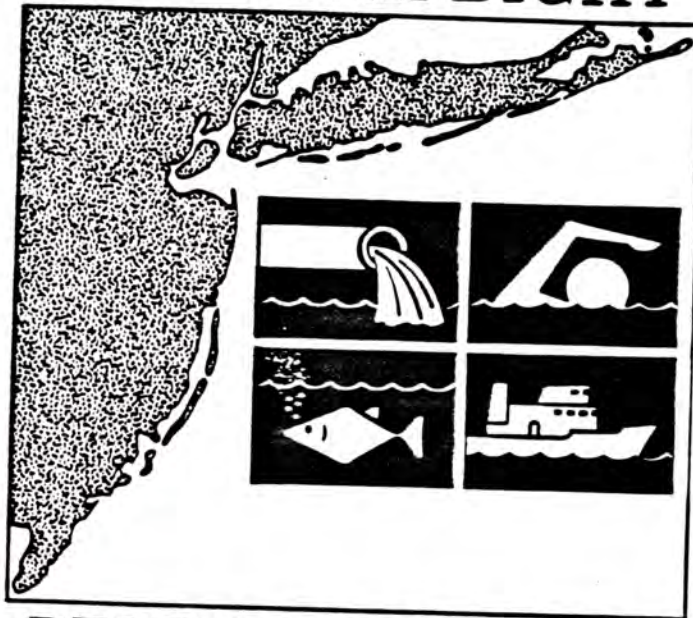


NEW YORK BIGHT



RESTORATION PLAN

REPORT TO CONGRESS

NEW YORK BIGHT RESTORATION PLAN

FINAL REPORT

MARCH 1993

**A PRODUCT OF THE
NEW YORK-NEW JERSEY ESTUARY PROGRAM
MANAGEMENT CONFERENCE**

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FINAL
NEW YORK BIGHT RESTORATION PLAN

EXECUTIVE SUMMARY

The New York Bight Restoration Plan (NYBRP) is authorized by the Marine Plastic Pollution Research and Control Act (MPPRCA) of 1987. The New York Bight is defined as the Atlantic Continental Shelf waters off Long Island, NY and New Jersey. The study area also includes the Hudson-Raritan Estuary. The purpose of the study is to investigate pollution problems affecting human health and the marine environment, and to propose remedies to those problems. This is the final report of the NYBRP. It summarizes what is currently known regarding pollutant inputs to the NY Bight and measures that have been taken or are planned to remediate the effects of those inputs. This program has been merged with the New York-New Jersey Harbor Estuary Program (HEP), an element of the National Estuary Program, which will complete a Comprehensive Conservation and Management Plan in 1994.

Use Impairments and Precipitating Pollutant Factors

The NY Bight has a long history as a repository for the various industrial and other wastes of human society. Problems tied to these pollution wastestreams include such occurrences as hypoxia in ocean waters related to phytoplankton blooms, floatables washups on ocean beaches, and closed beaches and shellfish areas due to pathogenic contamination. The NYBRP's early efforts concentrated on investigating the major pollution sources to ocean waters, and on documenting the problems that can be attributed to those sources. These preliminary studies revealed a number of areas where pollutant inputs have led, at least in part, to the impairment of human uses of ocean waters and to adverse ecosystem impacts in the NY Bight. These areas of impact are:

- Bathing Beach Closures
- Tainted Seafood
- Threats to Commerce and Navigation
- Declines in Marine Fish and Wildlife Populations

These problems are caused by a combination of factors, not all of them pollution-related. Some are related to other human activities (e.g., overharvesting of fishery resources), and others are derived from natural conditions (e.g., algal blooms, water stratification, wind and current conditions).

The NYBRP has focused primarily on the pollutant-related factors affecting the human and ecosystem health of the region: floatable debris; pathogenic contamination; toxic contamination; nutrient and organic enrichment; and habitat loss and degradation.

Recommendations to deal with these factors, organized into plan modules, constitute the heart of the Restoration Plan. The progress and recommendations regarding each of these pollutant-related factors are summarized below.

Floatable Debris

The NYBRP early focused on floatable debris as a major cause of use impairment. The program developed and implemented a short-term action plan to reduce the volume of floatable debris exiting the NY-NJ Harbor and impinging on the beaches and open waters of the Bight. The action plan is a multi-agency collaboration among the US Environmental Protection Agency (EPA), the US Army Corps of Engineers (CE), the US Coast Guard, the States of New York and New Jersey, and New York City (NYC). The main features of the action plan entail: surveillance operations; cleanups of debris floating in the Harbor; cleanups of debris cluttering Harbor shorelines; and a communications network among participating agencies. The action plan began as a pilot project in the summer of 1989, and has been continued with minor modifications every year since, with expanded operation covering the entire year. Since the rash of beach closures in 1988, few debris-related closures have occurred on ocean beaches from 1989 through 1992.

Following the success of the short-term action plan, a comprehensive plan to address floatable debris was completed in 1991 and is currently being implemented. It calls for improved implementation of programs that will serve to cut off sources of floatable debris that can enter area waterways. A few of the more important measures in this plan are:

- remove floatables from combined sewer overflow (CSO) and stormwater discharges;
- improve handling of solid wastes at sanitary landfills and marine transfer stations;
- continue the existing Federal Harbor Drift Removal Project and give added emphasis to removing debris from Harbor shorelines that are most severely impacted.

Steps have been taken to implement these and other measures of the comprehensive plan, including public education and outreach, recycling, and waste reduction. Additional efforts and follow-up activities will be conducted through the Management Conference of the HEP.

Pathogen Contamination

Improving conditions of pathogen-related water quality have been exhibited in the Harbor and Bight region since the implementation of the Clean Water Act of 1972 and the cessation of sewage sludge dumping in the NY Bight Apex in 1987. Additional steps have been taken, through the NYBRP and other existing authorities, to continue and augment these water quality improvements.

A short-term plan has been implemented to combat intermittent closures of bathing beaches due to high coliform bacteria levels, and to reinforce the campaign to reduce beach closures due to floatables washups. This plan, called the Beach/Shellfish Bed Closure Action Plan, is operated by EPA with the cooperation of NY and NJ. When causes of beach and/or shellfish closures are traceable to discrete point sources, enforcement provisions of the Clean Water Act are immediately brought to bear to require corrective action and assess penalties. Its first year of implementation was 1990, and it has subsequently reduced the number of episodic pathogenic pollution incidents in the region.

EPA's action to shift ocean dumping of sewage sludge from the former 12-mile ocean dump site to the deepwater 106-mile site was followed by the Ocean Dumping Ban Act of 1988, which mandated the complete phase-out of ocean dumping of sewage sludge. The phase-out was begun in March 1991 and final compliance was achieved by July 1992.

Combined sewer overflows (CSOs) are among the most significant remaining untreated sources of pathogenic contamination to the Harbor and the Bight. NYC's program to abate CSOs, the implementation of which will extend beyond the year 2000, will make an important contribution to the continued improvement of the region's water quality. NJ is completing an inventory of its CSOs within the Harbor watershed, and is funding pilot projects for monitoring and remediation of those sources.

In addition to these measures, the NYBRP has supported NJ studies to identify an alternative indicator of human-specific contamination in marine waters.

Toxic Contamination

A support document to the NYBRP prepared in 1990 (Preliminary New York Bight Toxics Categorization) found that toxic contamination was a serious concern in the NY Bight Apex, that portion of the Bight closest to the mouth of the NY-NJ Harbor. Three toxicants were identified from historical data sets to have exceeded enforceable limits for fish tissue concentrations: mercury; PCBs; and Dioxin. A complementary characterization report for the NY-NJ Harbor identified up to 12 metals and 42 organic compounds as toxicants of concern, but questions of adequacy with regard to historical sampling methods necessitate further investigation to confirm these levels of concern.

More recently, two metals, copper and mercury, have been emphasized as toxicants of concern, and a strategy to reduce their impact to the Harbor and the Bight is being developed. Activities for reducing the toxic contamination problem, either through the HEP program or other existing Federal and State authorities, include:

- Total Maximum Daily Loads/Wasteload Allocations - The Harbor program has begun an effort to reduce inputs of metals from major point sources that contribute to exceedances of water quality standards. Copper and mercury are the prime candidates for implementation of such control measures.
- Antidegradation - Certain toxic chemicals also have a tendency to accumulate in the tissues of marine and terrestrial organisms (bioaccumulation). A policy of antidegradation would focus not only on remediating existing toxic pollution but also on preventing contamination by new chemicals or new sources. EPA and NY have reached an agreement to implement an antidegradation policy for the Great Lakes area, and NY intends to propose adoption of this policy statewide.
- Dredged Material Management - EPA and the US Army Corps of Engineers are working to improve management of dredged material disposal at the Mud Dump Site, an ocean disposal site located 6 miles east of Sandy Hook, NJ. On a bulk basis, dredged material from the Harbor represents a significant source of toxicant inputs to the NY Bight.
- Ecosystem Indicators - In order better to define the severity of the toxic pollution problem in the Harbor and the Bight, and to provide an objective measure by which to gauge improvements brought on by remedial actions, the Harbor and Bight programs have begun studies to identify ecosystem indicators. The programs are investigating the following parameters: sediment toxicity; ambient water toxicity; benthic community structure; and reproductive success in marine birds.

Nutrient and Organic Enrichment

To date, information from completed studies shows that nitrogen is the limiting nutrient within the Bight ecosystem and that nitrogen inputs to the Harbor and the Bight, in addition to other natural factors, appear to have an effect on stimulating algal growth and fostering hypoxic conditions. In order better to understand the nutrient problem of the NY Bight, work is underway to use existing mathematical frameworks to develop coupled hydrodynamic and water quality models of the impacted area of the Bight. This modeling study will examine the Bight in relation to the NY-NJ Harbor and Long Island Sound in terms of nutrient inputs and fate. This effort will continue through the remaining schedule of the Harbor Estuary Program. The nutrients effort will also include an investigation of ecosystem indicators for eutrophication and adverse effects of nutrient overenrichment. Indicators that are being considered include dissolved oxygen levels in the water column and nuisance algal blooms.

Habitat Loss and Degradation

The loss and degradation of habitat are factors that compound the effects of pollutant inputs to the Bight and the Harbor, and they constrain the ability of the ecosystem to recover once pollution remediation practices are put into effect. Work is progressing to complete an inventory of significant coastal habitats in the Harbor and Bight region, which will improve knowledge of little-studied habitats, such as seagrass beds and anadromous fish spawning areas, and will set a baseline for assessing the changes that occur with coastal development and/or habitat remediation measures.

Actions for implementing the habitat component of the NYBRP will focus on two general approaches: (1) better coordination and implementation of existing agency authorities to conserve habitat; and (2) a series of non-regulatory guidelines that can assist local land-use authorities to include habitat protection within their planning and decision-making processes. In a parallel effort, the NYBRP and HEP are identifying particular, well-defined natural habitat units as demonstration areas for the application of the regulatory and non-regulatory approaches. This work will proceed through the remaining schedule of the HEP.

Program Administration

The integration of the NYBRP with the HEP ensures that ongoing activities will continue within the Management Conference framework, and provides assurance that the recommendations of the Restoration Plan will be implemented. This Report to Congress is not a static document, but a working model for the implementation of the NYBRP. Development of the NYBRP has proceeded with public participation throughout, and public meetings and hearings have been held at every juncture of the program. It is clear that public education and involvement will be an indispensable ingredient to the successful implementation of the NYBRP for the benefit of human health and the marine environment.

Many authorities, at all levels of government, and non-governmental entities, together or independently, have initiated actions that support the restoration of the NY Bight. The actions, programs, and initiatives cited within the text of this report are meant as a partial inventory of all efforts being made towards environmental improvement. In some cases, e.g. antidegradation policy, particular measures may not currently apply to the Bight region nor come under the auspices of NYBRP or HEP, but are being adopted by one or more members of the HEP Management Conference, and could be applied to this geographic area, given sufficient funding and/or staff resources. The NYBRP identifies areas where additional effort is necessary in this region and where the Management Conference can best direct its attention to ensure a comprehensive focus for the program.

INTRODUCTION

General

The New York Bight is an ocean area approximately 15,000 square miles in size, extending over 100 miles into the Atlantic Ocean from the mouth of the Hudson-Raritan Estuary to the limit of the Continental Shelf. Roughly 240 miles of sandy shoreline stretching from Cape May, New Jersey to Montauk Point, Long Island form its landside border. A map of the Bight is shown in Figure 1.

The geographic scope of the New York Bight Restoration Plan (NYBRP) includes the Hudson-Raritan Estuary as well as the NY Bight proper. The most important feature of the Hudson-Raritan Estuary is the New York-New Jersey Harbor, a complex estuarine ecosystem subjected to an enormity of competing demands, from waste disposal to commercial and recreational pursuits, including the major shipping port of NY and NJ. The NY-NJ Harbor is depicted in Figure 2.

The NY Bight and NY-NJ Harbor are resources of overriding public importance, sustaining commercial and recreational pursuits of a resident population approaching 20 million, the densest in the nation. These waterbodies are the repositories for a vast effluent stream, including ocean dumping, stormwater runoff and combined sewer overflows (CSOs), from a sprawling metropolitan area. The Harbor area alone is subjected to an enormous wasteload, totaling about 2.5 billion gallons per day of point source effluents, primarily from municipal sources. These pollutant inputs have affected and may be threatening all of the many other water-based uses.

Congressional Mandate

In response to concerns about the degradation of water quality and marine resources, the U.S. Congress passed the Marine Plastic Pollution, Research, and Control Act (MPPRCA) of 1987 (PL 100-220, Title II, Subtitle C) which directs the Administrator of the U.S. Environmental Protection Agency (EPA), in consultation with the National Oceanic and Atmospheric Administration (NOAA) and other Federal, State, and Interstate agencies, to prepare a New York Bight Restoration Plan.

Congress required that the Restoration Plan: (1) identify the pollutants affecting water quality and marine resources and the uses being adversely affected; (2) determine the fate of the contaminants in the system and the effect on human health and the marine environment; (3) identify and assess the costs and impediments to implementing

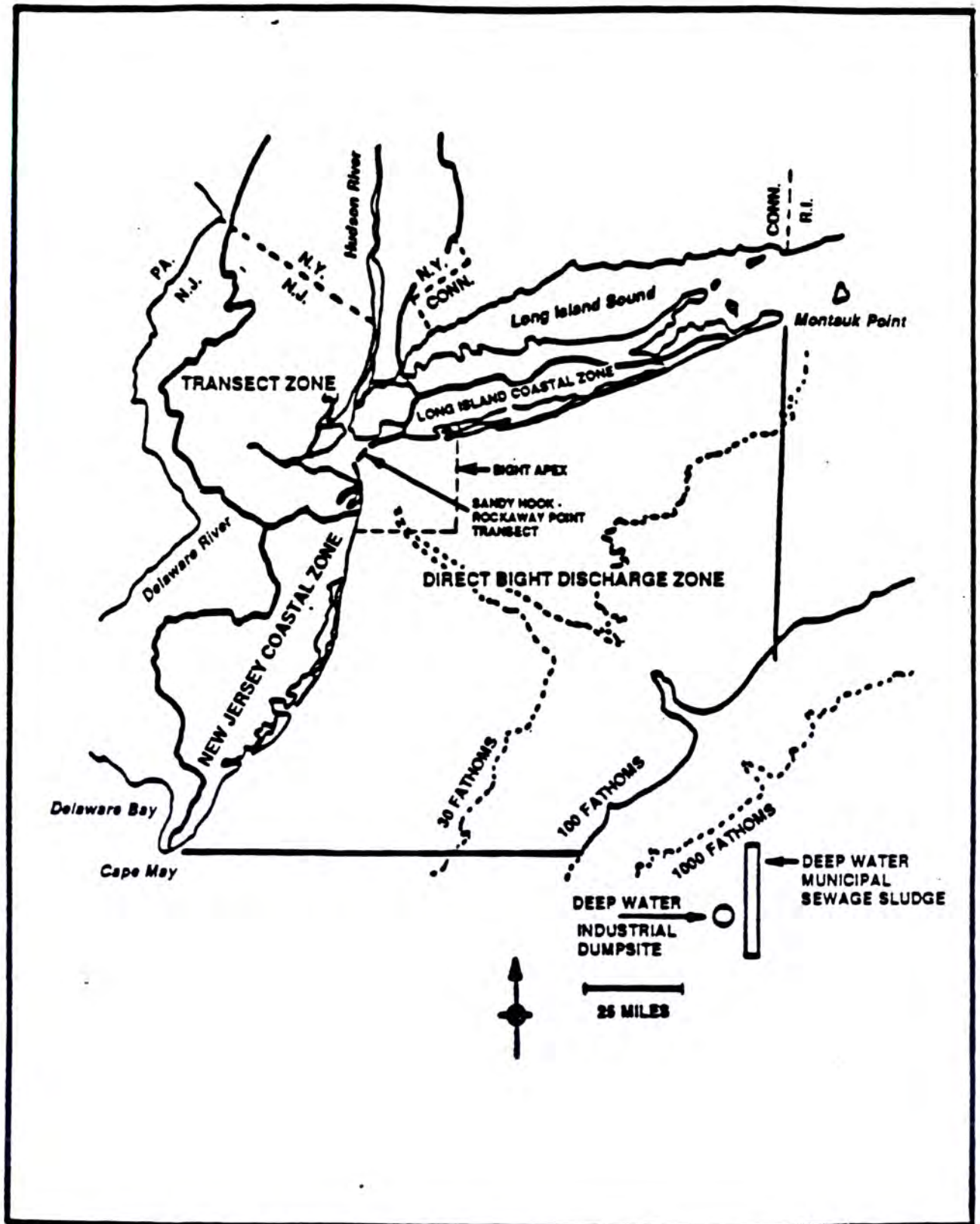


Figure 1. The New York Bight

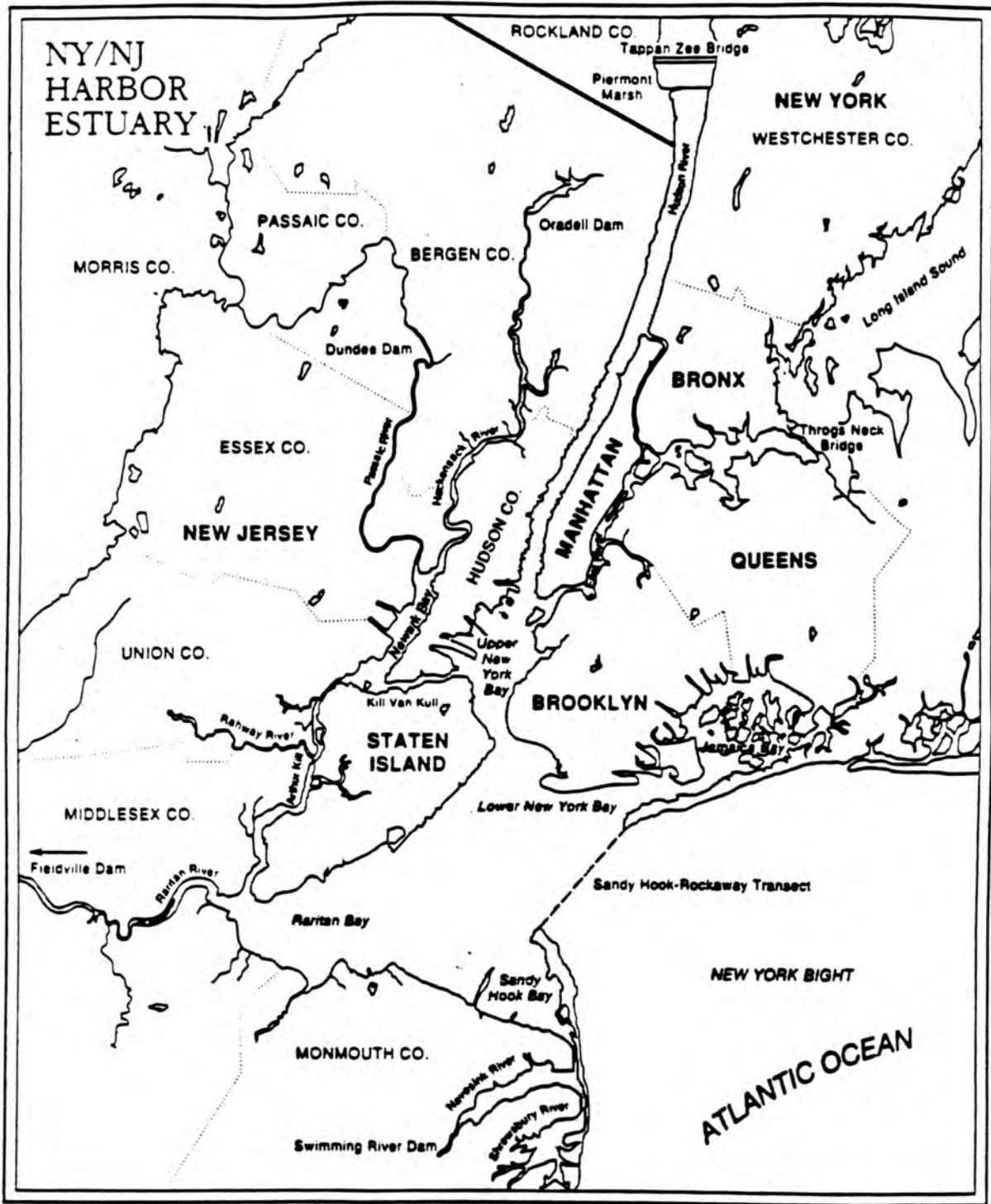


Figure 2. The New York-New Jersey Harbor

technologies and management practices necessary to control the pollution; and (4) devise an implementation schedule, including recommendations for funding and for interagency and intergovernmental coordination.

At about the same time that the NYBRP was initiated, the EPA Administrator, under authority of Section 320 of the Clean Water Act of 1987, designated the New York-New Jersey Harbor as an estuary of national concern, and convened a five-year Management Conference to prepare a Comprehensive Conservation and Management Plan (CCMP) for the Harbor waters. This action made the NY-NJ Harbor a component of the National Estuary Program. The Management Conference includes representatives of EPA, NOAA, and other Federal, State, and Interstate agencies. It also includes representatives of local government, the scientific and technical community, and the general public. Management Conference membership and structure is shown in Figure 3.

The Bight and the Harbor constitute two inextricably linked ecosystems; therefore, the two studies have been closely coordinated. In recognition of this close coordination, and in order to enhance the prospects for implementation of the NYBRP, EPA, in cooperation with the other participants, has adopted the Restoration Plan as a product of the Management Conference of the NY-NJ Harbor Estuary Program (HEP).

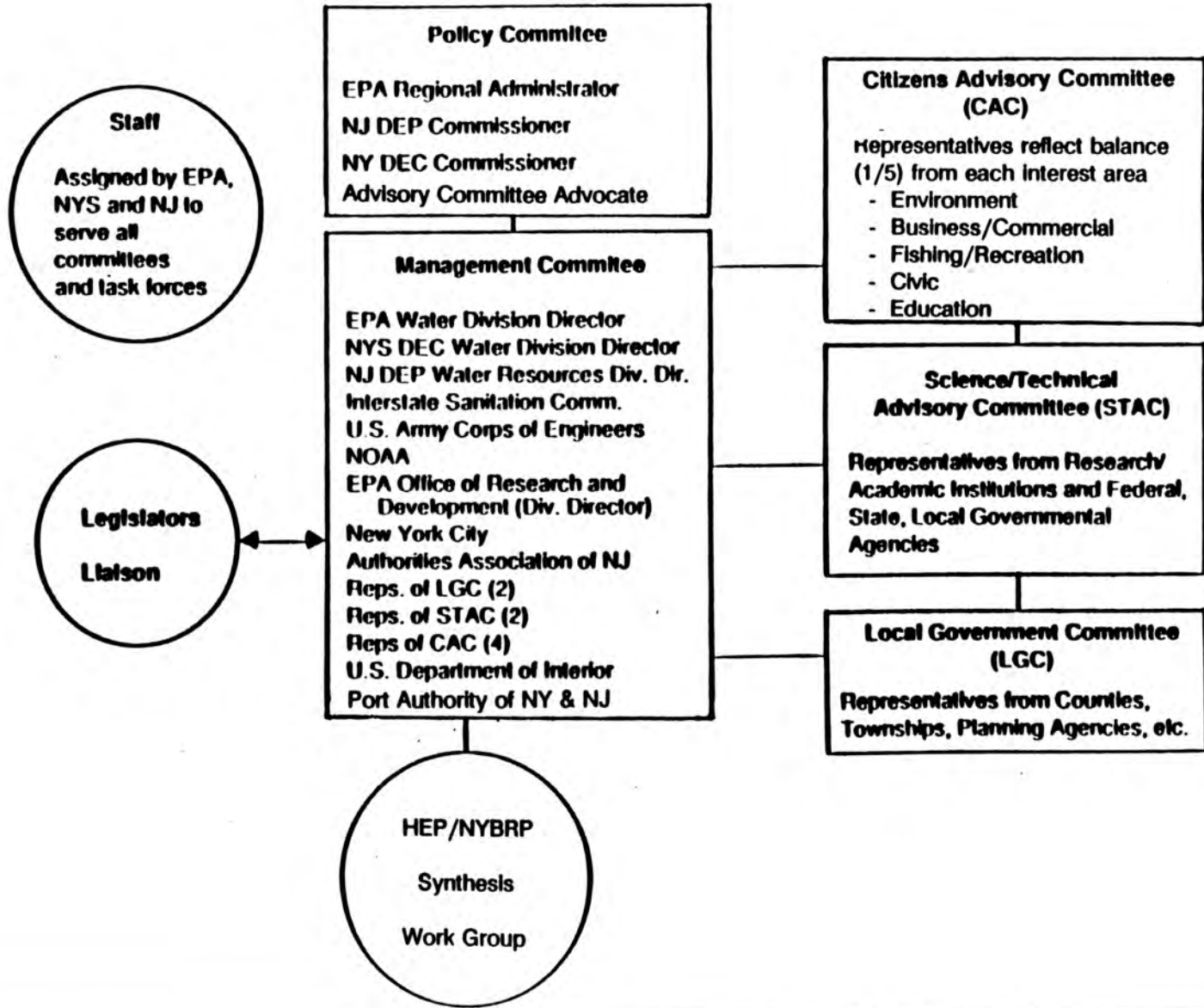
Prior Reports and Activities

The NYBRP was developed in phases, consistent with the requirements of MPPRCA. Phase I was completed in April 1989 with the preparation of the Phase I Preliminary Report and Work Plan. This document identified priority impairments in the condition of the Bight and its use by humans, and established an overall perspective from which corrective measures can be taken. It summarized available data on pollutant inputs, the fate of pollution, and the scope of pollutant effects in the NY Bight. It also took into account the public's concern for ocean and beach pollution as they pertain to human use and public health.

The second general report, Report to Congress - Phase II Preliminary Report and Work Plan, was completed in August 1990 and gave a progress summary of actions and additional studies that were undertaken to substantiate further and to remediate the primary pollutant factors in the NY Bight. A preliminary plan for long-term action to address the floatable debris problem was a product of Phase II activities, and characterization studies were conducted to examine the problems of pathogenic and toxic contamination as well as habitat loss and degradation. An assessment report was prepared discussing land-based alternatives to woodburning at sea. The Phase II Report also established a schedule for the remaining program tasks to be completed.

**New York - New Jersey Harbor Estuary Program
MANAGEMENT CONFERENCE COMMITTEE STRUCTURE**

Management Conference Membership and Structure



A Phase III Interim Report was completed in January 1992. It referenced a completed plan to address the floatable debris problem as well as continuing studies tied to pathogenic and toxic contamination, habitat loss and degradation, and nutrient and organic enrichment.

The schedule for the NYBRP has been somewhat modified from that specified in MPPRCA to account for the integration of the Bight program with that of the HEP. Rather than pursue redundant efforts in the Harbor and the Bight, the Management Conference decided that integration would streamline the programs and conserve limited staff time and funds. Activities were synchronized so as to accommodate the schedule needs of both the Harbor and Bight programs.

Public education and involvement has been an ongoing activity, and public meeting dates have been set consistent with each program milestone. The latest series of public meetings was held in October 1991. Public involvement will continue through the HEP.

Preliminary Problem Assessment

The NY Bight has a long history of being a repository for the various industrial and other wastes of human society, from a variety of sources ranging from ocean outfalls, accidental spills and ocean dumping to indirect sources, such as land runoff and contaminants within the estuarine plume exiting the NY-NJ Harbor. Problems resulting from these pollution wastestreams have also been in evidence since early in this century. Widespread hypoxia in ocean waters related to an algal bloom in 1976 along with floatables washups on ocean beaches and reports of sewage sludge migrating to shoreline areas aroused a concerned public. Continuing problems in the 1980's (fish and shellfish health advisories, closure of commercial fisheries, green and brown tides) and the increasingly controversial Ocean Dumping Program raised further alarm. Repeated washups of floatables in 1987 and 1988, culminating with the finding of medical waste, including syringes and blood vials, along with a rash of dolphin deaths and reports of diseased crabs in offshore waters, galvanized public outrage. The first effort of the NYBRP was to investigate comprehensively the major pollution sources to the ocean waters and the problems that can be attributed to them.

A number of technical reports were produced in Phase I that established the baseline for examining pollution problems in the NY Bight. One report, Use Impairments and Ecosystem Impacts of the New York Bight, summarized the region's water quality problems as follows:

- Beach Closures
- Tainted Seafood
- Threats to Commerce and Navigation
- Declines in Marine Fish and Wildlife Populations

These problems are caused by a combination of factors, some related to pollution, some related to other human activities (e.g., overharvesting of fishery resources), and still others derived from natural conditions (e.g., water stratification). The NYBRP has focused on the pollutant-related factors affecting the health of the Bight ecosystem.

Among the findings of the preliminary investigations were five significant pollutant-related factors affecting the Bight, and the Management Conference adopted these for consideration within the HEP as well. These factors are:

- Floatable Debris
- Pathogen Contamination
- Toxic Contamination
- Nutrient and Organic Enrichment
- Habitat Loss and Degradation

It is recognized that there are numerous existing and developing programs meant to control these pollutant-related factors. The Management Conference is assessing the adequacy of these programs and has recommended additional incremental measures where needed. The current status of these recommendations constitute the NYBRP. The HEP Management Conference is scheduled to complete a Comprehensive Conservation and Management Plan (CCMP) for the Harbor Estuary in 1994, building on these accomplishments of the NYBRP, and providing a more comprehensive region-wide focus for the remediation of priority pollution problems.

RESTORATION PLAN MODULES

The heart of the Restoration Plan is the recommendations to deal with each of the five pollutant factors, organized into modules. This Report notes the progress that has been made by the Management Conference and other authorities, and identifies specific areas of study and implementation to be carried on through the HEP, as staffing and funding resources allow.

The NYBRP does not attempt to assume credit for all of the actions that have been taken, or are being considered, in the region to reduce pollutant inputs, remediate pollution problems, or improve environmental quality. Many authorities, at all levels of government, and non-governmental entities, together or independently, have initiated actions that support the restoration of the NY Bight. The actions, programs, and initiatives cited below are meant as a partial inventory of all efforts being made towards environmental improvement. In some cases, e.g. antidegradation policy, particular measures may not currently apply to the Bight region nor come under the auspices of NYBRP or HEP, but are being adopted by one or more members of the HEP Management Conference, and could be applied to this geographic area, given sufficient funding and/or staff resources.

The NYBRP identifies areas where additional effort is necessary in this region and where the Management Conference can best direct its attention to ensure a comprehensive focus for the program.

1. Floatable Debris

Introduction

An early product of the MPPRCA was a separate EPA Report to Congress on the NY Bight Plastics Study, dated November 4, 1988. Floatable debris, including plastics as well as wood debris, sewage-related wastes, and medical wastes, was recognized as a priority problem for the NY Bight. These wastes foul ocean beaches and become potential hazards to navigation and marine life.

Short-term Floatables Action Plan

Following up on this early focus, the Management Conference developed and implemented a short-term action plan to reduce the adverse impacts of floatable debris. This action plan integrated the efforts of a number of agencies at all levels of government that were directed at the cleanup of floatable debris in the NY-NJ Harbor, and was the first achievement of the NYBRP. It coordinated the activities of EPA, the US Army Corps of Engineers (Corps), US Coast Guard, NYS Dept. of Environmental Conservation, NJ Dept. of Environmental Protection, and the NYC Depts. of Sanitation and Environmental Protection.

The short-term floatables action plan was initiated as a pilot program for the summer of 1989. Following an assessment report of its success, the action plan was continued in subsequent seasons with minor modifications, and has been expanded to a year-round program. The floatables action plan has four main features:

- helicopter and vessel surveillance;
- routine cleanups of debris floating in the Harbor, emphasizing times of lunar high tides and significant rainfall;
- non-routine cleanups as necessitated by reports of floatables slicks at other times;
- a communications network among participating agencies.

The action plan has been directly supported by actions of the two States to remove accumulations of floatable debris from their respective Harbor shorelines. NJ has implemented its "Operation Clean Shores" since 1989, accomplishing removal of a total of over 10,000 tons of debris, mostly waste wood. NY is being assisted with an EPA action grant to implement a comparable shoreline cleanup effort within NYC.

The floatables action plan has met with success, and has significantly reduced ocean beach closures attributable to floatable debris in the region since 1988. While other factors are also involved in the occurrence of floatables washups, such as wind conditions, ocean currents, and freshwater flows from the Hudson-Raritan Estuary, the retrieval of floatables slicks in the Harbor and policing the Harbor shoreline have helped to reduce the volume of debris that can affect ocean beaches.

NYC is adding to this already successful effort by using a Marine Combined Sewer Overflow (CSO) grant to purchase two debris collection vessels that will supplement the debris removal performed by vessels operated by the Corps. It has been recommended that the action plan be continued until such time as the major sources of floatable debris are remediated. This is estimated to be at least five to seven years, or until CSO floatable controls are implemented.

Comprehensive Floatables Plan

The Management Conference has subsequently approved a long-term plan that is expected to provide more permanent relief from the adverse effects of floatables in the NY Bight and NY-NJ Harbor. Its major features provide for:

- floatables removal from CSO and stormwater discharges.
- improved handling of solid wastes at sanitary landfills and marine transfer stations;
- continuing the Federal Harbor Drift Removal Project, a project to clean up old industrial shorelines to remove potential sources of navigational hazards, and emphasizing removal efforts on those shorelines most heavily impacted by such debris;
- improved policies and programs to reduce and remove beach litter and shoreline debris;
- mobilizing the public through education efforts and citizen cleanup campaigns;
- increased emphasis on recycling and waste reduction activities.

Many of these items are currently being implemented. For instance, NYC has begun a CSO abatement strategy for floatable debris, and recently signed a consent order which fixed the schedule for implementation. This strategy builds on previous pilot projects for floatables abatement conducted by the City, and entails both short-term and a long-term components. In 1993 and 1994, booms and skimming devices will be used to abate floatables discharges from over 50% of the City's CSO drainage area. In later years, floatables capture facilities will be constructed as a more permanent measure, and these will supplement construction of CSO retention facilities at other of the City's approximately

450 CSO discharge points. In addition, New York City, in fulfillment of another consent order, has reduced the errant discharge of floatable debris from its Fresh Kills sanitary landfill in Staten Island and related solid waste marine transfer stations.

Similarly, in 1990, NJ initiated a Statewide CSO Control Strategy designed to, among other things, control the discharge of solids/floatable materials. The strategy sets solids/floatables discharge limitations in State point-source discharge (NJPDES) permits and provides financial assistance for the planning, design and construction, and/or implementation of abatement measures.

Since 1990, all NJPDES permits issued for CSOs specifically prohibit dry weather overflows, require the preparation and maintenance of Proper Operation and Maintenance Plan and Manuals, and include a performance standard as a solids/floatables discharge limitation. The performance standard prohibits discharges which cannot pass a screen having openings of 0.5 inches. The NJDEPE anticipates that all permitted CSO dischargers will be on a compliance schedule to implement these control measures.

In February 1990, pursuant to the Sewage Infrastructure Improvement Act, the NJDEPE established the "CSO Fund" to complement the solids/floatables control initiative. The fund was specifically dedicated to providing grants to local government units for the planning and design of CSO abatement facilities. Through the fund, the NJDEPE provides grants of up to 90% of the eligible cost for planning and designing CSO control for solids/floatables and dry weather flows. The NJDEPE provides further financial assistance through its Municipal Wastewater Treatment Assistance Program. This program provides low interest loans to local government units for the construction and/or implementation of CSO abatement measures.

The NJDEPE has also been pursuing the abatement of floatables discharges from other than CSOs. The Department has actively pursued a statewide anti-littering program, including the promotion of street cleaning activities, since 1987. The program provides immediate control measures for reducing pollutant loadings derived from street wastes in both communities served by CSOs and those served by separate sanitary and stormwater systems. The Department, through the Clean Communities Program, provides grants to communities for litter reduction. Its purpose is to stimulate statewide litter abatement through community-based programs of litter pickup and removal, enforcement and education, and a statewide education effort.

The NJ statewide program provides communities, municipalities, and counties with model programs that can be structured to suit their individual needs. All model programs incorporate cleanup, enforcement, and educational activities. Additionally, the NJ grants allow the recipients to target and/or prioritize the use of grant monies. This allows the recipient flexibility to purchase and maintain street cleaning equipment as well as subsidize salaries for personnel.

Independent Activities and Public Education

Periodic beach cleanups have become a regular and popular element of citizen participation to reduce floatable debris. COASTWEEKS, a national beach cleanup program, coordinated by the Center for Marine Conservation and supported by EPA and the National Marine Fisheries Service, has been involved with beach cleanups since 1988. Another volunteer beach cleanup program is "Adopt-A-Beach."

A Citizen Pollution Patrol operates in NJ to involve citizens in reporting illegal disposal of floatable debris in coastal areas. The NY/NJ Harbor Baykeeper Program of the American Littoral Society has set up a citizens monitoring network to measure water quality in the Harbor and to act as the eyes and ears to safeguard its environmental health.

Public education is recognized as an integral component of the NYBRP. Some current activities include stenciling projects whereby messages are painted on stormdrains to advise citizens not to discharge pollutants down the drains. New York and New Jersey Sea Grant Extension Programs are leaders in these efforts. Clean Streets/Clean Beaches is a joint effort of EPA, the States of NY and NJ, and NYC to encourage citizens in an anti-litter campaign. In 1992 and 1993 the NYC Dept. of Environmental Protection is placing over 3,000 billboard posters in public spaces within the metropolitan area. School programs and media announcements by governmental and non-governmental institutions are also part of the regional effort to educate and empower the public.

MARPOL Annex V

MARPOL Annex V is an international treaty to which the United States became a signatory in November 1987, and regulates the discharge of solid wastes into ocean waters, both nearshore and beyond national boundaries. The US Coast Guard has promulgated interim implementing regulations that ban the disposal of plastic wastes at sea and specify the distance from shore where ocean disposal of other types of garbage are permissible. Implementing legislation for MARPOL Annex V requires shore-based waste reception facilities for marinas providing dockage for 10 or more vessels, but it is up to the States to meet this mandate and full implementation has not yet been achieved. A demonstration project in NY and NJ funded in 1989 by the Harbor Estuary Program to encourage proper waste handling and recycling proved that waste handling facilities at small marinas can be successful. The Management Conference strongly encourages sustaining this effort and placing waste handling and recycling facilities at all marinas in the region.

Recycling and Waste Reduction

Both states in the region have recycling laws in effect, NJ's requiring up to a 65% reduction in solid waste volumes entering sanitary landfills. Implementation of these laws will depend on the ability of local governments to meet the necessary costs, which are

often higher than traditional, non-recycling waste disposal practices. A number of methods are being tried in the region to meet these costs, such as charging a fee per bag of refuse collected rather than a flat monthly or quarterly waste collection charge. The Management Conference will continue to review regional developments in recycling with the intent that this become an effective strategy in remediating the floatable debris problem.

Program Constraints

While much has been achieved to date through NYBRP and other regional and local efforts, a number of actions face significant hurdles. The schedule for completing the Federal Harbor Drift Removal Project has been extended due to the lack of funds to continue work. One development that has affected project costs has been the closure of an interim ocean woodburning site 17 nautical miles off the NJ coast. Acceptable land-based disposal alternatives presently exist, but they have considerably higher costs than woodburning at sea. The Management Conference will continue to explore ways to overcome these impediments.

CSO abatement strategies, actively underway in NYC and NJ, are long-term programs for improving the Harbor's water quality. NYC's schedule for implementation extends to 2007. A sustained level of commitment and funding will be necessary to bring these programs to fruition. The Management Conference of HEP will continue to report progress on these endeavors by means of periodic updates from the implementing State and local agencies.

Demonstration project grants, in the amount of \$71,000 each, were awarded by HEP to NY and NJ for shore-based reception facilities at area marinas in order to support MARPOL Annex V. NJ implemented waste reception activities at 3 marinas and produced public service announcements to encourage recycling and proper waste disposal. NY organized projects at 5 sites in NYC, Nassau County, and Long Island. The demonstration projects proved successful in stimulating public awareness and cooperation, but lack of additional funds prevented expansion of this worthy effort to other marina facilities throughout the region.

Program Follow-Up

The Management Conference of the Harbor Estuary Program will continue to support efforts to reduce adverse effects of floatable debris in the Harbor and the Bight, and will present the most current status of ongoing efforts as part of its Comprehensive Conservation and Management Plan.

2. Pathogen Contamination

Introduction

The preliminary study of use impairments identified two areas of concern regarding human pathogens, or more correctly, human pathogenic indicators, in the New York Bight. These are: (1) a large closure area for shellfish in the Bight Apex, that portion of the Bight closest to the NY-NJ Harbor; and (2) intermittent bathing beach closures along the ocean shores of NJ and NY. In comparison, the NY-NJ Harbor exhibits the full spectrum of pathogen-related use impairments from intermittently affected beaches and mildly polluted shellfish beds to areas that are condemned for both shellfishing and primary contact recreation. The impact area of pathogenic water quality in the Harbor extends to the NY Bight Apex, rendering the Harbor an important target area for remedial action to restore the Bight.

Beach/Shellfish Bed Closure Action Plan

A short-term measure, implemented in 1990, the Beach/Shellfish Bed Closure Action Plan, was directed to combat intermittent closures of bathing beaches due to high coliform bacteria levels, and to reinforce the successful campaign to prevent beach closures due to floatables washups. Under this plan, EPA Region II, with the cooperation of NY and NJ, is implementing a preemptive approach towards stemming the causes of pathogen-related point source discharges. It has been implemented since Spring 1990 and has resulted in several enforcement actions. More importantly, it has reduced the number of pathogenic pollution incidents in the region. This plan sets forth the following principles:

- All short-term or intermittent beach closures and shellfish bed closures will be assessed in terms of identifiable pollution sources.
- When causes of beach and/or shellfish bed closures are traced to discrete sources, enforcement provisions of the Clean Water Act will be used to require corrective action on a priority basis.
- Enforcement responses to identified violations will be coordinated between EPA and the respective States.
- EPA and/or the States will make public/press announcements of enforcement responses to documented violations to establish further deterrent effect.

Ocean Dumping Ban Act

Short-term solutions to the pathogenic pollution problem in the NY Bight include the 1987 phase-out of sewage sludge dumping at the 12-mile ocean dump site, a site within the NY Bight Apex. Recovery of the area's water quality has been documented subsequently,

and the prognosis is hopeful that much or most of the NY Bight Apex can be reopened to shellfishing activity. Toxic contamination of the shellfish resource and residual impacts of the dredged material ocean dump site ("Mud Dump") are remaining factors that need to be addressed prior to any decision to reclassify the waters of the Bight Apex.

Combined Sewer Overflow (CSO) Abatement Program

New York City has committed to a CSO abatement program, estimated to be implemented over a period of 14 years at a cost exceeding \$2 billion. Implementation programs for remediation of CSO's are necessary for other sewerage authorities in the NY-NJ metropolitan region as well, and may entail additional costs in the hundreds of millions of dollars. NY and NJ are both developing programs for stormwater and nonpoint-source runoff control, and implementation of those programs will be necessary in order to restore uses in some areas of the Harbor and back bays of the NY Bight. Cost estimates for those programs have not yet been fully developed.

Alternative Pathogenic Indicator Study

An additional study is examining microbial indicators to help improve detection and quantification of pathogenic contamination. Conventional indicators (coliform bacteria) are poorly correlated with viral pathogens in marine waters, especially when sewage effluents are chlorinated, as they are in the NY Bight region. Coliforms and other bacteria are effectively disinfected during chlorination, but viruses may not be; moreover, the coliform indicator system in itself is not specific to human fecal contamination. NJ is evaluating alternative pathogenic indicators of marine water quality, with support from the Management Conference, to address these outstanding concerns.

Program Constraints

The ever tightening restrictions on point-source discharge permits, in addition to newly developing programs to remediate CSO, stormwater, and non-point source discharges, are putting great financial strain on State and local governments. The design and advanced age of much of the region's sewage infrastructure, as well as a lack of available space to site new facilities, makes compliance with new and developing regulatory requirements a costly proposition. NYC's program for CSO abatement (14 years and \$2+ billion) is but one municipality's commitment to addressing one of the many categories of pollution sources now coming under regulatory restriction. In addition, the region's municipalities are facing increasing restrictions and costs related to solid waste disposal, sewage sludge disposal, air emissions, and drinking water quality. Recommendations for a comprehensive plan to remediate pathogenic contamination must address these competing demands and recognize the limited pool of available funds for implementation.

Program Follow-Up

In addition to these immediate and near-term steps to reduce pathogenic pollution episodes, a more long-term approach is needed to recover areas in the Harbor/Bight region that are chronically affected by high coliform levels. Historically, this approach has included upgrading regional sewage treatment plants to secondary level of treatment. For most of the Harbor and Bight region, upgrading is either completed or under judicial schedules, resulting in significant water quality improvements over the past 20 years. In addition, a new generation of programs is coming on line to tackle pathogenic pollution sources that continue to impair beneficial uses within the Harbor and/or the back bays of the NY Bight: combined sewer overflows (CSO's); stormwater discharges; and nonpoint source runoff. The Management Conference will continue to review existing and developing programs whose focus, in part, is to control pathogenic contamination.

3. Toxic Contamination

Introduction

Toxic contamination in the Bight originates primarily within the Harbor. Sources of contamination to the Harbor include point and non-point sources, tributaries, and remnant deposits in sediments. Data on sources of most organic priority pollutants to the Harbor are incomplete; reliable evaluations of the relative significance of source categories of organic priority pollutants basin-wide have not yet been made. Data on sources of metals are more complete but subject to concerns about data accuracy; principal sources of most metals to Harbor waters are municipal discharges and tributaries.

Historical data identify many chemicals, including certain metals, pesticides, PAHs, PCBs and Dioxin, that show exceedances of regulatory criteria in water and/or biota of the Harbor, thus implying toxicity. Several of these chemicals are also of concern in the Bight Apex; however, the accuracy of some of these data are in question. Historical data may not reflect existing conditions, may not comprehensively cover the geographic area, and may have been generated using methods which are now considered inadequate. Notwithstanding these concerns, the data point to the NY Bight Apex as the main area, outside of the Harbor itself, of toxic pollutant inputs and effects, and it is in this limited region of the Bight that the Restoration Plan has placed its focus.

A report was produced in 1990 that identified three toxicants - mercury, PCBs, and Dioxin - as exceeding enforceable limits for fish tissue concentrations in the Bight. A complementary characterization report for NY-NJ Harbor identified as many as 12 metals and 42 organic compounds that are of concern and require further investigation. A range of studies and management actions have been developed to address this pollution issue, many of them independent of the NYBRP and HEP programs. The Clean Water Act

(CWA) and the Water Resources Development Act (WRDA) are just two of the laws that have provisions mandating actions or studies to control toxic contamination in the waters of the U.S.

Problem Characterization

The following actions are underway to complete the definition of problem chemicals in water and biota tissue:

- Review data to characterize spatial and temporal extent of apparent criteria exceedances and data uncertainties.
- Recommend and conduct additional monitoring as necessary, and develop final list of problem chemicals.
- Review data on sources of problem chemicals, and recommend and conduct monitoring.
- Recommend control actions.

Levels of many chemicals in sediments of the Harbor are among the highest in the U.S. There is evidence that these chemicals are at levels associated with adverse effects on biota; however, there are no applicable regulatory criteria for chemical contamination in sediments. Because the bioavailability of chemicals in sediments is not a simple function of their concentration, information on the effects of Harbor sediments on biota, in conjunction with information on chemical concentrations, is necessary to develop geographic and chemical-specific management priorities. The NYBRP and HEP have developed a sediment quality assessment program for this purpose. The objectives of this program are to:

- Characterize the magnitude and distribution of sediment-related toxic effects in the Harbor and Bight using measurements of sediment toxicity, bioaccumulation and benthic community structure.
- Determine the probable causes of sediment-related toxic effects in the Harbor and Bight.
- Develop management strategies addressing the causes of the toxic effects.

The studies on sediment toxicity and benthic community structure can be used in developing ecosystem indicators, as discussed elsewhere below.

Total Maximum Daily Load/Wasteload Allocation (TMDL/WLA)

The TMDL/WLA process establishes a framework for determining pollutant loads to achieve water quality standards. To date, the TMDL/WLA process has focused on metal contamination in the Harbor. Historical data indicate exceedances of water quality criteria

for silver (Ag), arsenic (As), cadmium (Cd), copper (Cu), mercury (Hg), nickel (Ni), lead (Pb) and zinc (Zn); data from more recent studies, using more sophisticated sampling and analytical methods, identify Cu and Hg as exceeding water quality criteria, based on total recoverable metal concentrations. Copper exceedances were systemwide; Hg exceedances were found in portions of the Harbor. A few exceedances for lead have also been recorded. There were no exceedances of water quality criteria for metals in the Bight, though fish tissue criteria were exceeded for Hg (See Note * below).

Questions remain as to the relative toxicity of the various fractions of the total metal (dissolved, particulate, etc.) that are in the water column. Following from this, a study is underway to develop site-specific water quality criteria for Cu in the Harbor, which are intended to reflect the bioavailable (and potentially toxic) concentration. NY and NJ have indicated that they will consider the site-specific Cu criteria if the results of the study are technically adequate.

In anticipation of possible load reductions for metals based on the WLAs, EPA, NY, and NJ, pursuant to Section 304(l) of the Clean Water Act, are currently identifying cost effective controls. Commitments to date include discharge permit modifications to include water quality based limits for metals, as necessary.

Antidegradation

Antidegradation is a policy to restrict increases in the discharge of pollutants which would result in a lowering of water quality. It applies even in ambient waters that are cleaner than standards require. Antidegradation establishes a process for evaluating actions that may lower water quality, particularly with regard to loadings of highly persistent, toxic, and bioaccumulative chemicals, and targets an appropriate response. This is because such chemicals can have serious effects on aquatic life in addition to human and wildlife consumers, even at very low concentrations in ambient waters.

On the basis of guidance to be provided by EPA, an agreement has been reached with NYS to schedule the implementation of an antidegradation policy for bioaccumulative chemicals of concern in the Great Lakes under the Great Lakes Water Quality Initiative. The first phase of implementation will focus on point source contributions of toxicants; in a later phase, nonpoint sources will be targeted. NYS intends to propose adoption of this policy statewide, which would include NY's portion of the Harbor/Bight region. NJ has also adopted an antidegradation policy, and EPA and the two States will coordinate to ensure that these policies are complementary within the Harbor region.

- * NY and NJ have different water quality standards for toxic chemical concentrations. Exceedances are defined in this report to mean violations of the most sensitive criteria (EPA's, NY's, or NJ's) applied to the Harbor as a whole.

Dredged Material Management

Most material dredged from NY-NJ Harbor is currently deposited at an ocean disposal site 6 miles east of Sandy Hook, NJ known as the "Mud Dump." EPA Region II and the NY District of the US Army Corps of Engineers (CE), as part of their regulatory authority under Section 404 of the Clean Water Act and Section 103 of the Marine Protection, Research, and Sanctuaries Act, among others, are developing a program to improve management of dredged material disposal in the region. Concerns regarding toxic contamination within the dredged material originating in NY-NJ Harbor has constrained the implementation of disposal alternatives. While this process is not directly a part of NYBRP or HEP, the public and the HEP Management Conference will have the opportunity to review preliminary proposals and to have input to the final decision-making on management options. The goal is to incorporate the dredged material management program as a component of the CCMP.

In December 1992, a revised regional guidance document for testing dredged material proposed for ocean disposal was completed by EPA Region II and CE. The regional guidance is designed to be more environmentally protective and will be used with the 1991 national testing manual known as the "Green Book". EPA and CE plan to finalize the revised guidance, including a public comment period, in 1993. Implementation will be immediate for any proposed project needing a testing/sampling plan. The guidance may also be revised in the future as needed.

The existing Mud Dump Site is expected to reach capacity by the mid- to late 1990s. EPA is responsible for designating a suitable replacement site. EPA, in cooperation with CE, is investigating the economic, environmental and operational feasibility of candidate areas for a replacement site under the Environmental Impact Statement (EIS) and site designation review process. EPA plans to issue a Notice of Intent to prepare an EIS that would consider both inshore and offshore sites. A draft EIS is planned to be released in 1994. A two-month comment period would include public hearings. A final EIS and Proposed Rule on Site Designation would follow, with a Final Rule released by mid-1995.

CE and EPA will continue to evaluate the current dredged material management program at the existing Mud Dump Site, and produce a written dredged material management document describing the current program and any recommendations to improve management. A draft management plan will be prepared by CE with EPA review and comment. Subsequently, the Management Conference will have the opportunity to review the draft document and to comment.

More specifically, EPA and the CE have agreed to a management and monitoring plan for the ocean disposal of dredged material containing dioxin. The plan was developed to help ensure that such material is discharged in an environmentally sound manner. To this end, the plan includes: (1) management/operational modifications to reduce the

impacts of such disposal; and (2) a monitoring program that can be used to assess the effects of disposal activities and to help develop a program for any future disposal of such material.

In accordance with Section 412(b) of the Water Resources Development Act (WRDA) of 1990, the CE and EPA are preparing a report to Congress on plans for the long-term management of dredged material from the NY-NJ Harbor. This report is currently undergoing agency review.

Under Section 412(c) of WRDA and Section 405 of the WRDA of 1992, Congress has mandated decontamination technology projects for Harbor bottom sediments. Under Section 412(c), Congress appropriated funds to the CE in Fiscal Year 1992 for a decontamination technology demonstration project effort; the ongoing effort includes a literature survey of technologies, four laboratory-scale treatments, site screening, and cost estimates. Under Section 405, Congress appropriated funds to EPA Region II in Fiscal Year 1993 for EPA and the CE: (1) to select technologies, based on the review in Section 412(c), for decontaminating Harbor sediments; and (2) to recommend a program to assess the effectiveness of these technologies. Based on information in the 412(b) report and results from 412(c)/405 studies, the CE and EPA will identify and present options for the disposal and decontamination of contaminated dredged material to the Management Conference.

Ecosystem Indicators

Proposed work is described in the HEP/NYBRP Biomonitoring Work Plan. Monitoring is scheduled for two indicators. Preliminary results are described below.

- Reproductive success of marine birds: Results suggest there may be lower reproductive success in the Harbor relative to other nearby regions in several of the species tested. Additional work is underway to investigate these differences further.
- Ambient water toxicity: Results were less than conclusive, but suggest toxicity to sensitive species in some Harbor waters. A toxicity identification evaluation is planned to assess possible causes.

Other Existing Programs and Authorities

The Management Conference has identified opportunities for relatively short-term action to prevent and reduce toxic contamination. These actions will help focus existing toxics control programs and authorities geographically and on problem chemicals affecting the Harbor and Bight. The Management Conference will review existing pollution prevention programs in the NY-NJ area and make recommendations to focus these programs on

releases which may affect the Harbor and Bight, and on problem chemicals of the Harbor and Bight. This review is expected to be complete by September 1993.

A focused application of existing programs to control toxic contamination in the Harbor and Bight will be included in the final CCMP. This will include NPDES, pretreatment, enforcement, water quality standards, Superfund, and other hazardous waste programs. Actions and schedules will be included as appropriate. In particular, EPA and the States, jointly and/or individually, are overseeing the implementation of upgraded source control measures in the Harbor watershed. Comprehensive CSO abatement programs are underway for NYC and Yonkers, and NJ is developing a CSO control program for its portion of the Harbor area.

Program Constraints and Follow-Up

The primary sources of toxic contamination to the NY Bight originate within the NY-NJ Harbor. Current studies and activities of the HEP will target these Harbor sources, and will develop a priority list for action. Atmospheric deposition of toxic contaminants to the NY Bight is a source that is very poorly known. Atmospheric deposition is considered a significant pollutant source in some enclosed bodies of water, such as the Great Lakes, but its potential impact to open coastal waters is less clear. Undertaking a monitoring study for toxic contaminants reaching the Bight through air sources is beyond the means of the NYBRP or the HEP. Implementation of the most recent Clean Air Act amendments will likely have a salutary effect on the Bight from this poorly known toxic source.

4. Nutrient and Organic Enrichment

Introduction

Nutrient and organic enrichment has been identified as a pollution problem of unknown severity in the Harbor and the Bight. In the NY Bight, there have been documented occurrences of algal blooms and hypoxia, most notably in 1976, but the mechanism by which these events come about, and the relative importance of human-generated inputs, is poorly understood.

The Long Island Sound Study, another of the National Estuary Program studies within the region and one whose waters are connected to the Harbor and the Bight through the East River, has already documented nitrogen overenrichment contributing to widespread seasonal hypoxia as a dominant problem. The case has not yet been clearly made for the Harbor or the Bight, however, despite the occurrence of a widespread algal bloom and hypoxia in the NY Bight that was recorded in the summer of 1976, and other less severe episodes of abundant algal growth and low dissolved oxygen in local areas of the Bight.

Problem Characterization

In order to better define and quantify the hypoxia problem in the Harbor and the Bight, the Management Conference is pursuing a work plan including the following activities:

- improve estimates of nutrient mass inputs;
- identify which nutrient is the limiting nutrient in the New York Bight and NY-NJ Harbor;
- develop a first order assessment of the manageability of the problem;
- develop first order load reduction targets required to meet ecosystem objectives;
- assign a level of confidence to the load reduction targets; and
- recommend a program of further required data collection and analysis to be carried out beyond the schedule of the Bight program.

An EPA contractor is carrying out the work plan, and has completed a report summarizing historical water quality data for the NY Bight.

Eutrophication Modeling

Other elements of the work plan entail use of existing mathematical modeling frameworks to develop coupled hydrodynamic and water quality models of the area of impact. Because of the highly technical nature of the contractor effort, a Modeling Evaluation Group composed of acknowledged technical experts is providing independent review at each juncture of the modeling study. This allows the established work plan to be modified as work progresses and as results dictate.

This modeling study is a sizeable effort and will continue through the remaining schedule of the NY-NJ Harbor Estuary Program. In addition to assessing the nutrient enrichment issue in the NY Bight, this modeling study will couple the Bight with the NY-NJ Harbor and Long Island Sound (another study of the National Estuary Program). In this way, the interactions of the connected waterbodies can be explored and the relative effects that one has on the others can be ascertained, ensuring that potential remedial measures can be applied with a comprehensive regional understanding.

To date, limited information has been produced from the preliminary studies that have been completed. Nutrient inputs to the Harbor and the Bight appear to have an effect on stimulating algal growth in the Bight and fostering hypoxic conditions in bottom waters, but the data are at present preliminary, and further modeling work is necessary to draw firmer conclusions.

Ecosystem Indicators

Analogous to the efforts associated with measuring toxic contamination, the Nutrients Module will investigate ecosystem indicators for eutrophication and adverse effects of nutrient overenrichment. Indicators that are being considered include dissolved oxygen levels in the water column and nuisance algal blooms. In addition to identifying the scope of the problem, a reliable indicator will be able to show the effectiveness of remedial measures in addressing the problem.

Program Constraints and Follow-Up

No specific action to reduce nutrient inputs to the NY Bight for the purpose of reducing hypoxia are currently recommended. The Long Island Sound Study, which is completing its Comprehensive Conservation and Management Plan and has determined that hypoxia is a major water quality issue, has decided to implement a freeze on allowable nitrogen inputs from point- and nonpoint-source discharges within its drainage area, and furthermore, to begin the process of actually reducing nitrogen loadings. This may have an indirect benefit to the Bight since a number of the affected discharge points are located in the East River, the tidal strait connecting Long Island Sound to the NY-NJ Harbor.

5. Habitat Loss and Degradation

Introduction

Habitat issues were not at first considered within the purview of the NY Bight Restoration Plan, but following public meetings on the preliminary work plan, it became clear that protection and restoration of habitat would be a vital component of the Restoration Plan. A pervasive element in the impairment and decline of beneficial uses in the Harbor/Bight region is the loss and degradation of natural habitats and fish and wildlife populations. While pollutant inputs can degrade habitat for fish and wildlife populations, the loss of habitat itself can reduce the capacity of an ecosystem to absorb human-generated waste effluents. A Habitat Work Group has been set up by the Management Conference to address this issue, and to date has examined the Federal and State programs designed to manage habitat within the region, and has also made a preliminary study of the existing and historic habitat conditions of the Harbor and the Bight.

Habitat Inventory

Efforts are currently underway to complete an inventory of significant coastal habitats in the Harbor and Bight region with the intent of developing a focused approach to protecting, maintaining and restoring a viable coastal ecosystem. Additional studies are programmed to improve knowledge of little-studied habitats, such as seagrass beds and

anadromous fish spawning areas, and assessing the changes in habitat that occur with coastal development. Effort is also being expended to develop a data management framework to ensure that habitat information within the region can be assessed for historical trends, and be made available to appropriate decision-makers.

Regulatory Programs

The Habitat Work Group is following a two-pronged approach. As a follow-up to the review and assessment of existing habitat-related programs the work group is investigating steps for focused improvements of those programs within existing authorities.

Non-Regulatory Approach

A parallel effort is the development of a "Habitat Management Strategy," which will identify missing links in the habitat protection framework as it now exists. This strategy will identify options that can be taken by responsible authorities to ensure long-term integrity of habitat features within the regional ecosystem. A habitat "Options Guide" has been drafted that is intended to help state, local, and individual land-use interests maintain a habitat-oriented focus as part of their decision-making.

Geographic Targeting

Regional interests have identified particular natural areas within the Harbor/Bight region as meriting special consideration for management and protection. Two such areas are Jamaica Bay, in NYC, and the Arthur Kill channel (Harbor Herons Project), which separates Staten Island from NJ. The Habitat Module will assist habitat protection efforts here or elsewhere within the Harbor/Bight region as the opportunity arises.

Program Constraints

No unifying legislation or regulatory authority exists that permits one agency or level of government to act as a focus for comprehensive habitat management and management of living resources. At the Federal level alone, the list of agencies involved in aspects of habitat management is long, those specific to our geographic region including:

- EPA
- NOAA/NMFS
- US Army Corps of Engineers
- US Coast Guard
- US Fish and Wildlife Service
- National Parks Service
- Soil Conservation Service
- Minerals Management Service

Developing a comprehensive plan to protect, maintain, and enhance natural habitats in the NY Bight and NY-NJ Harbor will be an especially difficult challenge for the Management Conference of the HEP, and will require the cooperation of State agencies, local municipalities, and non-governmental bodies and individuals as well. Regionally focused land use planning programs have been, or are being, developed for the Hackensack Meadowlands, Barnegat Bay, and the Pinelands National Reserve in NJ, and for the Hudson River Estuary in NY. NYC released a Comprehensive Waterfront Plan in the summer of 1992 that lists the "Natural Waterfront" as one of four primary land-use categories to be applied to its urban shores. All of these programs face funding and jurisdictional constraints in their implementation.

Program Follow-Up

The Habitat Module will continue to plan for protection and restoration of habitat values and features within the Harbor/Bight ecosystem. It will build on existing programs and habitat protection efforts, and attempt to develop a comprehensive regional focus. The HEP will further develop this conceptual plan, and oversee its implementation.

A Comprehensive Focus

Examining pollution problems according to categories (floatable debris, pathogen contamination, etc.) facilitates the development of specific, effective remedies for those particular pollutants. This strategy, however, omits the interrelationships that exist between and among the problems, their respective remedies, and the human uses that will be regained with the restoration of the NY Bight. A sample of these conflicting issues are:

- water quality implications of reducing pathogens vs. residues of chemical disinfection;
- human recreational uses vs. wildlife uses of habitat
- human development needs and habitat values;
- recovery of fish and wildlife populations vs. human exploitation of living resources;
- water quality improvement vs. increased pressure for shoreline development;
- human bather density vs. spread of waterborne pathogens
- pathogenic water quality improvements vs. residual toxic contaminants in sediments;
- navigation improvements vs. habitat degradation
- reduction in wastewater discharges vs. air and land disposal alternatives;
- sewerage and other hydrological modifications vs. loss of freshwater flows to coastal tributaries and bays;

- effects of nutrients on ambient pathogen concentrations
- reducing wasteload of "disposables" vs. public health implications.

None of these issues have been addressed directly by the NY Bight Restoration Plan. A number of them may not be significant from an environmental management standpoint; nevertheless, for a program to be truly comprehensive, they must be factored into the final accounting of environmental benefits and costs.

Program Administration

As noted above, the NYBRP has been integrated with the HEP with respect to funded studies, objectives, and administration. This Report to Congress is not a static document, but a working model for the implementation of the NYBRP. Total program expenditures amounted to \$2.6 million, including Congressionally appropriated funds and EPA Region II funds dedicated to the NYBRP. This report has been approved by the Management Conference of the Harbor Estuary Program.

Studies and actions that have been initiated will be continued or completed within the framework of the HEP. Remedial measures will be recommended and implemented as the needs arise, and commitments with Federal, State, and local agencies to deal with outstanding pollution issues in a comprehensive fashion will be secured. Where actions not currently programmed or under existing authorities are recommended, estimated costs and schedules for implementation will be provided.

Public participation has been an integral part of the overall planning process. Public meetings and hearings have been held at every juncture of this program, and the input of the public has had a major impact on the direction this program has taken. It is clear that public education and involvement will be a crucial factor in the success of this program, and the appearance of many action-oriented environmental initiatives within the region gives cause for hope that continued inroads against environmental degradation can be made, and the restoration of the NY Bight for human health and marine resources can be achieved.