

## BUZZARDS BAY STRATEGY AND FY85 WORKPLAN

### PREFACE

The FY-85 Congressional Appropriations provide funding to the Environmental Protection Agency (EPA) for the study of Buzzards Bay as part of a larger national program to study bays and estuaries. This workplan has been prepared by the staff of EPA Region I and the Commonwealth of Massachusetts' Division of Water Pollution Control (DWPC), Office of Coastal Zone Management (CZM), and Division of Marine Fisheries (DMF). This workplan identifies the major tasks to be undertaken during the study period and will form the basis for the development of detailed scopes of work for consultant grants and contracts and cooperative agreements. In addition, the management and advisory committee activities to be undertaken during the conduct of the study are presented.

This workplan has been prepared after soliciting the input of representatives of other Federal agencies, including the National Oceanic and Atmospheric Administration, the Army Corps of Engineers, and the Food and Drug Administration. In addition, meetings were held around Buzzards Bay to solicit the input, advice, and recommendations of the region's academic community and local public interest groups regarding critical water quality problems and concerns related to Buzzards Bay.

The staff of EPA and Massachusetts have proposed a focused approach in this workplan. This focus is intended to reflect our primary goals of protection of public health and the environment, and is coupled with our goal of investigating critical issues for which a determination regarding action or abatement is essential. With these premises and considering the extent to which Buzzards Bay is an extensive source of recreational and commercial fishing and shellfishing, the focus of the workplan will be on the management of pollutants released to Buzzards Bay and the necessary remedial actions to preserve the Bay's shellfish resources. Associated with these two critical issues is the development of a means to transfer technical information to local agencies and the general public to facilitate the implementation of measures to clean up and preserve Buzzards Bay.

The wise management of Buzzards Bay resources, as with coastal areas throughout the world, requires an increasingly sophisticated knowledge about interacting ecosystems within the Bay and between the Bay and contiguous coastal areas. A balanced mix of a near-term search for solutions to current management problems, together with longer-term (years to decades) research and monitoring to improve our predictive capabilities. This workplan does not propose to deal with all of the issues, problems and concerns related to the Bay, a project which would require extensive funding and many years to complete. It is our intent, though, that the current workplan be used to create a foundation for continued coordinated effort that combines basic research with an active search for solutions to current management problems. Neither does this workplan propose to rehash old information by directing limited resources and time to issues and problems which have been investigated and where conclusions and recommendations have been made to the appropriate management and institutional entities. In these cases, the study will reiterate and stress the need for implementation and appropriated funding.

## THE SETTING

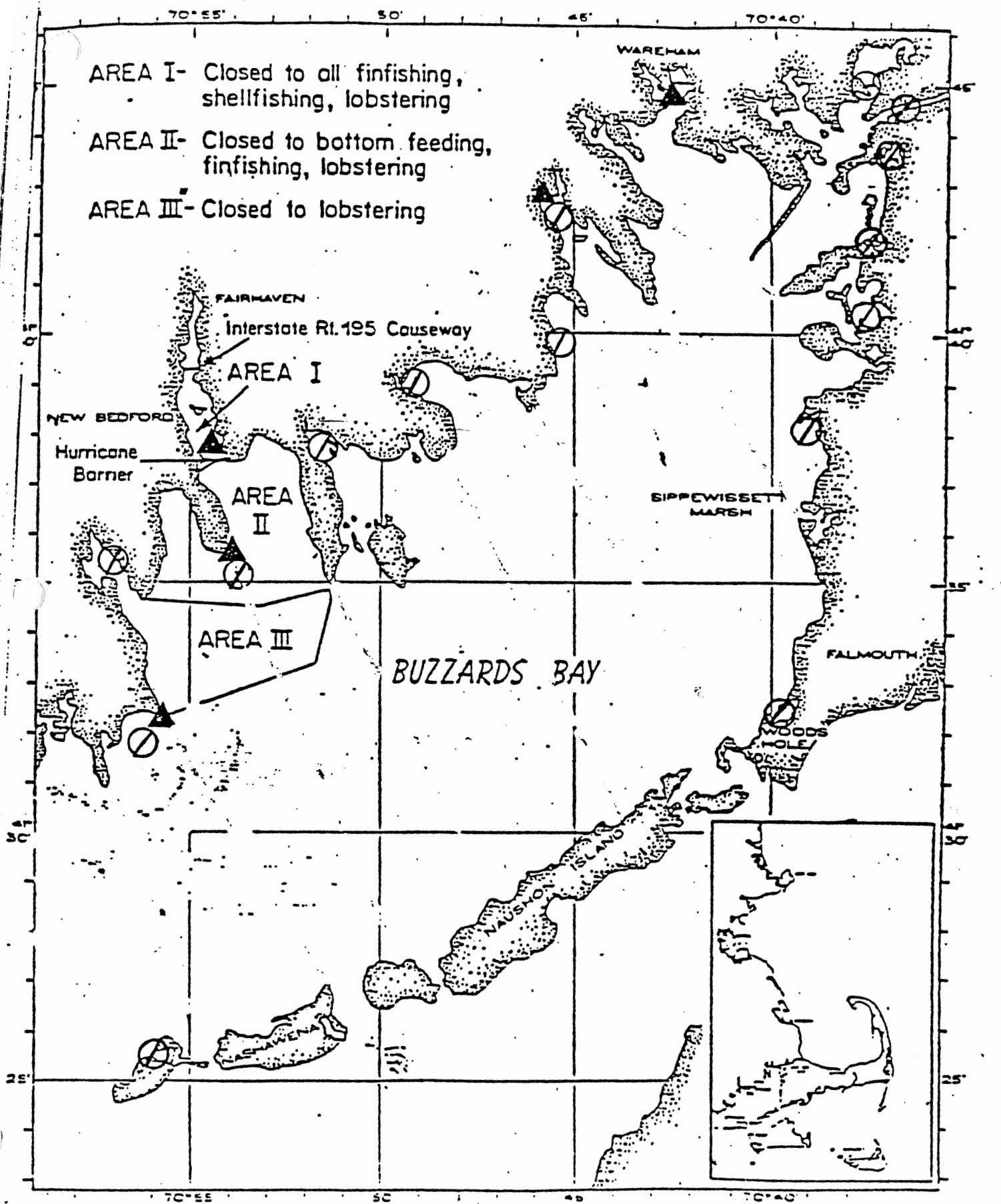
Buzzards Bay is an estuary in transition. Renowned since colonial times for its whaling and fishing industries, communities along its western shores have been the most troubled region economically in Massachusetts over the last several decades. Waste residues from some of those industries have been trapped in the sediments of the Acushnet River and New Bedford Harbor resulting in the designation of that area as a Superfund site. Along its eastern shores, the burgeoning development of retirement communities and the spread of commuters to Cape Cod has made Barnstable County the fastest growing county in New England. The legacy of industrial pollution from the west and accelerated development on the east combine to threaten the health of Buzzards Bay.

Buzzards Bay is a small New England estuary, only about 30 miles long and 10 miles wide nestled between Cape Cod and the southern edge of Massachusetts (Figure 1). For the management purposes of this study, Buzzards Bay is defined to include the waters between the Rhode Island border, Elizabeth Islands, and the Cape Cod Canal. Dendritic glacial extensions of land provide for an expanded coastline stretching over 210 miles, including 11 miles of beaches which lure thousands of tourists from Massachusetts and neighboring states. The bay is heavily used by recreational boaters — 4300 slips and moorings along the bay, commercial and recreational fishermen, and commercial shippers travelling through the Cape Cod Canal. Over 20,000 vessels pass through Buzzards Bay each year in transit through Cape Cod Canal, carrying over 19 million tons of commercial cargo including most of the #2 fuel oil used in New England. More recently, Buzzards Bay has become an important site for estuarine research used by marine scientists from Woods Hole and Southeastern Massachusetts University (SMU).

Cape Cod acts as a northern faunal boundary for many marine species, and fishermen pursue such diverse species as winter flounder, scup, tautog, bluefish, and striped bass. The Bay contains over 8000 acres of productive shellfish-growing areas where thousands of bushels of hardshell clams, bay scallops, and oysters are harvested annually. These fisheries are economically important to both commercial and recreational fishermen, accounting for more than ten million dollars in annual commercial landings and a similar recreational impact. In the last two decades, the Bay's lobster fishery has suffered a major decline to 500,000 pounds in 1983 in commercial landings with many fishermen forced to pursue other full-time employment. A portion of this decline has possibly been due to the closure of areas in and around New Bedford Harbor. In addition, Buzzards Bay is thought to nourish lobster larvae for recruitment to the fishery in Cape Cod Bay as well as Buzzards Bay to account for much of the economic strength of the nearshore fishery.

There are 30 point dischargers to Buzzards Bay and its tributaries (Table 1; Figure 2). Of these discharges, the major ones are the sewage treatment plants in the towns of New Bedford, Dartmouth, Fairhaven, Wareham, and Marion (Figure 1, Table 2). Major industrial dischargers are Canal Electric, Commonwealth Electric-Cannon, and Cornell Dubilier Electric Corp. Non-point pollution sources occur from fertilizers and pesticides applied to cranberry bogs and manure from pastures and feedlots along the tributaries to the Bay. The magnitude of these non-point sources has not been well characterized, but these sources have been implicated in several instances with fish kills or

FIGURE 1





LEGEND:  STP OUTFALLS  
 SHELLFISH CLOSURE

TABLE I - NPDES PERMITTED DISCHARGES TO BUZZARDS BAY AND ITS TRIBUTARIES

| FACILITY                           | RECEIVING WATER                   | NPDES #   | SIC CODE | MAJOR ? |
|------------------------------------|-----------------------------------|-----------|----------|---------|
| Acushnet Capacitor Co.             | Acushnet R.                       | MA0023884 | 3675     | N       |
| Acushnet Co.-Rubber Div.           | Acushnet R.                       | MA0003913 | 3069     | N       |
| Acushnet Co.-Titleist<br>Golf Div. | Acushnet R.                       | MA0005428 | 3949     | N       |
| Acushnet Nursing, Inc.             | Acushnet R.                       | MA0026280 | 8051     | N       |
| Aerovox Corp.                      | Acushnet R.                       | MA0003379 | 3675     | N       |
| Atlas Tack Corp.                   | New Bedford Harbor                | MA0002704 | 3964     | N       |
| Berkshire Hathaway                 | Acushnet R.                       | MA0003506 | 2221     | N       |
| Canal Electric                     | Cape Cod Canal                    | MA0004928 | 4911     | Y       |
| Canal Marine                       | Cape Cod Canal                    | MA0004979 | 5423     | N       |
| Commonwealth Electric              | New Bedford Harbor                | MA0004910 | 4911     | Y       |
| Cornell Dubilier                   | New Bedford Harbor                | MA0003930 | 3675     | Y       |
| Dartmouth WPCF                     | Buzzards Bay                      | MA0101605 | 4952     | Y       |
| Fairhaven                          | Acushnet R.                       | MA0100765 | 4952     | Y       |
| Franconia Fuel Co., Inc.           | Wareham R.                        | MA0024384 | 5074     | N       |
| Glen Petroleum Corp.               | Acushnet R.                       | MA0003301 | 5172     | N       |
| Goodyear Tire & Rubber             | Clarks Cove                       | MA0005606 | 3011     | N       |
| Hoyt Mfg. Corp.                    | Westport R.                       | MA0022152 | 3582     | N       |
| Isotronics Inc.                    | CSO (New Bedford)                 | MA0027995 | 3674     | N       |
| John Dugan Buick-Pontiac           | Acushnet R.                       | MA0024350 | 5511     | N       |
| Lincoln Park Amusement C.          | Westport R., E. Br.               | MA0024996 |          | N       |
| Marion                             | Aucoot Cove                       | MA0100030 | 4952     | Y       |
| Maritime Terminal Inc.             | Acushnet R.                       | MA0022080 | 4222     | N       |
| Massachusetts Maritime A.          | Cape Cod Canal                    | MA0024368 | 8211     | N       |
| Mattapoissett                      | Mattapoissett Harbor              | MA0100072 | 4952     | N       |
| New Bedford WTP                    | Acushnet R.                       | MA0100781 | 4952     | Y       |
| Old Rochester RWS                  | Mattapoissett Harbor<br>tributary | MA0102318 | 8211     | N       |
| Revere Copper Products             | Acushnet R.                       | MA0004821 | 3471     | N       |
| Teledyne-Rodney Metals             | Acushnet R.                       | MA0003336 | 3312     | N       |
| Tremont Nail Co.                   | Wankinco R.                       | MA0005801 | 3315     | N       |
| Wareham WTP                        | Subsurface percolation            | MA0101893 | 4952     | N       |

TABLE II.

Sewage Treatment Plants Within Buzzards Bay

|             |   |
|-------------|---|
| Dartmouth.  | Extended aeration 2.1 MGD capacity;<br>ocean outfall; sludge - landfill disposal.   |
| New Bedford | Primary treatment 30 MGD; ocean outfall;<br>sludge - on site landfill.<br>Has applied-for a 301 H waiver.                                   |
| Fairhaven   | Extended aeration 2.1 MGD capacity;<br>outfall inside hurricane barrier;<br>sludge - municipal landfill.                                    |
| Marion      | Stabilization ponds (3), sand filters, 0.34<br>MGD; effluent discharged to stream tributary<br>to Aucoot Cove. Sludge - municipal landfill. |
| Wareham     | Extended aeration, sand filters 1.75 MGD<br>capacity.   |

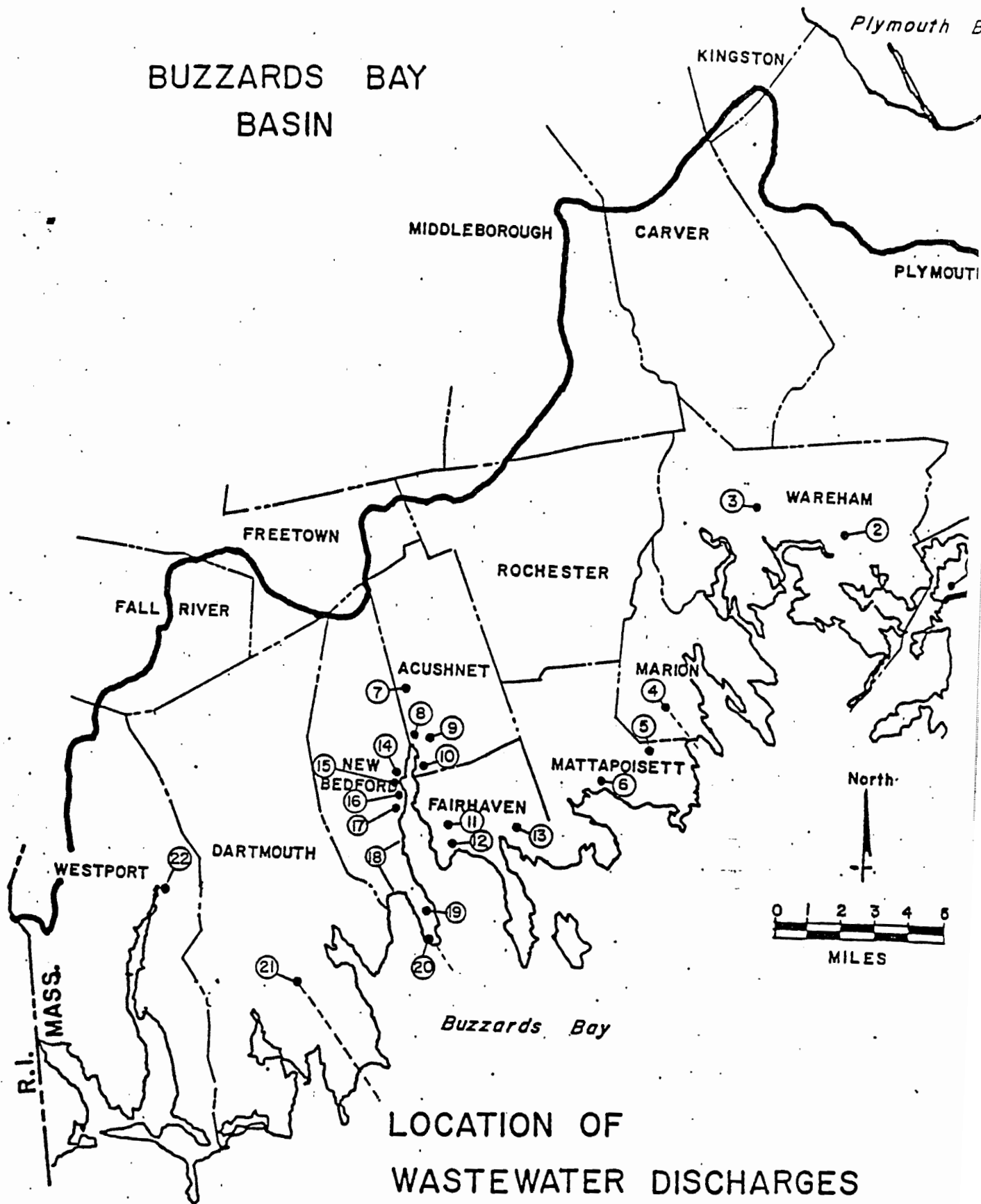


FIGURE 2

shellfish bed closures respectively. Combined sewer overflows in New Bedford have been cited previously as a major concern, and street run-off is emerging as an issue in many coastal communities. Another non-point source of potentially large significance is groundwater discharge, which dominates the freshwater input on the Cape Cod side of the Bay. Leachate from sewage treatment systems can move very quickly through the porous soils which border much of the Bay. The major source of toxic pollutants to Buzzards Bay currently, though, is thought to be the introduction of contaminated sediments from the New Bedford Superfund site.

## THE PROBLEMS

### ○ Toxic Contamination from the Acushnet River/ New Bedford Harbor Region

The legacy of New Bedford's declining industrial sector has been sediments contaminated by copper and nickel from the metal finishing industry and PCBs from the electronic capacitor manufacturers. EPA has placed New Bedford Harbor on its Superfund listing due to the extensive PCB contamination in sediments with concentrations reaching over 100,000 ppm. PCBs have been exported from the Acushnet River to Buzzards Bay where contamination has resulted in restricted fishing activities in an estimated 2000 acres of the estuary. Lobster living in the New Bedford Harbor region and neighboring sections of Buzzards Bay have a high incidence of gill and shell disease, which may be associated with the high levels of contamination. While options are being considered to remove the PCBs in the most grossly contaminated areas, New Bedford Harbor could possibly export contaminants to the surrounding Bay for years in the future. Dredging projects around the Bay could also mobilize toxic contaminants from the sediments. The long-term problem of toxic contamination is a major environmental concern to commercial and recreational fishermen and the general public who consume fish.

### ○ Shellfish Bed Closures and Coastal Development

Communities along Buzzards Bay are facing phenomenal pressures for development. At the same time, shellfish beds are increasingly closed due to coliform contamination thought to be released from malfunctioning septic tanks. Additional contamination from avian sources and agricultural run-off complicate the situation. At present, approximately one-quarter of the shellfish beds in the Bay are closed (Figure 1; Table 3). These same sources are probably responsible for large loads of nutrients to the eastern shore of the Bay, where the freshwater input is dominated by groundwater resources. Shellfishing is important to the Buzzards Bay community both economically and as an index of the "quality of life" along the Bay. To permit coastal development without threatening the health of the Bay is a second major issue.

### ○ Other Problems

Several other problems provide a potential threat to the health of Buzzards Bay:

1. SPILLS - The large volume of commercial traffic through the Bay, strong currents near the Canal, and frequent freeze-ups during winter increase the potential, for chemical spills, particularly oil. The U.S. Army Corps of Engineers has developed a sophisticated tracking system for ships. Although, about a dozen "response" incidents occur each year, the last major spill was the loss of the "Bouchard" in 1977.

TABLE III.

## Shellfish Closures Within Buzzards Bay

| <u>TOWN</u>   | <u>DEQE</u> | <u>NAME</u>                           | <u>REASON FOR CLOSURE</u>       |
|---------------|-------------|---------------------------------------|---------------------------------|
| Westport      | BB4         | East Branch                           | Bacteria                        |
| Dartmouth     | BB12        | Apponagansett Bay                     | Bacteria                        |
|               | BB11        | Salter's Point                        | Bacteria                        |
| New Bedford   | BB13        | Clark Cove                            | Bacteria (PCB)?                 |
|               | BB15        | Outer New Bedford Harbor to Fairhaven | Bacteria (PCB)?                 |
| Fairhaven     | BB22        | Little Bay                            | Relay of contaminated shellfish |
| Mattapoissett | BB25        | Mattapoissett Harbor                  | Bacteria                        |
|               | BB27        | Eel Pond                              | Bacteria                        |
|               | BB30        | Hiller Cove                           | Bacteria                        |
| Marion        | BB32        | Sippican Harbor including Briggs Cove | Bacteria                        |
| Wareham       | BB44        | Buttermilk and Little Buttermilk Bay  | Bacteria                        |
| Bourne        | BB45        | Cape Cod Canal                        | Bacteria                        |
|               | BB47        | Back River, Eel Pond                  | Bacteria                        |
|               | BB48        | Pocasset River                        | Bacteria                        |
|               | BB49        | Red Brook Harbor                      | Bacteria                        |
| Falmouth      | BB58        | Quisset Harbor                        | Bacteria                        |
| Cuttyhunk     | E9          | Cuttyhunk Pond                        | Bacteria                        |



2. EUTROPHICATION AND AGRICULTURAL RUN-OFF - The rapid growth of the cranberry industry has resulted in increased use of fertilizers and pesticides which are implicated in fish kills occurring during the summer months. Anoxia events due to eutrophication in some of the local embayments may spread to the larger Bay in the future, but there is no documented problem at this time.

3. DREDGING - Sites in Buzzards Bay are also being evaluated as potential locations for the disposal of dredged materials from the region's harbors. Other materials may be present in the sediments surrounding the old textile mills which discharged a variety of old dyestuffs. EPA is currently developing criteria for the selection of dredged material disposal sites.

#### o Management Coordination

Management of Buzzards Bay resources falls under the aegis of several coastal agencies including the Division of Marine Fisheries, the Office of Coastal Zone Management, the Division of Water Pollution Control, the Department of Health, the New England Fisheries Management Council, the Food and Drug Administration, the Army Corps of Engineers, and the Environmental Protection Agency. But even more important to the management of local problems are the local conservation commissioners, shellfish wardens, and health agents in each of the coastal towns. It is imperative that all these various participants have available consistent and up-to-date information concerning the resources and management options available to them.

#### BUZZARDS BAY STRATEGY AND INTEGRATION WITH OTHER STUDIES

Necessary to any attempt to develop management strategies for Buzzards Bay is an understanding of transport processes in the Bay, how water and sediments and the contaminants they carry move around the Bay and into the food chain. As a part of the \$3 million Superfund feasibility study, the transport of PCBs, lead, copper, and cadmium in the water and sediments and to the food chain will be numerically simulated so that predictions can be made concerning the length of time necessary for contaminants to be flushed from the New Bedford Harbor system under different Superfund site clean-up alternatives. That work will be completed in 1986. Compared to the Superfund effort, the amount of funds available for this project at this time is small and insufficient to do a comprehensive, management-oriented study of Buzzards Bay. Research conducted at other Federal laboratories and academic institutions at Woods Hole and SMU (summarized in Appendix 1) will develop an improved numerical description of transport processes in the Bay and conceptual understanding of how the biological systems respond. While this program can not presently provide the financial support for such research, it can provide the management orientation to allow the timely syntheses of technical results into ongoing water quality management programs and coordinate academic state, and Federal sampling programs.

For instance, Massachusetts Division of Marine Fisheries (DMF) will continue ongoing monitoring efforts of PCB residues in fish and shellfish to allow the Division to ascertain the sufficiency of the closure areas. Additionally, Massachusetts Division of Water Pollution Control (DWPC) plans to conduct sampling to update its Water Quality Management Plan for the Buzzards Bay Basin as required by the Clean Water Act Amendments of 1972 (PL92-500). Sampling will be undertaken to complement the modeling effort of Superfund with particular emphasis on sites north of Cleveland Ledge which

are outside the range of the Superfund sampling stations. Through the Superfund modeling results and information collected regarding current discharges, DWPC will be able to set permit limits sufficient to protect the water quality of Buzzards Bay.

Of long-term interest for its impact on management of the Bay's water quality is the potential for the increasing nutrient flows from developments along the Bay to affect the amounts and kinds of organisms which grow in the Bay. As part of its basin plan development, Massachusetts DWPC will coordinate its sampling stations for nutrients and bacteria with proposed research at Woods Hole on eutrophication in Buzzards Bay.

Besides these Bay-wide studies, efforts will be focussed on restricted arms of the Bay (e.g. Buttermilk Bay) where discharges of septic tank leachates impinge upon shellfish habitats forcing closure or transplantation. Areas will be evaluated to determine what sort of zoning practices and engineering requirements are necessary to allow the future development of coastal communities consistent with the preservation of shellfish habitat.

Finally, the implementation of many of these clean-up efforts, whether through accepted management plans, statutory or regulatory changes, or alterations in land, water, or resource use, requires the participation of a diverse collection of local, state, and federal agencies and depends on public acceptance of their need and rationale. An ongoing series of workshops is planned to keep the public apprised of progress of the Buzzards Bay study and to focus on specific implementation strategies as soon as they are developed.

#### MANAGEMENT GOALS AND OBJECTIVES

As a result of the problems cited above, we have developed a workplan that addresses both existing and evolving problems. The overall goal of the Buzzards Bay workplan is to improve and protect the water quality and living resources of the Buzzards Bay system. In pursuit of these goals we have a number of specific objectives:

- (1) Develop a data management system which provides a procedure for collection and storage of information, and ongoing interpretative summaries of the data and bibliographic information collected.
- (2) Conduct a Bay-wide survey of water, sediment, and biota quality in Buzzards Bay as part of the Massachusetts updating of the Buzzards Bay Basin Plan to expand the coverage of the Superfund modeling work to include a larger portion of the Bay's geographic extent and to initiate baseline sampling for long-term monitoring.
- (3) Through the study of locations throughout the Bay, determine the relationship between land use practices and the closure of shellfish beds due to bacterial contamination.
- (4) Develop a series of workshops for local and state decision-makers, interest groups, and the general public on subjects of concern in Buzzards Bay. These can serve to clarify public concerns, publicize ongoing work, and increase the interaction between researchers, regulators, and the public.
- (5) Develop a long-term study and management plan for Buzzards Bay. This

plan would define overall research and management needs, priorities, and costs that would provide the basis for better future management of the Bay.

#### FY85 WORKPLAN

In consideration of the overall strategy for the clean-up and preservation of Buzzards Bay and the above near-term management objectives, a workplan for FY85 is proposed below. This program is proposed as the first year of a multi-year study.

#### Objective 1

Develop a data management system which provides a procedure for collection and storage of information, and ongoing interpretative summaries of the data and bibliographic information collected.

1. Collect scientific, technical and management literature concerned with Buzzards Bay. Review 201 facilities plans and engineering studies. Contact all state and federal agencies to collect unpublished results from water quality data. Review EPA Superfund data base for completeness.
2. Develop data base format, equipment, and procedures for the collection and entry of data with mechanisms to ensure the quality of data entered. Develop procedures for access to the data base by the relevant parties.
3. Summarize data for PCBs, nutrients, coliforms, and resources (land use, soil types, fishery status, etc.) with a series of atlases or review papers for Buzzards Bay. These data will be used in conjunction with the objectives below to assist in assessment and sampling design.

#### Products:

Bibliography for Buzzards Bay  
Data Base Management System with published users guide  
Atlas of resource and contaminant data

#### Related Studies in Other Programs:

WHOI and DWPC staff presently collecting bibliography. Metcalf & Eddy has collected most PCB-related data for Superfund. Battelle is combining those data with data from their modelling effort into a larger data base.

#### Estimated Costs:

Data management system will cost at least \$25,000-\$75,000 for rudimentary set-up.  
Review and analysis of Buzzards Bay information (\$25,000).

#### Management Rationale:

Massachusetts, EPA, and other institutions will have a consistent source of data to use in planning programs for the rehabilitation/ protection of Buzzards Bay. The system will be accessible to any computer with a phone hook-up, allowing users in the various state agencies and EPA to easily access relevant information regarding Buzzards Bay. The information will also be easily reviewed to assess trends in water quality to determine the success of implementation programs. EPA has developed a data management system for marine data called the Ocean Data Evaluation System (ODES) for reporting of monitoring results in the 301(h) secondary treatment waiver program. This system is consistent with the format used by NOAA's National Ocean Data Center.

Information collected as part of the Buzzards Bay program would be an effective part of a larger national program.

#### Objective 2

Conduct a Bay-wide survey of water, sediment, and biota quality in Buzzards Bay as part of the Massachusetts updating of the Buzzards Bay Basin Plan to expand the coverage of the Superfund modeling work to include a larger portion of the Bay's geographic extent and to initiate baseline sampling for long-term monitoring.

1. Review existing data on water and sediment quality, residue levels, fish diseases and abnormalities, and permitted discharges.
2. Coordinate sampling by DWPC and DMF with WHOI, Battelle, and SMU regarding the appropriate location and types of sampling stations for nutrients, coliforms, PCBs and specific heavy metals as appropriate.
3. Collect effluent data for industrial and municipal dischargers.
4. Initiate long-term monitoring at selected stations in the Bay for PCB residues, shellfish contamination, and indices of overall Bay health.
5. Determine feasibility of using biochemical or histopathological indices for determining health of Bay organisms in conjunction with determination of external abnormalities.

#### Product:

Updated Basin Plan for Buzzards Bay  
Annual report each year of trend monitoring stations and implications for health of Bay

#### Related Studies in Other Programs:

NOAA's National Ocean Survey will be updating its atlas of circulation in the Bay. NOAA also plans to set up three mussel watch stations in the Bay —(off Barney's Joy Pt., Mattapoisset Neck, and Coxen's Ledge). NOAA's Milford Lab is conducting research on the effects of PCBs on lobster growth and reproduction. As part of its Superfund efforts, Battelle is compiling a model to predict the fate and transport of material released from New Bedford Harbor and subsequent uptake into the food chain. Woods Hole Sea Grant is funding five studies in Buzzards Bay (see Appendix 1)—Biogeochemistry of PCBs in Buzzards Bay, Effects on Energetics and Reproductive Cycles of Bivalve Molluscs, The Origin of Induced Cytochrome P-450 in Buzzards Bay Fish: A Possible Biochemical Effect of PCBs, The Effects of Size Class and Bioturbation on Fine Grained Transport in Coastal Systems: Specific Application to Biogeochemistry of PCB Transport in New Bedford Harbor, and Application of Growth Indices to Bay Scallop Management in Southeastern Massachusetts.

#### Estimated Costs:

Most of Basin Plan Costs will be borne by EPA-Massachusetts 106 planning grants. WHOI Sea Grant and Coastal Research Center funding some work on efficacy of biochemical and histopathological indices. \$50-\$100,000 necessary to supplement above work and initiate long-term monitoring stations.

#### Management Rationale:

A potentially valuable tool for determining waste load allocations to Buzzards Bay is the model being developed by Battelle through EPA

Superfund to predict the transport of contaminants from New Bedford Harbor. Since New Bedford's sewage treatment plant is the largest point source discharger to Buzzards Bay and most of the other major dischargers are located on the Acushnet River, the model should also allow evaluation of the effects of most discharges to the health of Buzzards Bay. The full utility of the model will not be known until early 1986. In the meantime, it is necessary to conduct sampling sufficient to expand the coverage of the model north of Cleveland's Ledge and initiate long-term monitoring to evaluate the efficacy of Buzzards Bay abatement and clean-up programs.

### Objective 3

Through the study of locations throughout the Bay, determine the relationship between land use practices and the closure of shellfish beds due to bacterial contamination.

1. For selected embayments, compile information on shellfish resources by volume and dollars; determine magnitude of sources of coliform loadings from zoning and land use practices, population density, septic tank density, and system quality; catalog soils of surrounding uplands; experimentally determine relative rates of transport and extent of attenuation of viruses; determine dilution capacity of embayment from tidal flows, volume, and freshwater input; and measure water quality through a tidal cycle for nutrients and bacterial indicators under different climatic conditions to determine relationship between rainfall, land use, soil type, and sewerage practices and water quality.
2. Review Title V of the State Sanitary Code for its application in coastal glacial outwash soils and areas where ground water is affected by tidal fluctuation.
3. Analyze present system for closure or limiting the harvest in shellfish beds within the Bay.

### Product:

Recommendations regarding nearshore zoning practices as a function of upland soil type and embayment flushing capacity.

Recommendations for upgrading Title V or developing local guidelines for town by-laws. Workshop.

Recommendations for improving implementation and enforcement of shellfish closures or establishment of alternatives such as transplantation or depuration. Workshop.

### Related Studies in Other Programs:

DEQE plans to conduct an extensive series of shellfish sanitation surveys in the Buttermilk Bay region in Buttermilk Bay this summer. A similar project is underway in the Westport River through the Westport River Defense Fund.

**Estimated Costs:** Ongoing efforts by DWPC, its regional offices, DMF, plus additional funds (\$50-\$200,000) as determined necessary.

### Management Rationale:

Shellfish resources are probably the most sensitive marine indicator of population pressure. A number of alternative sewage and septic

practices have been developed, but none have been evaluated for their use along Buzzards Bay.

#### INFORMATION TRANSFER

Implementation of many of the recommendations which emerge from these studies will require diffuse management strategies which are difficult to enforce. For example, fishery closures or advisories are often violated as are wetland filling regulations. The success of these sorts of programs requires that the public understand and endorse their objectives. We intend to make information available in a useful and timely fashion to the general public and local public officials. In addition, it is necessary that the efforts of other state agencies be coordinated with ongoing work in Buzzards Bay.

#### Objective 4

Develop a series of workshops for local and state decision-makers, interest groups, and the general public on subjects of concern in Buzzards Bay. These can serve to clarify public concerns, publicize ongoing work, and increase the interaction between researchers, regulators, and the public.

#### Product:

Primer- Overview of contamination problems and biological importance of Buzzards Bay.

Series of workshops and possible publications at quarterly intervals.

Topics to include:

1. Consequences of PCB pollution on fish and shellfish and harvesters.
2. Review of Title V and town by-laws and their effects on coastal development.
3. Shellfish closures: Biological bases, economic impacts, monitoring alternatives
4. Methods of stormwater management in coastal communities
5. Eutrophication in small embayments: Causes, Impacts, and Mitigation

#### Estimated Costs:

Project will be conducted in conjunction with SMU and Boston University as a part of Marine Economic Policy Consortium project supported by Massachusetts Department of Economic Affairs.  
\$10,000-\$20,000

#### Objective 5

Develop a long-term research and management plan for Buzzards Bay.

1. Establish a technical working group with representatives of the scientific and management communities.
2. The technical working group would review the existing data base and ongoing research activities in the Bay to identify information gaps critical to sound management decisions.
3. The technical working group would coordinate ongoing sample collection conducted as a part of other state and Federal programs.
4. Develop a list of research needs and priorities for future work in Buzzards Bay.

#### Product:

A master plan for future research in Buzzards Bay. This would include a prioritized listing of research needs essential for sound management decisions and could be used to solicit additional funding through this program

or through other sources.

Estimated Costs: Existing staff plus \$20,000-\$50,000.



## PROPOSED BUZZARDS BAY ORGANIZATIONAL STRUCTURE

### Policy Committee

Tasks: Assesses and oversees implementation of workplan by coordinating the activities of the substituent agencies.

Meets every 3-6 months.

Membership: Michael Deland, Regional Administrator, EPA  
Massachusetts - Governor's designate (Secretary Hoyte?)

### Management Committee

Tasks: Directs program activities under guidelines of the Policy Committee

Forms task-oriented subcommittees as necessary and solicits and acts upon their recommendations

Annually assesses committee membership

Annual written report on Buzzards Bay activities

Meets every 4-6 weeks

Membership: EPA Water Management Division (David Fierra)  
Division of Marine Fisheries (Leigh Bridges)  
Department of Environmental Quality and Engineering (Russell Sylva)  
Coastal Zone Management (Richard Delaney)  
NOAA (Jack Pearce/ Phyllis Cahn)  
Local Advisory Committee chair  
Technical Advisory Committee chair

Staff: Mike Connor, EPA  
Larry Gil, DWPC  
Steve Bliven, CZM

### Local Advisory Committee

Tasks: Provides review and critique by local officials and citizens of Bay activities

Reports to Management Committee

Membership: CCPED

SERPED

Association for the Preservation of Cape Cod

Representative from each coastal town (9-11)

Westport River Defense Fund

Commonwealth Electric

Lobster industry representative

Sports fishermen representative

### Technical Advisory Committee

Tasks: Reviews workplan, requests for proposals, and proposals for technical merit as whole committee or subcommittees

Reports to management committee

Membership: Judy Capuzzo, WHOI  
John Farrington, WHOI  
Hank Parker, SMU  
Al Beck, EPA Narragansett  
John Hobbie, MBL  
Russ Isaac, DWPC

Phyllis Cahn, NOAA  
Frank O' Brien, SMU  
Ira Somerset, FDA  
Alan Hankin, Lloyd Center  
William Grant, WHOI  
SMU/BU Economic Policy Consortium



## APPENDIX I - WHOI SEA GRANT STUDIES IN BUZZARDS BAY

Biogeochemistry of PCBs in Buzzards Bay, Massachusetts. (Farrington)- \$82,000

- 1) To investigate and define physical-chemical aspects of PCB biogeochemistry in coastal waters with particular emphasis on the role of partitioning of the hydrophobic PCB molecules onto high molecular weight dissolved-colloidal organic matter in both the water column and sediment pore waters.
- 2) To characterize the monthly and seasonal fluctuations of PCBs in Mytilus edulis and Mercenaria mercenaria in PCB polluted waters in conjunction with biological effect studies of PCBs on populations of these organisms.
- 3) To provide high resolution glass capillary gas chromatography analyses of PCBs in fish for colleagues studying sublethal effects of PCBs on fish.

PCBs in Buzzards Bay, MA: Effects on Energetics and Reproductive Cycles of Bivalve Molluscs. (Capuzzo) - \$67,300

To characterize the biological consequences of PCB uptake and accumulation in marine bivalve molluscs. During the first project year we will characterize the effects of PCB accumulation on energetics and reproductive potential of Mytilus edulis transplanted in cages to New Bedford Harbor, MA, an area heavily contaminated with PCBs. During the second project year, we will extend our studies to identifying the responses of natural populations of bivalve molluscs, specifically two important commercial resources of Buzzards Bay - the soft shell clam Mya arenaria and the hard shell clam Mercenaria mercenaria.

The origin of induced cytochrome P-450 in Buzzards Bay fish: A possible biochemical effect of PCBs. (Stegeman) - \$26,400

To provide data relevant to the hypothesis that environmental chemicals are linked to the high levels of cytochrome P-450E identified in local fish (scup; S. chrysops) in Buzzards Bay; to determine whether this induction can be correlated with PCB and/or PAH residues.

The effects of size class and bioturbation on fine grained transport in coastal systems: specific application to biogeochemistry of PCB transport in New Bedford Harbor. (Grant, Hannan) - \$124,700

To determine the relative role of size class distribution and biological effects on the transport of fine sediment. Particular emphasis on pollutant transport.

- a. Specific scientific focus on: particulate matter transport of PCBs; realistic incorporation of effects into bottom boundary conditions for suspended sediment transport; storm resuspension and transport.
- b. Geographical focus on New Bedford Harbor/Buzzards Bay PCB pollution and subsequent transport.
- c. Melding of lab, field & theoretical approaches to problems of fine grain transport.

Application of growth indices to bay scallop management in southeastern Massachusetts. (Hampson, Capuzzo) \$9000

To compare reproduction and growth of bay scallops collected from different areas on Cape Cod and the Islands and to test the feasibility of using these data for managing the bay scallop fishery. Simple indices (gonad index, adductor muscle index) will be used by local wardens towards regulating local shellfish ordinances. This will provide management with a scientific basis for determining differences in harvesting strategies and more effective fishery management. At a WHOI Sea Grant sponsored workshop support was received from some Cape and Island towns to apply these growth indices to more efficiently regulate their scallop crops.

are outside the range of the Superfund sampling stations. Through the Superfund modeling results and information collected regarding current discharges, DWPC will be able to set permit limits sufficient to protect the water quality of Buzzards Bay.

Of long-term interest for its impact on management of the Bay's water quality is the potential for the increasing nutrient flows from developments along the Bay to affect the amounts and kinds of organisms which grow in the Bay. As part of its basin plan development, Massachusetts DWPC will coordinate its sampling stations for nutrients and bacteria with proposed research at Woods Hole on eutrophication in Buzzards Bay.

Besides these Bay-wide studies, efforts will be focussed on restricted arms of the Bay (e.g. Buttermilk Bay) where discharges of septic tank leachates impinge upon shellfish habitats forcing closure or transplantation. Areas will be evaluated to determine what sort of zoning practices and engineering requirements are necessary to allow the future development of coastal communities consistent with the preservation of shellfish habitat.

Finally, the implementation of many of these clean-up efforts, whether through accepted management plans, statutory or regulatory changes, or alterations in land, water, or resource use, requires the participation of a diverse collection of local, state, and federal agencies and depends on public acceptance of their need and rationale. An ongoing series of workshops is planned to keep the public apprised of progress of the Buzzards Bay study and to focus on specific implementation strategies as soon as they are developed.

#### MANAGEMENT GOALS AND OBJECTIVES

As a result of the problems cited above, we have developed a workplan that addresses both existing and evolving problems. The overall goal of the Buzzards Bay workplan is to improve and protect the water quality and living resources of the Buzzards Bay system. In pursuit of these goals we have a number of specific objectives:

- (1) Develop a data management system which provides a procedure for collection and storage of information, and ongoing interpretative summaries of the data and bibliographic information collected.
- (2) Conduct a Bay-wide survey of water, sediment, and biota quality in Buzzards Bay as part of the Massachusetts updating of the Buzzards Bay Basin Plan to expand the coverage of the Superfund modeling work to include a larger portion of the Bay's geographic extent and to initiate baseline sampling for long-term monitoring.
- (3) Through the study of locations throughout the Bay, determine the relationship between land use practices and the closure of shellfish beds due to bacterial contamination.
- (4) Develop a series of workshops for local and state decision-makers, interest groups, and the general public on subjects of concern in Buzzards Bay. These can serve to clarify public concerns, publicize ongoing work, and increase the interaction between researchers, regulators, and the public.
- (5) Develop a long-term study and management plan for Buzzards Bay. This

plan would define overall research and management needs, priorities, and costs that would provide the basis for better future management of the Bay.

#### FY85 WORKPLAN

In consideration of the overall strategy for the clean-up and preservation of Buzzards Bay and the above near-term management objectives, a workplan for FY85 is proposed below. This program is proposed as the first year of a multi-year study.

#### Objective 1

Develop a data management system which provides a procedure for collection and storage of information, and ongoing interpretative summaries of the data and bibliographic information collected.

1. Collect scientific, technical and management literature concerned with Buzzards Bay. Review 201 facilities plans and engineering studies. Contact all state and federal agencies to collect unpublished results from water quality data. Review EPA Superfund data base for completeness.
2. Develop data base format, equipment, and procedures for the collection and entry of data with mechanisms to ensure the quality of data entered. Develop procedures for access to the data base by the relevant parties.
3. Summarize data for PCBs, nutrients, coliforms, and resources (land use, soil types, fishery status, etc.) with a series of atlases or review papers for Buzzards Bay. These data will be used in conjunction with the objectives below to assist in assessment and sampling design.

#### Products:

Bibliography for Buzzards Bay  
Data Base Management System with published users guide  
Atlas of resource and contaminant data

#### Related Studies in Other Programs:

WHOI and DWPC staff presently collecting bibliography. Metcalf & Eddy has collected most PCB-related data for Superfund. Battelle is combining those data with data from their modelling effort into a larger data base.

#### Estimated Costs:

Data management system will cost at least \$25,000-\$75,000 for rudimentary set-up.  
Review and analysis of Buzzards Bay information (\$25,000).

#### Management Rationale:

Massachusetts, EPA, and other institutions will have a consistent source of data to use in planning programs for the rehabilitation/ protection of Buzzards Bay. The system will be accessible to any computer with a phone hook-up, allowing users in the various state agencies and EPA to easily access relevant information regarding Buzzards Bay. The information will also be easily reviewed to assess trends in water quality to determine the success of implementation programs. EPA has developed a data management system for marine data called the Ocean Data Evaluation System (ODES) for reporting of monitoring results in the 301(h) secondary treatment waiver program. This system is consistent with the format used by NOAA's National Ocean Data Center.

Statement of Work

EPA Cooperative Agreement with the Commonwealth of Massachusetts

05.14  
FY 85

1. Title: Project Manager for EPA/Commonwealth Joint Buzzards Bay Project
2. Description: Cooperative agreement to provide assistance to the Commonwealth for project management as approved by Management Committee on 28 May 1985.
3. Period of Performance: 15 July 1985 to 15 July 1986
4. Background:

The Comprehensive Program for Estuarine Studies and Pollution Abatement is implemented through EPA Regional Offices under the Guidance of the Office of Marine and Estuarine Protection. Region I is responsible for the development and implementation of a estuarine program for Buzzards Bay in FY 85 including the identification of and establishment of management structures and advisory committees, development of comprehensive strategies and annual workplans, and implementation of management approved efforts to reach stated goals and objectives.

Policy and Management Committees have been established comprised of federal, state, local, and technical representatives. Two sub-committees of the Management Committee have been formed for 1) Technical and Scientific Advice and 2) Local government, industry, user groups, and the public at large. These are described in the approved workplan for the Bay. The overall goal of the project is to protect human health and restore and maintain a high quality estuarine environment. A secondary goal is to improve communication among all parties and coordinate water quality management activities with research efforts.

A project manager has been established within the EPA Region I office. This cooperative agreement, will establish a project manager as a significant feature of the Commonwealth's management structure.

5. Statement of Work:

The Commonwealth of Massachusetts, through its Executive Office of Environmental Affairs, will provide a project manager. This individual will provide state input including technical and policy guidance to the joint EPA-State Buzzards Bay project, oversee contractual arrangements including technical research as well as policy analysis. He or she will report to the Policy and Management Committees on an as needed basis. Specific job tasks include, but are not limited to , acting to:

- Represent and advocate the E.P.A. Buzzards Bay Project to state agencies and programs. Coordinate the project with ongoing state and federal programs and related scientific research.
- Represent the Commonwealth by providing technical and policy guidance to a cooperative project between E.P.A., the State, and other institutions.
- Oversee all grants and contracts for Buzzards Bay Study. Provides technical direction, oversight and coordination to Buttermilk Bay study as described in the workplan.
- Develop priorities for long range scientific and management goals in Buzzards Bay.

- Report to Technical Advisory, Management, and Policy Committees on policy and technical issues.
- Write quarterly progress reports. Writes and edits Annual Report.
- Develop proposals and workplans for continued funding, as need arises.
- Ensure timely execution of all project components and writes final report.

Buzzards Bay Project

Project Manager

15 July 1985 - 15 July 1986

Salary: \$32,000.00

Hired through an Ø3 (consultant) account  
Money to be paid directly for services rendered  
with no additional benefits

Fringe Benefits: -0-

Travel:

Local-(5,000 miles @ \$.20/mile) \$1,000.00

National-(1 trip to Washington @ \$300)  
(1 National Conference @ \$700) 1,000.00

Total Travel: \$2,000.00

Supplies:

Expendable office supplies \$ 500.00

Photo copy supplies \$ 500.00

Other (Massachusetts Match)

Office space and services includes floor  
space, utilities, secretarial services, and  
postage \$1,850.00

TOTAL: \$36,850.00

Federal Funds Requested: \$35,000