RETURN TO 1998 ROD AR INDEX

RETURN TO SER AR INDEX

EPA Region I
Superfund Program
New Bedford Harbor Site
New Bedford, Massachusetts

May 1992

Addendum Proposed Plan

SITE NEW BEDFORD
BREAK 4.9
OTHER 217613

EPA Proposes Expanded Cleanup to Address Contamination in Parts of Upper Buzzards Bay, New Bedford Harbor Superfund Site.

In January, 1992, EPA issued a proposed plan for remediation of the **estuary** and **lower harbor/bay** (E/LH/B)[1] areas of the New Bedford Harbor Superfund Site. The proposal called for dredging **sediment** in the E/LH/B contaminated with **polychlorinated biphenyls (PCBs)** at concentrations exceeding 50 **parts per million (ppm)**. Sediments would be disposed of in shoreline **confined disposal facilities (CDFs)** that would be constructed as part of the site cleanup.[2]

The January 1992 proposal noted that the State and Federal **Trustees of Natural Resources (the Trustees)** had requested an evaluation of additional remediation in the 17,000 acres of the site located south of the hurricane barrier (Fishing Closure Areas II and III, as shown in Figure 1). EPA has developed a **Supplemental Feasibility Study (SFS)** which describes in detail the additional **remedial alternatives** evaluated for the upper bay (the bay alternatives). The Trustees participated in the development of the SFS and on April 22, 1992, submitted an "Evaluation of Effectiveness" which EPA considered in its evaluation of additional remediation in the upper bay.

EPA now is issuing this Addendum Proposed Plan for the upper bay. Set forth in this document is a cleanup plan, referred to as a preferred alternative, to further address contamination in the upper bay portion of the site. EPA's preferred alternative for the upper bay would dredge two areas near the hurricane barrier and cap a third area at the Wastewater Treatment Plant (WWTP) outfall. These actions would occur as part of the cleanup that is planned for the E/LH/B. Before any remedial work occurs, EPA will resample areas of the upper bay where PCB concentrations greater than 10 ppm have been found. The new data will ensure that remediation occurs where sediments exceed 10 ppm PCBs.

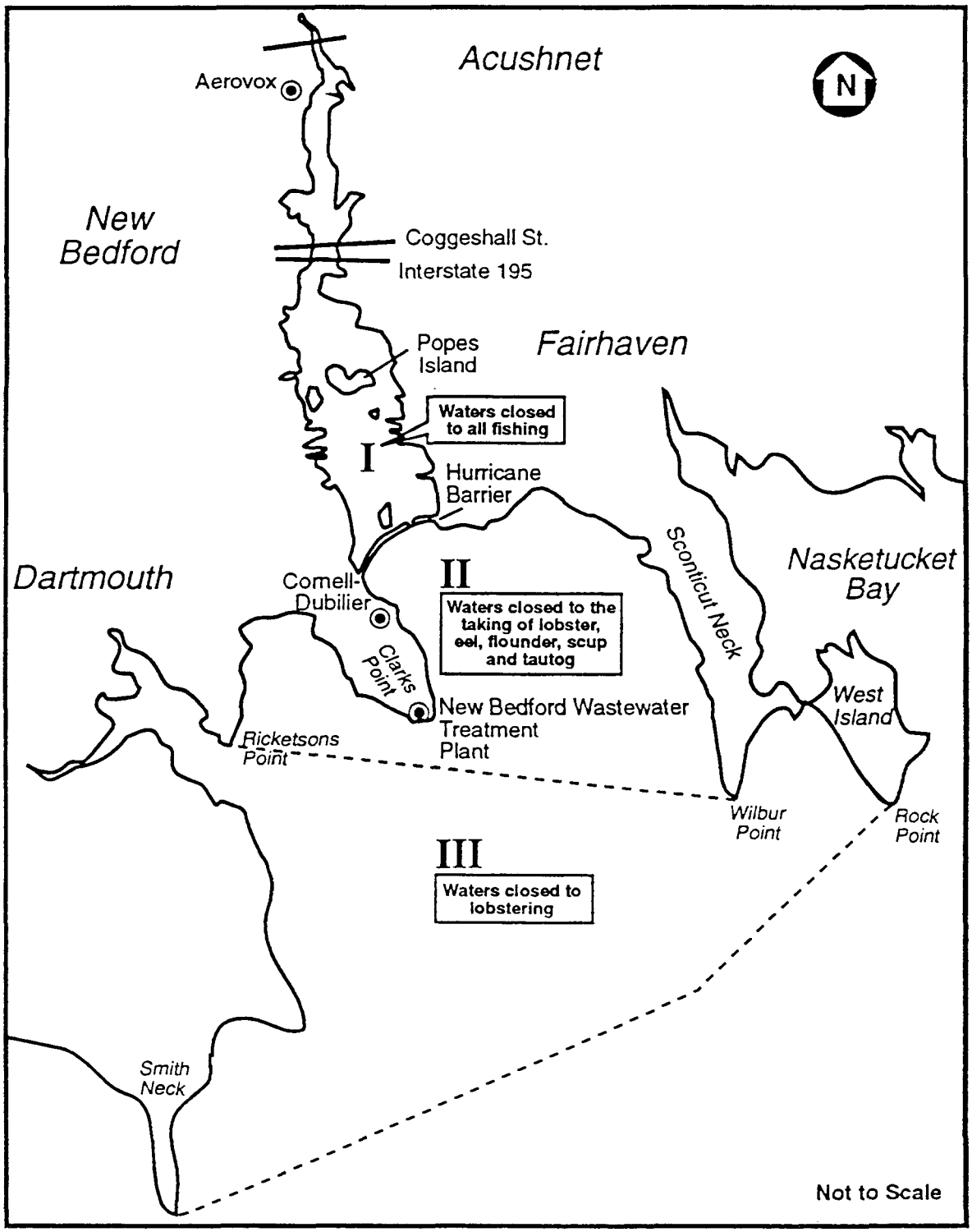
This Addendum Proposed Plan along with the January 1992 Proposed Plan, and the Hot Spot **Record of Decision** issued on April 6, 1990, constitute a comprehensive remedial decision with respect to PCBs for all areas of the site.

SDMS DocID 000219698

[1]Words in **bold** type are described in the glossary at the end of this document.
[2]For a detailed description of the cleanup proposal, see *EPA Region I Superfund Program, New Bedford Harbor Site, New Bedford, Massachusetts, Proposed Plan* January 1992.

Figure 1

Fishing Closure Areas



In accordance with Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, EPA is publishing this Addendum Proposed Plan to provide an opportunity for public review and comment on the cleanup alternatives, known as remedial alternatives, under consideration for the upper bay. The selection of a preferred alternative is not a final decision. EPA will consider public comments as part of the final decision-making process for selecting a cleanup remedy for the upper bay.

This Addendum Proposed Plan:

1. explains the opportunities for public comment on the remedial alternatives;
2. provides a brief description of the preferred bay alternative and other alternatives evaluated in the SFS; and
3. presents EPA's reasons for its preliminary selection of the preferred bay alternative.

Opportunities for Public Comment

Public Information Meeting

EPA will hold a public information meeting on May 13, 1992, at 7:30 p.m. at the Days Inn on Hathaway Road in New Bedford, MA to describe the preferred alternative and other alternatives evaluated in the SFS. The public is encouraged to attend the meeting to hear the presentations and to ask questions about the bay alternatives and their interrelationship with the preferred alternative for the E/LH/B.

Public Comment Period

EPA is conducting a 30 day public comment period, from May 14, 1992, to June 12, 1992, to provide the opportunity for public comment on this Addendum Proposed Plan. EPA is also extending the public comment period to June 12, 1992, for the Proposed Plan issued in January 1992, to coincide with the end of the 30-day comment period for this document.

In addition to the issues identified for comment in the January 1992 Proposed Plan, EPA is seeking comment on whether marine sediment from navigational (maintenance) dredging of Buzzards Bay or other harbors would be appropriate cap material for a remedial action. EPA is also seeking comment on whether institutional controls are effective in protecting the public from the potential health risk from ingestion of PCB contaminated seafood.

Informal Public Hearing

EPA will hold an informal public hearing on June 10, 1992, at 7:30 p.m. at the Days Inn to accept oral comments on the bay alternatives and their interrelationship with the preferred alternative for the E/LH/B. This hearing will provide the opportunity for people to comment on the cleanup plan after they have heard the presentation made at the informational meeting and have reviewed the Addendum Proposed Plan. Comments made at the public hearing will be transcribed and a copy of the transcript will be added to the site Administrative Record available at the information repositories listed below.

Written Comments

If, after reviewing the information on the site, you would like to comment in writing on EPA's preferred alternative, any of the other cleanup alternatives

under consideration, or other issues relevant to site cleanup; please deliver your comments to EPA at the Public Hearing or mail your written comments (postmarked no later than June 12, 1992) to:

Gayle Garman, Remedial Project Manager
U.S. Environmental Protection Agency
Waste Management Division (HRM-CAN3)
JFK Federal Building
Boston, MA 02203
(617) 223-5522

EPA's Review of Public Comment

EPA will review comments received from the public on this Addendum Proposed Plan as part of the process of reaching a final decision on the most appropriate remedial alternative, or combination of alternatives, for addressing PCB contamination at the New Bedford Harbor site. EPA's final choice of a remedy will be issued in a **Record of Decision (ROD)** for the site. EPA anticipates that one ROD will be issued which addresses the proposed plan of January, 1992, and the Addendum Proposed Plan. A document called a Responsiveness Summary, that summarizes EPA's responses to comments received during the public comment period, will be issued with the ROD. Once the ROD is signed by the EPA Regional Administrator, it will become part of the **Administrative Record**, which contains documents used by EPA to choose a remedy for the site.

Additional Public Information

This Addendum Proposed Plan provides only a summary description of the SFS for the bay portion of the New Bedford Harbor site and the cleanup alternatives currently being considered by EPA. The public is encouraged to consult the Administrative Record, which includes the SFS report. Other documents which may be of interest to the public are contained in the Administrative Record as well.

The Administrative Record is available for review at the following locations:

New Bedford Free Public Library
613 Pleasant Street
New Bedford, Massachusetts 02740
(508) 991-6275
Hours: Monday, Wednesday: 9 a.m. to 9 p.m.
Tuesday, Thursday, Friday, Saturday: 9 a.m. to 5 p.m

EPA Records Center
90 Canal Street, 1st Floor
Boston, Massachusetts 02114
(617) 573-5729
Hours: Monday - Friday: 10:00 a.m. to 12:00 noon and
2:00 p.m. to 5:00 p.m.

Copies of selected site investigation studies, the FS, SFS and NOAA's report only are available for review at:

The Millicent Library
45 Center Street
Fairhaven, Massachusetts 02179
(508) 992-5342
Hours: Monday, Wednesday: 9 a.m. - 8 p.m.
Tuesday, Thursday, Friday, Saturday: 9 a.m. - 6 p.m.

Site History

A brief history of the New Bedford Harbor site and EPA's various studies of the site can be found in the January 1992 Proposed Plan.

EPA's Preferred Alternative for the Estuary/ Lower Harbor/Bay (E/LH/B)

As discussed in the January 1992 Proposed Plan, EPA's preferred alternative for the E/LH/B involves construction of confined disposal facilities (CDFs) along the shore of the estuary at locations 1, 1a, and 3, shown in Figure 2. Sediments with PCB levels in excess of 50 ppm in the estuary, lower harbor, and the upper bay would be dredged, transported to the CDFs, dewatered by gravity settling in the CDFs, and covered by an impermeable **cap**. This would permanently isolate the dredged sediment. Water produced by dewatering would be treated by **Best Available Control Technology (BACT)** to reduce contamination to appropriate discharge limits. (See EPA's Proposed Plan of January 1992.)

EPA's preferred alternative for the E/LH/B significantly reduces the potential for PCB migration and isolates the contaminants from both the public and the environment. Although the potential human health risk from direct contact with contaminated sediments would be considerably diminished, the potential risk from ingestion of contaminated **biota** would remain. To decrease the threat from ingestion of contaminated biota, institutional controls on the harvesting of certain biota would need to be maintained until PCB levels were reduced to acceptable levels. These institutional controls may include: (1) enforcement of the Fishing Closure Areas until acceptable PCB levels in harvestable biota are achieved, and (2) a public awareness program. In addition, long-term sampling would be conducted to monitor contamination in biota to assist EPA in evaluating reopening of the Fishing Closure Areas.

Basis for the Supplemental Feasibility Study (SFS)

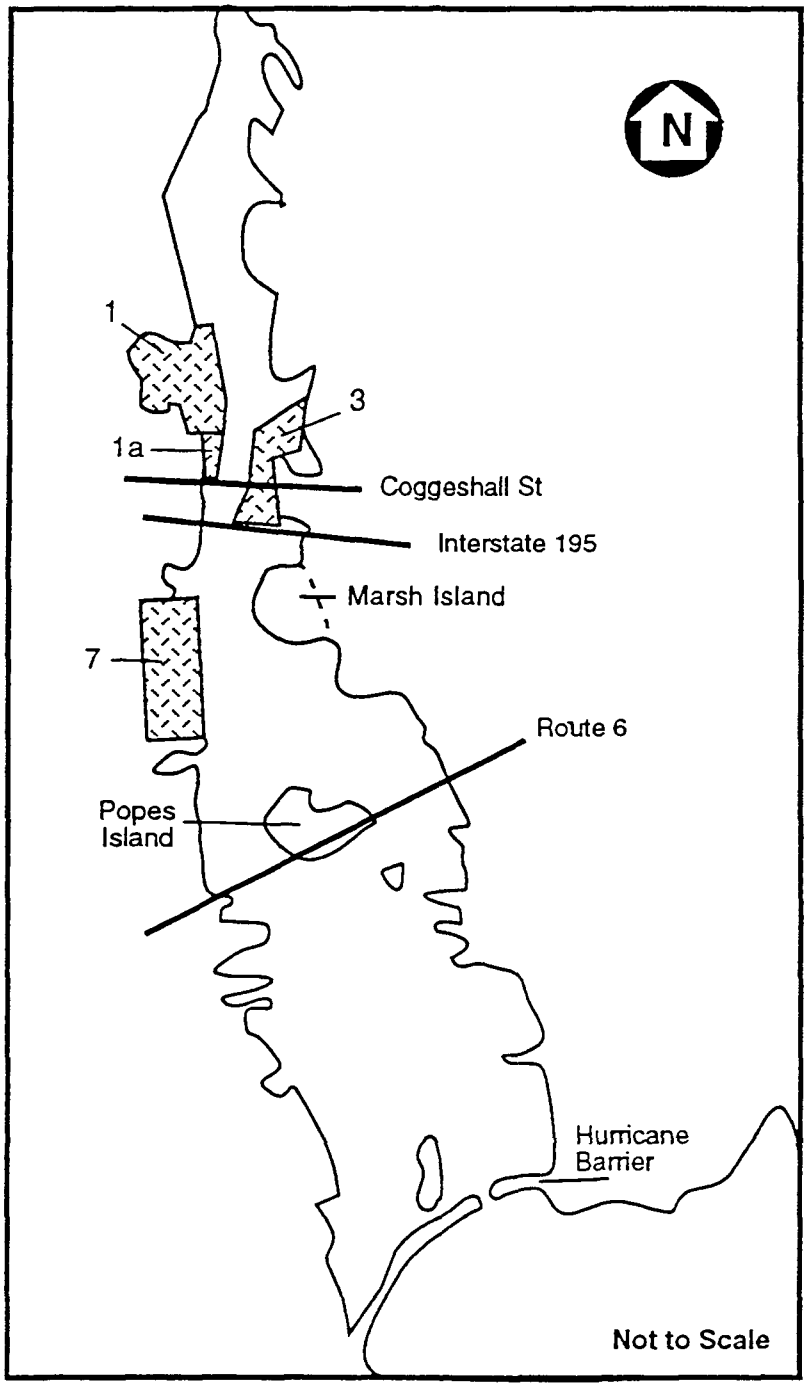
In response to EPA's proposed plan for the E/LH/B, the Trustees requested that EPA consider additional remediation in the upper bay. Consequently, a cooperative evaluation of data and remedial alternatives was undertaken by EPA, the Trustees, and the State. All of the bay alternatives are based on sediment and water contaminant data reported in the 1990 FS. This data has been collected since 1985.[3]

The more recent sediment data and informed engineering judgement were used to estimate the areal extent of sediment contamination exceeding 10 ppm PCBs in the upper bay. There are two areas of sediment contamination near the hurricane barrier which coincide with a **Combined Sewer Outfall (CSO)** which drains areas adjacent to Cornell Dubilier. A third area is located at the outfall from New Bedford's Wastewater Treatment Plant (WWTP), 3300 ft South-

[3]EPA restricted its consideration to the FS data because only this more recent data is known to meet EPA's standards for quality assurance and quality control.

Figure 2

Potential Confined Disposal Facility Locations



Legend

Potential Confined Disposal Facility locations

Southeast of Clark's Point. These three areas were evaluated for the additional remedial actions, as described in detail in the SFS, and summarized herein.

As part of the cooperative effort between EPA, the Trustees, and the state; the National Oceanic and Atmospheric Administration (NOAA) developed and submitted to EPA an "Evaluation of Effectiveness" (April, 1992) which develops a technical rationale for remediating the delineated areas in the upper bay with sediment contamination greater than 10 ppm PCBs. The rationale includes both quantitative and qualitative discussions of the potential benefit to the marine resource that would result from remediation.

NOAA's quantitative approach to the upper bay was first described in three memoranda submitted to EPA in 1990 and 1991. The quantitative approach assumes that all areas of the upper bay are used uniformly by the biota, that biota contaminant levels are directly related to sediment concentrations, and that the data adequately describe contaminant concentrations and distribution. NOAA's April 1992, "Evaluation of Effectiveness" refines this quantitative approach.

The quantitative approach estimates the benefit that would result from remediating the three identified remedial areas by calculating the change in average sediment concentrations over the 17,000 acres of Fishing Closure Areas II and III. The overall incremental reduction in sediment PCB concentration is very small.

However, NOAA also incorporates a qualitative rationale for remediating the three identified areas. NOAA suggests that local improvements in sediment and water from additional remediation in the bay may have greater benefit than is indicated by the quantitative approach. NOAA cites a study which indicates fish congregate at WWTP outfalls. These congregations are likely related to an abundance of benthic prey organisms, such as seaworms, found in these areas. Data collected by the City of New Bedford supports the conclusion that the outfall is an area with a significant population of benthic organisms that attract feeding fish. NOAA notes studies indicating that this benthic food source, which bioaccumulates PCBs, may contribute more to the PCB contamination of these fish populations than would be predicted based on sediment concentrations alone. NOAA indicates further that because young lobsters and flounder stay predominantly in the nearshore areas, remediation in contaminated nearshore areas of the upper bay may have a greater ecological benefit than is predicted by the quantitative analysis.

Based on the SFS, the FS, NOAA's evaluation, and information in the **Administrative Record**, EPA believes that additional remedial action in the upper bay will result in reduced PCB concentrations in biota. This remedial action may serve to reduce PCB concentrations to levels that are protective of human consumers. Table 1, from the Record of Decision (ROD) for the Hot Spot portion of the site, indicates biota which are contaminated significantly less than the **FDA Tolerance Limit** of 2 ppm PCBs in edible tissue may still present an unacceptable health risk as defined by the **National Contingency Plan (NCP)**. The edible tissue level at the New Bedford site which meets EPA's definition of acceptable risk, is 0.2 ppm PCBs in edible tissue. EPA's level differs from the current FDA tolerance limit of 2.0 ppm of PCBs in edible tissue by a factor of 10. This difference arises, in part, from the fact that the FDA tolerance limit is a national standard which assumes that not all of a person's diet is from the contaminated food source, and that not all of the contaminated food source contains PCB concentrations at the tolerance limit. EPA's 0.2 ppm PCB level is designed to be protective of an adult who eats 8 ounces of fish and/or shellfish from upper Buzzards Bay each month over a 70 year lifetime.

Table 1

Lifetime Carcinogenic Public Health Risks Ingestion of Contaminated Biota

Source	PCB Concentration (ppm[1])	Frequency of Exposure	Lifetime Risk (70 years)
Lobster[2]	2.3	Daily	7 in 100
		Weekly	1 in 100
		Monthly	2.5 in 1000
Flounder	0.371	Daily	1 in 100
		Weekly	1.7 in 1000
		Monthly	4 in 10,000
Clam	0.231	Daily	7 in 1000
		Weekly	1 in 1,000
		Monthly	2.4 in 10,000

Notes:
[1] All biota concentrations are mean values from the DPH Fishing Closure Area II.
[2] Lobster edible tissue includes the tomalley.

Reference:
"Draft Final Baseline Public Health Risk Assessment," EC Jordan/Ebasco, 1989.

In the January 1992 Proposed Plan, EPA relied in part on institutional controls to ensure protection of human health. The additional remediation proposed for the upper bay will increase the probability that institutional controls can be lifted, and that these controls can be lifted sooner.

Presently, bottom feeding fish such as flounder are not legally harvestable from Fishing Closure Area II, yet EPA and the Trustees have reports of fishing in this area. Furthermore, because of declining bacterial contamination, Clark's Cove in Fishing Closure Area II has recently been opened to clamming for the first time in nearly a century. EPA's data indicates there may be areas of sediment in Clark's Cove that exceed 10 ppm PCBs. It is probable that additional areas of Fishing Closure Area II will be opened to clamming as New Bedford continues to upgrade its CSOs and WWTP. These ensuing harvests will permit more frequent exposure of consumers to PCB contaminated shellfish than has occurred in the past, with a consequent potential increase in human health risk.

Upper Buzzards Bay is an important economic resource. The State Trustee of Natural Resources, Massachusetts Coastal Zone Management, submitted to EPA a report by the Conservation Law Foundation (CLF) on the economic value of the shellfish resource in Fishing Closure Area II. The CLF Report estimates that quahogs alone in Fishing Closure Area II have a value of $24 million, and that an annual clam harvest could yield $5 million. They estimate an annual harvest of this magnitude would generate as much as $22 million in annual economic activity.

Any remedial action which removes PCBs from the ecosystem would contribute to recovery of the biota and reopening of the Fishing Closure Areas. However, the magnitude of this incremental improvement is difficult to quantify.

Proposed Cleanup Objectives

Using information gathered during the FS and **Risk Assessments**, EPA identified the following remedial response objectives for overall site cleanup:

- Reduce human exposure to PCB contaminated sediment.
- Reduce ecological exposure to PCB contaminated sediment.
- Reduce PCB surface water concentration by reducing PCB sediment concentrations.
- Reduce PCB concentrations in biota by reducing PCB sediment concentrations.

Using the FS, the SFS, and the additional information submitted by the Trustees, EPA determined that these objectives were applicable to additional work in the upper bay. However, EPA believes that additional work in the upper bay will provide an added measure of environmental protectiveness and protection of human health by:

- Further reducing ecological exposure to PCB contaminated sediment.
- Further reducing PCB water concentrations by reducing PCB sediment concentrations.
- Further reducing PCB concentrations in biota by reducing PCB sediment concentrations.

As part of these cleanup objectives, EPA examined a **PCB action level** for the upper bay. A PCB action level is a sediment concentration level, the effects of which are evaluated in terms of its human health and environmental im-

pacts. The action level for the upper bay portion of the site is 10 ppm. A **residual PCB level** (i.e, the level that remains) in the sediment in some cases may be lower than the PCB action level. For example, dredging a localized area in the upper bay at a 10 ppm action level, will leave a residual PCB level of less than 10 ppm PCBs in that area.

Monitoring and Pre-remedial Sampling

Each of the bay alternatives assumes the same 30-year monitoring and maintenance period included in the preferred alternative for the E/LH/B. This monitoring plan includes quarterly collection of sediment, surface water, and biota at 50 locations. Samples would be analyzed for PCBs and metals. In accordance with the requirements of CERCLA, the monitoring data would be reviewed every five years.

Each of the bay alternatives also incorporates a sampling component to better define the degree and extent of contamination in areas of the upper bay. Nine areas identified since 1976 as having sediment contamination in excess of 10 ppm would be resampled (Figure 3). If the levels or areas of contamination are dramatically different from those assumed for this evaluation, a reevaluation of the bay alternatives may be warranted.

Alternatives Evaluated in the SFS

EPA assumes that any upper bay alternative will be implemented in conjunction with EPA's preferred alternative for the E/LH/B. The public is encouraged to comment not only on the proposed alternatives for the upper bay, but also on the combination of the various bay alternatives with the preferred alternative for the E/LH/B. Each of the bay alternatives are described briefly below. A detailed description of each upper bay alternative can be found in the 1992 SFS report.

EPA's Preferred Bay Alternative (Bay-4): A Combination of Dredging with Shoreline Disposal and Capping of Areas Exceeding 10 ppm PCBs

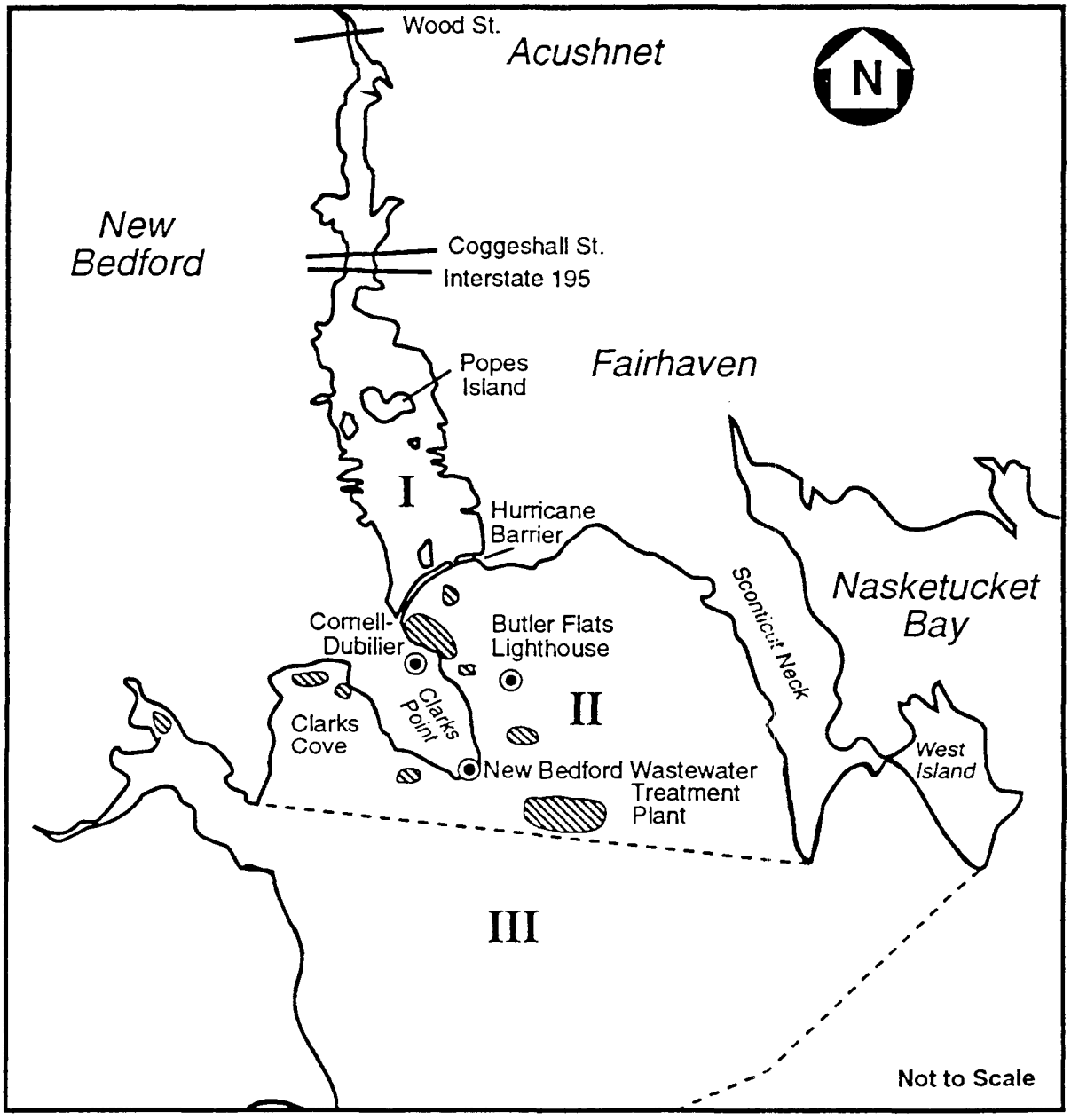
EPA's preferred alternative combines dredging and in-place capping of three sediment areas with PCB levels greater than 10 ppm (Figure 4). Prior to implementation of the remedy, a pre-design sampling program would be implemented.

In the preferred bay alternative, the 17 acre area at the WWTP outfall would be capped with 160,000 cubic yards of clean material from an upland source. Cap material would be delivered to the waterfront and transferred to a **split hull scow**. The scow then would be towed to the contaminated area at the WWTP outfall. The scow would be guided back and forth over the area by two tugboats, while the hull remains partially open to deposit the cap material. Special design and implementation considerations would be necessary to accommodate New Bedford's planned upgrade of the WWTP outfall. The water depth at this location requires that a volume of capping material equal to a six foot cap be deposited to ensure that a two foot cap is emplaced over the entire area. A minimum two foot cap is necessary to block chemical transport and mixing by burrowing organisms.

The two areas adjacent to Cornell Dubilier and the hurricane barrier which are proposed for dredging in EPA's preferred alternative for the E/LH/B would be expanded from areas with PCB levels over 50 ppm to areas with PCB

Figure 3

Areas potentially exceeding 10 ppm in Upper Buzzards Bay



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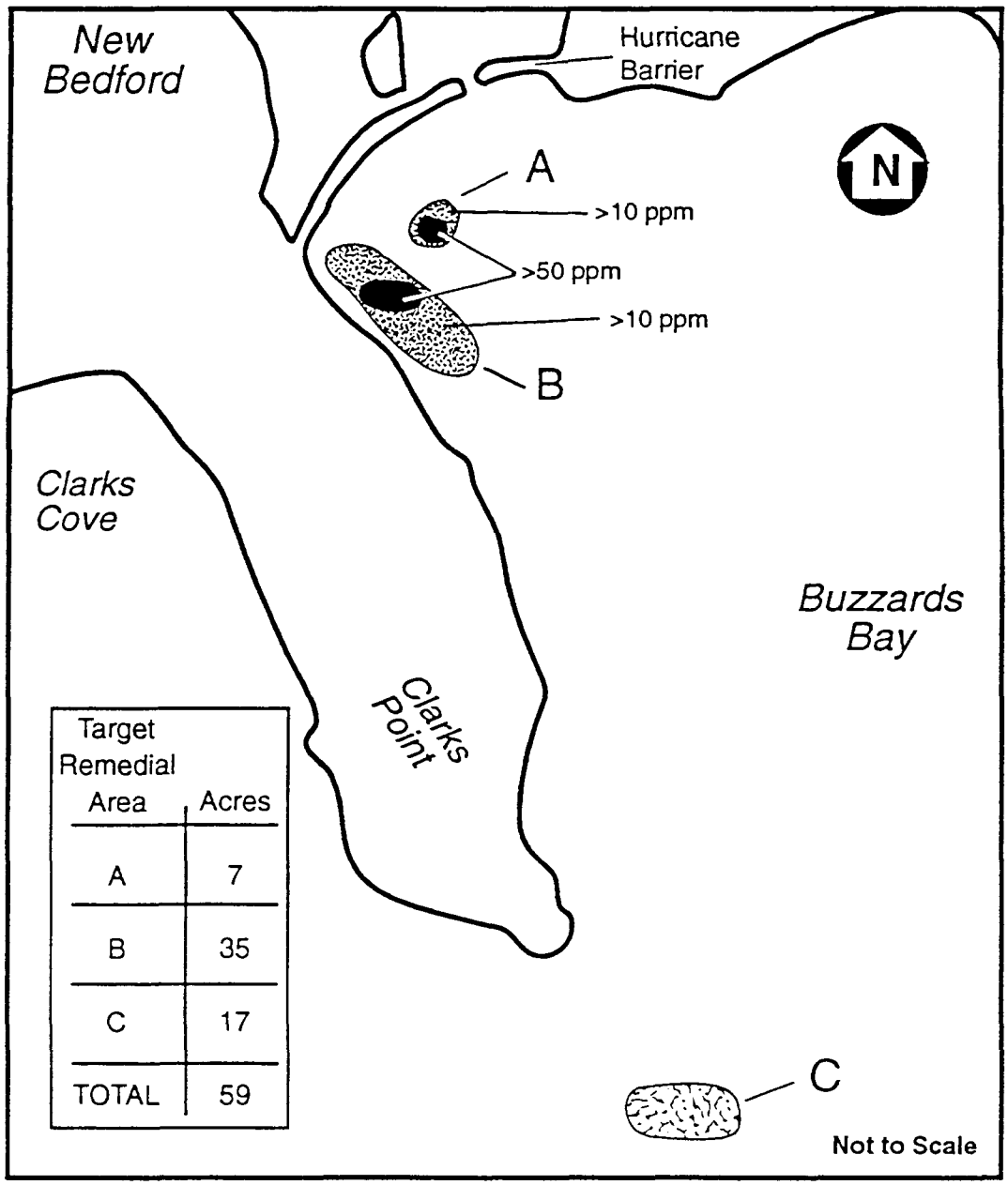
Areas potentially >10 ppm

Figure 4

Preferred Alternative (Bay-4)



Target Remedial Area	Acres
A	7
B	35
C	17
TOTAL	59

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Proposed Dredging Areas

Proposed Capping Area

levels over 10 ppm (see Figure 4). The additional area is estimated to total 42 acres. The sediment would be dredged to a depth of one foot, removing 67,000 cubic yards of contaminated sediment. As in EPA's preferred alternative for the E/LH/B, a **cutterhead dredge** would be used. Dredged sediment would be transported on a scow to the northern end of the lower harbor. Sediment would be pumped from the scow through a pipeline running north to CDF-1 for disposal. Water produced from gravity settling of the dredged sediment would be treated by Best Available Control Technology (BACT) prior to discharge back to the estuary. Construction of CDF-1 is proposed in EPA's preferred alternative for the E/LH/B. To accommodate the additional sediment volume from these two areas, the top of the dike-walls of CDF-1 would be raised two feet during construction.

The preferred alternative would protect the public from the risk of direct contact with contaminated sediments. However, institutional controls would be required to ensure control of the health risk from ingestion of contaminated biota until PCB levels in the biota decline to acceptable levels.

Following implementation of the preferred alternative, sediment PCB concentrations in the remediated areas of the upper bay will be less than 10 ppm and will approach the 1 ppm sediment level recommended in the "Baseline Ecological Risk Assessment" for protection of aquatic species. The bay ecosystem will benefit from the reduction of PCBs and the associated risks that in the absence of remediation would remain.

On a localized basis the expected benefits from remediation are more apparent. Areas to be dredged under the preferred alternative currently support shellfish. Following the reduction of PCBs resulting from remediation, there is likely to be a reduced level of contamination in the shellfish and other benthic organisms when these areas recolonize.

In the outfall area schooling fish congregate and feed. The reduction in PCB contamination at the outfall area will mean that these fish will be congregating and feeding in a less contaminated environment. The resulting reduction in PCB transfer to the fishery resource may cause a measurable decrease in PCB tissue levels in harvestable biota.

By remediating in the nearshore areas known to support the early and sensitive life stages of many commercially and recreationally important biota, increased population health and survival is anticipated.

The estimated costs for the preferred alternative as presented below include direct and indirect capital costs, and 30 years of operation and maintenance on a net present worth basis. The capping costs could decrease significantly if a marine source of clean sediment for cap material becomes available. EPA is seeking comment on whether sediment that may come from dredging in another harbor would be an acceptable cap material, and the likelihood of such a source becoming available.

Estimated Predesign Sampling Costs:	*$601,200*
Estimated Capital Costs to Cap Area C:	*4,733,000*
Estimated Capital Costs for Areas A & B:	*3,063,100*
Operation and Maintenance:	*1,099,500*
Total Cost for Alternative Bay-4:	*$9,651,350*
Estimated Dredging Time:	*5 to 7 months*

Other Alternatives Evaluated in the SFS

Alternative Bay-1: Minimal No Action

EPA evaluated a minimal no action alternative in the SFS, which assumed that the preferred alternative for the E/LH/B, would be implemented; but there would be no further action in the upper bay portion of the site. Bay-1 serves as a baseline to measure the other bay alternatives under consideration.

Alternative Bay-1 incorporates the remedial measures and institutional controls presented in the January 1992 Proposed Plan and adds a confirmational sampling program designed to validate the assumed degree and areal extent of PCB contamination in the upper bay. The confirmational sampling plan includes those areas where data collected since 1976 indicates PCB levels greater than 10 ppm. The confirmational sampling program would use a larger grid design than would the predesign sampling program incorporated in the other bay alternatives.

Unlike the other bay alternatives, the cost to implement Bay-1 would not change in response to the findings of the sampling program. However, if contamination levels or areas are found to be significantly greater than assumed for this analysis, a decision to implement Bay-1 would need to be re-evaluated.

Estimated Confirmational Sampling Program Cost:	*$373,500*
Estimated time for Operation:	*Assumes 30 years*

Alternative Bay-2: Dredging and On-Site Disposal

As with all of the alternatives other than Bay-1, a predesign sampling plan would be implemented to better define the areas in the upper bay that have PCB levels above 10 ppm. Alternative Bay-2 involves constructing a CDF in the lower harbor to isolate approximately 120,300 cubic yards of PCB contaminated sediment that would be dredged from 59 acres in upper Buzzards Bay. Sediment dredged from areas in excess of 10 ppm PCBs would be transported by scow into the lower harbor. CDF-7, identified in the FS for the E/LH/B, would be constructed in the lower harbor to permanently contain and isolate the dredged sediments. The sediments would undergo gravity settling, and the produced water would be treated by BACT prior to discharge to the lower harbor.

The two areas to be remediated between the CSO and the hurricane barrier would be dredged with a hydraulic cutterhead dredge. The seventeen acre area at the WWTP outfall would be dredged with a mechanical dredge to accommodate the greater water depths and wave heights in this area.

Estimated Predesign Sampling Cost:	*$601,312*
Estimated Dredging Costs:	*2,878,000*
Estimated CDF Construction Costs:	*9,610,000*
Operation & Maintenance Cost:	*408,600*
Estimated Total Cost - Alternative Bay-2:	*$13,146,550*
Estimated Construction Time:	*2 years*

Alternative Bay-3: Capping

Alternative Bay-3 would involve capping sediment areas found by predesign sampling to have PCB concentrations in excess of 10 ppm. Bay-3 assumes an upland source of capping material, which would be transported to the identified areas and deposited onto the contaminated areas by a split hull

scow. A final cap thickness of two feet is necessary to prevent chemical transport and biological mixing across the cap. In order to ensure that all capped areas are adequately protected, a volume of capping material equal to a four foot thickness is required in the shallower water near the hurricane barrier, and a volume equivalent to a six-foot thickness is required in the deeper waters near the WWTP outfall. It is estimated that 268,000 cubic yards of capping material would be required. A marine source of capping material would significantly reduce the cost of Bay-3. Special design and implementation considerations would be required to avoid interference with the City's planned upgrade of the WWTP outfall.

Estimated Predesign Sampling Cost:	*$601,300*
Estimated Total Capping Cost:	*13,176,000*
Estimated Operation & Maintenance Cost:	*2,900,400*
Estimated Total Cost for Alternative Bay-3:	*$16,936,200*
Estimated Time to Install Cap:	*1 year*

Alternative Bay-4: Combination of Dredging and Capping

EPA has made a preliminary selection of this alternative, as the preferred remedial action for upper Buzzards Bay. It is discussed under the section titled "EPA's preferred bay alternative" on pages 10-13.

Alternative Bay-5: Dredging, Solvent Extraction and On-Site Disposal

Alternative Bay-5 would involve dredging sediment areas with PCB levels exceeding 10 ppm and treating the sediments by **solvent extraction** prior to final disposal in a shoreline CDF. With the exception of the mechanical dewatering and sediment treatment steps, this alternative is identical to Bay-2. Sediments would be dredged as described in Bay-2 and deposited into CDF-7 constructed in the lower harbor. After gravity settling, the sediments would undergo mechanical dewatering. The generated water would be treated prior to discharge back to the lower harbor. The dewatered sediments would be treated by solvent extraction to remove the PCBs. The PCB/oil extract generated would be incinerated off-site to permanently destroy the PCBs. The treated sediments would be deposited in the CDF and an impermeable cap with a vegetated cover would be constructed.

Estimated Cost of Predesign Sampling Program:	*$601,312*
Estimated Dredging Costs:	*2,787,000*
Estimated CDF Construction Costs:	*9,610,000*
Estimated Sediment Treatment Costs:	*64,419,676*
Estimated Total Capital Costs:	*79,189,657*
Estimated Operation and Maintenance Costs:	*408,600*
Estimated Total Costs for Bay-5:	*$79,598,257*
Estimated Construction Time:	*2 years*

Summary of the Comparative Analysis of Alternatives

EPA uses nine criteria to evaluate each remedial alternative. The nine criteria are used to select a remedy that meets the national Superfund program goals of protecting human health and the environment, maintaining protection over time, and minimizing untreated waste. A summary of EPA's evaluation of the alternatives using the nine criteria is provided below.

1. Overall Protection of Human Health and the Environment.

Under this criterion EPA considers how an alternative as a whole will protect human health and the environment. This consideration includes an assessment of how human health and environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Each bay alternative results in the attainment of the **Ambient Water Quality Criterion**, which is a concentration of PCBs in water that EPA considers to be protective of aquatic life. Therefore, each of the bay alternatives is environmentally protective.

However, EPA believes that additional environmental protectiveness will occur with Bay-2 through Bay-5, because sediment PCB levels in the upper bay are expected to approach 1 ppm on an area-wide basis. The bay remediation is targeted at areas which are inhabited by young fish and lobsters and which contribute disproportionately to contamination of the foodchain. Bay-2 through Bay-5 provide an incremental decrease in the availability of PCBs to the bay ecosystem and consequently to the foodchain. This incremental decrease in contamination will ultimately benefit the human consumer thereby being more protective of human health.

All of the bay alternatives are equally protective with regard to threat to human health from direct contact with contaminated sediment. The "Baseline Human Health Risk Assessment" determined that a sediment concentration of 10 ppm PCBs is protective with regard to direct contact. Furthermore, in the upper bay, overlying water depth makes repeated contact with these sediments highly unlikely. Therefore, there is no appreciable human health risk from direct contact with sediments in the upper bay.

Bay-1 would provide the least incremental protection to human health and the environment. In contrast Bay-5 appears to provide the greatest increase in protection of human health and the environment because contaminated sediments would be treated.

Table 2:
Summary of Bay Alternatives

BAY-1 Limited confirmational sampling in 9 areas	$373,500
BAY-2 Dredge areas A,B,C; construct and dispose in CDF-7	$13.1 M
BAY-3 Cap areas A,B,C with upland material	$16.9 M
BAY-4 Dredge areas A and B, dispose in CDF-1; Cap area C with upland material	$9.6 M
BAY-5 Construct CDF-7; dredge and treat sediment from areas A,B and C; Dispose treated sediment in CDF-7	$79.6 M

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).

Under this criterion, EPA considers whether a remedy complies with applicable or relevant and appropriate requirements (ARARs) under federal environmental laws and state environmental or facility siting laws. If ARARs are not attained, EPA considers whether grounds for a waiver exist.

Each of the bay alternatives is expected to result in the achievement of the AWQC on a site-wide basis, providing a sufficient level of protection for the environment. It may take longer to reach the AWQC under Bay-1 than for the other bay alternatives because a lesser amount of PCBs would be removed from the bay ecosystem.

None of the bay alternatives is expected to achieve the FDA tolerance limit for lobsters throughout the upper bay. EPA is proposing waiving this ARAR and requests comment on the proposed waiver.

To achieve the FDA tolerance limit for PCB concentrations in lobsters, remediation to below 1 ppm PCB level in all areas of the site would likely be required. EPA proposes waiving this ARAR because compliance with the requirement would result in greater risk to the environment than other alternatives, and because EPA believes it is technically impracticable to reduce sediment PCB levels sufficiently to achieve the FDA tolerance level in lobsters. An alternative that attains the FDA tolerance level in lobsters would not provide a balance between the need for protection of human health and the environment at the site and the availability of Superfund monies to respond to other sites that may present a threat to human health and the environment. The cost of remediating to 1 ppm throughout the site, the only level which will result in the achievement of the FDA tolerance limit for lobsters, exceeds $500 million. In light of this extraordinary cost and the limited funds available for other Superfund sites, EPA proposes invoking the fund balancing waiver. Notwithstanding the fact that the FDA tolerance limit may not be achieved for lobsters in all portions of the site with this remedy, water quality would improve and a corresponding reduction in the PCB levels in biota is expected.

EPA's data for PCB levels in flounder and clams from Fishing Closure Area II indicate they currently are below the FDA tolerance limit. Polychlorinated biphenyl levels in harvestable seafood are expected to decline more under Bay-2 through Bay-5 than under Bay-1, because the organisms spend a greater portion of their time, or a more sensitive lifestage, in the more contaminated areas. Due to the difficulty in predicting the exact response of the ecosystem to any remedial action, long-term monitoring would be conducted to confirm the water column and biota concentrations achieved as a result of remedial activities in the upper bay.

Under Bay-2, Bay-4, and Bay-5, sediment disposal may have to comply with the Massachusetts hazardous waste regulations at 310 CMR 30.501(3)(a), if bulk sediment PCB concentrations exceed 50 ppm. EPA believes that at this site, disposal in a chemical waste landfill is not reasonable and appropriate, and that disposal in CDFs will provide adequate protection of human health and the environment. As stated in the January 1992 Proposed Plan for the E/LH/B, because the requirements of the Toxic Substances Control Act (TSCA) at 40 CFR 760 will be met at this site, the Massachusetts hazardous waste requirements at 30 CMR 501(3)(a) will also be attained.

Except for Bay-1, all of the bay alternatives would be subject to the substantive requirements of Section 404 of the CWA, an ARAR which provides that no dredging or filling of wetlands will be allowed unless there is no practicable alternative that would have a less adverse impact on the aquatic ecosystem and

would also meet the remediation goals. Executive Order 11988 Protection of Floodplains would apply to the construction of CDF-7 proposed in Bay-2. Executive Order 11990 Protection of Wetlands would apply to Bay-2 through Bay-5. EPA believes that there is no practicable alternative that will attain remedial action objectives, while having a less adverse impact to wetlands, since it is the wetland sediments themselves that are contaminated. Implementation of the remedy would use engineering and operational control measures to minimize potential harm to surrounding areas. Water generated during sediment dewatering would comply with Massachusetts Surface Water Quality Standards (310 CMR 4.00). Alternatives Bay-4 and Bay-3, in addition, would comply with the substantive requirements of 310 CMR 9.00, Waterways Licenses and the Massachusetts Certification for Dredged Material Disposal.

3. Long-term Effectiveness and Permanence.

Under this criterion EPA compares the ability of remedial alternatives to maintain adequate and reliable protection of human health and the environment over time.

Alternatives Bay-2 through Bay-4 would reduce the movement of PCBs from the sediment into the overlying water and into the foodchain. The magnitude of this decrease may not be large system-wide, although it is expected that water column PCB concentrations in the immediate vicinity of the areas remediated would show a permanent, measurable decrease. This benefit may also be attained near the CSO under Bay-1, but to a lesser degree. Only Bay-1 would not provide any improvement at the WWTP outfall, where fish are known to congregate and feed.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Under this criterion EPA compares the degrees to which remedial alternatives permanently and significantly reduce the mobility, toxicity, or volume of contaminants as a direct result of treatment.

Only Bay-5 of the bay alternatives would significantly reduce the toxicity, mobility or volume of the contaminants as a direct result of treatment. However, Bay-2 through Bay-4, and to a lesser extent Bay-1, would reduce the potential for migration of contaminants by containing the sediments either in a CDF or under a subaqueous cap. The Record of Decision for the Hot Spot **operable unit** requires treatment of 45% of the PCB mass at this site. Thus, the proposed overall site remedy does include a treatment component.

5. Short-term Effectiveness

EPA evaluates the likelihood of adverse impacts on human health or the environment that may be posed during the construction and implementation of an alternative until cleanup objectives are achieved under this criterion.

Alternatives Bay-2 through Bay-5 would have limited short-term impacts from temporary **resuspension** of sediments and destruction of benthic organisms. Habitat at the outfall would be permanently altered, but improved overall. Engineering and operating controls would be used to limit the resuspension of contaminated sediments. Bay-1 would have the least adverse short-term effect because it does not entail any construction.

Bay-5 probably poses the greatest relative threat to onsite workers and the community.

6. Implementability

This criterion requires EPA to evaluate the technical and administrative

feasibility of an alternative, including the availability of materials and services needed to implement the alternative.

The **pilot study** demonstrated that dredges are available, and that CDFs are an effective and feasible means for containing contaminated sediments. Numerous areas comparable to the WWTP outfall have been capped. However, the cap must be emplaced carefully to avoid interference with the outfall. Construction of a cap at the WWTP outfall would be planned in coordination with the City of New Bedford.

Bay-1 would be the easiest of the bay remedies to implement. Both Bay-2 and Bay-5 propose the construction of a CDF in the lower harbor to accommodate the large volume of sediment generated by dredging. Bay-3 requires that 268,100 cubic yards of cap material be transported overland to the shore, and then by scow to the site, unless a marine source is available. Bay-4 is probably the second easiest bay alternative to implement because it does not require construction of a CDF, nor does it require an exceptionally large volume of capping material.

7. Cost

When evaluating the cost of an alternative, EPA considers the capital (up-front) cost of implementing an alternative, as well as the cost of operating and maintaining the alternative over the long term, and net present worth of both capital and operation and maintenance costs.

Only Bay-1, No Further Action, is less costly than the preferred bay alternative. The costs for the preferred alternative could be significantly reduced if a marine source of clean sediment were available. Bay-2 and Bay-3 are somewhat more expensive than Bay-4. Bay-5, the treatment alternative is dramatically more expensive than any other bay alternative.

8. State Acceptance

In its final choice of a remedy, EPA considers the comments the State has made on the SFS and the Addendum Proposed Plan and ultimately whether the State concurs with or opposes implementation of the preferred alternative. State comments or other information received from the State may result in the choice of an alternative other than the preferred alternative or in modifications to the proposed plan.

9. Community Acceptance

In its final choice of a remedy, EPA also considers comments it has received from the public regarding the SFS and the Addendum Proposed Plan. EPA may modify the proposed plan or choose an alternative other than the preferred alternative, based on the comments or other information it receives from the public.

EPA's Rationale for Proposing the Preferred Alternative

The preferred alternative, together with the January 1992 preferred alternative, and the Hot Spot Operable Unit Record of Decision issued on April 6, 1990, constitute a comprehensive remedial decision with respect to PCBs for all areas of the site. Based on current information and on analysis of the information contained in the Administrative Record, EPA believes that the preferred alternative for the bay is consistent with the requirements of the Superfund law and its amendments, specifically Section 121 of CERCLA, and to the extent

practicable, the National Contingency Plan.

In EPA's judgment, the preferred alternative together with the January 1992 preferred alternative and the Hot Spot ROD, provide the best balance of tradeoffs among the other alternatives with respect to the evaluation criteria. EPA believes the preferred alternative would be protective of human health throughout the site and the environment, that it complies with most ARARs and justifies a waiver of one ARAR (the FDA Limit for lobster). The preferred alternative also utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

As noted in the NCP there will often be a range of alternatives that are protective and that also comply with ARARs, but which vary in their cost and effectiveness. At this site, there is a range of protective alternatives which comply with ARARs (except for the FDA Limit).

With this preferred bay alternative, EPA is proposing a remedy which is incrementally more protective than was proposed in the January 1992 Proposed Plan. The preferred bay alternative will remove PCBs from sediments in certain areas of upper Buzzards Bay that are believed to contribute disproportionately to the contamination of the bay ecosystem and human foodchain. With implementation of Bay-4, PCB levels in sediment are expected to approach 1 ppm on an area-wide basis. Implementation of Bay-4 is expected to reduce transfer of PCBs to the foodchain so that clams and flounder harvested from the upper bay may meet the NCP acceptable risk levels more quickly.

The Minimal No-Action Alternative is the sole alternative which was evaluated in the SFS that is less costly than the preferred bay alternative. EPA believes the vast size and extent of the ecological resource that may be affected by the proposed additional remediation, the value of that resource, and the expected environmental benefits which may accrue, justify the additional expenditure beyond the expenditure for the Minimal No-Action alternative. The other more costly alternatives are also apparently superior to the Minimal No-Action alternative. However, their increased costs do not provide additional levels of protectiveness, reliability, or increased ease of implementation which are proportional to their increased cost.

For More Information

If you have any questions about the site or would like more information, you may call or write to:

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or

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Glossary

Administrative Record: The compilation of documents upon which EPA bases its remedy selection. The Administrative Record is available for public review at the information repositories established for a site.

Ambient Water Quality Criteria: State-adopted and EPA-approved ambient standards for water bodies. The standards cover the use of the water body and the contaminant concentration which must be met to protect the designated use or uses.

Applicable or Relevant and Appropriate Requirements (ARARS): ARARs are cleanup standards, requirements, criteria, or limitations found in federal environmental law or state environmental or facility siting law which are considered applicable or relevant and appropriate to the remedial action to be taken at a Superfund site. EPA must consider whether a remedial alternative meets ARARs as part of the process for selecting a cleanup alternative for a Superfund site.

Best Available Control Technology (BACT): A treatment method which is approved by the EPA as meeting regulatory requirements.

Biota: Living organisms, both plant and animal life.

Cap: A cover placed over a contaminated area to prevent surface water and rain from coming into contact with the buried contaminants. A cap is usually made from a waterproof synthetic material or clay, or some combination.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The acts created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can either: 1) pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work or 2) take legal action to force parties responsible for site contamination to clean up the site or pay back the Federal government for the cost of the cleanup.

Combined Sewer Outfall: Discharge location of stormwater runoff and wastewater during heavy rain events.

Confined Disposal Facility (CDF): An on-shore facility separated into cells that can be used for sediment storage/disposal and dewatering, and water treatment. The CDF at the New Bedford Harbor Superfund site was evaluated as a disposal and water treatment option during the Pilot Study.

Cutterhead dredge: One version of hydraulic dredge which operates on the principal of the centrifugal water pump. The cutterhead dredge gets its name from the rotating basket fitted to its suction head. The basket is used to assist in breaking up densely packed materials.

Estuary: The mouth of a river where its flow is affected by the ebb and flow of tides.

FDA Tolerance Limit: The Food and Drug Administration limit on the concentration of a contaminant in food items to be sold in interstate commerce.

Feasibility Study (FS): A Feasibility Study is a report that summarizes the development and analysis of remedial alternatives that EPA considers for the cleanup of Superfund sites.

Lower Harbor/Bay: The lower harbor is the area located between Coggeshall Street Bridge and the Hurricane Barrier. The bay is fishing closure areas II and III located to the south of the Hurricane Barrier.

National Contingency Plan (NCP): The plan codified at 40 CFR Part 300 that sets forth the procedures and standards for responding to releases of hazardous substances.

National Priorities List (NPL): EPA's list of top priority hazardous waste sites that are eligible to receive Federal funds for investigation and cleanup under the Superfund program.

Net Present Worth (NPW): The amount of money necessary, at the present time, to cover future payments of an item, at an assumed interest rate.

Operable Unit: An action taken as one part of an overall Superfund site cleanup. A number of operable units can be used in the course of a site cleanup.

Parts per Million (ppm): A unit of measurement used to describe levels of contamination. For example, one gallon of a contaminant in one million gallons of water is equal to one part per million.

Pilot Study: A physical demonstration of dredging equipment and construction and testing of disposal facilities conducted by the Army Corps of Engineers in a cove within the New Bedford Harbor Superfund site. Results of the Pilot Study provided supporting documentation to the Corps' Engineering Feasibility Study of the New Bedford Harbor site.

Polychlorinated biphenyls (PCBs): A group of organic chemicals used since 1926 in electric transformers as insulation and coolants, in lubricants, carbonless copy paper, adhesives and caulking compounds. PCBs are extremely persistent in the environment because they do not break down to new and less harmful chemicals. If ingested by humans or animals, PCBs can be stored in fatty tissues. EPA banned most uses of PCBs in 1977. Acute and chronic exposure to PCBs can cause liver damage. PCBs have also caused cancer in lab animals and have adversely affected the development and survival of fish.

PCB Action Level: Concentration of PCB in sediment that causes examination of remedial alternatives.

Record of Decision (ROD): A legal document signed by EPA that describes the final cleanup action or remedy selected for a site, the basis for EPA's choice of that remedy, public comment on alternative remedies, and the cost of the remedy.

Remedial Alternatives: Options evaluated by EPA to reduce the source and migration of contaminants at a Superfund site to meet cleanup goals.

Residual PCB Level: The level of PCBs that remain after an action is taken.

Resuspension: The churning up of sediments in water in a manner similar to the stirring up of dust resting on a table top.

Risk Assessment: A study conducted by EPA to determine the risks posed to human health and/or the environment by contamination at a Superfund site.

Sediment: Material that settles to the bottom of a stream, creek, lake, or other body of water.

Solvent Extraction: An innovative technology for treatment of contaminated soils and sediments. Solvent extraction chemically separates contaminants from the material, leaving clean soil or sediment and a separate contaminated liquid component.

Split Hull Scow: A boat designed to transport bulk materials such as soil and dredge spoils. A split hull scow has doors in the bottom that can be partially opened to slowly discharge its contents into the water.

Supplemental Feasibility Study: A study and evaluation of remedial alternatives that are being considered for expanding or modifying an existing proposed plan.

Trustees of Natural Resources (the Trustees): The officials designated to act on behalf of the public to protect the natural resources, such as land, fish, wildlife, biota, etc. This trustee may be a federal, state or local official or a representative of an Indian tribe.

Water column: The water overlying a particular region, as distinguished from the sediment or air.

Wetlands: An area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. In coastal areas wetland include intertidal zones and nearshore land under water.

Mailing List Additions

If you or someone you know would like to be placed on the New Bedford Harbor Superfund Site mailing list, please fill out and mail this form to:

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