LGC technical assistants, which will summarize community-specific CCMP actions, costs, and timetables for each of the five coastal subregions.

9 The MBP, through its RPA/LGC technical assistants, will work closely with the Department of Public Health (DPH) and local Boards of Health to ensure the proper development, interpretation, and use of public beach testing data. Please refer to DPH Action #1.1 in Action Plan #1 (Protecting Public Health) of Chapter V.

10 The Commonwealth has an active program underway to identify, prioritize, and restore degraded salt marsh and other wetland types. Please refer to EOEA Action #3.13 in Action Plan #3 (Protecting and Enhancing Coastal Habitat) of Chapter V for a discussion of the Commonwealth's innovative Wetlands Restoration and Banking Program.

11 Through funding to be provided through the 1995 Open Space Bond, the Regional Planning Agencies (RPAs) will be established as regional GIS data centers. Working in collaboration with the Mass-GIS Office, the RPAs will make GIS data available to local officials, non-profit organizations, businesses, and citizens.

12 Sources of stormwater pollution, and best management practices (BMPs) for controlling stormwater pollution, including "snow dumping" BMPs, are too numerous to have discussed individually in the CCMP.

13 Under the leadership of the Executive Office of Environmental Affairs, the Commonwealth is consulting with industry representatives (including manufacturers and retailers), municipal officials, environmental organizations, and others to explore and form public/private partnerships that can facilitate the safe management of a broad range of hazardous products - emphasizing reduced products use and recycling wherever possible. [See EOEA/Municipal/Private Sector Partnership Action #5.4 in Action Plan #5 (Reducing and Preventing Toxic Pollution).]

With respect to used motor oil, EOEA has drafted and will be pursuing legislation in 1996 that will make significant improvements in the collection of used oil from do-it-yourself oil changers (DIYers). In particular, the EOEA-proposed legislation would make current collection requirements more flexible, and pay recycling incentives to both collection centers and to DIYers who return used oil for recycling. It also would provide needed resources (through payments made by motor oil manufacturers) for public education programs, reimbursement of collection centers for costs of disposing of contaminated oil, and expansion of current Department of Environmental Protection (DEP) municipal recycling grants for used oil storage tanks. The Massachusetts Bays Program supports the passage of the revised legislation developed by EOEA. [See Municipal Action #6.1 in Action Plan #6 (Reducing and Preventing Oil Pollution).]

14 There is clearly a need to broaden and enhance emergency response planning at the local level to address situations such as toxic spills to storm drains. There is also a need to provide better linkages among local, regional, state, and federal agencies to coordinate and share data. The CCMP is a living document, and as such, can be revised to reflect developments in and improvements to emergency response planning For example, assistance to support local emergency responders may be considered as a future area of support under EPA's Emergency Planning and Community Right-to-Know Program.

15 See response #13, above.

16 The question of whether natural gas is cleaner than fuel oil, and whether public policy should tip the scale toward greater use of natural gas, is far broader than the current Massachusetts Bays Program focus on near coastal water quality and living resources of the Bays. For more information on these subjects, the MBP recommends that the writer contact the Federal Department of Energy at (617) 565-9700 or the Massachusetts Executive Office of Energy Resources at (617) 727-4732.

17 For several years, the MWRA financed a pilot program for used oil collection in selected communities, and issued a guidance manual for use by other communities interested in establishing similar collection programs. The MBP staff has passed the writer's comment along to the MWRA regarding possible future subsidy of local oil collection programs by the MWRA.

18 The tracking and recording of oil spills, the specific safeguards being instituted to prevent toxic materials spills during bad weather, and the technical capacity to totally enclose a foundering barge or tanker are subjects beyond the current scope of the Massachusetts Bays Program. For information on these subjects, the MBP recommends that the writer contact:

Marine Safety Division
First Coast Guard District
408 Atlantic Avenue
Boston, MA 02110
Tel.: (617) 223-8434

19 The reuse of "gray water" or other waters from sanitary systems is not a widespread practice in Massachusetts due primarily to local and state

health regulations, but it is being examined and researched in the context of alternative wastewater systems. Some individual on-site systems do allow water reuse. With respect to the beneficial use of biosolids on a small scale, several makes of composting toilets are becoming more widely allowed and used; these are part of a range of innovative wastewater technologies which the MBP encourages communities to consider in managing nutrients and pathogens from individual on-site systems. Finally, land application of certain classes of biosolids from larger sources (e.g., wastewater treatment plants) is regulated under both federal and state law, and as such, can be a viable alternative to more traditional disposal options such as incineration and landfilling.

20 The CCMP has been expanded to include a brief discussion of the issue of seasonally elevated molybdenum concentrations in the MWRA sewage sludge. Please refer to the introduction to "7A. Action Plan for Managing Centralized Wastewater Treatment Facilities" in Action Plan #7 (Managing Municipal Wastewater) of Chapter V.

The "controversy over chlorine" is presumed to refer to the adverse effect of excess chlorine on aquatic life versus the need to adequately disinfect wastewater effluent (typically using chlorine) prior to its discharge to coastal waters. While this conflict may have historically been controversial, both the Massachusetts DEP and the EPA currently use the chronic aquatic life criterion to set the chlorine limits in wastewater effluent discharge permits. As a result, some wastewater effluents undergo dechlorination prior to discharge in coastal waters as a means to protect aquatic life in those waters from excess chlorine levels.

21 The Ad Hoc Task Force for Decentralized Wastewater Management may be contacted as follows:

c/o Marine Studies Consortium
Pine Manor College
400 Heath Street
Chestnut Hill, MA 02176
Tel.: (617) 566-8600

22 The MBP believes that aggressive implementation of Municipal Action #8.1 (*Municipalities should work cooperatively with neighboring communities, private boatyards, and state agencies (DFWELE and CZM) to establish, promote, and maintain Boat Pump-out Programs in targeted embayment areas*) will significantly reduce the problem of improper boat waste disposal along the coast. Already, over 50 new pump-out facilities have been placed in Massachusetts coastal waters as a result of Clean Vessel Act (CVA) grants and technical assistance to communities from DFWELE, CZM, and DEP personnel. Another year of funding though the CVA grants program is expected to help finance additional pump-out facilities. Boat wastes collected at these facilities are required to be properly disposed of at authorized sewage and septage treatment plants.

23 Using a subaqueous discharge tube at reasonable depths, the mixing of dredged materials with a large portion of the water column is minimized. However, the use of this technique may prove difficult with strong currents in the upper water column. These discharge tubes have not yet been widely used. With respect to "injection" of dredged materials, although the intent of this word is unclear, dredged materials have been successfully isolated in natural or manmade depressions on the ocean bottom. Also, capping of surface mounds in some of the New England's dump sites has successfully isolated dredged materials from marine biota. Finally, both state and federal regulations require the evaluation of alternatives to open water disposal of dredged materials. Agency policies regarding these alternatives encourage the beneficial uses of these materials, as appropriate. For example, these uses could include shoreline stabilization, beach nourishment, habitat development, and landfill capping.

24 According to CZM staff, discarded cigarette butts on a beach are not known to constitute a significant hazard to coastal wildlife. Nevertheless, like other litter, they are unsightly and detract from the public's beach-going experience. See Action Plan #10 (Reducing Beach Debris and Marine Floatables) in Chapter V.

Commercial as well as recreational docking fees can, and in some instances do, include the costs of trash collection and disposal. For example, the design standards for marinas under Chapter 91 (Waterways) licensing regulations require the placement of trash receptacles at all marina gangways and restrooms.

The U.S. Coast Guard has regulations addressing the management of both shipboard waste (plastic, food, medical, etc.) and dockside receptacles. A

"designated waterfront facility", in accordance with US law/regulation, must have a Certificate of Adequacy (COA) to operate. The COA shows that the facility has capacity to handle shipboard waste (generally through contractors). Fish facilities handling over 500,000 lbs. of fish per year also fall under this COA requirement.

As the commenter pointed out, economics often encourage disposal of waste elsewhere, since U.S. waste disposal is very expensive. Currently, the requirements focus on the availability of the disposal facilities, not the costs of such capacity.

If a vessel has illegally disposed of trash, and the USCG notes a discrepancy when boarding such a vessel, one of two actions will be taken:

1. If the USCG cannot prove that the vessel dumped plastic within the EEZ (U.S. Exclusive Economic Zone - 200NM), then all obtainable data are collected and forwarded to the flag state of the vessel by the USCG Commandant.

2. If the USCG obtains evidence that the vessel may have dumped illegally within the EEZ, the USCG unit will process a civil penalty against the vessel; these cases can be very difficult to process because of the requirement for *proof* of dumping within our waters.

25 No response required.

26 The MBP has worked hard over the last five years to develop and implement an effective public participation program. The Management Committee - the MBP's principal deliberative body - is composed of diverse representatives from numerous larger public and private constituencies, including scientists and educators, business and industry, resource user groups, environmental advocacy groups, and government agencies (federal, state, regional, and local). Complementing the work of the Management Committee, and a major success of the Program, has been the formation and *active* participation of Local Governance Committees (LGCs) from the five coastal subregions. The LGCs consist of a broad range of local officials and citizens and have played a key role both in developing, and now implementing, the CCMP.

Building on its already considerable outreach efforts, the MBP is currently developing a home page on the Internet, and has provided funding to link member organizations of the Coastal Advocacy Network through the Internet. MBP will continue to explore electronic and other means of communicating the work of the Bays Program, including its extensive research findings and the CCMP, to the public. For more information on the MBP's public participation efforts, please refer to Chapter XI (Public Participation/Public Responsiveness Summary).

27 Members of the Coastal Advocacy Network and their affiliations are listed in the "Acknowledgements" section in the front of the document.

28 No response required.

29 Public participation in the development of the CCMP, and solicitation of public comments on the contents of the CCMP, have been ongoing over a 5-year period. The most recent public review process, as with those preceding it, was formally approved by the Management Committee. As this section of the Plan attests, all public comments on the Draft Final CCMP have been incorporated in full, along with a corresponding written response from the MBP.

30 While it is true that most Regional Planning Agencies (RPAs) lack regulatory authority, they have proven to be an effective mechanism for delivering a broad range of professional planning services and technical assistance to local governments. Through the RPAs, the MBP has been able to provide Local Governance Committees and municipal boards along the coast with much needed technical assistance in the areas of water quality task force organization, pollution source identification and remediation, habitat protection, aquaculture development, and grant writing and public education. The strong MBP/RPA/LGC partnership created by the Massachusetts Bays Program will serve as one of the key mechanisms for implementing CCMP actions at both the local and regional (i.e., embayment and watershed) levels.

Boston Redevelopment Authority

Thomas M. Menino, Mayor
Clarence J. Jones, Chairman
Mariso Lago, Director

January 19, 1996

Ms. Ruth Kuykendall
Massachusetts Bays Program
100 Cambridge Street / Rm. 2006
Boston, MA 02202

Dear Ms. Kuykendall:

Re: Draft Final CCMP

I have reviewed the excerpts from the December 1995 Draft Final CCMP, which were recently submitted to me for review, and have the following comments on the new and/or revised material:

(1) Chapter II, pg. II-4 "Rocky Shores"

Cite "recent study by Northeastern University" (ll. 6-7).

(2) Chapter II, pg. II-5 "Shipping, Boating, and Dredging"

Update economic activity figure. Data for 1992 indicate $1.858 billion in economic activity generated by the Port (Port of Boston Economic Development Plan, Nov. 1995, Table 1.11). (This figure is used in the 2nd paragraph of "Expected Benefits" on page IV-16.)

(3) Chapter II, Pg. II-6 "Fishing"

The spread in the annual economic benefit of recreational fishing ($45-$344 million) seems rather large (l. 6, 2nd paragraph). Is this correct?

(4) Chapter II, pg. II-7 "Sources of Pollutants..."

CSO's also are a significant contributor to the degredation of nearshore waters and should be added to stormwater as a source of pollutants (top paragraph on this page).

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(5) Chapter II, Pg. II-7 "Concentrations of Toxic Pollutants..."

Cite reference to "MBP funded... sediment triad analysis" (II. 6-7, 2nd paragraph).

Reduction in CSO's also will contribute to a decrease in levels of selected contaminants in Boston Harbor and should be added to improvements in wastewater treatment facilities and reduced use of certain toxic pollutants (last paragraph of this section).

(6) Chapter II, pg. II-8 "Effects of Contaminants..."

I would recommend qualifying the statement that health risks associated with consumption of fish from our coastal waters (including Boston Harbor) are low (last paragraph of this section). As noted in the preceding paragraph, there are some risks, even though generally fish in the Bay are considered safe to eat. Nonetheless, we should be careful about making too general a statement.

(7) Chapter IV, pg. IV-6 (Boston Harbor Project)

In the first paragraph of the section "Work to be Completed", change "on the following page" (last line) to "below" (since this is where the timetable chart is located).

(8) Chapter IV, pg. IV-8 (Boston Harbor Project)

I would again recommend eliminating the recommendation that the MWRA consider, in contingency planning, to relocating the outfall to Boston Harbor (7th recommended action) (see my memo to Diane Gould of July 7, 1995). As noted in my previous comment, the MWRA does not recommend this action and therefore there seems little reason for Mass Bays to support it.

(9) Chapter IV, pp. IV-15-IV-16 (Boston Harbor Navigation Improvement Project)

To clarify the recommended plan, I would recommend rewording the last sentence of the "Maintenance Dredging" paragraph as follows: "It is recommended that the maintenance material be disposed of in-channel (Mystic River, Chelsea River, and Inner Confluence) at a cost of $32 million."

(10) Chapter V, pg. V-61 (DEP Action #4.3)

In line 10 of "Implementation Strategy", should "plan" be "play"?

RM/20.LTR/011896

(11) Chapter VI, pg. VI-2

In the second paragraph of "Models for a Regional Approach..." 16 action plans should be changed to 15 action plans (I.14).

I thank you for the opportunity to comment.

Sincerely,

Richard B. Mertens, AICP
Environmental Review Officer

RM/20.LTR/011896

MBP Response to Richard Mertens, Boston Redevelopment Authority

1 Please note addition of study citation to "Rocky Shores" discussion in Chapter II.

2 Please note updated economic activity figure in "Shipping, Boating, and Dredging" discussion in Chapter II.

3 Bowen et al. (1992) used ranges of estimates from around the country on the consumer surplus value of a recreational fishing day to estimate a range of $45 - 355 million in annual economic benefit of Massachusetts Bays recreational finfishing. The authors acknowledge that their analysis was of necessity limited due to the unavailability of reliable survey data on the particular socioeconomic characteristics and fishing habits of Massachusetts' Bays recreational marine fishermen.

4 Please note inclusion of CSO reference in "Sources of Pollutants to Massachusetts Bays" discussion in Chapter II.

5 Please note inclusion of sediment triad analysis citation in "Concentrations of Toxic Pollutants in the Water Column and Sediments" discussion in Chapter II. Also, please note reference to CSOs in the concluding paragraph of the same discussion.

6 Please note addition of qualifying statement to concluding paragraph in "Effects of Contaminants on Organisms in the Bays" discussion in Chapter II.

7 Please note text change from "on the following page" to "below" as suggested.

8 Please refer to the MWRA Recommended Actions in the "Boston Harbor Project: Upgrading Sewage Treatment in the Metro Boston Area" section of Chapter IV.

9 Please note discussion of the preferred option of "in-channel" disposal of dredge maintenance material in the Chapter IV BHNIP section labeled "Issues of Concern".

10 Spelling corrected as noted.

11 Text changed to "15" action plans as noted.

CITY OF BOSTON * THE ENVIRONMENT DEPARTMENT

Air Pollution Control, Back Bay Architectural, Beacon Hill Architectural, Boston Landmarks and the Conservation Commission

Thomas M. Menino, Mayor
Lorraine M. Downey, Director

January 31, 1996

Ruth Kuykendall
Massachusetts Bays Program
100 Cambridge Street
Boston, MA 02202

RE: 1995 Massachusetts Bays Comprehensive Conservation and Management Plan - Draft Final Plan.

Dear Ms. Kuykendal:

The City of Boston Environment Department has reviewed the Draft Final 1995 Massachusetts Bays Comprehensive Conservation and Management Plan (CCMP) and hereby submits the following comments in response:

General Comments

1 There needs to be a discussion of how the plan will be presented to municipalities and the public and how support for the plan will be solicited. There should also be a discussion as to how municipalities are expected to use this information.

2 The plan discusses the DEP's stormwater performance standards as if they have already been approved and accepted, yet they are still in the development stage. The guidance document "Urban Best Management Practices for Massachusetts", which is intended to accompany the standards, is also referred to in the CCMP as if it were final. However, this document is still in draft form and likely to be revised once final standards are issued. The CCMP should be clarified to reflect the status of the stormwater performance standards. Information could include an update of the DEP's schedule for stormwater performance, the process for developing standards, and how public review of the standards will be conducted.

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Coastal Subregions - Metro Boston Region

3 III-9 Survey Answers and Action Plan #3

Boston does not have local guidelines in addition to the Wetland Protection Act. The survey was given a "yes" answer because Boston has a separate filing fee, procedural policies, and informal protective policies. In the context of the CCMP, as a reference document, the "Y" under "Boston" should be changed to "N". Otherwise the City of Boston has implemented the remaining applicable actions in Action Plan 3.

Projects of Regional Scope and Impact

IV-8 **The Boston Harbor Project:**

4 We do not endorse Recommended Action #7 which would consider divergence of effluent from the new Deer Island outfall pipe to the existing outfalls in Boston Harbor. This recommendation should be eliminated from the CCMP. The state and the City are spending $30 million and $500,000, respectively, to restore the Boston Harbor beaches. Also, the Boston Water and Sewer Commission is eliminating and/or reducing CSO discharges to the harbor at substantial cost. The purpose of the Beaches initiative is to actively bring people "Back to the Beaches." These efforts should not be hampered by bringing effluent back to the Harbor, especially if it poses a health or odor problem.

5 IV-13 **Central Artery/Tunnel Project** -

The information under this section should be updated by acknowledging the opening of the Ted Williams Tunnel.

Even more important to the Bay, the CCMP should indicate that there is a proposal by CA/T Project to add more excavate to Spectacle Island than previously agreed.

Recommended Actions:

6 The Plan does not make Recommended Actions to the CA/T Project. There have been incidents of sedimentation control breakdown at Spectacle Island, with plumes and sediment suspension observed in the waters around the Island. We ask that the CCMP recommend to the Artery Project that double staked haybales be maintained around the perimeter of the Island as usual best management practices. The CCMP should further recommend that special attention be paid to containing the fill on Spectacle Island.

Action Plans

7 Action Plan #4

The NPDES stormwater discharge permit program applies to municipalities with a separate storm drainage system serving a population of 100,000 or more rather than 500,000 as indicated. 40 C.F.R. 122.26(a)(b).

Action Plan #4 cont.

In addition to running Logan International Airport, the Massachusetts Port Authority controls considerable industrial property along Boston Harbor. Stormwater draining from Massport properties picks up foams, de-icing agents, jet fuel, oil and other toxins. As a
8 responsible State Authority with an interest in the Harbor, Massport should have its own "Action Plan #4" calling for best management practices for stormwater discharges, correcting sheetflow, and educating tenants about the effect of their operational practices on runoff.

EPA Action 4.5

EPA should provide assistance to all communities in the Mass. Bays watersheds for stormwater management. The rationale provided seems to focus only on the lower
9 Charles River and the Neponsett River. While these areas have been specifically targeted, EPA and DEP should not ignore the other watersheds. Furthermore, in the case of the Charles project, attention should be given to upstream sources.

Action Plan #6

10 Emergency Spill Response Plans should include emergency spills to storm drains. A more extensive analysis of which agency has what responsibility would increase the functioning value of the CCMP document. Preparedness for response to emergency spills should occur on all levels of government, so that implementation can begin sooner rather than later.

Action Plan #8

11 The Massachusetts Port Authority controls several piers in Boston Harbor. Tenants at these piers include tugs, barges, cruise ships, fishing and cargo vessels. As a responsible State Authority with an interest in the Harbor, Massport should have its own Action Plan #8 calling for pumpouts at each pier where tenants tie up. Massport should have a pumpout education program for its tenants, and look for other incentives to ensure compliance.

I thank you for your time and attention.

Sincerely,

Lorraine M. Downey

Lorraine M. Downey
Director

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MBP Response to Lorraine M. Downey, Boston Environment Department

1 The CCMP has been expanded to provide additional information on the development of the Plan, its presentation to and use by the municipalities, and mechanisms for its implementation. Please refer to Chapter I (Introduction) and Chapter VI (Implementing the CCMP Throughout the Bays Watershed).

2 The CCMP has been revised to reflect the current status of DEP's developing stormwater performance standards and draft guidance document, *Urban Best Management Practices for Massachusetts*. Please refer to DEP Actions #4.3 and #4.4 in Action Plan #4 (*Reducing and Preventing Stormwater Pollution*) of Chapter V.

3 The CCMP has been revised to reflect the fact that the City of Boston does not currently have local wetlands guidelines in addition to the state Wetlands Protection Act regulations. Please refer to the "Metro Boston Resource Management Survey" chart in the Metro Boston Region section of Chapter III.

4 Please refer to the MWRA Recommended Actions in the "Boston Harbor Project: Upgrading Sewage Treatment in the Metro Boston Area" section of Chapter IV.

5 The CCMP has been updated to reflect the current status of the Central Artery/Tunnel Project. Please refer to the Central Artery/Tunnel (CA/T) megaproject discussion in Chapter IV.

6 The CA/T discussion has been expanded to include a discussion of the past sediment control problems at Spectacle Island and the need for improved best management practices to prevent erosion of fill material. Please refer to the "Issues of Concern" section in the CA/T megaproject discussion of Chapter IV.

7 The CCMP has been revised to reflect the fact that the NPDES stormwater discharge permit program applies to municipalities with a separate storm drainage system serving a population of 100,000, and not 500,000 as originally indicated. Please refer to the introductory section of Action Plan #4 (*Reducing and Preventing Stormwater Pollution*).

8 One specific effort to facilitate the reduction of stormwater pollution from Massport facilities is the planned issuance, by U.S. EPA, of an individual stormwater permit under the National Pollutant Discharge Elimination System for Logan International Airport. This permit may be issued during the 1996 calendar year.

9 To the extent that staff and technical resources allow, EPA will be providing assistance to Massachusetts communities which request it. However, due to currently limited compliance and assistance resources for stormwater control, EPA will be targeting its community-based efforts during Federal Fiscal Year 1996 on the Massachusetts communities situated within the Neponset River and Charles River watersheds, as a complement to existing efforts in these watersheds (e.g., Massachusetts DEP Watershed Initiative). Finally, the Lower Charles River Initiative does consider pollutant sources upstream of the Initiative area.

10 There is clearly a need to broaden emergency response planning to address situations such as spills to storm drains, as well as to provide linkages among local, regional, state, and federal agencies to coordinate and share data. The CCMP is a "living" document, and as such, its future revisions can include developments in and improvements to emergency response planning. For example, federal assistance to support local emergency responders may be considered as a future area of support under EPA's Emergency Planning and Community Right-to-Know Program.

11 Subsequent to receipt of the City's comment letter, a meeting was hosted on 2/23/96 by CZM which included representatives of Massport, the Boston Environment Department, and the State DFWELE, which administers Clean Vessel Act funds. As a result of this meeting, Massport is proceeding with submission of an application for Clean Vessel Act funding. If possible, Massport will submit the application in cooperation with the City of Boston. The application will request funds for the upgrading of existing pump-out facilities and for installation of a series of new pump-outs on Massport property. Sewer connections already exist at the Black Falcon Cruise Terminal and the World Trade Center, and MBP recommends these locations for consideration.

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Management

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Memorandum BY FAX

To: Alan Macintosh, MVPC/MPB
From: Leslie Luchonok, DEM ACEC Program
Subj: Revisions to draft final plan, CCMP
Date: February 15, 1996

Alan, attached are three pages of suggested revisions to the draft final CCMP regarding ACECs and the ACEC Program.

I will also send another FAX with the specific pages referenced, with locations of suggested changes shown, as you requested.

I hope the suggestions are clearly described and that you can incorporate them into the final plan without difficulty.

Thank you for your patience, and for all your good work!

Please call if you have any questions. I'm in my Northampton office this morning; however, beginning this afternoon I will be out until Tuesday. Liz will be in her Boston office tomorrow. Thanks again.

attachments

cc: Liz Sorenson, DEM

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Comments and Corrections to MBP 1995 CCMP 12/95 Final Draft, Concerning ACEC Program
· submitted by Leslie Luchonok, ACEC Program

1) The Parker River/Essex Bay ACEC is not mentioned in the Upper North Shore Region Section (ACECs are mentioned in other regional sections). On page III-4, provide description of Parker River Essex Bay ACEC under 3) Watersheds and Important Tributaries - add paragraph after Ipswich River paragraph, as follows:

The estuarine portions of the Parker River and Ipswich River watersheds, as well as the Castle Neck River, Essex River and Essex Bay, are located within the Parker River/Essex Bay Area of Critical Environmental Concern (ACEC). This is the only ACEC located on the Upper North Shore, but is the largest ACEC in the Commonwealth - approximately 25,500 acres in size. The ACEC is located in the towns of Essex, Gloucester, Ipswich, Newbury and Rowley, and was designated in 1979 (see description of ACEC Program and table on page V-31).

2) Correct and revise Upper North Shore and Salem Sound Directories on pages III-14 and III-27, and add ACEC listing to Cape Cod Directory on page III-66, as follows:

For each Directory -
a) correct spelling of Leslie's last name - **Luchonok**

For each Directory -
b) revise Program Description - **ACEC status provides additional protection to critical resource areas, and creates ecosystem-based planning and management framework for state and local actions.**

3) Correct and revise description of ACECs on page III-41, as follows:

The Metro Boston region has two estuarine ACECs. The Rumney Marshes ACEC is approximately 2,800 acres in size, and is located in Boston, Lynn, Revere, Saugus and Winthrop. The 1,260-acre Neponset River Estuary is located in Boston, Milton and Quincy. An ACEC Resource Management Plan for the Neponset Estuary ACEC is currently underway, as part of the Executive Office of Environmental Affairs commitment to working with municipalities, environmental organizations and residents for the long-term stewardship of ACECs. Portions of three freshwater ACECs are also in the region - the Cranberry Brook Watershed, the Fowl Meadow-Ponkapoag Bog, and Golden Hills ACECs (see description of ACEC Program and table on page V-31).

4) Correct descriptions of D. Areas of Critical Environmental Concern on page III-52. Add introductory sentence, correct Weir River ACEC, and add Herring River Watershed ACEC, as follows:

Currently there are four ACECs located in the South Shore Region (see description of ACEC Program and table on page V-31):

Weymouth Back River (Hingham and Weymouth)
Weir River (Cohasset, Hingham and Hull)
Ellisville Harbor (Plymouth)
Herring River Watershed - Plymouth and Bourne

5) Add section on Cape Cod ACECs within Mass Bays watershed on page III-64 (as done in other regional sections), as follows:

D. Areas of Critical Environmental Concern

There are three state-designated Areas of Critical Environmental Concern (ACEC) located on Cape Cod within the Massachusetts Bays Watershed. These three ACECs total approximately 24,000 acres. The Inner Cape Cod Bay ACEC is located in Brewster, Eastham and Orleans (2,550 acres); the Sandy Neck/Barnstable Harbor ACEC is in Barnstable and Sandwich (8,850 acres); and the Wellfleet Harbor ACEC is in Eastham, Truro and Wellfleet (12,350 acres). An ACEC designation provides additional resource protection regarding state regulations, programs and actions; creates a framework for ecosystem planning and management; and affords an opportunity for increased state-municipal cooperation and collaboration. Currently an ACEC Resource Management Plan is being prepared for the Pleasant Bay ACEC, a joint effort of four towns, state and regional agencies, environmental organizations and residents (see description of ACEC Program and table on page V-31).

6) Correct and update table of ACECs on page V-31, as follows:

a) Update/revise heading/title, as follows:

Statewide, there are 25 coastal and inland ACECs comprising approximately 170,000 acres:

b) add/update, under inland ACECs, below Canoe River Aquifer:

*** Central Nashua River Valley 12,900 acres Bolton, Harvard, Lancaster, Leominster**

c) add/update, under inland ACECs, below Hockomock Swamp

Kampoosa Bog Drainage Basin 1,350 acres Lee, Stockbridge

d) correct-add/delete * denoting ACECs within Mass Bays Watershed

add *** to Sandy Neck/Barnstable Harbor**

delete *** to Canoe River Aquifer** (this ACEC is in Taunton R. basin)

7) Correct intro paragraph, last sentence, under Department of Environmental Management on page A-5, as follows:

The programs of the following Offices are most closely related to the CCMP.

8) Add section on page A-5 describing Office of Natural Resources, directly under intro paragraph for Department of Environmental Management, as follows (the ACEC Program, the GOALS Program, the Coastal Access Program, and the Greenways Program are administered from this Office):

OFFICE OF NATURAL RESOURCES

The Office of Natural Resources provides for the long-term protection of natural resources, and for the public use and enjoyment of them. Activities include land acquisition, resource management planning for parks and trails, critical resource identification and protection, and municipal technical assistance and greenway grant programs. The Resource Management Planning program develops long range resource management plans (GOALS plans) for Massachusetts State Forests and Parks and identifies significant "Wildlands" areas of Forests and Parks for designation and protection. The Area of Critical Environmental Concern program identifies critical resource areas for designation as Areas of Critical Environmental Concern (ACECs), facilitates state agency actions and coordination to protect ACECs, and supports local and regional actions for long-term ACEC management and preservation. The Coastal Access - Sea Path program coordinates, promotes, and implements the establishment of community shoreline pathways or "Sea Paths" along the inter-tidal zone for the use of walkers or hikers. The Bikeways and Rail Trails program which acquires, plans for, and implements conversion of former railroad rights-of-way into long distance recreation trails.

MBP Response to Leslie Luchonok, DEM ACEC Program

1 Please note addition of Parker River/Essex Bay ACEC description to Upper North Shore Region section of Chapter III.

2 Please note spelling corrections and revised ACEC program description in regional directories of Chapter III.

3 Please note amended discussion of ACECs in Metro Boston Region section of Chapter III.

4 Please note corrected ACEC information in South Shore Region section of Chapter III.

5 Please note addition of ACEC description to Cape Cod Region Section in Chapter III.

6 Please note corrected and updated information in table of ACECs in Municipal Action #3.3 of Action Plan #3 (*Protecting and Enhancing Coastal Habitat*) in Chapter V.

7 Please note correction in introductory paragraph of "Department of Environmental Management" discussion in Appendix A - Management Framework.

8 Please note added description of "Office of Natural Resources" in "Department of Environmental Management" discussion in Appendix A - Management Framework.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND REGION
JFK FEDERAL BUILDING
BOSTON, MA 02203

TO: Diane Gould, Ph.D
Executive Director, Massachusetts Bays Program

FROM: Tara Tracy
Senior Regional Program Manager, Massachusetts Bays Program

SUBJ: U.S. Environmental Protection Agency Comments on the Massachusetts Bays Comprehensive Conservation and Management Plan

DATE: February 26, 1996

Representatives of the Coastal Management Branch and the Marine Pollution Control Branch of the U.S. Environmental Protection Agency (EPA) (Headquarters) have reviewed and commented on the Draft Final Massachusetts Bays Comprehensive Conservation and Management Plan (CCMP) (December, 1995). As such, the purpose of this memorandum is to provide a synopsis of these comments in order to facilitate the inclusion of responses in the Final CCMP.

Coastal Management Branch

1 o Existing and Future Management Conference Structure. The current Management Conference membership which participated in the development of the Draft Final CCMP should be documented, as well as the activities and efforts leading to the Final CCMP. This latter discussion should refer specifically to the letters of commitment and resolutions signed by agencies and communities participating in implementation of the Final CCMP. In addition, the future structure of the Management Conference should also be documented. This relates particularly to the Conference's responsibilities in facilitating and tracking implementation of the Final CCMP, as well as approving annual workplans. Finally, the Final CCMP should describe the structure and approach of the Massachusetts Bays Program on a post-CCMP basis.

2 o Monitoring. The Final CCMP should include schedules related to programmatic monitoring and reporting (e.g., tracking of Action Plan implementation, what will be reported to the public by the Management Conference). Also, the Final CCMP's approach to monitoring should reflect both the currently proposed level of effort, based on present funding and resources, as well as any efforts planned beyond this level

should the current funding situation change. Lastly, the Final CCMP should discuss the means for the public and others to access data which supported the development of Action Plans and recommendations, as well as the monitoring of their implementation.

3 o Federal Consistency. Coordination and consistency with the Federal Endangered Species and National Historic Preservation Acts should be addressed in the Final CCMP, since these laws are critical components of the overall CCMP objective to preserve and protect coastal habitat.

4 o Base Programs Analysis. The report, The Massachusetts Bays Management System: A Valuation of Bays Resources and Uses and an Analysis of its Regulatory and Management Structure (Bowen, Archer, Terkla, and Myers, June 1993), is referenced in the Analysis, but its results (e.g., identifying the need for technical assistance) are not included. This should be rectified by summarizing the report's conclusions in the Base Programs Analysis (as well as in the Implementation Strategy).

5 o Action Plans. As written, the Action Plans do not establish that the absence of implementation priorities is related to the fact that each community will largely be responsible for setting priorities, through their Local Governance Committee (LGC). This approach should be documented in both the Introduction to the Action Plans as well as in the Implementation Strategy; the latter should also document recent "visioning" discussions by the LGCs in support of this community-by-community approach to implementation.

With respect to the Habitat Action Plan, the Final CCMP should describe how the Community Resource Atlases (GIS) document the presence of endangered species.

Each Action Plan with outdated milestones should be updated.

6 o Implementation Strategy. A number of the above comments relate to revisions recommended for the Implementation Strategy and are significant enough to reiterate as follows: the role of the Management Conference in implementation; written commitments by agencies and communities to implementation of the Final CCMP; incorporation of the Bowen, etal report; and setting of Action Plan priorities at the local level.

Marine Pollution Control Branch

7 ○ Boat Wastes and Marina Pollution. This Action Plan should consider provisions for "dump stations" for the disposal of the portable heads common on small boats. Also, the U.S. Fish and Wildlife Service (USFWS) has a number of education/outreach materials and grants (Clean Vessel Act) which could support implementation of this Action Plan. A contact at USFWS was provided.

8 ○ Dredging and Dredge Material Disposal. This Action Plan should reflect both EPA and U.S. Army Corps of Engineers (ACOE) regulation and guidance regarding dredge material disposal. This applies to both the proposed capping demonstration project at the Massachusetts Bay Disposal Site, and the potential survey of future dredge areas to identify contaminated "hot spots" using EPA's "Beneficial Use Manual" (currently being drafted). Finally, similar to the National Dredging Team, regional dredging teams are being established; potentially supporting implementation of this Action Plan.

MBP Response to Tara Tracy, EPA - New England/MBP

1 For expanded discussions on the MBP Management Conference's existing and future structure, as well as its role in developing the Draft Final CCMP, approving annual workplans, and facilitating and tracking CCMP implementation, please refer to Chapter I (Introduction) and Chapter VI (Implementing the CCMP Throughout the Bays Watershed). Also, please refer to Appendix L for letters of commitment and resolutions signed by agencies and communities participating in implementation of the Final CCMP.

2 For expanded discussions on: 1) programmatic monitoring and reporting (e.g., tracking of Action Plan implementation); 2) currently proposed and possible future levels of effort; and 3) mechanisms for accessing MBP data, please refer to Chapter VIII (Monitoring CCMP Implementation).

3 CCMP coordination and consistency with the Federal Endangered Species Act and the National Historic Preservation Act is discussed in the Final CCMP. In particular, please refer to Appendices J and K, respectively.

4 The conclusions of the Base Programs Analysis report, *The Massachusetts Bays Management System: A Valuation of Bays Resources and Uses and an Analysis of its Regulatory and Management Structure* (Bowen et al., 1993), are summarized in the Final CCMP. Please refer to the Management Characterization/Base Programs Analysis discussions in Chapter IX and Appendix E (available under separate cover).

5 The approach to setting of implementation priorities by the LGCs is discussed in the Introduction to the Action Plans (Chapter V) as well as in the Implementation Strategy (Chapter VI). The latter also documents the recent "visioning" discussions by the LGCs in support of this community-by-community approach.

The Habitat Action Plan describes how the Community Resources Atlases document the presence of endangered species.

Action Plans with outdated milestones have been updated.

6 For further discussion on: 1) the role of the Management Conference in CCMP implementation; 2) written commitments by agencies and communities to implement the Final CCMP; 3) incorporation of the Bowen report; and 4) setting of action plan priorities at the local level, please refer to Chapter VI (Implementing the CCMP Throughout the Bays Watershed).

7 The Federal Clean Vessel Act (CVA) provides financial support for the establishment of boat pump-out stations. CVA funds are appropriated through the U.S. Fish and Wildlife Service, and granted by the Massachusetts Division of Fisheries, Wildlife and Environmental Law Enforcement to harbors (i.e., municipalities) and marinas which are situated in targeted embayments. In Massachusetts, CVA funds have also been used to establish dump stations in similarly sensitive areas. Dump stations are used as waste receptacles for the sewage wastes from portable heads typically found on smaller boats. Accordingly, in conjunction with CVA funding and planning agency efforts to initiate pump-outs for larger boats, the Massachusetts Bays Program will work to establish dump stations for smaller boats in targeted embayments.

8 Recent revisions to the CCMP Action Plan for Managing Dredging and Dredged Materials Disposal reflect the role federal regulations will play in implementing the Action Plan's recommendations. In addition, MBP staff have a close working relationship with the EPA-New England staff who oversee federally-regulated dredging projects and demonstrations. Accordingly, all work related to implementation of this Action Plan will occur with EPA-New England input and direction, using such sources as available guidance materials (e.g., the *Beneficial Use Manual*) and the yet-to-be-formed regional dredging team.

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
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MEMORANDUM

To: Diane Gould, Director
Massachusetts Bays Program
From: Peg Brady, Director
Massachusetts Coastal Zone Management
Date: March 5, 1996
Re: Massachusetts Bays Program Draft Final Comprehensive Conservation and Management Plan; Statewide

---

Massachusetts Coastal Zone Management (MCZM) would like to thank the Massachusetts Bays Program (MBP) for the opportunity to comment on the 1995 Draft Final Comprehensive Conservation and Management Plan (CCMP).

The CCMP is the result of a five year effort by the Massachusetts Bays (or MassBays) Program to characterize the natural resources of Massachusetts and Cape Cod Bays, identify resource management issues, and propose remediation strategies to address these concerns. The MassBays Program has made extensive public outreach and participation efforts, attempting to ensure both scientifically valid and publicly acceptable solutions to resource management problems of the Bays. MCZM has been an active participant in the development of the CCMP.

MCZM is currently conducting a federal consistency review of the CCMP to ensure consistency with its enforceable program policies. This review will be completed following incorporation of comments into the Draft CCMP and submission of the Plan to the US Environmental Protection Agency (EPA) for acceptance.

MCZM offers the following comments for consideration in the amendment of the Draft CCMP.

1 **Introduction:** A great deal of information underlies or is included in the CCMP, however, for a reader who has not participated in the development of the Plan, this depth may not be apparent. MCZM recommends that an introductory chapter be developed that describes:

- the National Estuary Program (NEP);
- the structure and purpose of a CCMP;
- the process by which MassBays developed its scientific understanding of the Bays and the management recommendations embodied in the Plan;

WILLIAM F. WELD, GOVERNOR; ARGEO PAUL CELLUCCI, LIEUTENANT GOVERNOR; TRUDY COXE, SECRETARY; MARGARET M. BRADY, DIRECTOR

- the authorities under which the NEP operates and the commitments of federal, state and local governments to implementation of the Plan's recommendations;
- participants in the Plan's development.

2 **Chapter II, Shellfish Bed Contamination, page II-8, third ¶:** MCZM recommends that the CCMP cite the US Department of Health and Human Services, Food and Drug Administration's 1989 Revision of the "National Shellfish Sanitation Programs's (NSSP) Manual of Operations, Part I, Sanitation of Shellfish Growing Areas" after the discussion of the criteria for shellfish beds open to harvesting.

3 **Chapter III, Overview of Coastal Subregions:** The overview of coastal subregions is nicely done. The MassBays Program has funded a large body of research on the characteristics of the Massachusetts Bay system -- reference to this research and identification of the location of reports would enhance this section and highlight the excellent work that the MassBays Program has sponsored.

MCZM suggests that, for consistency, directories of Projects, Programs, and Sources of Assistance for the Metro Boston Region and South Shore Region be added to the CCMP. Fara Courtney's name as MCZM North Shore Coordinator should be deleted from the Directory of Upper North Shore and Salem Sound Coastal Projects, Programs, and Sources of Assistance.

4 **Chapter IV, Massachusetts Bay Disposal Site, page IV-19:** Under "Recommended Actions," MCZM asks that MBP consider including a commitment to develop a long-term monitoring program for the Massachusetts Bay Disposal Site (MBDS).

5 **Chapter IV, Plymouth Sewage Treatment Project, page IV-29:** MCZM questions the inclusion of the Plymouth Sewerage Treatment Project in the "Projects of Regional Scope and Impact" section. This project is similar in complexity and significance to ongoing work in Gloucester and in Scituate, which were not included as "Mega-Projects".

6 **Chapter V. Action Plans:** The goals of the Massachusetts Bays Program are mentioned in an introductory section and then are not referenced again in the text. A slight restructuring of the chapter containing the CCMP's Action Plans might make the Action Plan's relevance to the goals clearer.

The authority of the MassBays Program to require implementation of Action Plans is unclear in the current text. It is MCZM's understanding that an NEP's authority is, to a large degree, persuasive. MCZM suggests that the MassBays Program reconsider the presentation of its recommendations, which are all stated in terms of an agency "should" perform the task specified. Rather than

"Municipalities with Areas of Critical Environmental Concern (ACEC) *should* work cooperatively with ...", the CCMP might, for example, read "*The Massachusetts Bays Program recommends that* municipalities with Areas of Critical Environmental Concern (ACEC) work cooperatively with ...". If the agencies being so directed have agreed to implement the recommendation, that fact could be noted in the Implementation Strategy for the recommendation. MCZM believes that this approach will emphasize the cooperative nature of this project.

Throughout the Action Plans, there are disagreements in tense between the recommended action and the implementation sections. From the text, it is very difficult for the reader to know if the Implementation Strategy is proposed or already underway (as many actions are). For example, DPH Action 1.1 recommends the establishment of a clearing house. The text states that DPH "will be the lead agent", DPH "will create" a data base, yet the section on target dates indicates that this task began in July, 1995. Again, notation of agreements with Responsible Agents to carry these proposals forward would be helpful.

7 **Chapter V, Action Plan #3, page V-32**: MCZM recommends that the nominators of an ACEC designation be included among the Responsible Agent(s) for the development of resource management plans.

8 **Chapter V, Action Plan #4, page V-56, second ¶**: MCZM suggests that the last sentence in this paragraph read: "DEP **is developing** a guidance manual,...." instead of "DEP has developed a guidance manual,...."

9 **Chapter V, Action Plan #4.3, page V-61, first ¶**: The state Department of Environmental Protection (DEP) **is producing**, not "has produced two excellent guidance documents...." In addition, DEP has shelved plans to reproduce the *Megamanual* since there appears to be considerable overlap with the Urban Stormwater guidance, currently in progress. The *Megamanual* was also not especially useful for local officials for implementing nonpoint pollution controls. DEP will wait until the Urban Stormwater guidance is finalized and then determine whether some portions of the *Megamanual* are not covered, such as the section on landfills, and could beneficially be reproduced for local boards.

10 **Chapter V, Action Plan #4.5, page V-65**: MCZM suggests that the state is more properly the lead agency in providing technical assistance to communities in the development of comprehensive stormwater management programs.

11 **Chapter V, Action Plan #4.5, page 65, first ¶**: The Action Plan indicates that EPA will work to reduce stormwater pollution by industrial stormwater dischargers through the use of the National Pollution Discharge Elimination System (NPDES) permit compliance.

However, EPA also requires NPDES stormwater general permits for construction activities that disturb more than five acres since these activities have been identified as major contributors to nonpoint source pollution. MCZM suggests MBP mention this additional requirement in the Action Plan, especially because both sources are important issues for the Charles and the Neponset River basins.

12 **Chapter V, Action Plan #5.5, page 85:** MCZM feels that this Action Plan does not greatly differ from Action Plan 4.5 in that both Action Plans address stormwater pollution issues from industrial sites. MCZM suggests that MBP consider combining the two Action Plans or make a reference in this Action Plan back to Action Plan 4.5.

13 **Chapter V, Action Plan #7, page 97:** It is our understanding that this text is meant to suggest that a variety of wastewater treatment options be considered, however, the opening characterization of wastewater facilities as causing a local decline in water quality is easily misread as suggesting that wastewater treatment plants (WWTP) have systematic adverse impacts. MCZM suggests that the overview first discuss the benefits that can be realized from centralized and on-site sewage treatment facilities and the successes associated with these approaches. MCZM recognizes that WWTPs are not without local impacts for most urban and suburban locations, but WWTPs are often an appropriate solution that provides water quality protection. Many WWTPs are built and operated correctly, and, in some areas, WWTPs offer the best available protection for drinking water supplies and shellfish. Often on-site systems have a finite life from the day operation of the system begins. When they fail the best local management systems are often unable to detect the adverse effects on drinking water supplies and shellfish beds until considerable harm has been done.

14 **Chapter V, Action Plan #7A, page 99:** MCZM agrees that the level of treatment at WWTPs is a concern and that advanced treatment be added to facilities where needed. MCZM also agrees that there are impacts from outfalls, but impacts can be managed, identified, and mitigated in ways that decentralized systems impacts often cannot.

15 **Chapter V, Action Plan #7A, page 99:** MCZM suggests that MBP consider not characterizing sludge as "unpleasant." This characterization is somewhat subjective.

16 **Chapter V, Action Plan #7A, page 100:** MCZM agrees that there are coastal WWTPs with flows that are at or above capacity, however the majority of the coastal WWTPs have available capacity to handle additional flows. Therefore, MCZM suggests the statement that many WWTPs "will not be able to handle increased flows" and "have antiquated and undersized collection systems..." is not broadly applicable. While centralized municipal treatment systems are not

all in perfect working condition and that they are a major point source of pollution, MCZM considers poorly designed, inadequate or poorly functioning individual septic systems and stormwater runoff to be the biggest threat to near coastal waters and drinking water supplies.

17 **Chapter V, Action Plan #7A.2, page 103:** MCZM suggests that this Action Plan cite EPA's 1994 Combined Sewer Overflow (CSO) Control Policy and the 1990 Massachusetts Water Quality Standards Implementation Policy for the Abatement of Pollution from Combined Sewer Overflows.

18 **Chapter V, Action Plan #7A.3, page 105:** MCZM supports the delegation of the NPDES permit responsibility to the state. MCZM is a participant in an advisory committee addressing the delegation process and specifically MCZM's federal consistency review of future delegated NPDES permits.

19 **Chapter V, Action Plan #7B, page 107:** MCZM suggests that this Action Plan identify the issue of toxics as a serious concern when managing on-site systems because of potential impacts to groundwater quality, and the longevity and efficiency of the overall on-site system.

20 **Chapter V, Action Plan #7B.1, page 111:** This Action Plan does an appropriate job of addressing the need for on-site management and planning, specifically in sensitive resource areas. However, MCZM suggests that the "Estimated Cost" section of this Action Plan also emphasize that this planning requires that there be a bottom line of environmental protection that must be met. Sensitive resources should not and cannot be forsaken by municipalities or property owners solely because of high costs.

21 **Chapter V, Action Plan #7B.2, page 113:** MCZM recommends that the CCMP recommend that municipalities work cooperatively with the DEP in the development of a regular inspection and maintenance program for on-site systems.

22 **Chapter V, Action Plan #7C, page 121:** When this Action Plan is rewritten, MCZM recommends that local responsibility for waste treatment be emphasized. Decisions about growth management and development will influence what wastewater treatment solutions are viable, desirable, and allowable. There is a spectrum of solutions, but less stringent local planning and growth management tend to drive the solution towards centralized WWTPs.

23 **Chapter V, Action Plan #8.1, page 127:** Implementation of this Action Plan depends on availability of funding from the federal Clean Vessel Act (CVA) Pump Out Grants Program. According to the state Department of Fisheries, Wildlife, & Environmental Law Enforcement (DFWELE), the office that manages the CVA grants program, there is only one more funding year left in this program.

In addition, we suggest that the CCMP note that the CVA grants program has resulted in the placement of over 50 new pump-out facilities in the coastal waters of Massachusetts.

24 **Chapter V, Action Plan #12, page 153**: Twice on this page there is a reference to "Comprehensive Harbor Plans" (second and fifth paragraphs). These should be changed to read "Municipal Harbor Plans." The language is correct on page 154 of this Action Plan.

25 **Chapter V, Action Plan #13, Planning for a Shifting Shoreline**: In the Implementation Strategy it is stated that MCZM has maps depicting areas subject to sea level rise. In fact, MCZM has relative sea level rise inundation maps for only three harbor locations. The Coastal Submergence Program document, from which the maps are taken, includes data on total acreage lost and projected loss per year per community, but not maps.

MCZM suggests that the section on "no new direct, untreated stormwater discharge..." does not appear to fit into the theme of shifting shorelines.

On page 168, reference is made to the availability from MCZM of the draft document "Scientific Recommendations for Performance Standards for Land Subject to Coast Storm Flowage". This document is a draft and has not yet been reviewed or approved by EOEA or DEP. The document is not yet ready for general distribution.

26 **Chapter VII. Financing the CCMP**: Complete implementation of the CCMP will be costly. This chapter describes the content of the *Financing Report* but is silent on its conclusions. It would be helpful to understand the fiscal context for the recommendations of the CCMP and MCZM therefore recommends that the chapter provide this a summary of this information.

27 **Chapter VIII. Monitoring CCMP Implementation**: First mention of four "Measurable Goals" for scientific monitoring is included in this chapter. As these are the measures by which the CCMP will be evaluated, MCZM suggests that these goals be discussed in the introductory chapter described above.

28 **Chapter X. Federal Consistency Analysis** and **Appendix F. Federal Consistency Analysis**: MCZM has worked closely with the MassBays Program and EPA to develop an innovative approach to future federal consistency reviews in the Massachusetts Bay watershed. We look forward to reviewing this chapter and Appendix when they are completed.

MBP Response to Peg Brady, Massachusetts Coastal Zone Management

1 Chapter 1 (Introduction) of the CCMP describes the National Estuary Program, the structure and purpose of the CCMP, the process by which the MBP developed its scientific and management recommendations, and the authorities under which the NEP operates. It also describes the participants in the Plan's development. (Note: for a list of individual MBP committee members and staff, please refer to the Acknowledgements section in the front of the document). Commitments by federal, state, regional, and local entities to implement the Plan are provided in Appendix L.

2 The "Shellfish Bed Contamination" discussion in Chapter II (The State of the Bays) has been expanded to include the citation for the US Department of Health and Human Services, Food and Drug Administration's 1989 Revision of the *National Shellfish Sanitation Program's (NSSP) Manual of Operations, Part I, Sanitation of Shellfish Growing Areas*.

3 The large body of research funded by the MBP is described in Chapter II (The State of the Bays). The location and availability of MBP research reports is discussed in the "Data Management" section of Chapter VIII (Monitoring CCMP Implementation). Finally, Appendix H lists all research reports funded by the MBP.

For purposes of consistency, directories of Projects, Programs, and Sources of Assistance have been added to both the Metro Boston and South Shore Region sections of Chapter III. Fara Courtney's name as MCZM North Shore Coordinator has been deleted from the Upper North Shore and Salem Sound directories.

4 With respect to the development of a long-term monitoring program for the MBDS, please refer to the "Site Management and Monitoring" discussion in the "Massachusetts Bay Disposal Site" section of Chapter IV.

5 The discussion of the Plymouth Sewage Treatment Project in Chapter IV was presented as an example of Massachusetts municipalities that are involved in the complexities of long-term wastewater facilities planning. A note to this effect has been added to the "Background" section of the Plymouth Sewage Treatment Project discussion.

6 The "Base Programs Analysis" (or Management Characterization) of the CCMP (Appendix E) discusses the relationship between the MBP's goals and the Action Plans. In particular, the Analysis identifies both the MBP's overall goal for the Massachusetts Bays (i.e., "...the preservation and management of a healthy ecosystem of living resources, useable by the public...") and its four measurable goals (e.g., improved habitat quality). The Analysis describes in detail how implementation of the 15 Action Plans will support these goals; for example, the relationship between the Action Plan for Reducing and Preventing Oil Pollution and the measurable goal of Reduction of Toxic Contaminants.

Generally, the CCMPs which have already been developed by the other 27 National Estuary Programs in the country use the term "should" in establishing their recommended actions. With respect to the MBP, the use of "should" in the Action Plan text represents the prior commitment of the responsible agency to implement a given action. In particular, all of the actions represent a significant level of effort by both the MBP and the agency in developing the recommendation, as well as to undertake its implementation. This effort is represented in the letters of commitment from the implementing agencies, as found in Appendix L.

7 As recommended, the nominators of an ACEC designation have been added to the list of "Responsible Agents" in Municipal Action #3.3 in Chapter V (Action Plans).

8 As recommended, the reference to the DEP guidance manual, *Urban Best Management Practices for Massachusetts*, has been revised to reflect the fact that the manual is still under development. Please refer to the introductory section of Action Plan #4 (Reducing and Preventing Stormwater Pollution) in Chapter V.

9 As in #8, above, the reference to the DEP BMP guidance document in Action Plan #4.3 has been revised to reflect its status as a document still under development.

While it is true that DEP has shelved plans to reproduce the complete *Megamanual*, copies of selected chapters and appendices are available on request from the DEP Nonpoint Source Program Office in Grafton.

10 Edits have been made to EPA Action #4.5 in Chapter V to address this comment.

11 Efforts by EPA to reduce stormwater pollution under NPDES do not preclude additional NPDES actions by EPA.

12 The last paragraph in the "Rationale" section of EPA Action #5.5 in Chapter V has been expanded to address this comment.

13 The second paragraph of the introduction to Action Plan #7 (Managing Municipal Wastewater) has been expanded to address this comment.

14 Additional language has been added to the first page of Action Plan 7A ("Action Plan for Managing Centralized Wastewater Treatment Facilities") to address this comment.

15 The characterization of sludge as "unpleasant" has been deleted from the first page of Action Plan 7A in Chapter V.

16 The language on the second page of Action Plan 7A has been changed to read "...<u>some</u> centralized sewage systems in the Massachusetts Bays region...", rather than "<u>many</u>". It is important to recognize, however, that the Massachusetts Bays region includes the entire watershed area draining to the Bays, and therefore includes many more centralized wastewater treatment systems than those located in the coastal zone alone.

17 The "Responsible Agents" section of EPA Action #7A.2 has been expanded to address this comment.

18 No response required.

19 The introduction to Action Plan 7B ("Managing On-site Sewage Disposal Systems") in Chapter V has been expanded to include a discussion of the potential adverse impacts of toxic substances on septic system management and groundwater quality.

20 The CCMP recognizes that there must be a bottom line of environmental protection in wastewater management planning. (See the Introduction to Action Plan #7, "Managing Municipal Wastewater.") The MBP agrees that sensitive resources should not be forsaken by municipalities or property owners solely because of high costs.

21 Municipal Action #7B.2 has been revised to include the recommendation that municipalities work cooperatively with DEP in the development of a local I/M program for on-site systems.

22 The first paragraph of the "Description" section of Action Plan #7C (Action Plan for Decentralized Wastewater Management and Treatment) has been expanded to address this comment.

23 Municipal Action #8.1 in Chapter V has been expanded to include references to: 1) the over 50 new boat pump-out facilities that have been placed in Massachusetts coastal waters through the CVA grants program; and 2) the one year of funding remaining in the program.

24 The references to "comprehensive" harbor plans in Municipal Action #12.1 in Chapter V have been revised to read "municipal" harbor plans.

25 Municipal Action #13.1 in chapter V has been revised to delete the references to: 1) CZM sea level rise maps, 2) the "no new, direct stormwater discharges..." performance standard, and 3) the draft document, *Scientific Recommendations for Performance Standards for Land Subject to Coastal Storm Flowage*.

26 The MBP "Financing Report", a companion document to the CCMP, is intended to serve as a technical assistance document for communities and others to use in implementing the CCMP's recommendations and actions. For example, the "Report" provides information regarding sources of financial assistance in the form of grants, revenues, etc., and can also be used to establish a framework through which a community can calculate its cost to implement applicable CCMP actions. The "Report" intentionally does not reach conclusions regarding the overall cost of implementing the CCMP, since the information which would be used to calculate these costs (e.g., individual site conditions, consulting fees, construction materials, etc.) is highly variable over time and is not germane to the implementation of every action.

27 The MBP's "measurable goals" for scientific monitoring are also discussed in Chapter I (Introduction).

28 Chapter X (Federal Consistency Analysis) and Appendix F (Federal Consistency Analysis) were developed in consultation with CZM staff and have been presented to CZM for review and comment.

Appendix H.

MBP—Funded Research Reports (1990-1996)

APPENDIX H.
MBP - FUNDED RESEARCH REPORTS (1990 - 1996)

Report Title	Principal Author/Grantee	Status	Doc. Number
Sources and Loadings of Pollutants to the Massachusetts Bays (337 pgs.)	Charles Menzie, Principal Investigator, Menzie-Cura & Associates	Final	MBP-91-01 October 1991
Evaluation of Elemental Tracers for Monitoring the Transport of Sewage Sludge in the Marine Environment (57 pgs.)	David K. Ryan Univ. of Massachusetts/Lowell et al.	Final	MBP-92-02 February 1992
Physical Oceanographic Investigation of Massachusetts and Cape Cod Bays (445 pgs. plus figures and appendices).	W. Rockwell Geyer Woods Hole Oceanographic Institution, et al.	Final	MBP-92-03 October 1992
Survival and Deposition of Fecal Bacteria in Boston Harbor Sediments (94 pgs.)	Michael Shiaris Univ. of Massachusetts/Boston	Final	MBP-92-04S MBP-92-05 (Full) October 1992
The Massachusetts Bays Management System: a Valuation of Bays Resources and Uses and an Analysis of its Regulatory and Management Structure (309 pgs.)	Robert Bowen Univ. of Massachusetts/Boston et al.	Final	MBP-93-01 June 1993
Bioavailability and Biotransformation of Hydrocarbons in Boston Harbor (68 pgs.)	Anne McElroy, Principal Investigator, State University New York/Stonybrook; New York Sea Grant, et al.	Final	MBP-95-02 November 1994
Examining Linkages between Contaminant Inputs and their Impacts on Living Marine Resources of the Massachusetts Bays Ecosystem through Application of the Sediment Quality Triad Method (210 pgs.)	Jeff Hyland Helder Costa Arthur D. Little, Inc.	Final	MBP-95-03 March 1995
Organic Loadings from the Merrimack River to Massachusetts Bay (182 pgs.)	Charles Menzie, Principal Investigator, Menzie-Cura and Associates, et al.	Final	MBP-95-04 April 1995
Evaluation of Chemical Contaminant Effects in the Massachusetts Bays (120 pgs.)	Michael Moore, Principal Investigator, Biology Dept. Woods Hole Oceanographic institution, et al.	Final	MBP-95-05 July 1995
Measurements and Loadings of Polycyclic Aromatic Hydrocarbons (PAH) in Storm-Water, Combined Sewer Overflows, Rivers, and Publicly Owned Treatment Works (POTWs) Discharging to Massachusetts Bays (236 pgs.)	Charles Menzie, Principal Investigator, Menzie-Cura & Associates, et al.	Final	MBP-95-06 August 1995
Atmospheric Deposition of Contaminants onto Massachusetts & Cape Cod Bays	Dan Golomb, Principal Investigator, Univ. of Massachusetts at Lowell, et al.	Draft Rec'd	In Final Review Print 4/96 (MBP-95-07)

Report Title	Principal Author/Grantee	Status	Doc. Number
Evaluating Costs to Communities of Management Measures to Reduce Loads to Sediments of Urban and Semi-Urban Harbors in Massachusetts Bays	Mark D. Curran Battelle Ocean Sciences Duxbury, MA 02332	Draft Rec'd	In Final Review Print 5/96
Biological and Physical Processes Controlling Nutrient Dynamics and Primary Production in Cape Cod Bay	George B. Gardner, Principal Investigator, Univ. of Massachusetts/Boston, et al.	In Process	Draft Due 4/96
Inventories and Concentration Profiles of Organic Contaminants in Sediment Cores from Massachusetts and Cape Cod Bays	Damian Shea, Principal Investigator, No. Carolina State University, et al.	In Process	Draft Due 4/96
Population Processes of Mya Arenaria from Contaminated Habitats in Massachusetts Bay	Judith E. McDowell, Woods Hole Oceanographic Institution, et al.	In Process	Draft Due 4/96
Geographic Analysis of Bacterial Loadings to Selected Massachusetts Bays Program Embayments	Scott Horsley, Vice President Horsley & Witten, Inc.	In Process	Draft Due 4/96
Other Funded Studies			
Identifying Southeast Asian Immigrant Populations at Risk from Eating Contaminated Shellfish	Jennifer Charles, Charles Consulting; Charles Menzie, Menzie-Cura & Associates	Final	MBP-95-1D May 1995
The Functions of Coastal Wetlands and the Economic Value of Coastal Wetland Restoration in Massachusetts	Dennis King, Project Manager, King & Associates	In Process	Draft Due 3/96
Impact of Contamination and Overfishing to Fisheries Resources	Robert Buchsbaum, Mass. Audubon: North Shore	In Process	Draft Due 3/96
Biological and Oceanographic Factors Controlling the Nuisance Algal Bloom of Pilayella Littoralis in Nahant Bay, Massachusetts	Don Cheney and Verena Gross, Northeastern University Marine Science Lab	In Process	Draft Due 4/96
Massachusetts Bays Monitoring Plan Components			
An Inventory of Organic and Metal Contamination in Massachusetts Bay, Cape Cod Bay, and Boston Harbor Sediments and Assessment of Regional Sediment Quality	Jeanne Cahill and Karen Imbalzano, U. Mass./Boston	Final 1991	N/A
Identification of Embayments at Risk of Eutrophication	Charles Menzie, Menzie-Cura & Associates	In Process	Due 4/96
Assessing the Health of Mussels, mytilus edulis L., sampled during the 1995 Gulf-Watch Project.	William Robinson, U.Mass./Boston	In Process	Due 6/96

Appendix H.

MBP—Funded Research Reports (1990-1996)

APPENDIX I.
MBP DEMONSTRATION PROJECTS (1990 - 1996)

1991 - 1992			
North Shore			
Gloucester Dye Testing	$16,000	Expansion of an existing dye-testing project conducted by City of Gloucester Health Department. Intended result: to control direct sewage discharges from inadequate septic systems.	Walter Meyer, Health Agent City of Gloucester Health Dept. Poplar Street Gloucester, MA 01930 (508)281-9771
Boston			
Quincy Tidegate Project	$35,000	Installation of a tidegate to control tidal influx into the storm water system for the City of Quincy.	Michael C. Wheelwright Program Manager Quincy Dept. of Public Works 55 Sea Street Quincy, MA 02169-2572 (617)376-1900
South Shore			
Stormwater Drainage System Monitoring	$33,000	Maintenance, upgrade, and monitoring of stormwater drainage systems discharging into the North River in Marshfield, Norwell, Hanover, and Pembroke.	Debbie Lenehan, Executive Director No. & So. Rivers Watershed Assn. P.O. Box 43 Norwell, MA 02061 (617)659-8168
Cape Cod			
Scudder Lane Stormwater Infiltration System Installation	$15,000	Installation and subsequent monitoring of a stormwater infiltration system at the parking area and boat ramp at Scudder Lane in Barnstable, an important shellfish relay area in Cape Cod Bay.	Stephen Seymour, Proj. Engineer Town of Barnstable 367 Main Street Hyannis, MA 02601 (508)790-6300
1992 - 1993			
Boston			
Winthrop Conservation Commission and Board of Selectmen	$31,000	"Lewis Lake Restoration Project": to improve water quality in a degraded coastal lake through a quantitative baseline assessment of the water quality, vegetation, and hydrology of the lake. Automate the existing manually operated tidegate, clean the area of debris, review the use of fertilizers and pesticides in the adjacent golf course, stencil storm drains which empty into the lake, and monitor recovery.	Mary Kelly, Chair Winthrop Conservation Commission Town Hall One Metcalf Square Winthrop, MA 02150 (617)846-1077

1992 - 1993 (con'd)			
Boston (con'd)			
Friends of the Boston Harbor Islands	$15,000	"Greater Boston Harbor Eelgrass Study and Island Revegetation Project" to renew and protect the native and naturalized vegetation on the harbor islands through data collection, propagation, and transplanting. Create an on-island nursery with seeds and cuttings collected from all of the islands. Create a better understanding of coastal erosion techniques through bioengineering which can be used throughout the islands and along the New England coast.	Marsha Bach Friends of the Boston Harbor Islands, Inc. P.O. Box 9025 Boston, MA 02114 (617)740-4290
Cape Cod			
Orleans/Brewster/Eastham Groundwater Protection District and Bourne Board of Health	$15,000	"De-nitrifying septic system" to perform site evaluation, and install and monitor an alternative on-site septic system: a peat system in Eastham. This system has the capacity to de-nitrify wastes. Work with DEP to get these systems approved as alternatives to the current Title 5 system. Conduct one educational workshop on the operation, maintenance, and regulations necessary for these systems.	Wayne McDonald District Administrator Orleans, Brewster, Eastham Groundwater Protection Dist. Overland Way - P.O. Box 2773 Orleans, MA 02653 (508)255-5744
1993 - 1994			
South Shore			
Duxbury/Kingston/Plymouth: Bluefish River Water Quality Monitoring/Habitat Restoration	$32,000	Goal of the project is improvement of near-shore water quality of Kingston/Plymouth/Duxbury embayment to enable opening of shellfish beds for commercial and recreational harvest. Cooperative working agreement among the three towns. Engineering study conducted to develop remediation strategy for failing septic systems.	Joseph M. Grady, Jr. Duxbury Conservation Commission 878 Tremont Street Duxbury, MA 02332 (617)934-6586

Other 1993 Demonstration Project funding was based upon projects submitted by the five regional Local Governance Committees (LGCs). Included is a 25% non-federal match from local communities, agencies, or companies. Award: September, 1993.

North Shore LGC (8 Towns & the Bay)			
Coastal Water Quality Task Force Development	$18,090	Task forces to be established in each community in a cooperative effort to identify, monitor and mitigate non-point pollution sources. Perform shoreline surveys, conduct water quality sampling and data analysis, and enter into agreements with local sewer and water filtration labs for fecal coliform testing.	Lisa Nicol MBP Technical Assistant M.V.P.C. 160 Main Street Haverhill, MA 01830 (508)374-0519

1993 - 1994 (con'd)			
Salem Sound 2000 LGC			
Salem Sound Monitoring Project and Source Identification Survey	$17,000	Shoreline survey and source identification project; teams of volunteer monitors collected and analyzed weekly water samples for fecal coliform bacteria. Data were shared with appropriate municipal officials and Program staff.	Nancy Goodman MBP Technical Assistant M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
Metro Boston LGC			
Pilayella littoralis Research	$6,000	Funding to Northeastern University's Marine Science Lab in Nahant for study of the biology of *Pilayella littoralis*. Results to provide information for the successful timing and location of harvesting efforts.	Dr. Don Cheney Northeastern University East Point Marine Science Lab. Nahant, MA 01908 (617)581-7370
South Shore LGC			
Water Quality Monitoring Project	$17,000	Monitoring to occur in the communities of Weymouth, Cohasset, Scituate, and Marshfield.	Bill Clark, MBP Tech. Asst. M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
1994 - 1995			
North Shore (8 Towns & the Bay)			
Town of Essex Septic System Evaluation	$19,000	Town-wide door-to-door survey of existing septic systems, examination of Board of Health records, and compilation of data resulting in remediation recommendations.	Lisa Nicol, MBP Tech. Asst. M.V.P.C. 160 Main Street Haverhill, MA 01830 (508)374-0519
Salem Sound 2000			
Water Quality Monitoring	$19,000	Ongoing water quality monitoring program and establishment of coastal water quality task forces in each community to work on specific projects (continuation funding).	Nancy Goodman, MBP Tech. Asst. M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
Metro Boston LGC			
Waste Oil Collection Center	$4,400	Establishment of waste oil collection center in Revere to reduce pollutants entering municipal storm water systems. A tank was purchased and installed, and will be operated for several years. It is the city's responsibility for additional construction costs, operation, promotion, and disposal.	Bill Clark MBP Technical Assistant M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770

1994 - 1995 (con'd)			
Metro Boston LGC (con'd)			
Metro Boston Area Contaminated Shellfish Harvesting Study	$5,000	Phase I of project to identify geographic areas and ethnic populations that are at risk from eating contaminated shellfish.	Nancy Goodman M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
Neponset River Watershed Bylaw Development	$8,000	Development of a stormwater bylaw, based on stormwater modeling, for communities in the Neponset River basin. Developed by MAPC in partnership with MA Coastal Zone Management, US Natural Resources Conservation Service, Boston Water & Sewer Dept., and Neponset River Watershed Association.	Martin Pillsbury M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
South Shore			
Water Quality Monitoring	$2,000	To identify pollution sources in the Herring River in Scituate.	Debbie Lenehan No. & So. Rivers Watershed Assn. P.O. Box 43 Norwell, Ma 02061 (617)659-8168
Cape Cod LGC			
Alternative On-Site Waste Technologies Development	$17,400	Hiring of part-time technical assistant to work with Cape Cod communities in the development of alternative septic technologies.	Julie Early, MBP Tech. Asst. Cape Cod Commission 3225 Main Street Barnstable, MA 02630 (508)362-3828
1995 - 1996			
North Shore (8 Towns & the Bay)			
Four Community Projects (in the planning stages)	$15,000		Lisa Nicol M.V.P.C. 160 Main Street Haverhill, MA 01830 (508)374-0519
Salem Sound 2000			
Water Quality Monitoring	$15,500	Ongoing water quality monitoring program and establishment of coastal water quality task forces in each community to work on specific projects they develop (continuation funding).	Nancy Goodman MBP Technical Assistant M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
Metro Boston Area			
Youth Environmental Action Summer Program	$5,000	Funding of 10-week "Harbor Vision Crew '95" peer education and service program for schools in the cities of Cambridge, Chelsea, Somerville, and Boston.	Jodi Sugerman Save the Harbor/Save the Bay 25 West Street Boston, MA 02111 (617)451-2860

1995 - 1996 (con'd)			
Metro Boston Area (con'd)			
Neponset River Water Quality Monitoring	$2,500	Citizen monitoring program to identify potential pollution sources in the Neponset River between Mother Brook section and the Lower Mills Falls.	Ian Cook Neponset River Watershed Assn. 2438 Washington Street Canton, MA 02021 (617) 575-0354
Storm Drain Stenciling	$4,000	Stenciling of storm drains throughout the metropolitan Boston area, indicating that the storm drains dump directly into Boston Harbor.	Nancy Goodman M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
South Shore			
Water Quality Monitoring	$2,000	To identify pollution sources in the Herring River in Scituate.	Debbie Lenehan North and South Rivers Watershed Association P.O. Box 43 Norwell, Ma 02061 (617)659-8168
Water Quality Monitoring	$2,055	To determine nitrogen levels and fecal coliform bacteria counts in the Billington Sea, Plymouth, in conjunction with Old Colony Planning Council, Natural Resources Conservation Service, and Massachusetts Department of Environmental Protection.	Mike Conrad Director of Water Monitoring Billington Sea Association 33 Hopkins Road Plymouth, MA 02360 (508)747-5510
Title 5 Septic System Municipal Data Base	$11,400	Purchase of FoxPro software, one copy for each South Shore Local Governance Committee municipal Board of Health, to compile DEP-required information on each septic system in a municipality. Contract to develop database and translate municipal assessor data to the system. Input data to municipal computers.	Bill Clark M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
Pollution Source Identification	$1,600	Purchase of smoke testing equipment for use by all South Shore communities (via DPW /Board of Health) in conjunction with the Massachusetts Division of Marine Fisheries.	Bill Clark M.A.P.C. 60 Temple Place Boston, MA 02111 (617)451-2770
ACEC Management Plan	$2,500	Work with the Back River Committee in Weymouth and Hingham to develop a resource management plan for their ACEC.	Tom Burbank 17 Andrews Isle/P.O. Box 185 Hingham, MA 02043 (617)749-9473

1995 - 1996 (con'd)			
Cape Cod			
Alternative On-Site Waste Technologies Development	$20,000	Continuation of part-time technical assistant to work with Cape Cod communities in the development of alternative on-site systems technologies.	Julie Early MBP Technical Assistant Cape Cod Commission 3225 Main Street Barnstable, MA 02630 (508)362-3828
MBP Mini-Bays Grant Awards (1991 - 1996)			
North Shore			
Plum Island Sound	$235,000	Develop, implement, and monitor a research, policy, and education plan to reduce nonpoint sources of pollution in the communities of Ipswich, Newbury, and Rowley	Dr. Robert Buchsbaum Mass. Audubon: North Shore 348 Grapevine Road Wenham, MA 01984 (508)927-1122 FAX: 922-8487
South Shore			
Fore River Embayment	$235,000	A tri-community effort of the Cities of Braintree and Quincy and the Town of Weymouth to identify sources of pollution in the Fore River and develop strategies to mitigate those problems.	James Clarke, Jr. Planning & Community Development Town Hall - 75 Middle Street Weymouth, MA 02189 (617)335-2000
Cape Cod			
Wellfleet Harbor	$235,000	The Town of Wellfleet, the Barnstable County Health and Environment Department, the Barnstable County Cooperative Extension office, and the Water Resources Office of the Cape Cod Commission have joined together to develop a long term management plan for Wellfleet Harbor, based on research and monitoring information, to mitigate pathogen and nitrogen sources to the estuary.	George Heufelder Barnstable County Health & Environment Department Superior Court House P.O. Box 427 Barnstable, MA 02630 (508)362-2511

Appendix J.

Endangered Species Act

APPENDIX J. ENDANGERED SPECIES ACT

The Action Plans and recommendations of the Massachusetts Bays Comprehensive Conservation and Management Plan (CCMP) seek to protect and enhance habitat for many different wildlife species, including those categorized as endangered or threatened. The CCMP is the product of the Massachusetts Bays Program (MBP) Management Conference, which has included representatives of both the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). An example of these CCMP directives is the action for municipalities (with assistance from knowledgeable sources) to prepare a "Barrier Beach Management Plan" for locally-owned barrier beaches, which provide significant nesting habitat for many species of wading birds, shorebirds, and waterfowl (e.g., piping plover and roseate tern, both of which are federally listed species under the Endangered Species Act). Also, NMFS, the U.S. Army Corps of Engineers (ACOE), and the U.S. Environmental Protection Agency (EPA) are responsible for continuing and expanding efforts to protect and restore eelgrass habitat, a critical nearshore food source for many of the same species of wading birds and waterfowl which nest on barrier beaches. Lastly, the MBP has recently published Geographic Information System Community Resource Atlases for each of the 49 coastal communities along Massachusetts and Cape Cod Bays; these atlases, which indicate locations at which listed species have been observed, will be delivered to the communities by mid-1996.

With respect to implementation of any CCMP Action Plans and recommendations which could affect a federally listed threatened or endangered species (or the designated critical habitat of a listed species), a federal agency which authorizes, funds, or otherwise carries out an implementation activity must consult with USFWS and/or NMFS to ensure that appropriate protections are in place, pursuant to Section 7 of the Endangered Species Act (ESA). In addition, federal agencies must "conference" with USFWS and NMFS, as appropriate under Section 7, to ensure that federal activities consider potential jeopardy to species which have been proposed for ESA listing but whose listing has not yet been finalized.

Appendix K.

National Historic Preservation Act

APPENDIX K. NATIONAL HISTORIC PRESERVATION ACT

At the request of the Director of the Massachusetts Coastal Zone Management Office (MCZM), the Massachusetts Historical Commission (MHC)/State Historic Preservation Officer (SHPO) reviewed the Draft Final Massachusetts Bays Comprehensive Conservation and Management Plan (CCMP) (December, 1995). As a result of this evaluation, the MHC/SHPO offered a number of general suggestions (e.g., implementation of the CCMP's Action Plans and recommendations relative to the work of the MHC/SHPO) and specific suggestions (e.g., inclusion of additional information) regarding the protection of the Commonwealth's significant historic and archaeologic resources. These constructive comments have been addressed and otherwise incorporated into the Final CCMP (please refer to Chapter XI and Appendix G).

Under Section 106 of the National Historic Preservation Act (NHPA), federal agencies must take into account the effects of proposed federal or federally-assisted undertakings on historic properties included in, or eligible for inclusion in, the National Register of Historic Places. The NHPA and its implementing regulations (36 CFR Part 800) also generally provide for the federal agency or its designee to consult with the SHPO and, as applicable, with the Advisory Council on Historic Preservation on such undertakings. In addition, applicable compliance with State historic preservation laws and regulations must be achieved.

If any federal agency implements, funds, or approves actions contemplated under this CCMP, it shall be the responsibility of that agency, in accordance with Section 106 of the NHPA and its implementing regulations, to notify the SHPO. In addition, if any such activities would result in effects on historic properties under this Plan, the federal agency shall complete Section 106 consultation prior to initiating the activity. Moreover, all entities implementing activities under the Plan must satisfy any applicable requirements to consult with the SHPO under state law. Finally, it will be the policy of the Massachusetts Bays Program (MBP) that any CCMP implementation projects directly funded by the MBP will be undertaken in accordance with Section 106 of the NHPA and its implementing regulations. It should be noted that since the MBP does not anticipate having excess funding to support many of these projects, it will notify an agency directly undertaking implementation (e.g., local Conservation Commission) that its project may be subject to MHC/SHPO regulations and policies. This will be accomplished when feasible, recognizing that the MBP may not be directly involved in all implementation activities (e.g., adoption of a local wetlands protection bylaw without hands-on technical assistance from MBP staff).

Appendix L.

Agency and Community Letters/Resolutions of Commitment

APPENDIX L. AGENCY AND COMMUNITY LETTERS/ RESOLUTIONS OF COMMITMENT

All of the state, federal, and regional agencies responsible for CCMP action recommendations were asked to provide letters affirming their support for the CCMP and their commitment to implementation. These letters follow.

In addition, Massachusetts Bays cities and towns in each of the five coastal subregions are being asked to sign a Resolution of support for the CCMP, affirming their voluntary commitment to work towards implementing the actions appropriate for their particular community. Copies of all signed Resolutions that have been received to date follow.

Throughout the CCMP implementation process, the Massachusetts Bays Program will provide guidance and technical assistance through the MBP Local Governance Committees and MBP/Regional Planning Agency Technical Assistance staff. In addition, the MBP will serve these communities as liaison to the participating state, federal, and regional agencies of the Management Conference.

The commitment letters and resolutions of support which follow set the stage for CCMP implementation. They serve as our commitment to the citizens of Massachusetts that we will work together to restore and protect our Bays resources for the present and future generations.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

February 22, 1996

Ms. Trudy Coxe, Secretary
Massachusetts Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202

OFFICE OF THE
REGIONAL ADMINISTRATOR

RE: EPA Commitment to the Massachusetts Bays Comprehensive Conservation and Management Plan

Dear Secretary Coxe:

As you know, the U.S. Environmental Protection Agency (EPA) has taken an active role in the development of the Massachusetts Bays Comprehensive Conservation and Management Plan (CCMP). Since the inception of the Massachusetts Bays Program (MBP) in 1990, EPA has supported the MBP's goals and objectives, as articulated in the CCMP. Accordingly, I believe that the purposes of the CCMP can be met by continuing the cooperative relationship of EPA, state and regional agencies, local environmental officials, as well as our other Federal partners. Specifically and through this letter, EPA establishes its commitment to the following in support of the CCMP:

ACTION PLANS: EPA-New England will undertake 6 individual actions to directly support implementation of 4 of the Action Plans in the CCMP.

Protecting and Enhancing Coastal Habitat: EPA, in partnership with the National Marine Fisheries Service and the Army Corps of Engineers, will continue and expand current efforts to support eelgrass habitat protection and restoration in Massachusetts and Cape Cod Bays.

Reducing and Preventing Stormwater Pollution: EPA will (a) provide technical assistance to communities in developing comprehensive stormwater management programs (lower Charles River); and (b) target National Pollutant Discharge Elimination System (NPDES) permitting and compliance for industrial stormwater dischargers (Neponset River).

Reducing and Preventing Toxic Pollution: EPA will target NPDES permitting of significant discharges in the Massachusetts Bays; in particular, oil tank farms along Chelsea Creek and the Island End River.

Managing Centralized Wastewater Treatment Facilities: EPA will (a) support the control of combined sewer overflows in the Massachusetts Bays watersheds, especially the lower Charles River; and (b) target NPDES permitting to implement technology and water quality-based requirements in the Merrimack River watershed.

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PROGRAMMATIC SUPPORT: This section identifies those EPA-New England programs and initiatives which provide firsthand support to CCMP implementation. Further, discussions with these program managers continue regarding programs in addition to those listed which may also support CCMP implementation.

Municipal Assistance: In support of CCMP recommendations regarding wastewater management, EPA's Center for Environmental Industry and Technology is currently leading an effort to analyze and ideally establish consistent performance standards for alternative residential on-site wastewater disposal systems. Refer also to the "Enforcement/Compliance" section on this page.

Technical Development: Through both the Environmental Technology Initiative and the Center for Environmental Technology and Industry, EPA is already providing significant support to the recently commenced effort on Cape Cod which is developing a testing and demonstration project for innovative and alternative design on-site sewage disposal systems.

Emergency Response: The partnership of EPA, the U.S. Coast Guard, and the National Oceanic and Atmospheric Administration will collaborate with the Massachusetts Department of Environmental Protection (DEP) to implement the "Policy on the Use of Oil Spill Chemical Counter Measures (Dispersants)", supporting implementation of CCMP recommendations regarding oil pollution reduction.

Compliance/Enforcement: EPA, through its Office of Environmental Stewardship, has designated the South Coastal watershed for targeted enforcement and technical assistance activity, consistent with CCMP recommendations regarding wastewater, toxics, and nutrient management. Also, EPA's Underground Storage Tank Program will target inspections in wellhead protection areas situated in the Neponset and South Coastal watersheds, supporting CCMP recommendations regarding the reduction of oil and toxic pollution.

FINANCIAL SUPPORT: EPA-New England's commitments to those financial programs which could advance implementation of the CCMP are described in this section.

State Revolving Fund: EPA will work with the Massachusetts DEP to continue to access the State Revolving Fund for authorized nonpoint source pollution control projects (e.g., stormwater mitigation).

Grant Programs: EPA will continue to support implementation of CCMP actions and recommendations through existing grant programs (e.g., the Gloucester stormwater mitigation project funded under §319, Clean Water Act in support of shellfish bed restoration).

Management and staff of EPA-New England take these commitments seriously; in fact, we have articulated our responsibility to the CCMP in both the Massachusetts Office of Ecosystem Protection Annual Workplan and in our ongoing negotiations with the Commonwealth regarding the Base Program Requirements of their annual Federal grant. I appreciate the opportunity to formally present these commitments to you, and look forward to continued collaboration as we begin full implementation of the CCMP. You, the Massachusetts Bays Program staff, and all the Program's partners are to be congratulated for developing this consensus- and community-based approach to improving and protecting public health and our critical coastal resources.

Very truly yours,

John DeVillars
Regional Administrator

cc: Ms. Margaret M. Brady, Director, Massachusetts Office of Coastal Zone Management

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930

February 7, 1996

Margaret Brady, Director
Massachusetts Coastal Zone Management Program
Room 2006
100 Cambridge Street
Boston, MA 02202

FEB 8 1996

Dear Ms. Brady:

This is in reference to the Comprehensive Conservation and Management Plan (CCMP) for the Massachusetts Bays Program. The National Marine Fisheries Service (NMFS) has reviewed the draft CCMP and we are familiar with the goals, objectives, and action plans outlined in the document. Clearly, cooperation between federal, state, and local agencies, as well as concerned interest groups, will be the key to accomplishing the ambitious steps described in the CCMP.

NMFS offers our strong support for the CCMP. In particular, we are committed to assisting Massachusetts with the implementation of Action Plan #3, "Protecting and Enhancing Coastal Habitat." As discussed in Action #3.14, NMFS will continue our efforts with the Environmental Protection Agency and the Army Corps of Engineers to support eelgrass habitat protection and restoration in Massachusetts and Cape Cod Bays. We will also continue to support greater awareness of and protection for other important coastal habitats.

I look forward to working together with you and the others involved to make the Massachusetts Bays CCMP successful.

Sincerely,

Chris Mantzaris
Chief, Habitat and Protected Resources Division

cc: Tara Tracy, EPA

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

February 2, 1996

Planning Directorate
Evaluation Division

FEB 7 1996

Ms. Margaret Brady, Director
Massachusetts Coastal Zone Management Program
Room 2006
100 Cambridge Street
Boston, Massachusetts 02202

Dear Ms. Brady:

The U.S. Army Corps of Engineers, New England Division (Corps) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). The Corps has reviewed the excerpts from the December 1995 draft Final Massachusetts Bays CCMP and has the following general comments. Specific comments are attached.

Over the past few months and as part of our review, the Corps has evaluated the goals and objectives outlined in the draft CCMP. Based on this review, we believe that the goals of the CCMP can be met by the cooperative relationship of the Corps, and other Federal, State and local agencies as well as other environmental organizations. In particular and through this letter, the Corps confirms its commitment to the following actions:

Action Plan for Protecting and Enhancing Coastal Habitat: The partnership of the Corps, U.S. Environmental Protection Agency (EPA) and the National Marine Fisheries Service (NMFS), will continue and expand current efforts to support eelgrass and saltmarsh habitat protection and restoration of the Massachusetts Bays region. We suggest inclusion of the following paragraph in the CCMP.

<u>These actions are critical to the protection and restoration of eelgrass and saltmarsh habitat, which provide valuable breeding, nursery, nutritional, and stabilization functions in the aquatic ecosystem. These efforts are ongoing by the Corps, EPA, and NMFS as partnership agencies, and will be funded through their annual operating budgets.</u>

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Action Plan for Managing Dredging and Dredged Material Disposal: The Corps, in coordination with other Federal and State agencies, will continue to monitor dredged material disposal sites in the Massachusetts Bays region. The Corps will also initiate the planning necessary to begin a capping demonstration project at the Massachusetts Bay Disposal Site. In addition, the coordination, planning, and possible designation of a disposal site suitable for containment of contaminated material will need to be initiated by the Corps, Massachusetts Executive Office of Environmental Affairs, and Massport, as well as EPA and NMFS. We suggest inclusion of the following paragraph in the CCMP.

The impact of dredged material disposal on the aquatic environment (e.g. the Massachusetts Bays Disposal Site) is monitored by the Corps Disposal Area Monitoring System (DAMOS). Further, dredged material unsuitable for unconfined open water disposal is prohibited at the MBDS until capping's efficacy can be effectively demonstrated. The Corps will begin efforts to research the efficacy of confined (i.e. capped) disposal at the MBDS. Planning efforts to identify an appropriate disposal site for future maintenance material from Boston Harbor will be initiated.

The Corps is committed towards implementing the goals of the Massachusetts Bays CCMP. We look forward to working together to make the CCMP successful in protecting the important resources of the Bays.

Any questions or comments can be addressed to Ms. Catherine Demos of my staff at (617) 647-8231.

Sincerely,

Joseph L. Ignazio
Director of Planning

U.S. Department
of Transportation

**United States
Coast Guard**

Commander
First Coast Guard District

408 Atlantic Avenue
Boston, MA 02210-3350
Staff Symbol: (mep)
Phone: 617/223-8434
S.Lundgren/D1m@cgsmtp.uscg.mil

16471
February 12, 1996

Ms. Margaret Brady, Director
Massachusetts Coastal Zone Management Program
Room 2006
100 Cambridge Street
Boston, MA 02202

Dear Ms. Brady:

The U.S. Coast Guard (USCG) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). We believe that the goals of the CCMP can be met by the cooperative relationship of the USCG, state and regional agencies, local environmental officials, along with other Federal agencies such as the Environmental Protection Agency (EPA). In particular and through this letter, the USCG confirms its commitment to the following actions:

Action Plan for Reducing and Preventing Oil Pollution:

The USCG will collaborate with agencies such as the Massachusetts Department of Environmental Protection, EPA, and the National Oceanic and Atmospheric Administration to implement the recently developed "Policy on the Use of Oil Spill Chemical Countermeasures (Dispersants)". In addition, the USCG will collaborate with these and other agencies to update and implement the Area Contingency Plans that apply to the Massachusetts Bays.

These actions are important to reduce oil pollution impacts on the marine environment, especially in the case of major spills or other releases. These efforts will be funded through the annual operating budgets of the participating agencies.

The USCG takes these commitments seriously. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Sincerely,

S. P. GARRITY
Commander, U.S. Coast Guard
Chief, Marine Environmental Protection Branch
By direction of the Commander,
First Coast Guard District

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR

TRUDY COXE
SECRETARY

Tel: (617) 727-9800
Fax: (617) 727-2754

April 3, 1996

Re: Executive Office of Environmental Affairs Commitment to the Massachusetts Bays Program CCMP

To Whom it May Concern:

The Massachusetts Executive Office of Environmental Affairs (EOEA) has actively participated in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). EOEA has evaluated the goals, objectives and commitments outlined in the draft CCMP. Based on our review of the draft document, we believe that the goals of the CCMP can be met by the cooperative relationship of EOEA and other state agencies, and local environmental officials, supported by EPA.

Several of the actions required by this important document fall to EOEA for implementation. In particular, and through this letter, EOEA affirms it commitment to the following actions:

Protecting and Enhancing Coastal Habitat

EOEA will continue the innovative Wetlands Restoration and Banking Program to restore and protect degraded coastal and inland wetlands.

Target Date: Ongoing

Reducing and Preventing Toxic Pollution

EOEA will work with municipalities and the private sector to explore and form partnerships to facilitate the safe management of hazardous products, encouraging reduced toxic products use and recycling wherever possible.

Target Date: Ongoing

Managing Centralized Wastewater Treatment Facilities

EOEA will work collaboratively to develop and implement an effective program for monitoring and enforcing point source discharges from wastewater treatment plants and energy-producing

facilities. EOEA, with DEP and CZM, will pursue state legislation to modify the Massachusetts Clean Waters Act to meet EPA requirements for NPDES delegation. Legislation has been before the state legislature for some time without additional action.

Managing Dredging and Dredged Materials Disposal

EOEA will coordinate the development of a comprehensive *Dredging and Dredged Materials Disposal Plan* to improve and maintain access to the Commonwealth's ports, harbors, and channels, and to minimize adverse impacts to the marine environment.

Target Date: Draft plan due in 1996.

Enhancing Public Access and the Working Waterfront

EOEA will, in collaboration with coastal municipalities, develop and implement an *Access-Via-Trails* program to enhance public access along the coast.

Target Date: A coastal trails program should be ready for full-scale operation by the end of fiscal year 1996.

Educating Teachers, Students, and the Public About the Bays

EOEA will continue to work closely with the Department of Education (DOE) through the Secretary's Advisory Group on Environmental Education (SAGEE) in order to develop a strategy for the implementation of the "Benchmarks for Environmental Education." Further, EOEA will continue to place a priority on the role of environmental education to insure that appropriate state leadership is maintained.

Target Date: 1996

EOEA will, in cooperation with the Department of Education, continue to develop a grant relationship with the National Science Foundation and other funding agencies in order to provide technological outreach aimed at enhancing environmental literacy. The goal is to make resource and curriculum materials widely accessible and to provide ongoing coordination among the various members of the educational community.

Target Date: 1996

EOEA will, with the DOE, empower exemplary teachers, administrators, and/or schools, who demonstrate the competence, to carry out formal and non-formal environmental education initiatives that complement the Commonwealth's environmental education program.

Target Date: 1996

Develop a State Non-Point Source Education and Outreach Strategy

EOEA will develop and maintain a clearinghouse of NPS education, information, and technical assistance materials, as well as a database of available state NPS materials and programs.

Target Date: The clearinghouse/database could be completed by July, 1996.

EOEA will develop and maintain a matrix, by topic, of NPS education, information, and technical assistance materials produced by state agencies and associated organizations.

Target Date: March, 1996

EOEA will expand upon Massachusetts Bays Program efforts and develop a strategy for NPS outreach and technical assistance statewide that would coordinate the development and production of NPS education, information, and technical assistance in order to implement NPS pollution controls.

Target Date: July, 1996

I look forward to continuing to work to make the Comprehensive Conservation and Management Plan successful in protecting the important resources of the Bays.

Cordially,

Trudy Coxe

cc: Diane M. Gould, Ph.D., MBP
Peg Brady, CZM

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
100 CAMBRIDGE STREET, BOSTON, MA 02202
(617) 727-9530 FAX (617) 727-2754

April 3, 1996

Re: Coastal Zone Management Office Commitment to the Massachusetts Bays Program CCMP

To Whom it May Concern:

The Massachusetts Coastal Zone Management Office (CZM) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Through this letter, CZM confirms its commitment to the following actions:

Action Plan for Managing Centralized Wastewater Treatment Facilities

CZM will work collaboratively to develop and implement an effective program for monitoring and enforcing point source discharges from wastewater treatment plants and energy-producing facilities. Consistent with the EOEA Basin Management Initiative, DEP and CZM will re-evaluate the effectiveness of the current NPDES program and, with EPA, will redesign the program to achieve effective pollution reduction, including pollution trading and other innovative "offsets/credits" models. CZM, with DEP and EOEA, will pursue state legislation to modify the Massachusetts Clean Waters Act to meet EPA requirements for NPDES delegation. Legislation has been before the state legislature for some time without additional action. CZM, with DEP, will assemble an interagency team to develop criteria for a routine comprehensive evaluation of coastal WWTP discharges. The evaluation will focus on permit compliance and pollution removal effectiveness to assist in prioritizing key issues within coastal watersheds. Priorities thus identified will be used to focus state agency actions.

Action Plan for Enhancing Public Access and the Working Waterfront

CZM will enhance the Designated Port Area program with new planning and promotional initiatives.

Target Date: Initial steps toward development of a DPA Planning/Promotion Program is being given high priority within CZM during the 1995-1996 fiscal year.

CZM will establish a new technical assistance program to accelerate municipal efforts to identify and legally reclaim historic rights-of-way to the sea. Phase One will include support resources for municipal use, including a case history, a "practioners handbook" and a series of workshops.

Target Date: Phase One will be completed during FY 1995-1996; Phase Two will be initiated during FY 1996-1997.

CZM, in collaboration with the Department of Environmental Management and MassGIS, will prepare and distribute a statewide Coastal Access Guide to facilitate public access to the shoreline.

Target Date: The first volume of the public access guide was published during the summer of 1995. Other volumes will follow as soon thereafter as the necessary GIS information becomes available.

I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Sincerely,

Margaret Brady
Director

cc: Diane M. Gould, Ph.D.
Executive Director, Massachusetts Bays Program

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON MA 02108 (617) 292-5500

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lt. Governor

TRUDY COXE
Secretary

DAVID B. STRUHS
Commissioner

RECEIVED
MAR 12 1996
COASTAL ZONE MANAGEMENT
EXEC. OFFICE OF ENVIRONMENTAL AFFAIRS

27 February 1996

Peg Brady
Director
Coastal Zone Management Program
100 Cambridge Street, Room 2006
Boston, Massachusetts 02202

RE: DEP Commitment to the Massachusetts Bays Program CCMP Actions

Dear Peg:

The Department of Environmental Protection (DEP) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months, DEP has evaluated the goals, objectives, and commitments outlined in the draft CCMP. Many of the actions required by this important document fall to DEP for implementation. We take this responsibility seriously. The following attachment summarizes the major DEP commitments and target dates for completing them.

I believe that the single most critical ingredient that will contribute to the overall success of the Mass Bays CCMP is its integration into EOEA's basin schedule. While the recommended actions in this plan are important, they can be further strengthened by integrating the Mass Bays program into the watershed initiative schedule. This will allow all the agencies to better implement the CCMP, identify "hot spots," and strategically target limited resources to address the most critical issues in the contributing watersheds in the most cost-effective manner.

Based on our review of the draft document, we believe that the goals of the CCMP can be met by the cooperative relationship of DEP and local environmental officials, with financial support from EPA and the state budget. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Sincerely,

David

David B. Struhs
Commissioner

Attachment

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DEP COMMITMENTS FOR IMPLEMENTING THE CCMP

Protecting and Enhancing Coastal Habitat

DEP will complete its statewide inventorying and mapping of coastal and inland wetlands, and provide local conservation commissions with: 1) accurate base maps depicting wetlands boundaries and 2) instruction on proper wetlands map interpretation and use.

Target Date:

Funding permitting, orthophoto wetlands maps for the following regions are projected to be available by the end of 1996:

- Metro/Suburban Boston
- Buzzards Bay (West Shore)
- MDC Watersheds (Sudbury, Quabbin, Wachusett)
- Portions of North Shore (Ipswich, Rowley and Parker River Watershed)
- City of Cambridge Water Supply Watershed Area
- Fort Devens Area
- Merrimack Valley

Reducing and Preventing Stormwater Pollution

DEP, in collaboration with Regional Planning Agencies, Natural Resources Conservation Service/MassCAP, and Massachusetts Coastal Zone Management Office, will: 1) disseminate its Nonpoint Source Management Manual and Urban Best Management Practices for Massachusetts, and 2) sponsor public workshops to educate local officials about best management practices and performance standards for controlling stormwater runoff.

Target Date:

Planning and development of workshops and handout materials - 1996
Publicizing and holding of workshops - 1996 and 1997

DEP will develop a coordinated and streamlined regulatory system within DEP to assure effective implementation of the stormwater components of the Massachusetts Clean Water Act, Wetlands Protection Act, and Federal Stormmwater Program (Federal Clean Water Act, Sections 401 and 402).

Target Date:

This action is expected to be implemented by DEP according to the following schedule:

Task	Projected Completion Date
Develop/adopt stormwater performance standards	Spring 1996
Develop BMP manual and related guidance	June 1996
Revise policies/regulations	June 1997
Prepare/distribute outreach materials	Winter-Spring 1996
Select implementation target areas (as part of the EOEA basin program)	1996

Reducing and Preventing Oil Pollution

DEP, in collaboration with the U.S. Coast Guard, EPA, and NOAA, will implement the recently developed Policy on the Use of Oil Spill Chemical Counter Measures (Dispersants) to protect coastal resources from the adverse effects of oil spills.

Target Date:

1996 for developing an implementation strategy. Implementation of the policy on dispersants will be ongoing.

Managing Municipal Wastewater

DEP will evaluate and build upon the centralized statewide repository for testing information on alternative technologies, to be established as part of the Buzzards Bay Project's two-year Environmental Technology Initiative (ETI) Project.

Target Date:

The ETI model will begin in 1996 and conclude in 1998. DEP evaluation of the clearinghouse function will take place throughout the project, with a follow-up DEP implementation strategy in place at the conclusion of the project.

DEP will work collaboratively with EPA, EOEA, and CZM to develop and implement an effective program for monitoring and enforcing point source discharges from wastewater treatment plants and energy producing facilities. Consistent with the EOEA Basin Management Initiative, DEP will work with CZM to re-evaluate the

effectiveness of the current NPDES program and with EPA, redesign the program to achieve effective pollution reduction, including pollution trading and other innovative "offsets/credits" models. DEP, in coordination with EOEA and CZM, will pursue state legislation to modify the Massachusetts Clean Waters Act to meet EPA requirements for NPDES delegation. DEP, with CZM, will assemble an interagency team to develop criteria for routine comprehensive evaluation of coastal wastewater treatment plant discharges. The evaluation will focus on permit compliance and pollution removal effectiveness to assist in prioritizing key issues within coastal watersheds. priorities thus established will be used to focus state agency program actions.

Managing Nitrogen-Sensitive Embayments

DEP will strengthen Massachusetts Water Quality Standards to enhance and protect nitrogen-sensitive coastal embayments.

Target Date:

Initial proposal(s) for designating nitrogen-sensitive embayments -1998 revisions to Massachusetts Water Quality Standards.

DEP will collaborate with municipalities and Regional Planning Agencies to expand upon current Massachusetts Bays Program efforts to identify nitrogen-sensitive embayments, determine critical loading rates, and recommend actions to manage nitrogen so as to prevent or reduce excessive nitrogen loading to coastal waters and ground water.

Target Date:

Mass Bays Program, in conjunction with DEP and CZM, will begin identifying and prioritizing nitrogen-sensitive embayments in 1996/1997. The development and implementation of appropriate local and areawide nitrogen management measures should begin in 1997/1998.

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

100 CAMBRIDGE ST., BOSTON, MA 02202 617-727-3180 FAX 727-9402

William F. Weld
GOVERNOR

Argeo Paul Cellucci
LT. GOVERNOR

Trudy Coxe
SECRETARY

Peter C. Webber
COMMISSIONER

January 31, 1996

Peg Brady, Director
Coastal Zone Management Program
100 Cambridge Street, Room 2006
Boston MA 02202

Re: DEM Commitment to the Massachusetts Bays Program CCMP Actions

Dear Peg:

The Department of Environmental Management (DEM) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months, DEM has evaluated the goals, objectives and commitments outlined in the draft CCMP. Based on this review, we believe that the goals of the CCMP can be met by the cooperative relationship of DEM and other state agencies and local environmental officials, supported by federal agencies such as EPA. In particular, and through this letter, DEM confirms its commitment to the following actions:

Action Plan for Protecting and Enhancing Coastal Habitat

- DEM will develop and implement Resource Management Plans for all DEM-owned coastal properties. Target date: 1996-1998.

- DEM will develop and promote the use of river basin planning data and analyses to facilitate responsible water resources planning and management at the local and regional level. Target date: DEM will participate in the ongoing EOEA five-year planning schedule.

- DEM will acquire and protect coastal properties that possess outstanding resources and public recreation opportunities. Target date: Ongoing as opportunities and additional funding becomes available.

Action Plan for Managing Municipal Wastewater

- In collaboration with other state and federal agencies, DEM will continue to implement the Ocean Sanctuaries Act by closely monitoring all facilities plans which propose to increase wastewater treatment plant discharges into an ocean sanctuary. Target date: Ongoing.

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Action Plan for Planning for a shifting coastline

• DEM will assist communities in the development of effective Floodplain Management by-laws that address this issue. Target date: Ongoing.

Saugus River Flood Control Project

• DEM will continue to work with coastal communities and the COE to implement cost-effective and environmentally-sound flood control measures and to strengthen local flood protection by-laws as appropriate.

I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Very truly yours,

Peter C. Webber
Commissioner

cc: Leslie Luchonok, DEM
Deborah Graham, DEM
Diane Gould, Mass Bays Program

Commonwealth of Massachusetts

Department of Fisheries, Wildlife & Environmental Law Enforcement

John C. Phillips, *Commissioner*

February 23, 1996

Ms. Peg Brady, Director
Coastal Zone Management Program
100 Cambridge Street, Room 2006
Boston, MA 02202

RE: DFWELE Commitment to the Massachusetts Bay Program CCMP Actions

Dear Peg:

The Department of Fisheries, Wildlife & Environmental Law Enforcement (DFWELE) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months, DFWELE has evaluated the goals, objectives and commitments outlined in the draft CCMP. Based on this review, we believe that the goals of the CCMP can be met by the cooperative relationship of DFWELE and other state agencies and local environmental officials, and through this letter, DFWELE confirms its commitment to the following actions:

Action Plan for Protecting and Enhancing Shellfish Resources

The Division of Marine Fisheries (DMF) will conduct three Sanitary Survey Training Sessions annually - one each on the North Shore, Metro-Boston/South Shore, and Cape Cod - to educate local shellfish constables and health officers on the proper techniques for identifying and evaluating pathogen inputs into shellfish harvesting areas.

Target Date: Ongoing

DMF will develop and administer a local Shellfish Management Grants Program to help communities finance the development and implementation of effective local shellfish management plans.

Target Date: This program will be developed as soon as funding is authorized and implement shortly thereafter.

100 Cambridge Street · Room 1901 · Boston, MA 02202 (617) 727-1614 FAX 727-2566

An Agency of the Executive Office of Environmental Affairs
Trudy Coxe, *Secretary*

Protecting and Enhancing Coastal Habitat

DMF will prepare an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region and develop a strategy to prioritize, restore and maintain these runs.

Target Date: 1996

DMF, in collaboration with the Riverways Program, will develop and implement a citizen-based Fishway Stewardship Program to restore and maintain anadromous fish runs along the Massachusetts Bays coast.

Target Date: Ongoing

DFWELE takes these commitments seriously. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Sincerely,

John C. Phillips
Commissioner

JCP/dmm

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Office of Technical Assistance, Suite 2109
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR
ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR
TRUDY COXE
SECRETARY
BARBARA KELLEY
DIRECTOR

Tel: (617) 727-3260
Fax: (617) 727-3827

February 2, 1996

Peg Brady
Director
Coastal Zone Management Program
Room #2006
100 Cambridge Street
Boston, MA 02202

Re: Office of Technical Assistance Commitment to the Massachusetts Bays Program CCMP Actions

Dear Ms. Brady:

The EOEA Office of Technical Assistance (OTA) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months, OTA has evaluated the goals, objectives and commitments outlined in the draft CCMP. Based on this review, we believe that the goals of the CCMP can be met by the cooperative relationship of MHD, other state agencies and local environmental officials, supported by federal agencies such as EPA. In particular, and through this letter, OTA confirms its commitment to the following action:

Action Plan for Reducing and Preventing Toxic Pollution

OTA will perform on-site assessments and provide instructional materials to help businesses and industries in the Massachusetts Bays region reduce the use of toxic substances.

Implementation Strategy - OTA will implement its Toxics Use Reduction (TUR) program by offering the following non-regulatory services at no charge:

- Perform on-site assessments designed to help businesses.

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- Respond to telephone and written requests for general information about TUR and specific information about the legal requirements of the Toxics Use Reduction Act.
- Sponsor conferences, workshops, seminars, and trade fairs to disseminate information about TUR technologies.
- Promote alternative manufacturing processes that reduce toxic substance use, hazardous waste generation, toxic air emissions, and wastewater discharge.

Target Date - 1996 and annually thereafter.

OTA takes this commitment seriously. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Very truly yours,

Barbara Kelley

Barbara Kelley
Director

BGK/tdf

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108–4619

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lieutenant Governor

GERALD WHITBURN
Secretary

DAVID H. MULLIGAN
Commissioner

RECEIVED

MAR 1 1 1996

March 5, 1996

Ms. Peg Brady, Director
Coastal Zone Management
100 Cambridge Street
Room 2006
Boston, MA 02202

Dear Ms. Brady:

As you know, the Department of Public Health (DPH) supports the efforts of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months the Bureau of Environmental Health Assessment (BEHA), under its Director Suzanne Condon, has evaluated and reviewed the goals and commitments outlined in the draft CCMP. Based on this review, we believe that the objectives of the CCMP can be met through the cooperative relationships among DPH, other state and federal agencies and local environmental officials. In particular, DPH confirms its commitment to the following action:

Action Plan for Public Health

The DPH will establish a central clearinghouse program for all beach testing and closure information generated for Massachusetts coastal public beaches.

Target Date

Initiation and implementation of this project has been ongoing within BEHA since July 1995. Data collection for this project will continue into 1996. Dependant on annual funding the project will become part of DPH's ongoing operation.

We look forward to working together to make the Massachusetts Bays CCMP successful.

Very truly yours,

David H. Mulligan
Commissioner

SKC/tp

The Commonwealth of Massachusetts
Department of Education

350 Main Street, Malden, Massachusetts 02148-5023

(617) 388-3300
(617) 388-3392 Fax

Robert V. Antonucci
Commissioner

Dr. Diane Gould
Mass Bays Program, Executive Director
100 Cambridge Street, Room 2006
Boston, MA 02202

Re: Department of Education Commitment to the Massachusetts Bays Program CCMP Actions

Dear Dr. Gould:

The Department of Education (DOE) has taken an active role in the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). DOE has evaluated the goals, objectives and commitments outlined in the draft CCMP. Based on this review, we believe that the goals of the CCMP can be met by the cooperative relationship of DOE, other state agencies and local environmental officials, supported by federal agencies such as EPA. In particular, and through this letter, DOE confirms its commitment to the following actions:

Action Plan for Enhancing Public Education and Participation

The DOE, in collaboration with the Executive Office of Environmental Affairs, will continue to develop and integrate environmental education as an important component of the curriculum in the public schools of the Commonwealth, making broad use of the Benchmarks for Environmental Education developed by the Secretary's Advisory Group on Education (SAGEE). We believe that funding will occur through local school budgets.

Target date: 1996

DOE will empower exemplary teachers, administrators, and/or schools, who demonstrate the competence, to carry out formal and non-formal education initiatives that complement the Commonwealth's environmental education program.

Target date: 1996

DOE takes these commitments seriously. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Very truly yours,

Robert V. Antonucci

Robert V. Antonucci
Commissioner of Education

MASSACHUSETTS WATER RESOURCES AUTHORITY
Charlestown Navy Yard
100 First Avenue
Boston, Massachusetts 02129

Telephone: (617) 242-6000
Facsimile: (617) 241-6070

February 6, 1996

Peg Brady
Director
Coastal Zone Management Program
Room 2006, 100 Cambridge Street
Boston, MA 02202

Dear Peg:

The Massachusetts Water Resources Authority strongly supports the effort of the Massachusetts Bays Program (MBP) to develop research and action agendas to protect, maintain, and where necessary, restore or improve the Massachusetts Bay and Cape Cod Bay ecosystem.

Over the past several months MWRA along with others has provided input into the development of the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP), including the specific section entitled "Boston Harbor Project: Upgrading Sewage Treatment in the Metro Boston Area." This component of the CCMP includes actions which MBP believes the MWRA should take.

A number of the recommended actions, specifically those which support appropriate budgeting, operation and maintenance of the sewer system and treatment facilities; continued agressive enforcement of industrial permits; education of the public about proper use of the sewer system; elimination of CSOs where deemed appropriate by a public review process; and appropriate monitoring of the health of the ecological community, are ones to which the MWRA has already committed itself and which it will continue to undertake wholeheartedly. A small number of the recommendations refer to matters subject to the ongoing decision-making processes of the MWRA Board of Directors who will be informed of the CCMP at an upcoming meeting.

In general we believe that the goals of the CCMP can be met through the cooperative commitment of MWRA, state and federal agencies and local environmental officials to work together, and we look forward to continuing to work with these groups to make the Massachusetts Bays CCMP successful in protecting the resources of the bays.

Very truly yours,

Doug MacDonald

Douglas B. MacDonald
Executive Director

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MASS HIGHWAY
Office of the Commissioner

William F. Weld, Governor
Argeo Paul Cellucci, Lieutenant Governor
James J. Kerasiotes, Secretary
Laurinda T. Bedingfield, Commissioner

February 15, 1996

Margaret Brady, Director
Coastal Zone Management Program
Room 2006
100 Cambridge Street
Boston, MA 02202

Re: Massachusetts Bays Program 1995 Comprehensive Conservation and Management Plan (CCMP) Actions

Dear Ms. Brady,

I would like to take this opportunity to thank you for including the Massachusetts Highway Department in the MassBays Program and working with my staff on the development of action plans to further protect the resources of the Commonwealth. As they relate to serving the public's interest, our missions are not inconsistent and I believe we can both achieve our goals to provide a quality transportation infrastructure while protecting the environment. We have evaluated the goals, objectives and commitments outlined in the draft CCMP. Based on this review, I am in general agreement with the content and substance of the various implementation strategies and believe that the goals can be met through the continuing cooperative relationship which has developed among the State and Federal transportation and environmental agencies. Target dates were obviously developed based upon the expectations projected over the last two years. These time frames will be affected by funding availability, staffing levels and operational priorities of both of our agencies.

With respect to the Action Items recommended for the Highway Department, I have the following comments.

1. Item 4.6 Development of an Environmental Manual

This initiative is currently being pursued by the Highway Department through the Environmental Division. A consultant has been selected and final negotiations are in progress. The initial outreach program is being conducted by the Highway Department through various partnering and interagency cooperative efforts. We anticipate development of the Manual itself during 1996. I would expect to issue the Manual in early 1997.

2. Item 4.7 Identification and Prioritization of Stormwater Discharge Problems

Since the initiation of discussions with MassBays on the CCMP, a number of programs have been implemented at the state level. The 1994 Transportation Bond Bill included $4 million for a grant program for projects to improve stormwater drainage facilities along roads, highways and bridges located in the watersheds within the coastal zone. The grant program is being

administered by CZM and is expected to effect significant improvements to coastal resources which have been adversely impacted by roadway storm drainage systems. Additionally, assessments of pollution threats throughout the state are being conducted through the Mini Bays programs and through the EOEA Watershed Basin Team studies. As noted in the rationale for this particular Action Item, MassHighway is tasked with the responsibility to maintain a safe and efficient roadway network for the Commonwealth. This equates to the design and construction of approximately $400 million of infrastructure improvements annually, exclusive of the Central Artery/Third Harbor Tunnel Project. We believe that the assessment and evaluation of stormwater concerns on a statewide basis should rest with the environmental agencies. In our efforts to put forth a comprehensive transportation improvement program, priorities are based mainly on safety, access and mobility issues. However, as existing stormwater pollution priorities are developed under the aforementioned CZM, DEP and EOEA programs, MassHighway will continue to internally evaluate the need for stormwater improvements and incorporate assessment recommendations on a project by project basis as roadway and bridge work is scheduled.

3. Item 4.8 Training Programs on Stormwater BMPs

MassHighway provides technical training and information to municipal highway and public works departments through funding of the Bay State Roads Program. This calendar year, three programs on stormwater drainage are scheduled by Bay State Roads. As the annual program is planned and any manuals and handbooks are developed, current issues and topics of concern such as stormwater BMPs will be included.

4. Item 4.9 Policy on Tie-ins to Highway Storm Drainage Systems

Given the DEP's initiative on stormwater standards, it is critical that tie-ins to state highway drainage systems address water quality. I intend to discuss with the Chief Engineer the formation of an internal task force at MassHighway to coordinate the development of a policy regarding tie-ins to assure that cost-effective and technically sound standards are applied to drainage tie-in permits. In an effort to minimize the cost and extent of infrastructure improvements which will be required by MassHighway to meet DEP standards, a policy regarding tie-ins is warranted. The policy must be "practicable," that is, require actions which can be implemented at reasonable cost and effort in order to achieve improved water quality while not prohibiting responsible economic development.

I look forward to continuing the working relationship which has been established with Coastal Zone Management and the MassBays Program to successfully accomplish the goals of the CCMP. You are to be commended on your keen foresight on the development of this Plan.

Very truly yours,

Laurinda T. Bedingfield
Commissioner

MASSPORT MARITIME DEPARTMENT, EAST BLDG. II, FISH PIER,
NORTHERN AVENUE, BOSTON, MA 02210 (617) 973-5354 FAX: (617) 973-5357

massport

January 26, 1996

JAN 31 1996

Margaret M. Brady, Director
Office of Coastal Zone Management
Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202

Dear Peg:

The Massachusetts Port Authority (Massport) has taken an active role in commenting on the Massachusetts Bays Program Comprehensive Conservation and Management Plan (CCMP). Over the past few months, Massport has evaluated the goals, objectives, and commitments outlined in the draft CCMP. Based on this review, we believe than many of the goals of the CCMP can be met by the cooperative relationship of Massport, state agencies, local environmental offices, and federal agencies such as the Corps of Engineers and EPA.

As you know, Massport is the local sponsor of the Corps of Engineers' Boston Harbor Navigation Improvement Project, known also as the Boston Harbor dredging project. As project partners, Massport and the Corps have moved the project in tandem, through the state and federal environmental review processes. The project, as currently proposed, reflects environmental, economic, and engineering concerns of both the project partners and many interested parties, including the state environmental agencies.

As a matter of federal law, the Corps will prepare the contract bid documents and issue the construction contracts necessary to complete all aspects of the Boston Harbor dredging project. The contracts will certainly require compliance with all environmental permits. In the development of the construction bid documents, Massport will continue to work with the Corps to encourage including other appropriate environmental performance standards into the construction contracts. Massport will, in all likelihood, have no formal contractual relationship with the dredging contractor. Even in the privately-owned berths, it is expected that the Corps will maintain control over the dredging contractor. Consequently, it remains a Massport priority to have enforceable performance standards included in the dredging contract.

It is expected that the Corps will include specific monitoring requirements in the construction contract. In addition, Massport will work with the Corps to assure that adequate independent monitoring of the dredging and disposal work during construction and to assure periodic monitoring of the cap is conducted. Post-construction monitoring is the sole responsibility of the Corps of Engineers.

Massport will provide planning assistance to the Commonwealth for future disposal of contaminated maintenance material. In the Final Environmental Impact Report submitted to the Commonwealth in June 1995 Massport provided the results of a major information-gathering exercise in the area of alternative technologies. We will continue to work with the state in pursuit of long-term solutions.

Massport takes these commitments very seriously. I look forward to working together to make the Massachusetts Bays CCMP successful in protecting the important resources of the Bays.

Very truly yours,

Ralph F. Cox
Maritime Director

MERRIMACK
VALLEY
PLANNING
COMMISSION

RESOLUTION OF SUPPORT
for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"
for
MASSACHUSETTS AND CAPE COD BAYS

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WHEREAS, the Massachusetts and Cape Cod Bays are public resources of inestimable value which contribute greatly to the environmental, economic, recreational, and cultural well-being of the Merrimack Valley region and the Commonwealth of Massachusetts; and

WHEREAS, the Massachusetts and Cape Cod Bays are threatened by deteriorating environmental quality that poses a risk to the public and ecological health and quality of life; and

WHEREAS, the watershed areas draining to Massachusetts and Cape Cod Bays cross multiple municipal boundaries; and the future health of the Bays depends on the ability of neighboring communities to plan and work cooperatively to protect their shared resources; and

WHEREAS, MVPC has actively participated in the development of the Massachusetts Bays Program's Comprehensive Conservation and Management Plan (CCMP) that is designed to protect and enhance the Bays' resources; and has sponsored and actively supported the Eight Towns and the Bay Committee (8T&B) of the coastal communities of the Upper North Shore;

NOW, THEREFORE, BE IT RESOLVED, that MVPC agrees to work cooperatively with the Massachusetts Bays Program, the Eight Towns and the Bay Committee, the MVPC region's coastal and inland communities, Massachusetts and New Hampshire Regional Planning Agencies, and appropriate state and federal agencies to help implement the recommended actions contained in the CCMP's fifteen major Action Plans, as follows:

1. Protecting Public Health
2. Protecting and Enhancing Shellfish Resources
3. Protecting and Enhancing Coastal Habitat
4. Reducing and Preventing Stormwater Pollution
5. Reducing and Preventing Toxic Pollution
6. Reducing and Preventing Oil Pollution
7. Managing Municipal Wastewater
8. Managing Boat Wastes and Marina Pollution

160 Main Street
Haverhill, MA 01830
(508) 374-0519
Fax: (508) 372-4890

MERRIMACK VALLEY PLANNING COMMISSION

9. Managing Dredging and Dredged Materials Disposal
10. Reducing Beach Debris and Marine Floatables
11. Protecting Nitrogen-Sensitive Embayments
12. Enhancing Public Access and the Working Waterfront
13. Planning for a Shifting Shoreline
14. Managing Local Land Use and Growth
15. Enhancing Public Education and Participation

Be It Further Resolved, that MVPC embraces the model regional implementation strategy developed by the partners of the Massachusetts Bays Program (Massachusetts Bays Program, Regional Planning Agencies, and Local Governance Committees working through Regional Planning Agencies) as the best mechanism for delivering the broad array of technical and financial services needed by communities to implement the CCMP in a timely and cost-efficient manner so as to achieve lasting protection for the Bays and their resources.

Adopted by Vote

Date 2-15-96

Luther E. McIlwain

Luther E. McIlwain, Chairman
Merrimack Valley Planning Commission

Metropolitan Area Planning Council

60 Temple Place, Boston, Massachusetts 02111 617/451-2770 Fax 617/482-7185

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RESOLUTION OF SUPPORT
for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"
for
MASSACHUSETTS AND CAPE COD BAYS

Whereas, the Metropolitan Area Planning Council (M.A.P.C.) recognizes Massachusetts and Cape Cod Bays as significant public resources that contribute to the environmental, economic, recreational and societal health of the region; **and**

Whereas, MAPC recognizes that Massachusetts and Cape Cod Bays are threatened by deteriorating environmental quality that poses a threat to public health and quality of life; **and**

Whereas, MAPC recognizes that the drainage basins of Massachusetts and Cape Cod Bays cross municipal boundaries; that the future of the Bays depends upon the ability of neighboring communities to control the quality of their environment through regional communication and cooperation among municipal, regional, state, and federal agencies responsible for managing the Bays and their watersheds;

Whereas, MAPC has contributed to and reviewed the Massachusetts Bays Program's Comprehensive Conservation and Management Plan (CCMP) that is designed to protect and enhance the Bays' resources; and,

Whereas, the CCMP is consistent with and furthers the interests of **MetroPlan 2000;**

Be it therefore resolved, that MAPC endorses the Massachusetts Bays Program's CCMP, and agrees to cooperate in the implementation of the CCMP recommendations, including:

- to protect and enhance shellfish resources and coastal habitats:
- to reduce and prevent stormwater, oil and toxic pollution;
- to manage wastes from on-site sewage treatment systems, sewage treatment plants, and boats;
- to manage dredging and the disposal of dredged materials;
- to reduce beach debris;
- to protect nitrogen sensitive embayments;
- to enhance public access and the working waterfront;
- to plan for a shifting shoreline;
- to manage local land use and growth.

Adopted by vote of the Executive Committee

Date February 21, 1996

William G. Constable, President

William G. Constable, *President* Richard A. Easler, *Vice-President* Grace S. Shepard, *Secretary* Leland G. Wood, *Treasurer*

David C. Soule, *Executive Director*

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Old Colony Planning Council

John G. Mather
President

Daniel M. Crane
Executive Director

70 School Street, Brockton, MA 02401-4097

Telephone: (508) 583-1833
Fax: (508) 559-8768

February 29, 1996

Ms. Peg Brady, Director
Massachusetts Coastal Zone Management
Massachusetts Bays Program
100 Cambridge Street, Room 2006
Boston, MA 02202

Dear Ms. Brady:

This is to advise that the Old Colony Planning Council formally voted at their meeting last night to endorse the Comprehensive Conservation and Management Plan for Massachusetts and Cape Cod Bays. The Old Colony Planning Council is pleased to have been part of the process in contributing to and reviewing the Massachusetts Bays Program's Comprehensive Conservation and Management Plan that is designed to protect and enhance the Bays' resources. The Council feels very strongly that these important resources must be protected for future generations.

We recognize that the drainage basins of Massachusetts and Cape Cod Bays cross municipal boundaries; that the future of the Bays depends upon the ability of neighboring communities to control the quality of their environment through regional communication and cooperation among municipal, regional, state, and federal agencies responsible for managing the Bays. We therefore look forward to working closely with your office in the future in carrying out our responsibilities in coordinating and implementing the strategies outlined in the Plan.

Sincerely,

John G. Mather

John G. Mather
President

DMC/mc

cc: Dr. Diane Gould, Executive Director
Massachusetts Bays Program

CAPE COD COMMISSION

3225 MAIN STREET
P.O. Box 226
BARNSTABLE, MA 02630
508-362-3828
FAX: 508-362-3136

RESOLUTION OF SUPPORT
for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"
for
MASSACHUSETTS AND CAPE COD BAYS

Whereas, Massachusetts and Cape Cod Bays are public resources of inestimable value that contribute greatly to the environmental, economic, recreational, and cultural well-being of the Cape Cod region as well as the Commonwealth of Massachusetts; and

Whereas, Massachusetts and Cape Cod Bays are threatened by deteriorating environmental quality that poses a risk to the public's health and quality of life, and to the ecological health of the bays; and

Whereas, the watershed areas of Massachusetts and Cape Cod Bays cross municipal boundaries and the future of the Bays depends upon the ability of neighboring communities to control the quality of their environment through regional communication and cooperation among municipal, regional, state, and federal agencies responsible for managing the Bays and their watersheds; and

Whereas, the Cape Cod Commission has actively participated in the development of the Massachusetts Bays Program's Comprehensive Conservation and Management Plan (CCMP), designed to protect and enhance the Bays' resources; and has actively supported the Cape Cod Coastal Resources Committee in its work;

Now,Therefore, Be It Resolved, that the Cape Cod Commission agrees to work cooperatively with the Massachusetts Bays Program, the fifteen Cape Cod towns, the Cape Cod Coastal Resources Committee, the other Massachusetts Regional Planning Agencies, and appropriate state and federal agencies to implement the CCMP's recommended actions to:

1. Protect public health
2. Protect and enhance shellfish resources and coastal habitats
3. Reduce and prevent stormwater, oil and toxic pollution
4. Manage municipal wastewater
5. Manage boat wastes and marina pollution
6. Manage dredging and disposal of dredged materials
7. Reduce beach debris
8. Protect nitrogen sensitive embayments

9. Enhance public access and the working waterfront
10. Plan for a shifting shoreline
11. Manage local land use and growth

Be It Further Resolved, that the Cape Cod Commission embraces the model regional implementation strategy developed by the Regional Planning Agencies the Local Governance Committees in partnership with the Massachusetts Bays Program, as the appropriate mechanism for providing technical and financial assistance to the Bays' communities to assist in implementing the CCMP in a timely and cost effective manner, so as to achieve long term protection of the Bays and their resources.

Adopted by vote

February 15, 1996

Sumner Kaufman
Chair

MASSACHUSETTS BAYS PROGRAM

100 Cambridge Street, Room 2006, Boston, Massachusetts 02202 (617) 727-9530 *fax (617) 727-2754*

RESOLUTION OF SUPPORT
for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"
for
MASSACHUSETTS AND CAPE COD BAYS

Whereas, the undersigned municipalities recognize Massachusetts and Cape Cod Bays as significant public resources that contribute to the environmental, economic, recreational and societal health of the region; **and**

Whereas, we recognize that Massachusetts and Cape Cod Bays are threatened by deteriorating environmental quality that poses a threat to public health and quality of life; **and**

Whereas, we recognize that the drainage basins of Massachusetts and Cape Cod Bays cross municipal boundaries; that the future of the Bays depends upon the ability of neighboring communities to control the quality of their environment through regional communication and cooperation among municipal, state, and federal agencies responsible for managing the Bays and their watersheds; **and**

Whereas, we have contributed to and reviewed the Massachusetts Bays Program's Comprehensive Conservation and Management Plan (CCMP) that is designed to protect and enhance the Bays' resources;

Be it therefore resolved, that we agree to voluntarily implement the CCMP recommendations - both individually and cooperatively - that are most appropriate for the communities. We will voluntarily work to:

- protect and enhance shellfish resources and coastal habitats;
- reduce and prevent stormwater, oil and toxic pollution;
- manage wastes from on-site sewage treatment systems, sewage treatment plants, and boats;
- manage dredging and the disposal of dredged materials;
- reduce beach debris;
- protect nitrogen sensitive embayments;
- enhance public access and the working waterfront;
- plan for a shifting shoreline;
- manage local land use and growth.

The Massachusetts Bays Program is sponsored by the Massachusetts Executive Office of Environmental Affairs through the Coastal Zone Management Office and the U.S. Environmental Protection Agency, Region I, John F. Kennedy Federal Building, Boston, MA 02203.

Signatures of Support for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"

Mayor, City of Newburyport

Chair, Rowley Board of Selectmen

Chair, Ipswich Board of Selectmen

Chair, Essex Board of Selectmen

Mayor, City of Gloucester

Chair, Rockport Board of Selectmen

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for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"

Chair, Beverly City Council

Chair, Peabody City Council

Chair, Salem City Council

Chair, Danvers Board of Selectmen

Chair, Marblehead Board of Selectmen

Chair, Manchester-by-the-Sea Board of Selectmen

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Mayor, City of Boston

Chair, Nahant Board of Selectmen

Chair, Swampscott Board of Selectmen

Mayor, City of Revere

Chair, Braintree Board of Selectmen

Mayor, City of Everett

Chair, Saugus Board of Selectmen

Chair, Winthrop Board of Selectmen

Chair, Milton Board of Selectmen

Mayor, City of QUINCY

JAMES A. SHEETS

Signatures of Support for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"

David H. Chandler
Chair, Weymouth Board of Selectmen

Katharine W. Reardon
Chair, Hingham Board of Selectmen

Chair, Cohasset Board of Selectmen

Chair, Norwell Board of Selectmen

Chair, Hanover Board of Selectmen

(No commitment of any monetary obligation)
Chair, Pembroke Board of Selectmen

(As Affordable)
Chair, Marshfield Board of Selectmen

Chair, Duxbury Board of Selectmen

Chair, Kingston Board of Selectmen

(No commitment of any monetary obligation)
Chair, Plymouth Board of Selectmen

Signatures of Support
for the
"COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN"

Chair, Provincetown Board of Selectmen

Chair, Truro Board of Selectmen

Chair, Wellfleet Board of Selectmen

Chair, Eastham Board of Selectmen

Chair, Orleans Board of Selectmen

Chair, Brewster Board of Selectmen

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Chair, Barnstable Town Council

Chair, Sandwich Board of Selectmen

Chair, Bourne Board of Selectmen

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