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CLEANING UP BOSTON HARBOR: FACT OR FICTION?

David Doneski*

I. INTRODUCTION

Boston Harbor is both a national landmark and a scenic natural resource. Since the American Revolution it has been the center of numerous maritime pursuits, including shipping, fishing and recreation.¹ Physically, Boston Harbor covers an area of forty-seven square miles and holds between 107,000 and 180,000 gallons of water, depending on the tides.² Three major tributaries, the Charles, Mystic, and Neponset Rivers, supply the harbor with 500 million gallons of water each day.³ Its waterfront facilities and magnitude of commerce make the harbor the largest seaport in New England.⁴ The harbor is home to a number of recreational and commercial fisheries, including lobster and softshell clams.⁵ In recent years, the harbor’s beauty has stimulated economic development of Boston’s waterfront area which is now the scene

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² Metcalf & Eddy, Application to the U.S. Environmental Protection Agency for Modification of Secondary Treatment Requirements for Discharges into Marine Waters of Boston Harbor and Massachusetts Bay for its Deer Island and Nut Island Wastewater Treatment Plants by the Commonwealth of Massachusetts Metropolitan Dist. Comm’n 12 (Sept. 13, 1979); Master’s Report, supra note 1, at 8.

³ Master’s Report, supra note 1, at 8.

⁴ Kolb, supra note 1, at 1.

⁵ Office of Marine Discharge Evaluation, Environmental Protection Agency, Analysis of the Section 301(h) Secondary Treatment Waiver Application for Boston Metropolitan Dist. Comm’n 12 (June 30, 1983) [hereinafter cited as Waiver Application Analysis].
of modern residential and commercial establishments, such as the Harbor Towers complex and the revitalized Quincy Market.

Besides functioning as a center of shipping and fishing industries, Boston Harbor offers a wealth of recreational opportunities for thousands of metropolitan area residents and tourists. Along the shoreline of the harbor are over thirty beaches which serve an estimated 160,000 people on an average summer day.\(^6\) Most of these beaches are located on Dorchester and Quincy Bays.\(^7\) For boating, there are numerous public and private launching

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\(^6\) Master's Report, *supra* note 1, at 9.

\(^7\) Kolb, *supra* note 1, at 2. *See* figure 1.
facilities along the shoreline. In addition, approximately 30,000 pleasure craft enter the harbor each year through locks at dams on the Charles and Mystic Rivers. Many of the islands in the harbor are excellent sites for swimming, camping, and other outdoor activities.

In addition to being an important seaport and recreational area, Boston Harbor has been subjected to another use which is far less attractive. For over 150 years the people of the Boston area have been depositing their sewage into the harbor. This practice has resulted in severe water pollution in certain sections of the harbor, as well as the accumulation of harmful waste product sediments on the harbor's floor. In 1968, a federal study concluded that "[b]ased upon biological conditions about seven square miles or 30 per cent of the Harbor, were grossly polluted." Subsequent studies have indicated that harbor pollution has become more serious and produced more widespread harm to the harbor's marine life. This pollution includes floating human

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8 Id.
9 Id.
10 Id. Some of the harbor islands have been joined to the mainland, by human design or by nature. Over the years, the islands have witnessed a number of uses. In the eighteenth century some were farmland; others, the site of resorts. Late in the nineteenth century, the islands became the location of certain public facilities. A reformatory was established on Deer Island; Spectacle Island was the first place where dead horses from the City of Boston were recycled into glue; Spectacle Island was later a garbage dump. Today, Deer Island is the site of the Suffolk County House of Correction.

In 1970, the Massachusetts Legislature created the Boston Harbor Islands State Park. The enabling legislation directed the State Department of Natural Resources to acquire those islands under private ownership and to develop a plan of recreation and conservation for both the acquired islands and certain islands already under public ownership. Completed in 1972, the plan made specific recommendations for many of the islands. Actual development has been on a small scale: clearing trails; constructing piers; establishing campsites and instituting a water taxi route among the islands. Recently, the plan has been updated to reflect increased use of the islands. The plan now recommends opening up Long Island to recreational use. Development of the harbor islands as well as future development along the shoreline are both issues related to the subject of this article, Boston Harbor pollution. Their breadth, however, precludes any more than tangential treatment here. The author hopes that points in the discussion where development considerations are relevant will be self-evident.

12 Kolb, supra note 1, at i. Sewage consists of the liquid and water carried wastes from residences and commercial establishments. Domestic sewage results from daily activities such as bathing, showering, and housekeeping. The content of industrial sewage varies depending on the activities engaged in, such as metal finishing and food processing. Master's Report, supra note 1, at 196-97.
13 Master's Report, supra note 1, at 27.
waste and consequent obnoxious odors; excessive levels of nutrients and organic matter which overstimulate plant growth and strangle other forms of aquatic life; and potentially harmful concentrations of disease-producing bacteria and viruses which have necessitated beach closings and restrictions on shellfish harvesting.\textsuperscript{15}

Sewage discharged into the harbor is comprised of the human and industrial wastes from cities and towns in the metropolitan Boston area.\textsuperscript{16} These wastes are conveyed through a network of sewer pipes known as the Metropolitan Sewerage System (MSS) to sewage treatment plants on Deer and Nut Islands in Boston Harbor.\textsuperscript{17} The MSS is currently operated by the Metropolitan District Commission (MDC), a state agency in the Executive Office of Environmental Affairs.\textsuperscript{18}

Unfortunately, not all sewage from the MSS receives sufficient treatment. When the amount of sewage being transported to Nut Island surpasses the plant's capacity to treat it, the excess volume is diverted directly into the waters of the harbor.\textsuperscript{19} Similarly, when sewage being transported to Deer Island exceeds that facility's capacity, some of the flow is rerouted to holding tanks at Moon Island and discharged into the harbor without treatment.\textsuperscript{20} In the past few years there has been an increase in the number of occasions on which sewage is released from Moon Island or discharged, untreated, from Nut Island.

Though pollution of the harbor has been a matter of public concern since the late 1960's, it is only recently that the problem has received widespread attention. The principal reason for this heightened interest is a lawsuit filed in December of 1982 by the City of Quincy against the MDC and the Boston Water and Sewer

\textsuperscript{11} Master's Report, \textit{supra} note 1, at 27-38.
\textsuperscript{15} Id. at 10-11. \textit{See infra} text and notes at notes 165-208.
\textsuperscript{16} Id. at 10.
\textsuperscript{17} Kolb, \textit{supra} note 1, at 5.
\textsuperscript{18} MASS. GEN. LAWS ANN. ch. 28, § 1, ch. 92, § 1 (West 1981). The MDC also provides water to a number of greater Boston communities; operates recreational facilities and parks; and maintains bridges and roads in and around its facilities. \textit{See id.} ch. 92, §§ 10-103 (West 1969 & Supp. 1984); Boston Globe, Aug. 26, 1984, at 27, col. 4.
\textsuperscript{19} Master's Report, \textit{supra} note 1, at 18.
\textsuperscript{20} Kolb, \textit{supra} note 1, at 11. \textit{See figure 1.} Moon Island is owned by the Boston Water and Sewer Commission (BWSC). The BWSC operates the City of Boston's water distribution and sewage collection systems. It functions under the direction of three Commissioners appointed by the mayor. Master's Report, \textit{supra} note 1, at 20.
Commission (BWSC). Quincy sought injunctive, remedial, and declaratory relief from pollution of Quincy Bay, which it claimed was resulting from the discharges of untreated and partially treated sewage from Nut Island and Moon Island. The city alleged violations of the Massachusetts Clean Waters Act; Massachusetts General Laws chapter 92, section 1, which requires the MDC to properly maintain its sewerage system; and the common law of nuisance.

In July 1983, the court appointed a special master and directed him to resolve disputed issues of fact. The master submitted a report on August 10, 1983. The report contained detailed findings of fact about the operation and consequent pollution impact of the facilities at Deer, Nut, and Moon Islands. It also made a number of recommendations for corrective action by the MDC. During the preparation of the report, the court had ruled that the MDC, but not the BWSC, was responsible for untreated sewage discharges from Moon Island. The court had learned that the BWSC, under an agreement with the MDC, could not treat excess sewage diverted to Moon Island unless the MDC granted permission.

One month after the master filed his report, the court approved an agreement among the parties which suspended all proceedings in the case. The court concluded that each party desired an extensive effort to clean up Boston Harbor and that "further adversarial litigation" might preclude the start of such an endeavor. It granted its approval in consideration of the MDC's

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21 City of Quincy v. Metropolitan Dist. Comm’n, No. 138477 (Superior Court filed Dec. 17, 1982); Master’s Report, supra note 1, at 1-2. On June 9, 1983, Quincy amended its complaint to join three additional defendants: Anthony Cortese, Commissioner of the Department of Environmental Quality Engineering (DEQE); Thomas McMahon, Director of the Division of Water Pollution Control in the DEQE; and James Hoyte, State Secretary of Environmental Affairs.
22 Id. The Massachusetts Clean Waters Act prohibits the discharge of sewage into coastal waters contrary to a state permit. See infra text and notes at notes 283-84. The plaintiff’s motion for a preliminary injunction requested an order prohibiting the MDC from admitting any new communities to the MSS or allowing any new connections to the system resulting in a flow of more than 2000 gallons per day. Master’s Report, supra note 1, at 2.
23 Master’s Report, supra note 1, at 4.
25 See Master’s Report, supra note 1.
26 Master’s Report, supra note 1, at 125-67.
28 City of Quincy v. Metropolitan Dist. Comm’n, No. 138477 (Superior Court Sept. 9, 1983) (Procedural Order) [hereinafter cited as Procedural Order].
29 Procedural Order, supra note 29, at 1.
and the other defendants' "voluntary moral commitment" to accept and comply with a court imposed schedule of measures aimed at alleviating harbor pollution. As part of its order, the court appointed the special master, Charles Haar, a Harvard Law School professor, to monitor compliance with the schedule.

In his report of August 10, 1983, Professor Haar included among his recommendations the preparation of a report by the MDC addressing possible methods of financing the construction and rehabilitation of the MSS necessary to clean up Boston Harbor. Specifically, he proposed the evaluation of removing sewer responsibilities from the MDC and placing them in a financially and organizationally independent public authority. Accordingly, the court's order of September 9, 1983, called for the development of a complete financial plan for the funding of the required projects.

On September 16, 1983, President of the Massachusetts Senate, William Bulger, announced the creation of a special committee to consider ways of improving the MDC's water and sewer services, including the possibility of establishing an independent agency. By January of 1984 the idea of a new agency had gained popularity in the state legislature as well as with the governor. Early in that month, the Legislative Commission on Boston Harbor Development filed a bill proposing the creation of an independent authority to operate the sewer and water systems under the control of the MDC. At the end of January, Governor Michael S. Dukakis' budget request for fiscal 1985 sought only six months of funding for the water and sewer divisions of the MDC. The governor revealed that he would soon propose legislation of his own to establish an autonomous agency which could finance the cleanup of the harbor. Despite this advance notice, however, the governor's bill was not filed until April 19, 1984.

31 Id. at 1.
32 Id. at 2.
33 Master's Report, supra note 1, at 163.
34 Id. at 165.
35 Procedural Order, supra note 29, Exhibit A.
37 Menzies, Cleaning up the harbor, Boston Globe, Jan. 7, 1984, at 11, col. 5.
38 Boston Globe, Jan. 27, 1984, at 18, col. 4. The Massachusetts fiscal year begins on July 1.
40 Boston Globe, Apr. 29, 1984, at 17, col. 4. A week earlier, Special Master Haar told a Boston Citizens Seminar that he felt there was a lack of progress on moving to clean up harbor pollution. Saying there was "no real sense of urgency," he predicted the City of Quincy would reactivate court proceedings. Boston Globe, Apr. 18, 1984, at 21, col. 2, at 26, col. 6.
In June of 1984, testifying before a legislative committee, Governor Dukakis stressed the need for quick action on his proposed legislation. Yet, without taking action on the bill, the legislature recessed for the summer a few weeks later. Following the state’s primary elections in September, the legislature reconvened. On October 4, 1984, Senate President Bulger substituted a new bill for the Dukakis proposal. His version provided for vesting control of only sewer operations in the new authority.

On October 9, lawyers for Quincy and the MDC were back in court. During a hearing, the attorneys for both sides volunteered their approval of an independent sewer and water agency. Stronger words, however, came from Massachusetts Superior Court Judge Paul Garrity. He was prepared to place the MDC’s sewer division into receivership unless the legislature voted for an independent authority. At a subsequent hearing on November 15, 1984, Judge Garrity was more forceful. Calling the harbor “unsafe, unsanitary, indecent, in violation of law and a danger to the health and welfare of the people,” he told the parties to report back to him on November 29 on the legislative progress in creating a new authority. He indicated that if the legislature adjourned by that date without establishing the authority, or if there were “no hope” of legislation passing, he would begin a receivership trial. On November 29, 1984, with no action from the Massachusetts Legislature, Judge Garrity declared that a trial would begin within the week. He further ordered an immediate ban on all new connections to the MSS and a halt to all MDC sewer construction projects.

41 Boston Globe, June 20, 1984, at 19, col. 5.
43 Boston Globe, Oct. 6, 1984, at 21, col. 2. Bulger stated that a sewer only bill had a better chance at legislative approval. Drinking water for the greater Boston area comes from the Quabbin Reservoir in the western part of Massachusetts, via an underground tunnel. Western legislators were worried about removing the reservoir, also used for many recreational purposes, from public control. They were also concerned about the power of a new authority to draw unlimited amounts of water, lowering the Quabbin and necessitating diversion of the nearby Connecticut River. Boston Globe, Oct. 10, 1984, at 30, col. 3, Oct. 14, 1984, at 30, col. 3, Dec. 23, 1984, at 26, col. 4; News Tribune, Dec. 21, 1984, at 12, col. 5.
45 Id. at col. 2.
46 Boston Globe, Nov. 16, 1984, at 1, col. 4, at 10, col. 3.
47 Id. at 10, col. 3.
48 Id. at 10, col. 3.
Judge Garrity's orders were short-lived. The MDC appealed to the Massachusetts Supreme Judicial Court. Acting for the Court, Justice Nolan overturned the orders without comment, only five days after they were issued. As Justice Nolan announced his decision, though, the trial to decide the receivership issue was continuing. A week later, on December 12, 1984, there was a legislative breakthrough. The Massachusetts House of Representatives passed a bill to create an independent water and sewer authority and sent the measure to the Senate. Then, on December 14, Judge Garrity announced he would impose receivership if the legislature did not submit a bill to the governor by December 20. Faced with this deadline, the legislature produced a final product. On December 17, 1984, House and Senate Conference Committee members approved a compromise bill. Two days later, the bill was passed by both chambers and Governor Dukakis signed it into law, thus creating the Massachusetts Water Resources Authority.

By approving the bill, the governor finalized a first step that many public officials believed was necessary to remedy the extensive sewage pollution of Boston Harbor. The agency was seen as symbolic of a fresh start in the effort to fight a long-standing problem. The creation of a separate agency with a new mandate, however, does not close the case of Boston Harbor. City of Quincy v. Metropolitan District Commission involved only some of the actors in this story. The discharge of untreated sewage into the harbor is a violation of federal as well as state law. Thus, the Environmental Protection Agency (EPA) has a principal role to play in effecting a cleanup. The contributions of local governments and concerned citizens are also important ingredients in achieving success. This article examines the legal and political developments which resulted in the new authority. How the authority will influence the cleanup and the significance of the other players in the Boston Harbor drama will also be explored.

50 Boston Globe, Dec. 6, 1984, at 1, col. 1.
51 Id. at 8, col. 2.
54 Boston Globe, Dec. 18, 1984, at 1, col. 4.
57 The Water Resources Authority Act placed responsibility for both sewage disposal and water supply in the new agency. In response to concerns about the Quabbin
tion II describes the operation of the MSS and the specific nature of the harbor's pollution problem. Section III presents the federal and state regulatory scheme which addresses water pollution. Section IV examines how this regulation has influenced efforts to abate harbor pollution. Finally, Section V discusses how the new authority improves the prospects for a successful cleanup, and how the other cleanup participants—the EPA and the communities of the metropolitan Boston area—will contribute to the harbor's restoration.

II. A BACKGROUND OF BOSTON HARBOR'S POLLUTION PROBLEM

The sewage pollution of Boston Harbor is a complex problem, involving issues of governmental procedure and political decision making. Nevertheless, the true impetus to Quincy's suit against the MDC was the daily operation of the Metropolitan Sewerage System. In exploring the factors which generated support for a new "manager" of that system, then, it is appropriate to begin with a discussion of the system itself. This section considers the mechanics of the MSS, its functional limitations, and the environmental consequences of its operation.

A. The Metropolitan Sewerage System

For more than a century, inhabitants of the Boston area have used the harbor as a sewage receptacle. Through the years individuals and government alike have employed various methods of depositing their wastes into the nearby waters. Unfortunately, a look at the history and present state of Boston's sewage disposal operations reveals that the passage of time has brought little progress in minimizing the harmful effects of such a practice.

In 1820, Boston residents were first allowed to dispose of human wastes in the city's storm sewers, which carried rain and melted snow to the shoreline of the harbor. Soon thereafter, the city council began to receive numerous complaints about odors and

Reservoir, the act created a division of watershed management in the MDC to maintain the Quabbin and other reservoirs and to exercise exclusive control over them. The division will supply water to the Authority. Also, the legislation provides that one member of the Authority's board of directors will be a resident of the Connecticut River Basin. 1984 Mass. Acts 372, §§ 3(b), 42. This article, however, will focus on the act as it relates to sewage disposal issues.

health problems. In 1865, a cholera epidemic claimed many lives. City officials then decided to lay additional sewer pipes to transport the sewage to Moon Island, where holding tanks were constructed. Sewage was released from the tanks twice a day on the outgoing tide. Completed in 1884, this new disposal method was known as the Boston Main Drainage System.

In 1889, the state legislature created the Metropolitan Sewerage District (MSD) in order to organize the disposal of sewage in communities surrounding Boston. The MSD was divided into northern and southern regions. Construction of the northern Metropolitan Sewerage System was completed in 1894. It collected sewage from areas north of the Charles River and carried it to Deer Island where it was released into the harbor following only a screening out of large solids. In 1904, the southern system was finished. It carried sewage to Nut Island from areas of the Charles River watershed, the Neponset River watershed, and adjacent regions south of the Boston Main Drainage System. There, the sewage was also screened and then discharged into the harbor.

Implementation of the new system did not put the issue of sewage disposal to rest. Six times between 1900 and 1939 public concern over the discharge of sewage into the harbor prompted the Massachusetts Legislature to initiate studies of the quality of the harbor’s water. The 1939 study recommended the construction of more extensive treatment facilities at Deer, Nut, and Moon Islands. Plants were built at Nut Island in 1952 and at Deer Island in 1968, but no treatment facility has ever been constructed at Moon Island. Instead, when construction at Deer

59 Id.
60 Id.
61 Id.; Kolb, supra note 1, at 5.
63 Kolb, supra note 1, at 5.
64 Master's Report, supra note 1, at 11.
65 Kolb, supra note 1, at 5.
66 Id. See figure 1.
67 Id. See figure 1.
68 Id.
69 Master's Report, supra note 1, at 26. The studies were conducted in 1900, 1917, 1929, 1930, 1936 and 1939.
70 Id. at 12.
71 Id.
Island was completed, the Boston Main Drainage System was linked to the northern metropolitan system, finally ending the daily release of Boston's raw sewage on the outgoing tide.\textsuperscript{72}

Currently, the MSS consists of two distinct systems of community sewer lines which are connected to two sets of larger sewer pipes called interceptors.\textsuperscript{73} These interceptor sewers are presently operated by the Metropolitan Sewerage Division of the MDC.\textsuperscript{74} On July 1, 1985, control of the interceptors will be transferred to the Massachusetts Water Resources Authority.\textsuperscript{75} The northern system of the MSS conveys sewage from twenty-two communities, including Boston, Cambridge, and Somerville to the Deer Island sewage treatment plant.\textsuperscript{76} The southern system carries sewage from twenty-one municipalities, including Weymouth, Quincy, and Milton to the treatment facility at Nut Island.\textsuperscript{77}

In the northern system the interceptor sewers channel sewage to one of three sets of screening devices, called headworks, which remove large debris and grit.\textsuperscript{78} The sewage then flows down vertical shafts into one of two deep rock tunnels which lead to Deer Island.\textsuperscript{79} From the tunnels, sewage is lifted up into the plant by a large pumping station.\textsuperscript{80} A fourth headworks unit is located on Deer Island itself and screens sewage received by an overland pipeline from East Boston and Winthrop.\textsuperscript{81} In the southern system, sewage flows from local sewers to interceptors and converges on one large sewer line which transports it to the Nut Island facility.\textsuperscript{82} It is then lifted into the plant by pumps and passes through a headworks unit as it enters the treatment system.\textsuperscript{83}

Both the Nut and Deer Island plants provide primary sewage treatment.\textsuperscript{84} This process is designed to remove most of the heavier, settleable solids and to decrease the concentration of

\textsuperscript{72} Id.
\textsuperscript{73} Id. at 13-14.
\textsuperscript{74} Id. at 13.
\textsuperscript{75} 1984 Mass. Acts 372, § 4(a), (c).
\textsuperscript{76} Master's Report, supra note 1, at 13.
\textsuperscript{77} Id.
\textsuperscript{78} Id. The headworks are located at Ward Street and Columbus Park in Boston, and at Chelsea Creek. See figure 1.
\textsuperscript{79} Id.
\textsuperscript{80} Id.
\textsuperscript{81} Id.
\textsuperscript{82} Id.; Kolb, supra note 1, at 6.
\textsuperscript{83} Kolb, supra note 1, at 6.
\textsuperscript{84} Id. at 8.
lighter, suspended solids in the sewage solution.\textsuperscript{85} Incoming sewage is chlorinated for disinfection and then enters a large sedimentation tank which forces grease and scum to the top of the solution where it can be drawn off.\textsuperscript{86} Heavier materials, including a substantial portion of the suspended solids, settle to the bottom of the tank.\textsuperscript{87} The sedimentation process also reduces the level of biochemical oxygen demand (BOD). BOD is defined as a measure of the dissolved oxygen in water which is required to decompose the organic matter in sewage.\textsuperscript{88} Since higher waste loads require higher levels of oxygen for decomposition, BOD is an indicator of pollution levels.\textsuperscript{89} Generally, primary treatment removes sixty-five per cent of suspended solids and thirty-five per cent of BOD.\textsuperscript{90}

The materials which are removed and settle to the bottom of the sedimentation tank become concentrated into sludge.\textsuperscript{91} This sludge is drawn to heated digestion tanks where it is decomposed by microorganisms.\textsuperscript{92} The process yields methane gas, which is then used to help generate the electricity that powers the treatment facilities.\textsuperscript{93}

After this primary treatment, the remaining sludge and the separate, liquid sewage, or "effluent," are released into the harbor through submerged pipes called outfalls.\textsuperscript{94} In the outfalls, the sludge and effluent are chlorinated, both for disinfection and odor control.\textsuperscript{95} When applied properly, chlorine destroys harmful bacteria, viruses, parasite worms, and other potential sources of infection in domestic sewage.\textsuperscript{96}

Following discharge, the effluent receives a last step in the

\textsuperscript{85} Id. Settleable solids are all solids in sewage that are heavy enough to settle out of solution. Suspended solids are those which do not settle from solution upon standing. Master's Report, supra note 1, at 196-97.

\textsuperscript{86} Kolb, supra note 1, at 8; Master's Report, supra note 1, at 65.

\textsuperscript{87} Kolb, supra note 1, at 8.

\textsuperscript{88} Id. The bacterial breakdown of organic matter may decrease the amount of dissolved oxygen in water. Thus, when the breakdown occurs in the ocean it reduces the dissolved oxygen available to aquatic life. See infra text and notes at notes 180-85.

\textsuperscript{89} U.S. Environmental Protection Agency, Boston Harbor Update 1, Glossary (Sept. 1983) [hereinafter cited as Harbor Update].

\textsuperscript{90} Master's Report, supra note 1, at Figure 3.

\textsuperscript{91} Kolb, supra note 1, at 8.

\textsuperscript{92} Id.

\textsuperscript{93} Id.

\textsuperscript{94} Id. at 10.

\textsuperscript{95} Master's Report, supra note 1, at 65.

\textsuperscript{96} Id.
treatment process. It is assimilated into the receiving waters through dilution and further breakdown of remaining pollutants by biological and biochemical reactions.\(^97\) This assimilation decreases the concentration of wastes and thus the polluting qualities of the sewage.\(^98\) When sewage is discharged to marine waters, as in the Boston Harbor situation, assimilation is enhanced by dispersion of the effluent from the effects of currents and tides.\(^99\)

At Deer Island, sludge and effluent are released together through two outfalls with a combined capacity of 400 million gallons a day (MGD).\(^100\) The outfalls terminate in the President Roads shipping channel fifty feet below the surface of the harbor.\(^101\) Three relief outfalls are utilized when incoming sewage flows exceed 400, 500, and 600 MGD respectively.\(^102\)

The Nut Island facility has two main effluent outfalls, numbers 101 and 102, which extend north from the island.\(^103\) A third outfall, 103, extends north into West Gut, which divides Quincy and Hingham Bays; a fourth, 104, is an emergency outfall and extends into the Hingham Bay side of West Gut.\(^104\) The sludge produced at Nut Island is conveyed through a long outfall across the harbor and is discharged into the south side of President Roads near Long Island.\(^105\)

The foregoing description of the Metropolitan Sewerage System provides a picture of how the system functions under optimum conditions. However, such a situation rarely exists. As a result, the effectiveness of sewage treatment is reduced and the level of pollution in Boston Harbor is increased.

### B. Bypasses and Overflows

When the volume of sewage entering the MSS exceeds the system's capacity to transport and treat it, millions of gallons of raw or only partially treated sewage empty into the harbor. There

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98 Kolb, *supra* note 1, at 10.

99 Id.

100 Id. at 16.

101 Id. at 16. See figure 1.

102 Id. at 16.

103 Id. at 64. See figure 1.

104 Id.

105 Id. at 17. See figure 1.
are three ways in which this occurs: overflows of sewage from
certain of the MSD community sewers which are located near the
harbor's shore; bypasses of sewage around the treatment facility
at Nut Island when all of the incoming flow cannot be treated;
and discharges of rerouted sewage from Moon Island when the
amount of sewage being transported to Deer Island surpasses the
plant's treatment capacity. Both the design of the MSS and oper­
ational inadequacies at the Deer and Nut Island facilities are
responsible for these overloads of the system.

1. Combined Sewer Overflows

There are two types of sewers which are used in the local sewer
systems of the MSD's cities and towns: sanitary sewers and com­
bined sewers. Sanitary sewers collect only human and industrial
wastes from residences and commercial establishments.106 Com­
bined sewers carry both human and industrial wastes and storm
water, such as rain and melted snow, which drains from streets
into catch basins.107 Approximately twenty per cent of the sewer
area tributary of the northern metropolitan system, and about
fifty per cent of the population served by the MDC utilize comb­
bined sewers.108

These combined sewer systems were all built before 1910 and
were designed to overflow to local waters during storms.109 When
storm water caused the amount of water and sewage entering the
sewers to exceed the capacity of the pipes, the excess volume
simply passed into an overflow pipe which emptied into Boston
Harbor at the shoreline or into one of the rivers flowing into the
harbor.110 Regrettably, the interceptor sewers built to transport
sewage to Deer and Nut Islands were not designed to handle
large amounts of storm water. Therefore, the existing combined
sewer overflow pipes were left in place.111 Currently there are over
100 combined sewer overflow points along the shores of the har­
bor and its tributaries.112

106 Id. at 196.
107 Id. at 194.
108 Id. at 13.
109 Id.
110 Id.; Kolb, supra note 1, at 76.
111 Master's Report, supra note 1, at 17.
The mechanics of the overflow devices are fairly simple. At the junction of community and interceptor sewers, regulating mechanisms allow excess combined sewage to overflow into a conduit which leads to the receiving waters.\textsuperscript{113} At the end of all conduits which empty into Boston Harbor are devices called tide gates.\textsuperscript{114} They are essentially flaps which open and allow for the release of sewage at low tide, while keeping out sea water at high tide.\textsuperscript{115}

Each year combined sewer overflows are responsible for the discharge of five to seven billion gallons of untreated sewage.\textsuperscript{116} Ordinarily, combined sewers overflow every five to seven days, but in some areas the situation is much worse.\textsuperscript{117} Along the waterfront of downtown Boston, for example, raw sewage flows out of overflow conduits every day, regardless of whether wet weather has increased the amount of storm water in the system.\textsuperscript{118} The city's sewer pipes are simply too small to handle the increased flow that has accompanied the steady development of the downtown area.\textsuperscript{119} In other instances, raw sewage is discharged into the harbor because of mechanical failures in the regulators or tide gates.\textsuperscript{120} Thus, even on a clear, dry day twelve to fifteen million gallons of raw sewage can spill into the harbor.\textsuperscript{121}

2. Nut Island Bypasses

The sewage treatment facility at Nut Island was designed to treat an average of 112 MGD and a maximum peak flow of 280 MGD.\textsuperscript{122} Currently, the average daily flow exceeds the plant's design capacity.\textsuperscript{123} When incoming flows exceed the plant's treatment capability the adverse consequences are substantial.

\begin{footnotesize}
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\item\textsuperscript{113} Kolb, supra note 1, at 73.
\item\textsuperscript{114} Id.
\item\textsuperscript{115} Id.
\item\textsuperscript{116} Boston Globe, Dec. 21, 1982, at 1, col. 2.
\item\textsuperscript{117} Id.
\item\textsuperscript{118} Id. at 16, col. 2.
\item\textsuperscript{119} Id.
\item\textsuperscript{120} Id.
\item\textsuperscript{121} Boston Globe, June 24, 1983, at 5, col. 3.
\item\textsuperscript{122} Master's Report, supra note 1, at 15.
\item\textsuperscript{123} Id. Design capacity consists of three values: dry weather capacity, average daily capacity, and wet weather capacity. Dry weather capacity represents the ability of the plant, according to its design, to treat the average daily flow during periods without precipitation. Average daily capacity is the capacity to treat average daily flow, the actual average flow regardless of weather. Wet weather capacity is the plant's capacity to treat the average daily flow during rainy periods. In 1982, the average daily flow was 124.6 MGD. Id at 66-67.
\end{itemize}
\end{footnotesize}
By design, excess flows bypass the treatment system at various stages of the process and enter the harbor through the same outfall system as sewage that receives full primary treatment.\(^{124}\) Thus, bypasses diminish the total effectiveness of treatment.\(^{125}\) On some occasions sewage bypasses the system before even entering the plant and flows directly into the harbor through outfalls 101, 102, and 103.\(^{126}\) These flows receive chlorination, but the density of solids and other waste products still present in the sewage makes the efficacy of the process uncertain.\(^{127}\)

Even when bypasses do not occur, the volume of effluent can surpass the capacity of the two main outfalls, 101 and 102, and impair the treatment process. When outfalls 101 and 102 cannot discharge all available effluent, the excess volume exits the plant through outfalls 103 and 104.\(^{128}\) Since outfalls 103 and 104 are shorter than the main outfalls they do not provide sufficient contact time with the effluent for the chlorination process to be fully effective.\(^{129}\) Moreover, outfalls 103 and 104 terminate much closer to the water’s edge; outfall 104 releases sewage less than 500 feet from Quincy’s shores.\(^{130}\) Reduced capacity of outfalls 101 and 102, from encrustation of sewage matter, has resulted in more frequent use of outfalls 103 and 104 than was intended under the plant’s design.\(^{131}\)

### 3. Moon Island Discharges

Similar to bypasses at Nut Island, sewage is discharged from Moon Island when the incoming volume at Deer Island exceeds the facility’s treatment capacity. The MDC responds to these periods of excess flows by closing off the headworks unit at Columbus Park.\(^{132}\) As a result, sewage backs up into the system and can potentially spill out into basements in low lying areas of Boston.\(^{133}\) To prevent such a situation, the BWSC, under agree-

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\(^{124}\) Master’s Report, *supra* note 1, at 51, 67, 68.

\(^{125}\) *Id.* at 72.

\(^{126}\) *Id.* at 76.

\(^{127}\) *Id.* at 79. In 1982, 2.1 billion gallons of sewage bypassed the primary treatment system. *Id.* at 81.

\(^{128}\) *Id.* at 72, 73, 75.

\(^{129}\) *Id.* at 73.

\(^{130}\) *Id.* at 72, 74.

\(^{131}\) *Id.* at 74-75. In fiscal year 1983, 765 million gallons of sewage entered the harbor through outfall 104.

\(^{132}\) *Id.* at 99.

\(^{133}\) *Id.*
ment with the MDC, activates pumping units to convey the backed-up sewage to Moon Island. Thus, Moon Island serves as an “overflow valve” for the Deer Island plant. However, because the holding tanks at Moon Island are now in total disrepair and because Moon Island has no treatment facilities, the rerouted raw sewage is simply released into the waters of the harbor regardless of the tides. During the first five months of 1983 alone, 863 million gallons of sewage emptied into the harbor through this process.

4. Why Treatment Capacity is Exceeded at Nut and Deer Islands

There are two reasons for the bypasses at Nut Island and the discharge of rerouted sewage at Moon Island: mechanical and personnel problems and infiltration/inflow, which is the addition of extraneous water to sewer lines.

a. Mechanical and Personnel Problems

In 1976, the plant at Nut Island was twenty-three years old and had already surpassed its life expectancy. A report issued in May of that year by an EPA task force observed that much of the equipment at Nut Island required repair or total restoration. It also noted that there was no preventive maintenance program, no stock inventory, and no spare parts for the three major engines which power the facility. Since that time EPA inspectors and other officials have continued to cite the same problems.

These functional problems are related, in part, to a lack of competent personnel and general understaffing of the plant. A March, 1981, investigation by the Massachusetts Department of Environmental Quality Engineering revealed that “adequate, qualified” staffing does not exist at Nut Island. Later that year an EPA report stated that inadequate staffing resulted in inadequate maintenance. In his report to the court, Special Master

134 Id. at 17, 99.
135 Id. at 17. The Moon Island tanks were inoperative when the BWSC assumed operation of Boston’s sewer system in 1978.
136 Master’s Report, supra note 1, at 107.
138 Id.
139 Id.
140 Id. at col. 3.
141 Id.
142 Id.
Haar declared that preventive maintenance and scheduled equipment replacement had been ignored to the extent that most maintenance only took place when required by an emergency situation. Consequently, a number of treatment devices are often out of order for long periods of time. The result is that the functional capacity of Nut Island to treat incoming flows is less than its design capacity, forcing the discharge of untreated or inadequately treated sewage.

At Deer Island, the main operational problem is with the diesel engines that power the pumps which lift sewage into the plant. The main pumping station consists of nine 90 MGD pumps, each of which is powered by a separate engine. The diesel engines have been a constant source of difficulty. In 1973, when the engines were only five years old, they functioned on average about one half of the time. When several engines are out of service, the Columbus Park headworks must be closed and sewage diverted to Moon Island.

The diesel engines are not easily repaired. They were purchased from a manufacturer who was taken over by a larger company which has since discontinued its engine business. Spare parts are not available and must be created at the plant site. To keep some engines operative others have been cannibalized. When Professor Haar filed his Master's Report there were only enough parts to keep five engines running at once.

As at Nut Island, inadequate staffing and a lack of preventive maintenance have contributed to treatment difficulties at Deer Island. In 1981, the EPA found that only 190 of the necessary 236 positions at the plant were filled. MDC officials acknowledge that the plant is still understaffed. This deficiency has produced

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143 Master's Report, supra note 1, at 69.
144 Id. at 68-69.
145 Id. at 100.
146 The deep rock tunnels that carry sewage to the plant terminate about 100 feet below the main pumping station. Id. at 100.
147 Id. One of the pumps is now operated by an electric motor.
149 Id.
150 Master's Report, supra note 1, at 101. Currently, the engines are the only ones of their kind being used in the world. Boston Globe, June 26, 1984, at 15, col. 1.
151 Master's Report, supra note 1, at 101.
152 Id.
dire consequences. On a weekend in May of 1983, for example, a pipe coupling on one of the pumps split from lack of maintenance and flooded the pumping station with two million gallons of sewage.\textsuperscript{155} During the three days it took to repair the break, 153 million gallons of raw sewage had to be diverted away from the plant and released into the waters around Moon Island.\textsuperscript{156}

b. Infiltration/Inflow

Decreases in plant capacity from mechanical failures are exacerbated by the consequences of infiltration/inflow (I/I). Infiltration is the surface or ground water which enters a sewer system through defective pipes, joints, connections and manhole walls. Inflow is the water discharged into a sewer system from roof leaders, foundation and surface drains, streams and catch basins, some of which are illegally connected to the system.\textsuperscript{157} The term “infiltration/inflow” refers to the total quantity of water from both sources.

During periods of wet weather the amount of I/I in the sewer lines rises, especially in combined sewers which collect storm water by design.\textsuperscript{158} As a result, incoming flows often exceed the treatment capacities at Deer and Nut Islands.\textsuperscript{159} In sum, I/I related to wet weather accounts for a greater percentage of bypasses at Nut Island and discharges from Moon Island. Between July, 1977 and March, 1983 incoming flows exceeded Nut Island’s capacity on ninety-seven days. On sixty-five of the days the cause was I/I from wet weather.\textsuperscript{160} Similarly, of the ninety-five discharges from Moon Island between January, 1982 and June, 1983, sixty-three resulted from additional I/I during rainy periods.\textsuperscript{161}

I/I significantly influences the number of times incoming flows exceed treatment capacity because it accounts for such a large proportion of those flows. For example, a 1978 study revealed that the total average annual I/I in the local sewers of the northern system of the MSS made up fifty to sixty per cent of the average daily flow at Deer Island.\textsuperscript{162} By contrast, in 1980 the average

\textsuperscript{155} Boston Globe, June 24, 1983, at 5, col. 1.
\textsuperscript{156} Master’s Report, \textit{supra} note 1, at 102.
\textsuperscript{157} \textit{Id.} at 195.
\textsuperscript{158} \textit{Id.} at 50, 98.
\textsuperscript{159} \textit{Id.}
\textsuperscript{160} \textit{Id.} at 51.
\textsuperscript{161} \textit{Id.} at 104.
\textsuperscript{162} \textit{Id.} at 48.
sewage flows to Deer and Nut Islands, exclusive of I/I, were only 150 MGD and 57 MGD respectively.163 These levels are substantially below the plants’ average daily design capacities.164 Thus, removing I/I from the sewers would greatly improve the ability of the Deer and Nut Island facilities to effectively treat all incoming flows.

C. The Environmental Impact of Sewage Discharges into the Waters of Boston Harbor

The inadequacies of the MSS and its treatment facilities produce ecological and economic harm and inhibit enjoyment of the harbor’s recreational opportunities. These adverse consequences occur in varying degrees in different areas of the harbor. Natural conditions and the source of the discharge determine the severity of pollution impacts. In the Inner Harbor, the chief discharges are the shoreline combined sewer overflow pipes and the incoming waters of the Charles and Mystic Rivers, which themselves receive sewage from overflow points along their banks.165 The primary sources of pollution in the Outer Harbor are the discharges from Deer, Nut, and Moon Islands.166 Overall, the plants at Deer and Nut Islands contribute ninety-seven per cent of the total sewage released into the harbor each day.167

1. The Inner Harbor

Sewage discharges to the Inner Harbor have created a stressed biological environment that is not suitable to support a diverse aquatic community.168 The area suffers from extensive overenrichment of nutrients.169 This condition stimulates growth of the ocean plants known as phytoplankton.170 An excessive population

163 Id. at 45.
164 The design capacity for average daily flow is 112 MGD at Nut Island and 343 MGD at Deer Island. See supra text at note 122.
165 Master’s Report, supra note 1, at 90. Pollutants also enter the Inner Harbor from direct industrial discharges and shipping activities. These sources are not included in the scope of this article. See figure 1.
166 Id. See figure 1.
167 Waiver Application Analysis, supra note 5, at 25.
168 Master’s Report, supra note 1, at 37.
169 Waiver Application Analysis, supra note 5, at 22-24. Human wastes contain nutrients which are used in plant growth, such as nitrogen and phosphorous. Ross, supra note 97, at 330.
170 Ross, supra note 97, at 327, 329-30.
of phytoplankton decreases the water's oxygen supply and thus restricts or destroys other marine life.\textsuperscript{171} Studies of the Inner Harbor indicate an overabundance of phytoplankton and the occurrence of fish kills.\textsuperscript{172} Increased amounts of phytoplankton can also discolor the water and destroy its aesthetic qualities.\textsuperscript{173}

In addition to nutrients present in ordinary sewage, the combined sewer overflows (CSOs) which empty into the Inner Harbor carry other pollutants which are less common to sewage. The source of these pollutants is the storm water element of combined sewage. As it flows down streets and through gutters, storm water picks up such materials as oil, grease, pesticides, fertilizer, and lead from gasoline.\textsuperscript{174} Instead of diluting the raw sewage and decreasing its adverse impact on the receiving waters, storm water can actually add to the pollution resulting from CSOs.\textsuperscript{175}

Adding to the harm associated with untreated CSOs is the uncontrollable fact that the Inner Harbor experiences less flushing of its waters from tides.\textsuperscript{176} The result is an often stagnant receptacle of pollution, where fecal material and other organic matter have accumulated to levels of over nine feet.\textsuperscript{177} The absence of disinfection before the sewage is discharged has resulted in high concentrations of coliform bacteria.\textsuperscript{178} Simply put, the excess organic substances in the Inner Harbor indicate that its waters “may be classified as bad.”\textsuperscript{179}

2. The Outer Harbor

Discharges from both Nut and Deer Islands have altered the biological community on the ocean floor, or benthos, near the

\textsuperscript{171} Id. Increased amounts of phytoplankton result in increased decay of cells by bacteria; a process that consumes oxygen.

\textsuperscript{172} Waiver Application Analysis, supra note 5, at 12, 24. On August 19, 1983, 100,000 to 200,000 dead fish washed ashore. The Massachusetts Department of Marine Fisheries stated that the kill was a result of overpopulation, seasonal high water temperatures and persistent levels of pollution in the harbor. Boston Globe, Aug. 20, 1983 at 32, col. 2.

\textsuperscript{173} Ross, supra note 97, at 930.

\textsuperscript{174} Kolb, supra note 1, at 73.

\textsuperscript{175} Id.

\textsuperscript{176} Waiver Application Analysis, supra note 5, at 11.

\textsuperscript{177} Master's Report, supra note 1, at 37.

\textsuperscript{178} Id. Coliform bacteria are common to the intestinal tracts of warm-blooded animals. Though harmless by themselves, their presence can indicate disease-causing bacteria or viruses. Usually, total coliform, including bacteria from soil and decaying vegetation, is distinguished from coliform found in fecal material. Kolb, supra note 1, at 8.

\textsuperscript{179} Master's Report, supra note 1, at 37.
When large amounts of organic matter, such as human wastes, accumulate on the bottom of the ocean the amount of decomposition from naturally occurring bacteria increases. This process reduces oxygen levels. As a result, normally occurring plant species are replaced by pollution tolerant species. The increase in pollution tolerant species decreases the food supply for fish and thus limits variety and quantity. Testing near the outfalls shows greater percentages of pollution tolerant species than at other areas in the Outer Harbor. In addition, distribution of pollutants is so widespread that the species diversity of fish is below normal throughout the harbor.

Sewage released into the harbor contains industrial as well as domestic wastes. The discharges contain toxic substances such as heavy metals and PCBs. These toxic compounds resist breakdown by chemical and biological degradation. Moreover, through the process of bioaccumulation, toxics can build up in the bodies of fish. Fin rot disease, a condition associated with the presence of sewage and its related toxicants, afflicts fish in the harbor area. Available evidence indicates that effluent from Deer and Nut Islands is responsible for PCB bioaccumulation in edible fish.

At both Deer and Nut Islands dilution of the sewage effluent by assimilation into the receiving waters is inhibited, and clusters of sewage materials, called "plumes," rise to the surface. Plumes occur because the outfalls are located in relatively shallow water and the effluent is released at a high velocity. Effluent contains

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181 Id. at 12. Though many bacteria produce disease, others are beneficial. They act as scavengers and decompose dead bodies and waste products. In the process, they recycle compounds which become available for other organisms. KEETON, BIOLOGICAL SCIENCE 14, (1980).
182 Waiver Application Analysis, supra note 5, at 12.
183 Id. at 11.
184 Id. at 27-28.
185 Id. at 29.
187 Waiver Application Analysis, supra note 5, at 11.
188 Id.
189 Id. at 36.
190 Id. at 37.
191 Id. at 15.
192 Id. Diffusers, devices affixed to the ends of outfalls to increase the rate of the effluent's dilution by the receiving waters can minimize the occurrence of plumes. At
mostly nonsaline liquids which are warmer and less dense than the harbor water, and as a result sewage will float on the surface of the water.\textsuperscript{193} During periods of bypasses at Nut Island or discharges from Moon Island, this plume phenomenon becomes particularly offensive.\textsuperscript{194}

Nut Island bypasses and Moon Island discharges release high concentrations of fecal coliform bacteria, and persons entering the water during such times risk skin irritations and ear infections.\textsuperscript{195} These discharges often result in the closing of beaches on Quincy Bay.\textsuperscript{196} Even when bypasses do not occur, the Nut Island effluent can contain high levels of bacteria.\textsuperscript{197} When sewage exits the plant through outfalls 103 and 104 it does not receive adequate chlorination because these two outfalls are too short to provide sufficient contact time.\textsuperscript{198} As well as damaging the Inner Harbor, bacterial contamination has resulted in the closing of all clam beds in the harbor to private, recreational use.\textsuperscript{199} Certain restricted areas are open for commercial use. However, prior to sale, clams taken from these areas must be processed at a purification plant.\textsuperscript{200} In addition, over 2,400 acres are completely closed to shell fishing.\textsuperscript{201} This closure has caused substantial losses to the state’s

Nut Island, however, the diffusers on outfalls 101 and 102 are decayed beyond repair, and outfalls 103 and 104 have no diffusers at all. Similarly, the two main outfalls at Deer Island have diffusers, but rust and blockage have impaired their efficiency. \textit{Id.} at 18; Master’s Report, \textit{supra} note 1, at 87.

\textsuperscript{193} Master’s Report, \textit{supra} note 1, at 86.

\textsuperscript{194} \textit{Id.} at 91. The plumes contain fecal matter replete with coliform bacteria, grease, and oil. They produce objectionable colors and odors and make the waters murky. Swimmers and boaters are likely to come into visual or physical contact with a floating mass of raw sewage.

\textsuperscript{195} \textit{Id.} at 108; Boston Globe, July 24, 1984, at 22, col. 2. The concentration of this bacteria is approximately 500,000 per 100 milliliters when the effluent is discharged. Over time, bacterial “die off” occurs and the concentration is reduced. When fecal coliform counts at Quincy beaches are at 200/100ml., a warning is posted; at 500/100ml. the beaches are closed to bathing. Master’s Report, \textit{supra} note 1, at 94, 108, 114.

\textsuperscript{196} Master’s Report, \textit{supra} note 1, at 95, 115-16. During the first half of June 1982, Moon Island discharged a large volume on a daily basis. From June 8, when beach testing began, to June 21, all Quincy beaches were closed. From July 1 to July 20, there were no discharges from Moon Island and almost all beaches remained open during this time. \textit{Id.} at 114.

\textsuperscript{197} \textit{Id.} at 83.

\textsuperscript{198} \textit{Id.} See \textit{supra} text at note 129.

\textsuperscript{199} Kolb, \textit{supra} note 1, at 3.

\textsuperscript{200} \textit{Id.} at 4. The plant is located in Newburyport and is operated by the Massachusetts Division of Marine Fisheries. It provides flushing of clams with fresh sea water. After about 48 hours of washing, the clams may be sold for human consumption.

\textsuperscript{201} \textit{Id.} at 4.
economy, as the potential annual yield from these areas had an estimated value in 1980 of about $6 million.\textsuperscript{202} In Quincy Bay, even open shellfish flats are ordered closed following Moon Island discharges and Nut Island bypasses.\textsuperscript{203} These closings result in the loss of fifty workdays a year, according to one clam digger.\textsuperscript{204}

In addition to treatment deficiencies, weather conditions can also increase the negative impact of discharges from the harbor facilities. The motion of the tides sweeps sewage from Nut and Moon Islands into Quincy Bay.\textsuperscript{205} Under certain wind conditions sewage may wash up on the shore.\textsuperscript{206} Yet, because only high coliform counts are grounds for beach closings, beaches may still remain open.\textsuperscript{207} Following a storm, heavier winds frustrate the ability of the outgoing tides to remove effluent from Quincy Bay. Consequently, sewage sometimes rides the waves onto the bay's beaches.\textsuperscript{208}

Besides damaging the natural resources of Boston Harbor, sewage discharges produce violations of both federal and state legislation designed to achieve cleaner waters. The City of Quincy litigation and much of the publicity given to the harbor's pollution problem concern issues derived from this legislation. To understand the setting in which efforts to clean up the harbor must operate and to appreciate the full nature of the pollution problem it is necessary to examine this body of law.

III. FEDERAL AND STATE REGULATION OF WATER POLLUTION

Federal legislation provides the basic scheme for the control of water pollution caused by the operation of sewer systems.\textsuperscript{209} Massachusetts also has specific statutes and regulations which seek to prevent the environmental degradation of its waters. In a number of ways, the state provisions are comparable to their federal counterparts. The result, for Boston Harbor and other Massachusetts waterways, is in an interrelated approach to pollution control.

\begin{itemize}
\item \textsuperscript{202} Id.
\item \textsuperscript{203} Master's Report, supra note 1, at 93, 115.
\item \textsuperscript{204} Boston Globe, June 26, 1984, at 15, col. 2.
\item \textsuperscript{205} Master's Report, supra note 1, at 85, 111. See figure 1.
\item \textsuperscript{206} Master's Report, supra note 1, at 87, 113.
\item \textsuperscript{207} Id. at 96.
\item \textsuperscript{208} Id. at 88, 113.
\item \textsuperscript{209} Kolb, supra note 1, at 12.
\end{itemize}
A. Federal Regulation

Until fairly recently, the individual states and municipalities possessed most of the legal authority to regulate water pollution.210 In 1948, Congress enacted the Federal Water Pollution Control Act (FWPCA), but power to enforce pollution control was delegated to the governors of the states.211 The federal role was limited to support of research on pollution, projects for new control technologies, and provision of small loans to assist the financing of treatment plants.212 The enforcement procedure developed in 1948 called for conferences and negotiations between dischargers of pollutants and representatives of local governments.213 Judicial review of conference recommendations for abatement of pollution was available, but a court could order abatement measures only if it found that compliance with the order was feasible.214

In 1956, new legislation enlarged the participation of the federal government by authorizing grants to aid the states in developing plans for pollution control and to assist localities in constructing treatment plants.215 Then in 1965, Congress again expanded the water pollution control program. Amendments to the FWPCA, the Water Quality Act of 1965, required the states to develop standards for the quality of the waters within their boundaries.216 The Act also established the Federal Water Pollution Control Administration to oversee federal participation in pollution abatement.217 By the early 1970’s, though, a Congressional study revealed that funding and enforcement procedures were inadequate and that few states had established complete water quality standards. The national effort to decrease water pollution was simply ineffectual.218 This conclusion resulted in a major change in the federal approach to water pollution control.

210 Id.
213 Id.
214 Id.
215 Id.
216 Id.
217 Id.
218 Id. at 5, 7-8; 1972 U.S CODE CONG. & AD. NEWS 3672, 3674-75. Under the enforcement procedures, only one case had reached the courts in over a decade.
1. The "New" FWPCA

In 1972, Congress completely rewrote the FWPCA to establish a "comprehensive, national approach to water pollution control." The 1972 amendments listed a number of national objectives, including the elimination of the discharge of pollutants into navigable waters by 1985, and wherever possible, the achievement of fishable, swimmable water by July 1, 1983. The chief aspects of the new approach to pollution control included the establishment of effluent limitations and water quality standards; the development of water quality management plans to attain such standards; the use of permits to regulate the discharge of pollutants into the nation's waters; and increased federal funding for construction of municipal sewage treatment facilities.

Section 303 of the FWPCA requires each state to promulgate standards for water quality for each body of water within the state by designating desired uses, such as recreation or public water supply. Because different uses demand different levels of water quality, the standards must be consistent with the designated uses. Moreover, all standards must be sufficient to protect public health and enhance the quality of the water body.

To promote the attainment and maintenance of a water body's desired quality, the 1972 amendments also established specific guidelines for the discharge of any pollutant into the nation's waters. For publicly owned treatment works (POTWs) such as the facilities at Deer and Nut Islands, Section 301 of the FWPCA prescribed a two step implementation process for the regulation of liquid, or effluent discharges. By July, 1977, POTWs were to achieve effluent limitations based on secondary treatment of sewage. Secondary treatment removes eighty-five per cent of

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221 Kolb, supra note 1, at 12.
224 Id.
225 "Pollutant" is defined as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water." 33 U.S.C. § 1362 (1982).
suspended solids and eighty-five per cent of BOD, and thus decreases the impact of organic wastes.\textsuperscript{227} The next step involved provision of a more stringent level of treatment by July 1, 1983.\textsuperscript{228} The 1972 amendments also prohibited the disposal of sewage sludge produced from the operation of a treatment works if it would result in any pollutant from the sludge entering the navigable waters, except in accordance with a permit issued by the Administrator of the EPA.\textsuperscript{229}

For other specific discharges of pollution, termed "point sources," the 1972 amendments provided that by July 1, 1977, such effluents were to be receiving application of the "best practical control technology currently available," as defined by the EPA Administrator.\textsuperscript{230} In \textit{Montgomery Environmental Coalition v. Castle}, EPA argued that combined sewer overflows fall into this category of discharges, and hence do not require treatment as stringent as secondary treatment if such is not practicable.\textsuperscript{231} The U.S. Court of Appeals for the District of Columbia concluded that EPA's position represented the correct interpretation of the FWPCA and that combined sewer overflow points were not treatment works within the meaning of the act.\textsuperscript{232}

To ensure that actual effluent discharges corresponded to established effluent limitations, the 1972 amendments created a permit program to regulate the actual discharges.\textsuperscript{233} The program is known as the National Pollutant Discharge Elimination System (NPDES).\textsuperscript{234} Under this system all POTWs must obtain a permit from the EPA in order to discharge any pollutant into a body of water.\textsuperscript{235} The permits contain three kinds of conditions:

\textsuperscript{227} Kolb, \textit{supra} note 1, at 13, 37. Secondary treatment involves a biochemical process in which bacteria are used to consume organic wastes. In contrast to primary treatment, it includes further sedimentation and more extensive sludge treatment. Secondary treatment thus doubles the amount of sludge produced. \textit{Id.} at 37, 43; Master's Report, \textit{supra} note 1, at 63.

\textsuperscript{228} 33 U.S.C. § 1311(b)(2)(B) (1976). Plants were to implement the "best practicable waste treatment technology."

\textsuperscript{229} 33 U.S.C. § 1345(a) (1976).

\textsuperscript{230} 33 U.S.C. § 1311(b)(1)(A) (1976). "Point source" is defined as "any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." 33 U.S.C. § 1362 (1982).

\textsuperscript{231} 646 F.2d 568 (D.C. Cir. 1980).

\textsuperscript{232} Id. at 591-92.

\textsuperscript{233} Kolb, \textit{supra} note 1, at 17; 33 U.S.C. § 1342(a) (1976).

\textsuperscript{234} 33 U.S.C. § 1342(a) (1982).

\textsuperscript{235} Id.; 33 U.S.C. § 1311(a) (1982).
limitations on the amount and nature of effluent discharges; requirements for monitoring such discharges; and, for discharges which are not in compliance with the national standards at the time the permit is issued, an implementation schedule for achieving compliance.\textsuperscript{236} Permits are issued for periods of not more than five years.\textsuperscript{237} All conditions of a permit are enforceable by the EPA. Section 309 of the FWPCA empowers EPA to issue an order requiring compliance, or to institute a civil action when it finds a violation of a permit.\textsuperscript{238} It also provides for fines or imprisonment for willful violators of a permit, and civil penalties of up to $10,000 per day for each violation.\textsuperscript{239}

In addition to the establishment of effluent limitations and a permit program, the legislation addressed pollution problems stemming from the inability of treatment plants to adequately process certain harmful substances present in sewage. Many constituents of industrial waste, such as toxic chemicals and metals, are not amenable to ordinary sewage treatment.\textsuperscript{240} They pass through treatment facilities unaffected.\textsuperscript{241} Further, toxic chemicals can harm treatment works by destroying bacteria used in the decomposition of organic material.\textsuperscript{242} The amendments, therefore, required pretreatment, at its source, for any pollutant discharged to a POTW if that pollutant is "not susceptible to treatment by such treatment works" or "would interfere with the operation of such treatment works."\textsuperscript{243} The Administrator of the EPA was directed to establish pretreatment standards for the particular sources of such pollutants.\textsuperscript{244}

Regulations implementing the pretreatment strategy dictate that POTWs receiving these incompatible wastes from industrial users shall establish a pretreatment program by July 1, 1983.\textsuperscript{245} Each POTW required to create a program must possess sufficient legal authority and procedural capability to enforce the pre-

\textsuperscript{237} 40 C.F.R. § 122.46(a) (1984).
\textsuperscript{239} \textit{Id.} at § 1319(c), (d) (1982).
\textsuperscript{240} Kolb, \textit{supra} note 1, at 68; Boston Globe, Aug. 20, 1984, at 27, col. 5.
\textsuperscript{241} Kolb, \textit{supra} note 1 at 68; Boston Globe, Aug. 20, 1984, at 27, col. 5.
\textsuperscript{242} Kolb, \textit{supra} note 1 at 68; Boston Globe, Aug. 20, 1984, at 27, col. 5.
\textsuperscript{244} \textit{Id.}
\textsuperscript{245} 40 C.F.R. § 403.8(a), (b) (1984).
treatment standards promulgated by the Administrator.\footnote{Id. at § 403.8(f).} POTW operators must be able to identify the nature of incompatible industrial wastes; control their discharge to the treatment facility by permit or other means; and ensure compliance through industrial self-monitoring and their own inspection.\footnote{Id. at § 403.8(f).}

In order to provide increased federal funding for water pollution control, Congress included in the 1972 amendments a provision establishing an extensive program of construction grants to help finance POTWs.\footnote{33 U.S.C. § 1281 (1976); H. REP. NO. 270, 97th Cong., 1st Sess. 2 reprinted in 1981 U.S. CODE CONG. & AD. NEWS 2630.} Corresponding regulations have created a three step funding process. Step I is Facility Planning, which includes identifying the pollution problems and treatment needs of a planning area, developing alternative solutions, evaluating their environmental impact, and recommending a preferred solution.\footnote{40 C.F.R. § 6.501(a) (1984).} Step II is Facility Design which involves the preparation of engineering plans and specifications for the treatment works.\footnote{Id. at § 6.501(b).} Step III is actual construction.\footnote{Id. at § 6.501(c).}

Since 1972 Congress has twice amended the effluent requirements for POTWs. In 1977 it extended the secondary treatment deadline to July 1, 1983 for those municipalities that had made good faith efforts to meet the 1977 deadline but had been unsuccessful because of inadequate funding.\footnote{Pub. L. No. 95-217, § 45, 91 Stat. 1585; H. REP. NO. 270, 97th Cong., 1st Sess. 2, reprinted in 1981 U.S. CODE CONG. & AD. NEWS 2630; S. REP. NO. 370, 95th Cong., 1st Sess. 1-5, reprinted in 1977 U.S. CODE CONG. & AD. NEWS 4327-31. The 1972 amendments were enacted over the President’s veto, and in the early years of the grant program funds were impounded.} In the same amendments, Congress authorized the EPA Administrator to exempt from the mandate of secondary treatment POTWs which discharge to marine waters.\footnote{33 U.S.C. § 1311(h) (Supp. II 1978).} To qualify for this “waiver” the operator of the POTW must show that the ocean discharge will satisfy certain statutory criteria.\footnote{33 U.S.C. § 1311(h)(1982). The applicant must demonstrate that: (1) There is an applicable water quality standard specific to the pollutant for
ment that the discharge will not interfere with achieving or maintaining a level of water quality which assures protection and propagation of a balanced, indigenous population of fish and wildlife and which allows for recreational activities in and on the water.\textsuperscript{256}

In 1981 Congress approved the Municipal Waste Water Treatment Construction Grant Amendments which significantly reduced the funding amounts for the FWPCA's financial assistance program for municipal sewage facilities.\textsuperscript{257} To compensate for this cutback, the secondary treatment deadline for facilities with construction or financing difficulties was further extended to July 1, 1988.\textsuperscript{258} In addition, the second step of the implementation process requiring achievement of treatment more stringent than secondary was repealed.\textsuperscript{259}

The 1972 amendments also developed a mechanism to assist in the integration of the numerous new features of the FWPCA, so that water pollution control and abatement could be most easily achieved. The amendments called for the states to develop specific plans for the treatment of wastes contributing to water pollution as well as plans for achieving the levels of water quality desig-

\begin{itemize}
  \item Which modification is requested;
  \item Such modified requirements will not interfere with the attainment of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water;
  \item The applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota to the extent practicable;
  \item Such modified requirements will not result in any additional requirements on any other point or nonpoint source;
  \item All applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;
  \item To the extent practicable, the applicant has established a schedule of activities to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works;
  \item There will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit.
\end{itemize}

\textsuperscript{256} Id.


\textsuperscript{258} 33 U.S.C. § 1311(i)(1) (Supp. V 1981). The amending legislation also provided that the time extensions should not be interpreted or applied to extend the 1977 secondary treatment compliance date beyond schedules for compliance in effect on December 29, 1981, except where reductions in federal funding or changed conditions affecting the rate of construction beyond the operator's control would make it impossible to finish construction by July 1, 1983. Pub. L. No. 97-117, § 21(a), 95 Stat. 1631.

\textsuperscript{259} Pub. L. No. 97-117, § 21(b), 95 Stat. 1632.
nated in the states' water quality standards. To this end, states were to prepare waste management plans for urban areas or other regions with substantial water pollution problems (Areawide Plans). In addition, states must establish a continuing planning process for all their navigable waters and include in it all elements from Areawide Plans. The total state plan becomes a guide to implementing the goals of the FWPCA.

2. The National Environmental Policy Act

The control of water pollution through implementation of the FWPCA is itself regulated by the National Environmental Policy Act (NEPA), the landmark legislation that requires all federal agencies to consider the particular environmental consequences of proposed actions that will significantly affect the quality of the human environment before making decisions on such actions. Under the FWPCA the federal agency subject to the mandate of NEPA is, of course, EPA. By statutory limitation, however, the only EPA actions which must be taken in compliance with NEPA are the issuance of NPDES permits for new discharge sources and the granting of federal aid for construction of POTWs. For the purposes of this article, only the NEPA impact on the FWPCA construction grants program is relevant. Accordingly, the discussion of NEPA will be limited to its effect on that program.

Under NEPA, the device for analyzing the environmental consequences of an agency action is the Environmental Impact Statement (EIS). EPA regulations provide a guide for the use of EISs in the environmental review process which accompanies the FWPCA construction grants program. State or local agencies intending to apply to EPA for a construction grant must submit their completed facilities plans to the agency and supply an "environmental information document." This document must describe the effects that construction will have on the environment. If EPA determines that the proposed project will have a

\[361\] Id. § 1288 (1976).
\[362\] Id. at § 1313(e) (1976).
\[363\] Kolb, supra note 1, at 19; 42 U.S.C. § 4332 (1982).
\[367\] Id. at § 6.507(c).
\[368\] Id. at § 6.101(d).
“significant impact on the quality of the human environment,” it must prepare an EIS.\textsuperscript{269} If EPA does not reach such a conclusion, it issues a Finding of No Significant Impact and the grant process may proceed.\textsuperscript{270}

When EPA decides that an EIS is necessary it must establish a scope of issues which will be considered.\textsuperscript{271} It then prepares a draft EIS, which is circulated for comment among governmental agencies with responsibilities relating to the proposed project and to interested citizens.\textsuperscript{272} The main element of an EIS is the evaluation of the proposed project and all reasonable alternatives.\textsuperscript{273} In the draft EIS EPA designates the alternative it prefers.\textsuperscript{274} In response to comments received on the draft EIS, EPA publishes a final EIS on which it may seek further comment.\textsuperscript{275} Finally, EPA must write a Record of Decision explaining its action regarding approval of the facility plan.\textsuperscript{276} The Record of Decision includes measures to be taken by the grantee to ensure that the recommended alternative is environmentally acceptable.\textsuperscript{277}

Though the usual procedure under the FWPCA places the decision to prepare an EIS after the completion of a facility plan, NEPA regulations provide that the NEPA process should be integrated with other planning at the earliest possible time.\textsuperscript{278} In this respect, the specific regulations for the construction grants program provide that certain projects may be excluded from the environmental review process by the EPA Regional Administrator.\textsuperscript{279} Eligible categories include minor rehabilitation of existing facilities and equipment replacement.\textsuperscript{280}

Along with EPA approval provisions of the FWPCA, the environmental review process of NEPA ensures that POTWs built with federal grant funds will provide treatment in a manner which reflects EPA’s philosophy on water pollution control. This strong federal power over local efforts to abate pollution is some-
what mirrored by the authority Massachusetts exercises in the water pollution control area.

B. State Regulation

Massachusetts has its own regulatory scheme for the protection of water quality. The state relies on two statutes which are very similar to the FWPCA and NEPA: the Massachusetts Clean Waters Act and the Massachusetts Environmental Policy Act (MEPA). Both allow for integration of their provisions with the federal statutes. In addition to this legislation, there are laws and regulations which apply directly to the operation of the Metropolitan Sewerage District.

1. The Massachusetts Clean Waters Act

Approved in 1966, the Clean Waters Act established the Division of Water Pollution Control (DWPC) with a mandate to "enhance the quality and value of water resources and to establish a program for prevention, control, and abatement of water pollution." Accordingly, the act makes unlawful the discharge of pollutants into any waters of the commonwealth except in conformity with a permit issued by the DWPC. Permits must include effluent limitations and such monitoring requirements as the director of the DWPC deems necessary. Thus, the state and federal permit programs are closely related.

The act also has a modest financial grant program. The DWPC may give assistance to public entities for the planning, design, or construction of a pollution abatement facility if the entity has received a grant from EPA under the FWPCA construction

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283 MASS. GEN. LAWS ANN. ch. 21, §§ 26, 27 (West 1981).
284 Id. at § 42 (West 1981 & Supp. 1984). The act defines pollutant as:

Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, in whatever form and whether originating at a point or major nonpoint source, which is or may be discharged, drained or otherwise introduced into any sewerage system, treatment works or waters of the Commonwealth.

Id. at § 26A (West 1981).
286 Id. at § 43(7) (West 1981).
286 Id. at § 43(5).
grants program. When the federal grant is seventy-five per cent of a project's eligible cost, the division may provide a fifteen per cent grant. When federal aid is less than seventy-five per cent, the DWPC may award a grant in an amount that ensures the public entity's cost does not exceed ten per cent. Public bodies may also receive grants for the construction of sewage collection systems if the abatement facility to which such systems will connect received a construction grant under the foregoing grant provision. Grants for collection systems are limited to fifty per cent of construction costs and no grant may exceed $2 million.

Like the FWPCA, the Clean Waters Act requires the promulgation of water quality standards for waters within the commonwealth. To this end, the DWPC has established standards which satisfy the requirements of both acts. For coastal and marine waters it has promulgated three classifications: "SC," meaning that the water is designated for fish and wildlife habitation and secondary contact recreation, such as boating, but is unsuitable for shellfishing or primary contact recreation such as water skiing and swimming; "SB," which includes the designated uses of fish and wildlife habitation, both primary and secondary contact recreation, and shellfishing with depuration; and "SA," the highest grade, which includes all of the designated uses of "SB" waters but allows for shellfishing without depuration. In addition to these classifications, all waters of the commonwealth must meet a minimum aesthetic standard of being free from "pollutants in concentrations or combinations that: (a) settle to form objectionable deposits; (b) float as debris, scum or other matter to form nuisances; (c) produce objectionable odor, color, taste or turbidity; or (d) result in the dominance of nuisance species." Bypasses of sewage at Nut Island and discharges from Moon Island produce significant violations of even this minimum standard.

The act explicitly addresses the use of sewer systems. Construction, modification, or use of any extension of or connection to any

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288 Id. See infra note 455.
290 Id.
291 Id. at § 27(5) (West 1981).
292 MASS. ADMIN. CODE tit. 314 §§ 4.00, 4.01(4) (1983).
293 Id. § 4.03. The Inner Harbor is classified SC; waters in the Outer Harbor are classified SB; and along the shore in parts of Quincy and Hingham Bays, the standard is SA. Id. at § 4.05, Table 17.
294 Id. at § 4.03(4).
sewer system is subject to the control of the director of the DWPC. Communities must apply to the DWPC for a permit for all extensions of their local sewer systems or connections to the MDC interceptor system. Under current law, the MDC has responsibility for constructing, maintaining, and operating those facilities which are “required for a system of sewage disposal” for the forty-three communities that make up the MSD. All cities and towns in the MSD must obtain permits from the MDC for all connections of their local sewers to the MDC interceptors.

2. The Massachusetts Environmental Policy Act

The Massachusetts act (MEPA) is modeled after the federal statute. It requires state agencies to evaluate the impact on the environment of all their projects and activities and to carry them out in a fashion which minimizes environmental damage. As with NEPA, the device for implementing the act is an agency statement analyzing potential environmental effects of a proposed action. This is termed an Environmental Impact Report (EIR).

An agency about to undertake a project subject to MEPA must file with the Secretary of Environmental Affairs an Environmental Notification Form briefly describing the expected environmental impacts of the project. Following a review period, the Secretary decides if an EIR is necessary. If it is not, the environmental review process ends and the agency may proceed. If an EIR is required, the Secretary delineates the scope of issues the EIR should address. It must include all measures being taken to minimize environmental damage; environmental consequences which cannot be avoided; and reasonable alternatives to the proposed project, and their environmental effects.

256 MASS. GEN. LAWS ANN. ch. 21, § 43(2) (West 1981).
258 MASS. GEN. LAWS ANN. ch. 92, § 1 (West 1969).
260 Kolb, supra note 1, at 20.
261 MASS. GEN. LAWS ANN. ch. 30, § 61 (West 1979).
262 Id. at § 62A.
263 Id.; MASS. ADMIN. CODE tit. 301, §§ 10.04, 10.08 (1979).
264 MASS. GEN. LAWS ANN. ch. 30, § 62A (West 1979); MASS. ADMIN. CODE tit. 301, § 10.05 (1979).
265 MASS. GEN. LAWS ANN. ch. 30, § 62B (West 1979).
Similar to the NEPA procedure, the agency prepares draft and final EIRs, each of which undergoes a period of review by the Secretary, other interested agencies, and members of the public. After review of draft and final EIRs, the Secretary publishes a statement indicating whether the EIR complies with the requirements of MEPA and its regulations. Ordinarily, when the Secretary determines that a draft EIR does not satisfy MEPA provisions the statement will identify the inadequacies to be remedied in the final EIR. The Secretary’s approval of an EIR, however, is not required before an agency may commence its proposed action.

Because the MEPA procedures are so similar to those of NEPA, the Massachusetts act provides that any draft or final EIS prepared to satisfy NEPA may be submitted to the Secretary in lieu of an EIR. MEPA regulations require that an EIS must comply with the scoping provisions contained in those regulations. The pertinent regulation states that the Secretary of Environmental Affairs shall determine the level of detail and the alternatives to be considered in an EIR. Thus, although approval of an EIR is not necessary, the Secretary may exercise considerable control over projects which involve federal as well as state participation.

The preceding federal and state regulatory mechanisms have established a comprehensive framework for the control and abatement of water pollution. The approach to regulation of pollution has evolved into an integrated scheme of both national and local measures. The success of this regulatory scheme in reducing pollution in Boston Harbor, however, has been virtually nonexistent. Efforts have been made, but progress has been extremely slow.

IV. A BRIEF HISTORY OF POLLUTION CONTROL EFFORTS IN BOSTON HARBOR

Concern over water quality in Boston Harbor is not a new phenomenon. Between 1900 and 1939 the state legislature ini-
tiated six investigations into the condition of the harbor. The last of these resulted eventually in construction of the treatment facilities at Deer and Nut Islands. In 1968, when the Deer Island plant was completed, the Federal Water Pollution Control Administration released a report on harbor pollution which documented recreational, economic, and biological impairment of the harbor's waters. This report generated increased interest in addressing pollution problems, and in the same month it was issued the first Enforcement Conference on Boston Harbor took place. At this conference, state and federal officials agreed on the formation of a technical study group to explore measures for pollution abatement. Subsequent conferences were convened in 1969 and 1971. The recommendations and agreements which grew out of these conferences, in conjunction with the mandates of the FWPCA and the Massachusetts Clean Waters Act, have, until recent legal actions, formed the framework for attacking pollution in Boston Harbor. This framework includes a master plan for the Metropolitan Sewerage System; a sludge management project; and the discharge permits of the MDC and the Boston Water and Sewer Commission.

A. The EMMA Study

Following the 1971 Enforcement Conference, the MDC, the DWPC, and the EPA, which had by then assumed the functions of the Federal Water Pollution Control Administration, entered an agreement which resulted in a comprehensive study of the MSS. The study, the Boston Harbor Eastern Massachusetts Metropolitan Area Wastewater Management and Engineering Study (EMMA) was initiated in 1972 and conducted by the MDC and the U.S. Army Corps of Engineers. Its purpose was to ascertain what repair, replacement, extension, and expansion of facilities was required to provide adequate sewage treatment for the next fifty years.

312 Master's Report, supra note 1, at 26.
313 Id. at 12.
314 Id. at 27.
315 Id., supra note 1, at 24.
316 Id.
317 Id. at 24, 26.
318 Id. at 26.
319 Id.
320 Id.
As the EMMA study progressed a number of recommendations surfaced, including rehabilitation and expansion of the facilities at Deer and Nut Islands; provision of secondary treatment at these plants in response to the mandate of the 1972 FWPCA amendments; incineration at Deer Island of all sludge produced by secondary treatment; and correction of combined sewer overflows. Another recommendation involved the construction of “satellite” treatment plants for the southern portion of the MSS.

When the study was published in March of 1976, its recommendations provoked public opposition. Members of the affected communities objected to satellite plants. There was concern over where the facilities would actually be built; effects on water quality; and potential public health impacts. Residents of Quincy and nearby communities protested as well the expansion of Nut Island into a secondary treatment facility. The controversy focused on the need to fill in twenty-eight acres of Quincy Bay in order to provide a sufficient land area to construct larger facilities. As a result of the public outcry, the Massachusetts Legislature in 1977 enacted a law expressly prohibiting such a filling process for the construction of sewage treatment facilities. Despite this opposition, the EMMA recommendations, including provision for secondary treatment, at some location, remained intact. Altogether, the study proposed a twenty year program of fifty-two distinct projects.

Although the EMMA study began at about the same time as the 1972 amendments to the FWPCA, its drafters did not consider it to be a water quality management plan as defined by the amendments. Nevertheless, EPA approved it as a basin plan for the Boston Harbor Drainage Area. The EMMA study also be-

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311 Id. at 28-29.
312 Id. at 28. A plant in the Natick area would discharge to the Charles River and a facility in the Town of Norwood would discharge to the Neponset River.
313 Id. at 31.
314 Id. at 29.
315 Id.
316 Id. at 31; 1977 Mass. Acts 296.
317 Kolb, supra note 1, at 31-32; Master’s Report, supra note 1, at 29.
318 Kolb, supra note 1, at 29.
319 Id. at 31.
320 Id. The initial regulations under Section 303 of the Act required states to develop water quality management plans for individual river basins. Subsequent regulations implemented a consolidated statewide planning process. Kolb, supra note 1, at 14.
came part of the special Areawide Plan for the metropolitan Boston area and emerged as a guideline for pollution control operations.\footnote{Id. at 33-34.}

1. Upgrading of the MSS Treatment Facilities

In the fall of 1976, following publication of the EMMA study, EPA’s regional office determined that an EIS should be prepared before any facilities planning commenced for those EMMA projects relating to upgrading of the MSS.\footnote{Id. at 53.} EPA based its decision on the interrelationship of the projects and the magnitude of their potential environmental effects.\footnote{Id. at 53-54.} Issues addressed in the draft EIS included alternative sites for the harbor’s treatment facilities and the engineering and environmental feasibility of satellite plants.\footnote{Id. at 54. See supra text and note at note 324.} To make this feasibility assessment, EPA’s contractor conducted mathematical modeling of the impacts of discharged effluent on the Charles and Neponset Rivers.\footnote{Id. at 55.} The modeling took longer than expected and the draft EIS was not available for comment until September, 1978.\footnote{Id. at 54.} When completed, the modeling projected adverse effects on the water quality of both rivers and the EIS recommended against satellite plants.\footnote{Id. at 54.} It thereby eliminated the controversy over that option, but it also created a new problem.

The draft proposed the consolidation of all harbor treatment facilities on Deer Island.\footnote{Id.} It determined that the poor condition of the Nut Island plant made the cost of renovation about equal to that of building new primary treatment facilities at another location.\footnote{Id. at 53-54.} Therefore, it settled on expansion of the much newer plant at Deer Island and construction of a pipeline under the harbor to transport sewage from Nut Island to Deer Island.\footnote{Id. at 54.} During the EIS comment period, residents of Winthrop objected to the new

\footnotesize{\textsuperscript{331} Id. at 33-34.  
\textsuperscript{332} Id. at 53. Those projects included the rehabilitation of the primary treatment facilities at Deer and Nut Islands and their expansion to handle future volume; construction of satellite treatment plants; and renovation of the MDC interceptor sewers.  
\textsuperscript{333} Id.  
\textsuperscript{334} Id. at 53-54.  
\textsuperscript{335} Id. at 54. See supra text and note at note 324.  
\textsuperscript{336} Id. at 55.  
\textsuperscript{337} Id. at 54.  
\textsuperscript{338} Id.  
\textsuperscript{339} Id.  
\textsuperscript{340} Id.}
arrangement, noting that their community had more than its share of negative impacts, from the present Deer Island plant, the Suffolk County House of Correction, also located on Deer Island, and the air traffic noise from Logan Airport. 341

Meanwhile, a few months prior to publication of the draft EIS, the MDC had responded to the 1977 amendments to the FWPCA and submitted a preliminary application for a waiver of secondary treatment. 342 If a waiver were granted much of the construction contemplated in the EMMA study would be deferred, at least until expiration of the modified permit, and perhaps indefinitely if the permit were renewed. 343 Nevertheless, because regulations pertaining to the waiver process require facilities plans to include a secondary treatment alternative, the MDC, following release of the draft EIS, began preparation of a facilities plan for upgrading which would consider alternative sites for secondary as well as primary treatment facilities. 344 The MDC established a two phase facilities planning procedure with the first phase including only an evaluation of various sites for treatment facilities. 345

In 1982 the MDC released its Phase 1 results. 346 After several years of study the recommended option was simply retention of the current treatment arrangement with improved and lengthened outfalls. 347 At the same time, the MDC reported plans for immediate repairs at Nut Island to remedy the sorry conditions there. 348 In June of 1983, EPA awarded a grant to help fund these repairs. 349 By April 1984, an MDC official was able to report that improvements at the plant had made operations more reliable. 350 However, MDC Commissioner William Geary observed that regardless of upgrading, the addition of stormwater into the sewer system would still cause sewage flows to exceed plant capacity during wet weather. 351

341 Id. at 55.
342 Id.
343 Id. Permits are issued for no more than five years. See supra text at note 237.
344 Id. at 55-56; 40 C.F.R. § 35.2112 (1984).
345 Kolb, supra note 1, at 56.
346 Harbor Update, supra note 89, at 2.
347 Master's Report, supra note 1, at 192.
348 Id.; Harbor Update, supra note 89, at 3.
349 Harbor Update, supra note 89, at 3.
350 Boston Globe, Apr. 6, 1984, at 15, col. 3.
351 Boston Globe, Apr. 22, 1984, at 22, col. 2. In December 1983, Governor Dukakis approved a bill authorizing the expenditure of $10 million for rehabilitation of the Deer Island plant. When requesting the aid, MDC Commissioner Geary stated that $10 million
During the interim, EPA had added a new wrinkle to the cleanup process. It decided to prepare a supplemental draft EIS on the siting of new treatment facilities for the harbor, in order to update the results of the original EIS released in 1978.\footnote{Harbor Update, supra note 89, at 1-2.} In January of 1985, the completed draft proposed seven siting alternatives: three based on primary treatment and four involving the application of secondary treatment.\footnote{Kolb, supra note 1, at 80.} At the conclusion of the EIS process, following publication of a final EIS, EPA will prepare a Record of Decision that will dictate the siting of facilities.\footnote{Harbor Update, supra note 89, at 1, 6.}

2. Control of Combined Sewer Overflows

With regard to combined sewer overflows, EMMA recommended that facilities planning be undertaken to address CSO problems along the Charles River, in the Inner Harbor, and around Dorchester Bay.\footnote{Kolb, supra note 1, at 78.} However, the harmful effects of CSOs had already existed for a number of years, and some measures to ameliorate pollution from CSOs had already been undertaken.\footnote{See supra text at notes 106-21.}

In 1967, a consultant hired by the City of Boston conducted an extensive investigation of means to remedy the problems associated with CSOs.\footnote{Id. Separation of combined sewers is generally accomplished by installing separate sanitary sewers alongside larger combined sewers and leaving the combined sewers to serve as storm drains. For smaller combined sewers, new storm drains are laid and the combined sewers serve as sanitary sewers. Id. at 94.} Methods examined included the separation of all combined sewers in the metropolitan area and construction of detention tanks at various points throughout the MSS to store excess flow and return it to the system as capacity became available.\footnote{See supra text at notes 409-18.} The study concluded that it would be simply too expensive to dig up and separate all the combined sewers contributing to overflow conditions.\footnote{Boston Globe, Dec. 21, 1982, at 17, col. 2.} The cost of building a sufficient number of detention facilities was likewise prohibitive.\footnote{Id.} Instead, the consul-
tant recommended a Deep Tunnel Plan under which overflows would be collected by a series of sewer pipes, conveyed through a system of rock tunnels, and, after screening and chlorination, discharged about nine miles out in Massachusetts Bay. The estimated cost of this plan was $430 million in 1967 dollars, but it was still the least expensive option.

Despite the cost of sewer separation and detention facilities, these alternatives have been implemented in some areas. In Boston, for example, the separation of combined sewers has often coincided with urban renewal projects of the Boston Redevelopment Authority. The MDC, in 1971, completed construction of a detention facility to control CSOs along the Boston and Cambridge shores of the Charles River. Two large sewer lines intercept overflow volume from different points along the river and channel it to the detention station. There, the sewage can be held and returned to the system as capacity becomes available. Flows that exceed the facility's capacity receive screening, sedimentation, and chlorination. Settled solids are flushed back into the interceptor system leading to Deer Island, and the effluent is released into the river. The MDC has built similar facilities further upstream on the Charles and on the Mystic River in Somerville.

Following publication of EMMA, the MDC initiated facilities planning to develop control strategies for CSOs in those areas identified in the study. In the spring of 1982, MDC consultants released a plan which recommended a variety of measures, including sewer separation, tidegate and regulator maintenance programs and detention facilities. Compared to the 1967 recommendation, the estimated cost of the proposals is the more modest figure of $279 million. Portions of the plan aimed at eliminating CSOs in the Inner Harbor are currently being im-

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361 Kolb, supra note 1, at 78.
362 Id.
363 Id. at 77. Section two of Massachusetts General Laws, chapter 92 provides that all sewer systems and extensions which are constructed after January 1, 1976 and which will connect to the MSD shall be constructed as separate sanitary and storm sewers. MASS. GEN. LAWS ANN. ch. 92, § 2 (West Supp. 1984).
364 Kolb, supra note 1, at 76.
365 Id. The facility is located near the Boston University Bridge.
366 Id. at 76-77.
367 Id. at 77.
369 Id.
Yet, even if CSO correction in the northern portion of the MSS is completed, "overflows" discharged from Moon Island are expected to continue.\(^\text{371}\)

**B. Sludge Management**

Another pollution problem that received considerable attention prior to the release of EMMA was the disposal of sewage sludge. The participants in the 1969 Enforcement Conference proposed the development of a water quality model of Boston Harbor which could be used to assess the effects of sewage discharges.\(^\text{372}\) The DWPC contracted for preparation of a model, and a research report was published in 1971. The model indicated that sludge released from Deer and Nut Islands was causing a buildup of harmful deposits on the floor of the harbor.\(^\text{373}\) Consequently, the MDC agreed with the DWPC that it would evaluate alternative means of sludge disposal.\(^\text{374}\) In 1973, it published a Sludge Management Plan which concluded that incineration would produce the least negative environmental impact.\(^\text{375}\) The report recommended that incineration of sludge from both Deer and Nut Islands take place at Deer Island.\(^\text{376}\)

The MDC intended to apply to EPA for a construction grant for the sludge management facilities, and prepared an Environmental Assessment Statement. A public hearing on the completed statement took place in April 1975, and, because of citizen opposition and its own concerns about incineration, EPA determined that an EIS was necessary.\(^\text{377}\) Completed in February 1976, the draft EIS also recommended incineration as opposed to the other alternatives of ocean disposal or application to land as compost.\(^\text{378}\) EPA submitted the draft to the Massachusetts Secretary of Environmental Affairs to satisfy the requirements of MEPA.\(^\text{379}\)

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\(^{371}\) Master's Report, *supra* note 1, at 152.

\(^{372}\) Kolb, *supra* note 1, at 25.

\(^{373}\) *Id.* The model indicated that of all sludge discharged on the outgoing tide, fifteen to twenty per cent returned when the tide changed and settled on the harbor's floor near Deer Island.

\(^{374}\) *Id.*

\(^{375}\) *Id.* at 45.

\(^{376}\) *Id.*

\(^{377}\) *Id.* at 46. Environmental information documents were formerly termed Environmental Assessment Statements.

\(^{378}\) *Id.* at 46-47.

\(^{379}\) *Id.* at 47.
1976, the Secretary released a statement that the draft EIS did not adequately comply with MEPA because it failed to sufficiently evaluate alternatives to incineration. She requested additional study of such alternatives, including land application of sludge.

A period of three years then elapsed before EPA completed a final EIS. Once again, EPA concluded that incineration was the most feasible and least environmentally harmful option, but it ordered an update of the MDC's 1973 Sludge Management Plan in order to consider the viability of composting as an adjunct or alternative to incineration. Following release of the final EIS in March 1979, it underwent a public comment period. Residents of Winthrop and Boston protested construction of the incinerators near a densely populated area that was already experiencing environmental stress. They felt the incinerators would only exacerbate current conditions through increased air pollution.

In addition, a new Secretary of Environmental Affairs issued a statement that the final EIS also did not comply with MEPA because of insufficient data on incineration and composting alternatives.

In 1980, the EPA granted funds to the MDC to prepare the update of its Sludge Management Plan. The MDC published the update in 1982. While recommending incineration at Deer Island, the update did propose some composting. Subsequent review of

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380 C. Breen, Massachusetts Office of Coastal Zone Management, Sludge Management Alternatives for the Metropolitan District Commission (Draft) Attachment A [hereinafter cited as Sludge Draft].
381 Id.
382 The delay was partly the result of changes in federal legislation. During this time, Congress amended the FWPCA, the Clean Air Act, and the Marine Protection, Research and Sanctuaries Act (MPRSA). Amendments to the FWPCA directed the EPA Administrator to publish guidelines for the disposal of sewage sludge and made it unlawful for any operator of a POTW to dispose of sludge from such works in any fashion for which guidelines had been developed unless the procedure was in accordance with the guidelines. The MPRSA amendments ordered the elimination of sewage sludge disposal by means of ocean dumping. Kolb, supra note 1, at 48; 33 U.S.C. §§ 1345(d), (e), 1412a (Supp. II 1978). The MPRSA was further amended in 1980 to allow ocean dumping of sewage sludge in emergency situations endangering human health if no other solution is feasible. 33 U.S.C. § 1412a (Supp IV 1980).
383 Sludge Draft, supra note 380, Attachment A.
384 Kolb, supra note 1, at 49.
385 Id.
386 Id.
387 Id. at 50.
388 Sludge Draft, supra note 380, Attachment A.
389 Id.
the update by the EPA and state officials revealed a number of deficiencies in the document. A major problem centered on evaluation of the air quality impacts related to incineration.

When Judge Garrity entered the September 9, 1983 order in *City of Quincy v. Metropolitan District Commission*, the attached schedule of cleanup measures included action on the sludge management issue. It established deadlines for the analysis of incineration and comments on the update by the Department of Enviromental Quality Engineering (DEQE) and the MDC, as well as a timetable for implementation of actual sludge disposal methods. On July 16, 1984, citing the state’s failure to comply with three of the deadlines, the EPA Regional Administrator ordered the MDC to submit preliminary plans for the halt of sludge discharges by September 7. Responding to the order, the MDC presented four options for further study: composting and subsequent marketing as landfill or fertilizer; scattered dumping far off the New Jersey shore; landfllling; and incineration. A schedule accompanying the MDC plan proposed a two to three year research period of the various options and officials within the MDC indicated that no new permanent disposal procedure could be implemented before the late 1980’s or early 1990’s.

C. Boston Harbor Pollutant Discharge Permits

Two NPDES permits, both issued jointly by EPA and the DWPC, govern the discharge of sewage into Boston Harbor. One permit belongs to the MDC and authorizes discharges from Nut and Deer Islands and also from certain combined sewer overflow points. The other, issued to the Boston Water and Sewer Com-
mission, regulates discharges from Moon Island and numerous combined sewer overflows.388

Though the use of Moon Island as a discharge site is directly related to the MDC's operation of its Deer Island facility, the MDC permit makes no mention of Moon Island.399 As noted earlier, the Moon Island facility is incapable of providing any treatment. Recently, however, the BWSC decided to install chlorination facilities at the pumping station that sends sewage to Moon Island.400 This will enable the BWSC to chlorinate about 20 MGD of Moon Island effluent.401

In addition to specific effluent guidelines for Deer and Nut Islands, the MDC permit contains requirements for monitoring the discharges from each of the plants and for monthly reports to the EPA and the DWPC.402 It also imposes treatment implementation schedules and directs the MDC to conduct a survey of all major contributing industries and to establish an industrial pretreatment program.403 The MDC received EPA approval of its pretreatment program in July, 1982.404 However, environmental organizations have charged that research and discharge statistics indicate the MDC's program is ineffective.405

The permit further dictates that after July 1, 1977, discharges from both Deer and Nut Islands shall be receiving secondary treatment.406 After this date, discharges are not to cause visible discoloration of the receiving waters or violate the water quality standards of the receiving waters.407 Moreover, the permit requires the elimination of sludge discharges by July 1, 1977.408 Provision of only primary treatment at Deer and Nut Islands and

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388 Master's Report, supra note 1, at 23.
389 Permit No. MA0102351.
399 Master's Report, supra note 1, at 108.
400 Master's Report, supra note 1, at 108.
401 Id. The facilities, however, will only provide chlorination to dry weather discharges.
402 Permit No. MA0102351 at 15, 17.
403 Id. at 12-13.
404 Waiver Application Analysis, supra note 5, at 46.
406 Permit No. MA0102351 at 5, 8.
407 Id. at 5, 9.
408 Id. at 5, 8, 14.
the environmentally degrading impact of discharges from the plant make it evident that the MDC is violating its permit. In response to this situation the MDC is attempting to obtain a secondary treatment waiver.

The MDC submitted a waiver application in September, 1979.400 The application was based upon a proposal of improved operation of primary treatment and construction of an ocean outfall system to discharge effluent from both Deer and Nut Islands farther out from the plants into the waters of Massachusetts Bay.410 In June of 1983, EPA tentatively denied the waiver request. EPA's 301(h) Task Force found that the proposed discharge would violate certain of Massachusetts' water quality standards.411 It also concluded that the discharge would interfere with the protection and propagation of a balanced, indigenous population of marine life and would impair recreational use of the surrounding waters.412 The Task Force further declared that the MDC had not sufficiently determined the sources of PCBs in its effluent, and as a result the level of PCBs present in the proposed discharge would preclude satisfaction of the waiver requirements.413

EPA regulations allow waiver applicants to revise and resubmit their applications within one year of the tentative decision.414 The MDC has decided to reapply for a waiver,4t.) and a decision by the regional office is expected in 1985.416

D. Legal and Legislative Action

Despite the use of pollution control permits, numerous plans, and even specific construction and rehabilitation projects, actual progress in cleaning up Boston Harbor has been extremely slow. Sewage discharges continue to harm marine life, foul beaches and pose health threats. As a result the pollution problem has found its way to the courts.

400 Waiver Application Analysis, supra note 5, at 1.
410 Id. Specifically, the MDC sought a variance of the secondary treatment removal levels for suspended solids and BOD.
411 Id. at 4. The Task Force concluded the proposed discharge would not comply with the Massachusetts standard for BOD.
412 Id. at 4.
413 Id. at 46-47.
415 Letter from William Geary, MDC Commissioner, to Michael Deland, EPA Region 1 Administrator (Aug. 11, 1983).
416 Letter from Paul Pan, Director, Office of Marine Discharge Evaluation, to William Geary, MDC Commissioner (June 30, 1983); News Tribune, Dec. 21, 1984, at 12, col. 5.
Following the institution of litigation by the City of Quincy, two other harbor related actions were initiated. In June of 1983, the Justice Department sued the MDC on behalf of EPA over the MDC's failure to monitor discharges from Nut Island, in violation of its NPDES permit. During the same month, the Conservation Law Foundation of New England (CLF) filed a suit against both the MDC and EPA. The plaintiff sought a court ordered timetable for upgrading of the MSS, alleging that EPA was shirking its enforcement responsibilities under the FWPCA. Both of these suits proceeded in the shadow of City of Quincy v. Metropolitan District Commission. In February of 1984, the MDC agreed to pay a $15,000 fine to settle the action brought by EPA. The settlement agreement established a July 1, 1984 deadline for the MDC to achieve compliance with its monitoring requirements and subjected the MDC to additional fines of $500 per day for violation of the agreement. In March 1984, the U.S. district court suspended proceedings in Conservation Law Foundation v. Metropolitan District Commission, pending future developments in City of Quincy v. Metropolitan District Commission. The threatened remedies available to Judge Garrity in the Quincy lawsuit spurred creation of the Massachusetts Water Resources Authority, which will replace the MDC on July 1, 1985 as the operator of sewage collection and treatment facilities for the metropolitan Boston area.

The Water Resources Authority Act establishes the Authority as an independent public agency under the Executive Office of Environmental Affairs (EOEA). The Authority will function under the supervision of an eleven member board of directors, which shall include as an ex officio member and chairperson, the Secretary of the EOEA. The act also provides for an advisory
board, consisting of voting representatives from each of the cities and towns served by the Authority, to make recommendations to the Authority on its expenses and to review its records and operations.  

As identified in the act, the goals of the Authority are the efficient and economical operation of sewage collection and treatment systems, including programs for reduction of I/I; the repair, replacement, and modernization of such systems; and establishment of charges designed to conserve water. The Authority is empowered to require compliance by sewer system users with applicable state and federal pollution control laws. It is directed to establish charges for its services, which will be assessed to the municipalities utilizing such services. In addition, it is declared eligible for grant money under the Massachusetts Clean Waters Act and is authorized to take all necessary action to secure federal financial assistance.  

With respect to the transition of power from the MDC, the act provides that all regulations and permits respecting the MSD promulgated by or on behalf of the MDC shall remain effective, so
far as consistent with the Act, until modified by the Authority.\textsuperscript{430}
Beginning on July 1, 1985, the Authority is directed to take all reasonable measures to continue planning and begin construction of treatment and collection projects for which planning and design contracts were approved by the MDC prior to January 1, 1985.\textsuperscript{431}

On the heels of the celebration attending passage of the Water Resources Authority Act, the EPA announced its intention to take additional action to help secure a harbor cleanup. The day after the act was signed into law, the Regional Administrator announced EPA's intention to bring suit in federal court, requesting a set of deadlines for pollution control projects.\textsuperscript{432} Filed at the end of January, 1985, the suit named four defendants: the MDC, the Authority, the state and the BWSC.\textsuperscript{433}

Pollution control efforts in Boston Harbor have been fraught with delays and public protest. The EMMA study provided an outline for attacking the harbor's pollution problem, yet the work that has been carried out has done little to relieve the harmful impacts associated with operation of the Metropolitan Sewerage System. Under the direction of EPA, major improvements to the system are nearly ready to proceed from years of planning into actual implementation. Responding to judicial pressure, the state legislature has established a new agency to ensure that these improvements become a reality. The goal of a clean harbor has been a long time in the hoping. Can it at last be achieved? This question will now be considered.

V. TOWARD A CLEANUP OF BOSTON HARBOR

Creation of the Massachusetts Water Resources Authority has been hailed as a major advance in the effort to clean up Boston Harbor. At the same time, both state and federal officials have observed that the birth of a new authority is only a first step in a long and involved process.\textsuperscript{434} Decision making, planning, and actual construction and repair all lie in the future. The first step, though, will enable the cleanup to proceed in a much smoother

\textsuperscript{430} Id. at § 4(f).
\textsuperscript{431} Id. at §§ 70, 73.
\textsuperscript{432} Boston Globe, Dec. 21, 1984, at 1, col. 1, at 11, col. 1.
\textsuperscript{433} Boston Globe, Feb. 1, 1985, at 19, col. 6.
fashion than if the MDC were still directing the operation of the MSS. This section will explore the failings of the MDC that prompted the drive for a new agency, and how the Water Resources Authority Act remedies those inadequacies. It will also discuss the roles of EPA and local communities in reversing the trend of harbor pollution.

A. Why a New Authority?

Pursuant to the Procedural Order of September 9, 1983 in City of Quincy v. Metropolitan District Commission, the MDC hired a financial consultant to prepare a funding plan for the harbor cleanup.\(^435\) In February, 1984, a lengthy report was released, concluding that the best approach was what legislators and the governor had already proposed: formation of an independent authority to take over the functions of the MDC.\(^436\) The report stated that “[p]roblems with the funding mechanism and organizational structure of the MDC are too serious and structural in nature to be alleviated through modification of the MDC.”\(^437\) An examination of these “problems” explains the support for a new authority.

Cost estimates for the cleanup of Boston Harbor run as high as $2 billion.\(^438\) Even if it obtained federal grant money, the MDC would not have sufficient resources to shoulder this financial burden.\(^439\) The MDC levies sewer service assessments on the cities and towns of the MSD.\(^440\) The money collected, however, goes to the state’s general fund, not the MDC budget.\(^441\) The operations budget for the MDC’s Sewerage Division is set annually by the state legislature, where a majority of the lawmakers represent non-MSD member communities.\(^442\) The MDC must rely for its funding on many legislators whose constituents receive no benefit from monies allocated to the MSD budget. Moreover as a former

\(^{436}\) Id. at col. 1.
\(^{437}\) Id. at col. 2.
\(^{439}\) MDC Commissioner, William Geary, testified at the receivership trial that his agency simply does not have the funding to solve the harbor’s pollution problem. Boston Globe, Dec. 5, 1984, at 7, col. 2.
\(^{440}\) MASS. GEN. LAWS ANN. ch. 92, § 6 (West Supp. 1984).
\(^{441}\) MASS. GEN. LAWS ANN. ch. 29, § 2 (West 1979).
\(^{442}\) Id. at §§ 3, 12, 27; Boston Globe, Dec. 20, 1982, at 18, col. 2.
chairman of the Massachusetts Senate Ways and Means Committee observed, appropriating public money for components of the "invisible infrastructure," such as sewer systems, is quite difficult.443

According to a 1976 audit by EPA, the budget process prevents the Sewerage Division from acquiring funds necessary to secure a continuing and efficient operation of the MSS.444 The audit disclosed that the Sewerage Division had not been adequately funded for a number of years.445 It concluded that lack of money was the "most significant factor" contributing to operational difficulties at the Nut Island plant.446

In recent years, the MDC's financial status has been further weakened by a state tax limitation law known as Proposition 2 1/2.447 This measure limits the increase in charges assessed by the MDC to two and one-half per cent of the total of such charges for the preceding fiscal year.448 The MDC, then, is not able to charge communities the true cost of providing sewer services. Millions of dollars in deficits have been absorbed by the state, a cause of growing concern for legislators from non-MSD communities.449

Budget constraints are not the only financial obstacles to the MDC's cleanup of the harbor. The budget provides money for operating expenses, but for major construction projects, which will assuredly be necessary to effect a cleanup, the MDC must depend on revenues from the sale of state bonds.450 Legislative approval of a bond issue is currently very difficult. Massachusetts residents already support the sixth largest per capita bond indebtedness in the country.451 In November 1983, the state was paying $1 million per day in interest on its debts.452 In January of 1984, the governor signed a bonding measure for $724 million worth of state construction and acquisitions.453 Issuance of addi-
tional bonds to fight harbor pollution could jeopardize the state’s credit rating. 454

Federal funding under the FWPCA offers financial relief to the MDC, but recent developments have diminished the contribution this avenue of assistance can make to the cleanup of the harbor. The construction grants program has incurred substantial cutbacks. Reductions have been made in the percentage of a project’s cost eligible for federal money, the types of projects qualifying for grants, and the total amount of money available. Originally, the amount of a grant was seventy-five per cent of a project’s cost, but the 1981 amendments to the act decreased this figure to fifty-five per cent for fiscal years beginning on or after October 1, 1984. 455 In addition, grants to provide assistance solely for facility planning or facility design were eliminated. 456

In conjunction with these scaled down funding levels, the 1981 amendments added a new section to the act which provides that it is the policy of Congress to limit federal financial assistance to those treatment projects which are the most economical and cost effective methods of meeting the act’s requirements. 457 This cost effectiveness restriction has an especially acute impact on current pollution control needs for Boston Harbor. Because it will take at least ten years to put new and improved treatment facilities in place, there is a need to take action that will ameliorate the inadequacies of the present system. 458 One measure which will

455 33 U.S.C. § 1282(a) (1976 & Supp. V 1981). Section 62 of the Water Resources Authority Act amended the Massachusetts Clean Waters Act to provide that where a federal grant is fifty-five per cent, the DWPC may award a thirty-five per cent grant. If the federal grant is less than seventy-five per cent or fifty-five per cent, as the case may be, the DWPC may award assistance to ensure that the public entity’s share of the project’s eligible cost does not exceed ten per cent. The section also states that where a project eligible for a federal grant does not receive federal money, the DWPC may make a grant of up to thirty-five per cent of the project’s eligible cost. 1984 Mass. Acts 372, § 62.
456 33 U.S.C. § 1281(1) (Supp. V 1981). The amendments provide that if a project receives a federal grant for construction, the EPA Administrator shall make an allowance in the grant for non-federal money spent on facility planning and design. A portion of each state’s allotment of federal funds, not to exceed ten per cent, is to be used to advance to potential grant applicants the cost of facility planning and design, but only to applicants that are small communities and that in the judgment of the state would otherwise not be able to prepare a construction grant request.

A 1982 amendment to the Massachusetts Clean Waters Act authorized the DWPC to advance funds to public entities for facility planning and design, when federal funding is not provided. 1982 Mass. Acts 286, § 3.
help to decrease pollution immediately is the removal from the system's sewer lines of infiltration/inflow, which contributes to combined sewer overflows, bypasses at Nut Island, and discharges from Moon Island. Reporting to the court, Special Master Haar observed that I/I removal would significantly affect the harbor's water quality and should be quickly commenced. The removal of I/I will produce long-term benefits by making room for the additional sewage that will inevitably accompany future development in the metropolitan Boston area. Yet, the cost effectiveness formula employed by EPA discriminates against I/I reduction in the MSS.

Under the EPA formula it is cost effective to remove I/I through sewer system rehabilitation when such a project is less costly than transportation to and treatment of the I/I at a sewage treatment facility. The costs of transportation and treatment, however, do not include the costs of pollution: health hazards; depreciation in real estate values; harm to shellfish flats; and damage to recreational areas; which are incurred or increased when I/I causes treatment plant capacity to be exceeded. The formula thus denies federal funding for projects which are cost effective when all costs are considered. For example, studies using the EPA formula indicate that it would be cost effective to remove only fifteen per cent of the infiltration and twenty-eight per cent of the inflow from the southern system of the MSS. In studies not following the EPA formula, state officials have calculated that thirty per cent of infiltration and fifty per cent of inflow in the southern system can be removed cost effectively. A removal of that magnitude would eliminate 113 MGD of flow from the southern system. The reduction would dramatically decrease the volume and frequency of bypasses at Nut Island and limit use of outfall.

459 Master's Report, supra note 1, at 141.
460 Id. at 59; Office of Water Program Operations, Environmental Protection Agency, Guidance for Sewer System Evaluation 4, 8 (Mar. 1974) [hereinafter cited as Guidance].
461 40 C.F.R. 35, Subpart E, Appendix A (1984); Guidance, supra note 460; Master's Report, supra note 1, at 59.
462 Id.
463 Id.
464 Id. at 140.
465 See supra text and notes at notes 122-23. In late 1984, the Massachusetts Legislature enacted a bill authorizing the director of the DWPC to spend up to $100 million for grants to cities, towns and sewerage districts to assist in I/I removal. 1984 Mass. Acts 472.
effective approach to control of pollution in Boston Harbor.

The 1981 amendments also cut back on funding for projects to correct combined sewer overflows, which account for the dumping of millions of gallons of raw sewage into the harbor. The legislation dictated that after October 1, 1984, only certain pollution control work could qualify for grant money. CSOs were not included among the projects that remained eligible. Instead, they were listed in a clause which allows the governor of a state to set aside twenty per cent of the state's yearly allotment of federal funds for the various projects that were removed from eligibility. Therefore, the money available for CSOs is also eligible to be obligated for other projects and may be less than twenty per cent of the state's allotment. A compromise provision added a special section authorizing a $200 million yearly appropriation for construction designed to remedy pollution problems in marine bays resulting from CSOs, but the program has not been fully funded. In fiscal 1983, for example, only $30 million were actually appropriated. During the City of Quincy litigation, the MDC indicated that these funding cuts might prevent completion of its CSO projects.

To compound matters, the amendments reduced total authorized appropriations for the construction grants program. Prior to the amendments, authorized appropriations for each of the years 1979 through 1982 totaled $5 billion; the change dropped the amount for fiscal years 1982 through 1985 to $2.4 billion. Under the allotment formula for fiscal 1984 and 1985, Massachusetts' share of this sum is approximately $83 million per year. With the cost of providing new treatment facilities alone estimated at $1 billion over ten years, it is clear that a major source of non-federal money is necessary to ensure a complete cleanup of the harbor. This point is underscored by President Reagan's proposed 1986 budget, which recommends further cuts in au-

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466 33 U.S.C. § 1281(g)(1) (Supp. V 1981). Following this date eligible projects are limited to those implementing secondary or more stringent treatment or any cost effective alternative, new interceptors and appurtenances and infiltration/inflow correction.


470 Master's Report, supra note 1, at 152.


thorized appropriations for the construction grants program. The Reagan Administration hopes to phase out federal funding entirely.

Saddled with such financial restrictions, the MDC would not have been able to support the expenditures necessary to improve the waters of Boston Harbor. The legislation establishing the Massachusetts Water Resources Authority provides the Authority with those financial tools the MDC lacked. Principally, the Authority is empowered to issue its own bonds for any of its corporate purposes, and without the approval of any official or agency of the state. The Authority may set sewer charges which accurately reflect the cost of providing service to the subscribing cities and towns. The rates are to be sufficient to meet all operating expenses, debt service on bonds, and the costs of maintenance and replacement of the sewer system. Revenues received may be applied without any allotment by the state or any political subdivision. The act grants to the Authority the fiscal independence and capability to effectively pursue a cleanup of the harbor.

Still, money is not the only problem facing the MDC. The agency must also cope with personnel inadequacies. The hiring procedure for MDC employees is governed by the Civil Service System. All appointments, except for labor positions, are made on the basis of lists established by administration of examinations. Examinations vary, depending on the knowledge and abilities deemed necessary for the particular job at issue. The lists rank applicants according to their examination scores; veterans who pass receive preference. It has been asserted by one

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476 1984 Mass Acts 372, §§ 12(a), 15. The aggregate amount outstanding at any one time is not to exceed $600 million.
477 Id. at § 10(a).
478 Id. at § 6(h).
479 MASS. GEN. LAWS ANN. ch. 28, § 3, ch. 31, § 48 (West 1981 & Supp. 1984). Unless expressly exempted by the civil service law or other statute, all offices and positions of the state are subject to the Civil Service System.
480 MASS. GEN. LAWS ANN. ch. 31, §§ 6, 28 (West 1979). Persons applying for labor positions are placed on employment registers in the order in which they apply. However, veterans are placed above all other applicants.
481 Id. at § 16 (West Supp. 1984). Examinations are conducted under the direction of the Administrator of the state department of Personnel Administration.
482 Id. at § 26. The specific order of placement is: disabled veterans; veterans; widows or widowed mothers of veterans who were killed in action or died from a service connected disability incurred in wartime service; all other applicants.
critic that the Civil Service System is one of the reasons behind the discharge of untreated sewage. Because people can qualify for positions simply by taking an examination, the system is not "competency based;" many of the Sewerage Division's "engineers," it is claimed, have little if any academic training in engineering.

The civil service law provides for examinations to establish lists of persons with bachelor's and master's degrees and the ranking of persons for scientific or professional positions based on experience and education. Another statute authorizes the MDC to employ civil engineer interns. However, low salaries make it difficult to attract trained engineers and staff. The MDC faces competition from the private sector as well as from other public entities.

The Water Resources Authority Act provides that employees of the Sewerage Division shall be transferred to the Authority without impairment of civil service status, seniority, and compensation, but all future employees will not be governed by the Civil Service System. This arrangement avoids the inequities of unexpected dismissal of current employees while freeing the Authority from the strictures that hindered the MDC. The Authority is empowered to employ engineers, architects, planners, and other personnel according to its own terms of compensation. Further, the act allows for regular scrutiny of job performance. Except for the executive director, officers and employees of the Authority shall serve at the pleasure of the board of directors or under collective bargaining agreements or employment contracts, but no such contract shall be for a term of more than three years.

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484 Id. at 18, col. 1.
487 Boston Globe, Dec. 20, 1982, at 18, col. 1. In late 1982, the director of the Sewerage Division observed that the "backbone" of the staff was a group of retired Navy men on pensions who learned how to operate diesel engines in their military service. Id. at col. 4.
488 Id. at 18, col. 3. Recently the MDC spent four months trying to hire an engineer to monitor discharges from Nut Island. It was during this interval that discharges went unchecked, thereby prompting EPA's enforcement suit. At the end of October, 1984, MDC Commissioner Geary declared that his agency was unable to manage the work necessary to halt harbor pollution. He stated that the Sewerage Division needed 65 engineers to direct ongoing projects, but it had only 29. Boston Globe, Feb. 4, 1984, at 14, col. 1, Oct. 31, 1984, at 27, col. 3.
490 Id. at §§ 6(g), 7(a).
491 Id. at § 7(e).
The Water Resources Authority Act addresses the financial and structural shortcomings which prevent the MDC from directing a cleanup of the harbor. Creation of a new agency is a major progress point in the effort to halt pollution. Yet, the Authority will not be the only character in this drama. EPA and the municipalities to be served by the Authority will have parts to play in restoring the waters of Boston Harbor.

B. The Role of the EPA

As the final arbiter on the application for waiver of secondary treatment requirements and on the siting of treatment facilities, EPA holds a powerful position in the shaping of the ultimate remedy for the harbor. With the filing of a suit to secure a mandatory schedule for the cleanup, EPA has demonstrated its intention to demand timely compliance with the FWPCA. This action contrasts with the general approach of EPA toward Boston Harbor in the last few years. If the change means a speedier solution to harbor pollution, it is to be applauded. An examination of EPA's philosophy and its recent record may indicate whether a quicker cleanup is possible.

Prior to its suit to ensure a cleanup timetable, EPA enforcement actions consisted of five administrative orders and the lawsuit concerning monitoring requirements at Nut Island. The administrative orders addressed violations of the MDC's discharge permit. Twice EPA reprimanded the MDC for failure to implement a secondary treatment program. The first citation, in 1980, revised the permit's schedule for construction designed to achieve secondary treatment. EPA has also ordered improved maintenance and staffing at Deer and Nut Islands in response to operational problems at these facilities. These directives have not produced the desired result.

EPA's approach to harbor pollution has prompted divergent views on the agency's enforcement of the FWPCA. The Conservation Law Foundation, for example, charged that the 1980 administrative order allowed the MDC to postpone indefinitely com-

pliance with the Act's secondary treatment requirements. Others have argued that EPA is being too strict. In June of 1983, a new Regional Administrator assumed leadership of the EPA, amid claims of agency footdragging on the harbor cleanup. Since then, EPA has made Boston Harbor a top priority. In July, 1984, demanding that the MDC produce a sludge strategy EPA labeled the harbor "the most serious pollution problem in New England," and Massachusetts "one of the worst violators of the Clean Water Act in the country." When Judge Garrity ordered a ban on sewer hookups, the agency supported him and indicated an interest in seeking a ban of its own if the legislature did not create a new authority. At the same time, the Regional Administrator stated that even if a new authority were established he would seek federal court supervision of the cleanup.

Despite EPA's more active participation in harbor cleanup efforts, problems remain. For example, delays continue in the NEPA environmental review process. In September 1983, EPA

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405 Letter from Paul G. Keough, Acting Regional Administrator, to Samuel Hoar, Esq. (June 3, 1983).
406 In an October 1983 editorial, the Boston Globe implied that EPA was mistaken in believing that cleanup of the harbor might require the imposition of secondary treatment instead of rehabilitation of existing facilities and the granting of a waiver. Following settlement of EPA's civil suit over monitoring requirements at Nut Island, the Globe observed that the $15,000 fine levied against the MDC would have been a "better symbol of EPA's willingness to cooperate in the harbor cleanup," if it had been instead a "down payment" of federal grant money.

Also commenting on the fine, Regional Administrator, Michael Deland stated that it represented the agency's "stepped up enforcement policy against municipalities." His words stand in contrast to EPA's record of performance up to that time and even to the subject of his comment. It seems inconsistent with the goals of the FWPCA that the EPA took the MDC to court when it failed to monitor its discharges, but not over its failure to decrease the polluting effect of the discharges by not providing secondary treatment, a shortcoming of greater import. A solution to this puzzlement lies, perhaps, in the fact that Deland has only recently assumed direction of EPA's regional office. Boston Globe, Oct. 15, 1983, at 18, col. 1, Feb. 3, 1984, at 15, col. 5, Feb. 4, 1984, at 14, col. 2.

408 Regional Administrator Deland has taken the time to respond publicly to perceived accusations by the Boston Globe that EPA is delaying progress on the cleanup by considering new siting options for treatment facilities and continuing to study the need for secondary treatment, instead of just waiving that requirement now. See, e.g., Boston Globe, Dec. 14, 1983, at 22, col. 3, Sept. 10, 1984, at 17, col. 1.

409 News Tribune, July 17, 1984, at 3, col. 5.
411 Id. at 8, col. 1.
412 See supra text at notes 332-36, 377-82.
set May of 1984 as the target date for completion of the supplemental draft EIS on siting of treatment facilities.\textsuperscript{503} The draft was not released until January, 1985.\textsuperscript{504} Similarly, the agency had scheduled announcement of its decision on the waiver application for December of 1984, but that date was missed.\textsuperscript{505} Notwithstanding these difficulties, EPA has exhibited a heightened sense of urgency about the harbor.\textsuperscript{506}

With two of the most important decisions in the cleanup process yet to be made, the improved vitality of the EPA’s image will soon be tested. First, there is the decision on the application for waiver of secondary treatment. Currently, Boston is one of only two major cities not applying secondary treatment to its sewage.\textsuperscript{507} When Congress provided the waiver option, it did so based on evidence that in certain regions of the country coastal conditions allowed for rapid dispersion and assimilation of sewage discharges, making secondary treatment unnecessary to protect the water quality of such areas.\textsuperscript{508} The regions identified as possessing this attribute did not include any east coast locations.\textsuperscript{509} In enacting amendments to the waiver program to allow more POTWs to

\begin{thebibliography}{99}
\item \textsuperscript{503} Harbor Update, \textit{supra} note 89, at 3.
\item \textsuperscript{504} News Tribune, Jan. 23, 1985, at 3, col. 6.
\item \textsuperscript{505} Harbor Update, \textit{supra} note 89, at 3.
\item \textsuperscript{506} Regional Administrator Deland’s comments on the recent federal court action filed by EPA indicate that perhaps he feels there has been a need for EPA to take a more forceful approach to the harbor. He observed that suits by EPA in other cities, including New York, Philadelphia and Providence have spurred “significant cleanup,” but that Boston Harbor “has been lagging behind every major metropolitan area in the country.” Deland also remarked that there are major cleanup decisions yet to be made, “and everyone’s feet, including the EPA’s, must be kept to the fire.”
\item Possibly the best measure of the impact from EPA’s resurgent concern about the harbor is the reaction of the Conservation Law Foundation, a chief critic of EPA. Executive Director Douglas Foy has lauded Deland for taking action in federal court. Noting that the Foundation asked EPA to file a similar suit two years ago but to no avail, he pointed out that Deland was not with EPA at that time. The suit just filed has so pleased Foy that he stated that if EPA actively pursues the action, the Foundation will work with the agency and seek a dismissal of its own action, still pending against EPA and the MDC. Foy’s most telling comment was that if the EPA relaxed or if Deland left the agency, CLF would sue again. It seems that the Regional Administrator has succeeded in creating a new image for EPA. Menzies, \textit{Decision Time for Harbor}, Boston Globe, Feb. 7, 1985, at 19, col. 1; Boston Globe, Dec. 21, 1984, at 1, col. 1, Feb. 1, 1985, at 19, col. 5.
\item \textit{Id.} at 46; 1977 U.S. CODE CONG. & AD. NEWS 4371.
\end{thebibliography}
file applications, Congress observed that new treatment technologies had given sewage plants the ability to achieve greater dispersion of effluent upon discharge from outfalls.\textsuperscript{510} However, the EPA Task Force's evaluation of the MDC's proposed discharge from improved outfalls revealed that the outfalls would terminate in an area where hydrological conditions prevent dispersion of pollutants sufficient to ensure maintenance of a balanced and healthy aquatic environment.\textsuperscript{511} Whether the MDC's revised application reflects a discharge plan that will not degrade Massachusetts Bay remains to be seen. Interpretation of the waiver requirements rests with EPA.\textsuperscript{512}

There is also the matter of siting treatment facilities. All seven options proposed in the supplemental draft EIS hold seeds of conflict. Six involve expansion of facilities at Deer Island, whether for primary or secondary treatment.\textsuperscript{513} Residents of the Town of Winthrop, which abuts Deer Island, have already expressed their strong opposition to any plant expansion.\textsuperscript{514} They argue that the plant is a noisy and odorous neighbor, and expansion would only exacerbate the situation.\textsuperscript{515} Further, the only land access to Deer Island is through Winthrop, and the residents say construction would double automobile traffic in the small town and create congestion.\textsuperscript{516} In November of 1984, approximately 200 of the townspeople picketed the state house to protest any expansion of the plant.\textsuperscript{517} A Winthrop Selectman observed that the residents are so committed they will fight expansion by civil disobedience or legal action.\textsuperscript{518}


\textsuperscript{511} Waiver Application Analysis, supra note 5, at 22.

\textsuperscript{512} In this regard, one MDC official has commented that “the EPA was not unalterably opposed to our plan if we could show an effective treatment process.” Environmental Affairs Secretary Hoyte has added that there is no reason to believe the revised application will not be approved. If he is correct, the cleanup effort could become mired in a new controversy. Douglas Foy of the CLF has stated that if the EPA grants a waiver, the Foundation will sue to stop it. Menzies, Decision Time for Harbor, Boston Globe, Feb. 7, 1985, at 19, col. 1; Boston Globe, Feb. 2, 1984, at 25, col. 1.

\textsuperscript{513} Boston Globe, Jan 23, 1985, at 19, col. 1.


\textsuperscript{515} Id. at col. 3.

\textsuperscript{516} Id. at col. 2.

\textsuperscript{517} Id. at col. 2.

\textsuperscript{518} Id. at col. 4.
Winthrop residents are not the only ones concerned about expansion. Two of the six options involving construction at Deer Island also require expansion at Nut Island. Neighbors of Nut Island are worried because construction there would necessitate the filling of three acres of Hingham Bay or the relocation of some families, both judged "severe environmental effects" by the supplemental draft EIS.

The seventh option requires relocation of the City of Boston’s Chronic Disease Hospital located on Long Island. It proposes one large secondary treatment plant on that island and the conversion of the Deer and Nut Island plants to simply headworks. According to the supplemental draft EIS, this plan would produce a "severe impact" on future recreation development of Long Island. Two of the six options requiring expansion at Deer Island also involve the use of Long Island. Under one plan, Long Island would be the site of a smaller secondary plant, likewise necessitating relocation of the hospital. The other plan calls for construction of a primary plant to replace the Nut Island facility, with "moderate impacts" on both the hospital and future recreational uses.

The position of the EPA Regional Administrator is not an enviable one. Both the waiver and siting decisions encompass emotional and controversial issues. Each decision has been delayed for a number of years, and each poses the threat of litigation that could further delay the cleanup of Boston Harbor. The Regional Administrator himself has observed that action to halt pollution "has been fraught with decisionmaking paralysis for a decade," largely because of difficult siting questions. The desire to avoid time consuming and expensive lawsuits, though undeniably an important consideration, should not unduly influence the decisions to be made. The gravity of these decisions requires that all considerations—environmental, social, and political—be meticulously measured.

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522 Id.
523 Id.
524 Id.
525 Id.
526 Id.
527 Id.
528 Regional Administrator Deland has expressed similar sentiments in assessing his
While the direction of EPA's current role in the harbor cleanup seems to be in dedicated hands, concern must be given to the future. Certainly, the cleanup process will entail further decision making by EPA, whether involving construction or permits. To ensure a successful effort, one that is both environmentally and politically acceptable, EPA must discharge its responsibilities in a timely fashion and with a sense of purpose that promotes the integrity of both the harbor and its neighbors.

C. The Community Contribution

In denouncing the harbor's pollution problem as one of the worst in the country, the EPA Regional Administrator observed that the cities and towns of the MSS must take an active role in the cleanup process.\(^{529}\) One way in which these communities will be involved is through the payment of increased sewer charges. With the Authority empowered to assess municipalities for the true cost of service, including construction necessary for the cleanup, a rate hike is inevitable.\(^{530}\) EPA and City of Boston officials have estimated that bills to consumers will double over a ten year period.\(^{531}\) The increased contribution from local communities, according to the MDC Commissioner, is justified. It is claimed that many cities and towns currently served by the MDC have problematic sewer systems of their own which contribute to harbor pollution.\(^{532}\) The MDC acknowledges, however, that most local governments do not have the money to take any corrective action.\(^{533}\) The problem should not be left at that.

If municipalities are unable to rehabilitate their sewer lines, they should take the initiative in educating their residents about causes of pollution and ways to decrease the level of flow in the system. Sewage is a consequence of daily living, and it should be realized that all citizens contribute to pollution. Likewise, all citizens can help to control and eliminate it. For example a letter

\(^{529}\) News Tribune, July 17, 1984, at 3, col. 5.
\(^{530}\) See supra text at notes 476-77.
\(^{533}\) Id. at col. 4. Governor Dukakis has stated that Proposition 2 1/2, which restricts property tax increases by local governments makes it difficult for communities to undertake capital improvement projects. Boston Globe, Dec. 31, 1983, at 14, col. 3.
to the editor in a local Boston area newspaper advocated the use of toilet devices to minimize the volume of water flushed and recommended the diversion of rain water from roofs to holding tanks for gardening uses. These two methods alone could reduce both the level of actual sewage flow and the amount of inflow.

Consistent with this view, the Water Resources Authority Act directs the Authority to undertake public programs of education and technical assistance to promote water conservation and environmental quality. In addition, the act requires the Authority to abstain from instituting any system of water charges whereby the unit price decreases as volume of use increases.

Local communities will also contribute to the cleanup through their participation in the "government" of the Authority. They will be directly responsible for the selection of eight of the board of directors' eleven members. Three directors will be appointed by the Mayor of Boston; the City of Quincy and the Town of Winthrop will each submit a list of three names to the governor, who will choose one person from each list; and the advisory board will place three members on the board. In addition, the advisory board is empowered to make recommendations to the Authority on the annual expense budget and charges; to hold hearings; and to furnish recommendations to the governor and the state legislature regarding the Authority and its operations.

While the participation of municipalities provided for in the Water Resources Authority Act should promote a sense of responsibility about local efforts to halt pollution, one aspect of the act gives cause for worry. Each community's voting strength on the advisory board is determined by the percentage of charges it pays in comparison to the total of charges assessed by the Authority to all communities. Under this formula, the City of Boston's

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536 Id. Under current law, the MDC is required to charge a flat rate to municipalities, many of which then employ a sliding scale that gives a lower per gallon rate to large volume users. MASS. GEN. LAWS ANN. ch. 92, § 26 (West Supp. 1984); Boston Globe, Jan. 13, 1984, at 14, col. 4.
537 1984 Mass. Acts 372, § 3(b), (c). The remaining members will include the Secretary of Environmental Affairs; a resident of the Connecticut River Basin and a resident of the Merrimack River Basin, in northern Massachusetts. These two members will be appointed by the governor and will serve coterminous with the governor.
538 Id. at § 23(d).
539 Id. at § 23(b).
voting power is much greater than that of the other cities and towns.\textsuperscript{540} Because the operations of the BWSC give Boston larger sewer bills than those of its suburban neighbors, there exists the possibility of division of interests when the advisory board considers financial recommendations to the Authority.\textsuperscript{541} Boston may oppose rate levels that other municipalities will find acceptable.\textsuperscript{542} If Boston wins the support of a few other advisory board members the controversy could inhibit an orderly and timely cleanup of the harbor. Even if it does not convince enough members to gain a majority, such conflict would have an unsettling effect on the efforts of the Authority.

Boston and surrounding communities served by the Authority must recognize that the cleanup of the harbor is a responsibility shared by all. Increased sewer charges are necessary to alleviate the problem. Local governments should endeavor to reach a consensus that focuses on conservation of water and restoration of the harbor. Minor repairs or the institution of conservation practices in one town could have a ripple effect and decrease volume throughout the system. Cooperation in and mutual adoption of such efforts can help to reduce costs for all. As observed by Special Master Haar, a lack of communication among the municipalities in the MSS and between state and local government has prevented the implementation of a “coordinated, integrated strategy” for cleaning up the harbor.\textsuperscript{543} The advisory board offers the

\textsuperscript{540} News Tribune, Jan. 13, 1985, at 1, col. 2. Under the figures used for 1985, Boston has 39 of the 95 votes allocated to the local governments. The city with the next largest share has only 3.695 votes. When voting to appoint members to the board of directors, votes will be unweighted.

\textsuperscript{541} In 1984 the monthly charge for a family of four in Boston was about $16.58, compared to $4.50 in some MDC communities. Boston Globe, Mar. 1, 1984, at 22, col. 4, Oct, 14, 1984, at 30, col. 3.

\textsuperscript{542} During debate on the Water Resources Authority Act, Boston lawmakers continually expressed concern about increased sewer charges. One representative offered an amendment that would have given Boston a controlling membership on the board of directors. Recently, Boston Mayor, Raymond Flynn, requested that EPA select the least costly treatment alternative, whether requiring primary or secondary facilities. See Boston Globe, Nov. 30, 1984, at 13, col. 1, Dec. 11, 1984, at 23, col. 2, Dec. 13, 1984, at 23, col. 2, Mar. 1, 1985, at 20, col. 2.

\textsuperscript{543} Master's Report, supra note 1, at 160. One example of the relationship between the MDC and its MSD communities concerns the combined sewer overflow pipes around the shore of the harbor. In March, 1984, when a group of protesters from the environmental group Greenpeace placed a wooden cover on one of the pipes to protest continued discharges, the MDC stated that it sent no representative to the scene because overflow pipes belong to the local governments. An official of the BWSC however, claimed the content of the pipe was the responsibility of the MDC. The MDC Commissioner has
vehicle for such communication. Its potential should not be ignored.

Following approval of the Massachusetts Water Resources Authority Act, the EPA Regional Administrator remarked that without the new agency, cleanup of the harbor would be "extremely difficult if not impossible." In the same breath, he noted that establishment of the Authority was only a first step. The legislation created a body with the financial and organizational independence required to lead the fight against pollution. For the Authority to be successful it must be mindful of its tremendous responsibility, to the people it serves; to the resources of the harbor; and to future generations. For the first step in the cleanup to be followed by other successes, both EPA and the communities served by the Authority must remember the importance of their cooperation and commitment to the entire process. Lastly, all three cleanup participants cannot diminish their energies once all the construction and renovations are complete. The goal must be not only to restore the harbor's beauty for today, but also to preserve it from any future harm.

VI. CONCLUSION

For over 150 years Boston Harbor has been used as a sewage disposal site for the metropolitan Boston area. This practice has periodically given rise to heightened levels of concern about damage to the harbor's water quality. In response, the sewer system discharging to the harbor has slowly been modernized to help reduce the polluting effects of the sewage. This modernization has not kept pace with the ever increasing pollution of the harbor. The operator of the sewer system, the MDC, is now incapable of meeting the statutory demands for water pollution control which are imposed on it. Consequently, the murky and often contaminated waters of Boston Harbor constitute an ugly defiance to the call for pollution abatement at both the federal and state levels. The valuable resources of the harbor are in danger of being lost.

Litigation initiated by the City of Quincy has led to the creation of the Massachusetts Water Resources Authority, an agency de-

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545 Id., Dec. 21, 1984, at 11, col. 1.
signed to take over control of the Metropolitan Sewerage System and invested with the fiscal and structural ability to implement a cleanup of the harbor. Establishment of the Authority has engendered hope that destruction of the harbor's resources can be averted. To break the history of delays and public opposition to cleanup strategies, however, will require more than the creation of a new governmental body. That body must bring a genuine sincerity to its mission. Further, EPA must appreciate its crucial role and continue to follow the same motives that have guided its recent approach to the harbor problem. Communities in the MSS, as well, should devote what energies they can to ending the present trend of pollution. Cleaning up Boston Harbor demands an atmosphere of cooperation and commitment.