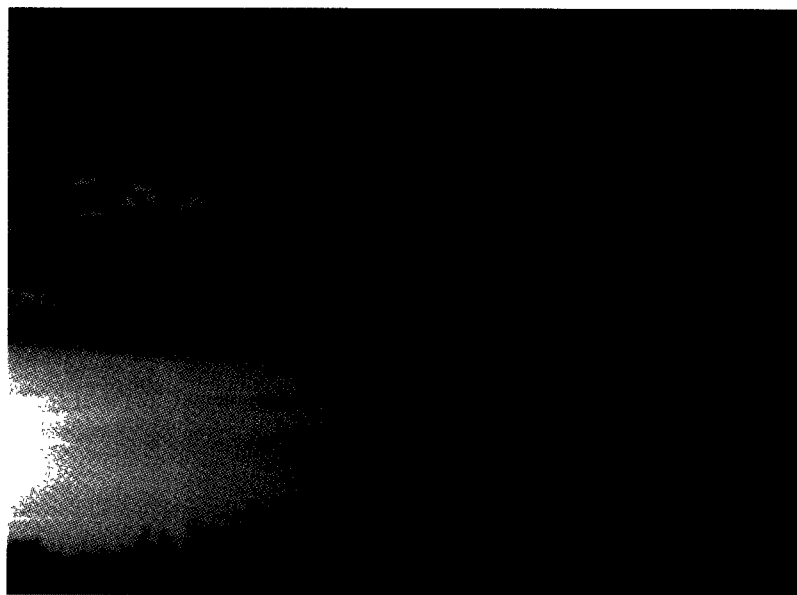
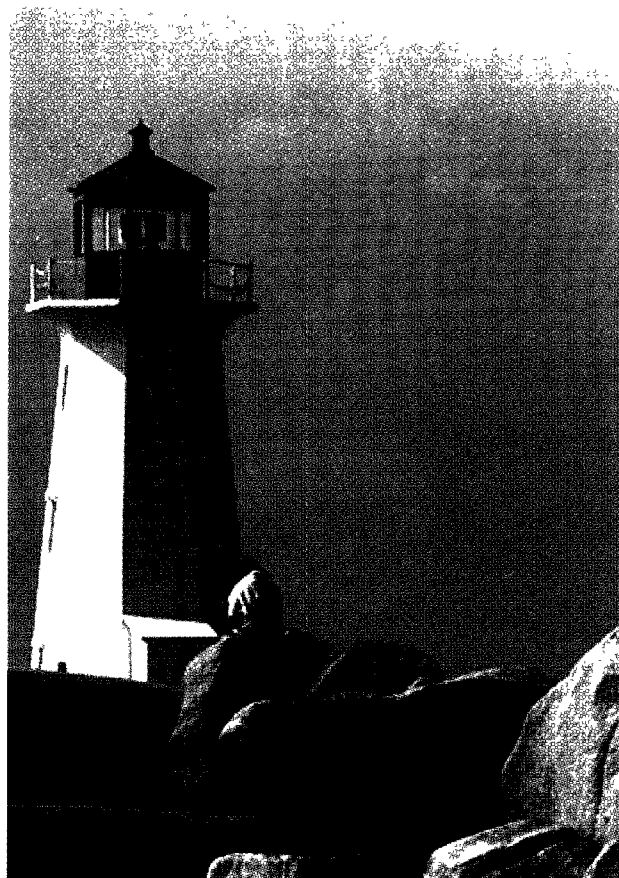


State of the New England Environment 1996



A REPORT TO THE PUBLIC



*This report is dedicated to the memory of
U.S. Senator Edmund S. Muskie of Maine
1914-1996.*

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Open Letter to the People of New England

Every region of America has something that makes it unique. The characteristic that most clearly sets New England apart from the rest of the country is its rich blend of tradition and modernity, pressing against one another in the context of a fragile, strikingly beautiful natural setting. We as New Englanders define ourselves by that tension, in a way — our desire to grow and to thrive without sacrificing the environment we hold in common.

For more than three centuries, we have worked hard to preserve New England's natural resources. Today, we must work harder than ever to protect that environment. Our population continues to grow, hitting new record highs every day. As a consequence, we drive more miles in our cars, we consume more resources, we create more waste, and we place greater pressure on the land on which we live.

Last year, EPA's New England office issued the first State of the New England Environment report, which detailed the many environmental successes we have achieved over the last quarter century, provided a glimpse of the environmental challenges we face today, and offered some new directions in environmental protection policy to meet those challenges. We promised to update that report every year — to give the hard-working taxpayers of New England an analysis of where we are in the ongoing effort to preserve and enhance our environment and a justification of how we are spending the federal money they have entrusted to us.

The State of the Environment Report for 1996 is another step toward making good on that commitment. Between its covers, we offer an update on where we are and where we're headed — and, importantly, how we plan to get there.

Our goal at EPA in New England remains the same as it was when the agency was created in 1970, but our approaches, as they must, are changing to keep up with changing times. We are focused more on places and industries rather than on rules; on people and communities rather than on regulations. And, most important, we are keenly committed to building partnerships and camaraderie rather than dictating outcomes from on-high.

This report catalogues some of these new directions. Our ongoing efforts to turn EPA's New England office into a laboratory for bold experimentation in environmental protection — the "how we plan to get there" part — fall into three thematic areas:

- bringing about cultural and organizational change at EPA to make our operation more efficient and more accountable;
- introducing sounder science and smarter economics to our decision-making, with a greater understanding of the real-world impacts and effectiveness of our efforts; and,
- transforming the agency into a force for education and empowerment of others, realizing that none of us — much less the federal government — can get the job done alone.

In each of these areas, we have set a standard higher than we can comfortably reach — but nonetheless we intend to reach it.

The sentiment behind what Woodrow Wilson once said of America is also true of our work to protect New England's public health and her environment. "America is not anything if it consists of each of us. It is something only if it consists of all of us," President Wilson said. In that spirit, I welcome your thoughts on how we're doing. I intend for you to hold us accountable for meeting the goals we have set forth in this report. And, most important, I invite everyone who lives, works and plays here to join us in protecting the natural resources that make up the unique corner of America that we call New England.



John P. DeVillars
Regional Administrator
EPA's New England Office

Introduction

"These New England states, I do believe, will be the noblest country in the world in a little while. They will be the salvation of that very great body, the rest of the United States; they are the pith and marrow, heart and core, head and spirit of that country."

FANNY KEMBLE, 1847

The New England environment is so precious to us because it is part and parcel of our past and our present, of our free time and our work, of our culture and our economy. Our environment is made up of many special places that are beloved for many different reasons. This year's State of the New England Environment Report takes an in-depth look at a few distinctive elements of our environment — such as coastal areas and our "urban ecosystems," or city environments — and describes our work to encourage and achieve sound stewardship of those and all our natural resources.



The New England Coastline

The people of New England have always been drawn to the region's coasts. From the rich oystering and quahogging beds of Long Island Sound to the sweep of Outer Cape Cod, from the openness and wildness of Block Island and its Sound to historic Boston Harbor, from the great homes looking out over the New Hampshire shoreline to the lighthouses and craggy shores of the coast of Maine, the Atlantic Ocean has kept New Englanders close to her. The coastline is up to five times more densely populated than our inland areas. The popularity of coastal areas — as understandable as it is — has placed increasing strain on our coastal environment. This growing strain calls for careful attention and for innovative approaches to coastal protection.

The New England Cities

Despite the classic imagery of families passing their days in idyllic, rural New England communities complete with town commons and town meetings, many of us actually live in major cities like Hartford, Connecticut; Boston, Massachusetts; Providence, R.I.; and Portland, Maine. Historically, urban issues have not been considered environmental issues. At EPA, we no longer think that way. The protection of the urban environment of New England is just as important to us as the protection of what we have traditionally thought of as our prized natural resources — astounding waters like Lake Champlain in Vermont, majestic peaks like Mount Washington in New Hampshire, and stunning open spaces like Indian Island in the Penobscot River of Maine. Urban spaces, like the coastline, present unique challenges in environmental protection.

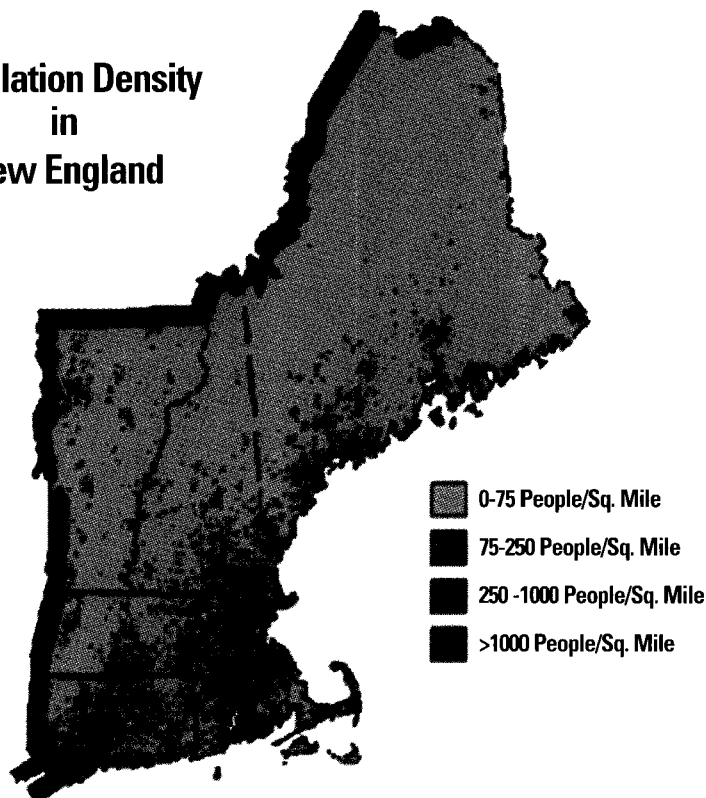
To protect the coastline, the urban areas and the rest of New England's environment, EPA has adopted a series of new

approaches to our work — new directions, described throughout this report, that call for greater participation by the public and the businesses of New England. With sufficient teamwork, these new directions could go a long way toward preserving our environment for generations to come.

There is more to the 1996 State of the New England Environment Report than a snapshot of the environmental health of our coasts and our cities and the innovative approaches to protect them at EPA. But these key areas point to the underlying theme of the report. We live in a world that is changing fast. We must adjust to those changes if we are to preserve our environment. EPA is working hard to keep up with the times. Our state and tribal partners must — and are — doing the same. And the public of New England must play a greater role than ever if we are to be successful — to continue to live up to our promise as the "pith and marrow, heart and core, head and spirit" of America.

Figure 1

Population Density in New England



Preserving New England's Natural Resources

Coastal Ecosystems: Life on the Edge

"We will go where winds blow, waves dash, and the Yankee clipper sweeps by under full sail."

WALT WHITMAN

New Englanders love the Atlantic coastline. The ocean serves a variety of needs, contributing a great deal to the New England economy and our quality of life. As a result, a large majority of New England's growing population is concentrated in coastal areas, placing a great deal of pressure on the protected areas where freshwater from rivers mixes with salty sea water — our estuaries.

Plants and animals in these sensitive ecosystems thrive in a delicate balance of nutrients and flow patterns unique to estuaries. This balance is increasingly under siege by large volumes of sewage, polluted runoff from city streets and parking lots, and heavy boating and shipping traffic. Our need to balance the commercial, recreational, and residential needs of a growing New England with the protection of sensitive coastal areas is a critical challenge before EPA and all New Englanders.

Shellfishing in New England

The bond between shellfish and New England is as thick as a good clam chowder. The commercial shellfish harvest is worth about \$200 million per year to the region and represents a livelihood

for thousands of people. Recreational shellfishing — the fun, messy harvesting of clams, oysters and mussels — draws tourists to New England's shoreline and mudflats every summer.

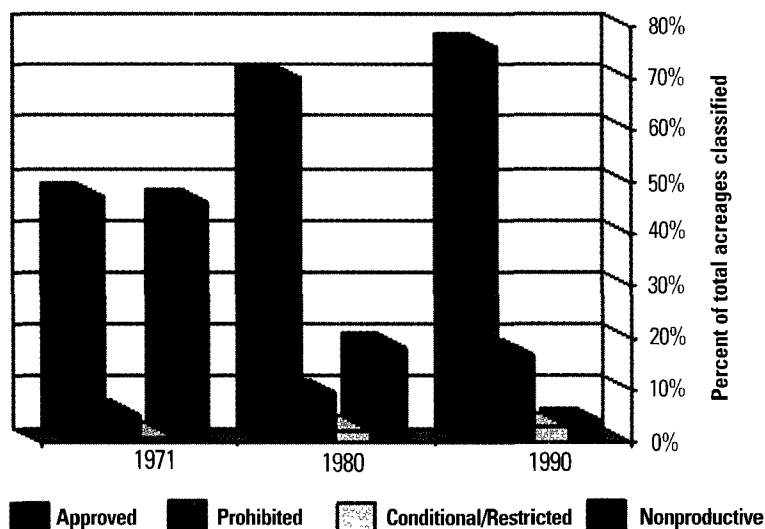
The health of New England's shellfish beds is important not only as a source of economic strength and wholesome recreation; it is important also as an indicator of water quality along the coasts. To protect consumers from exposure to contaminated shellfish, the U.S. Food and Drug Administration and the states classify shellfish growing habitat based on levels of fecal coliform bacteria in the overlying water. These bacteria, which are present in the intestines of warm-blooded animals, are indicators that warn us that harmful contaminants, known as pathogens, may be present as well. Sources of pathogens contaminating shellfish beds include improperly treated or untreated sewage, storm water polluted with animal and other wastes, as well as other nonpoint (or diffuse) sources

of pollution. Not surprisingly, shellfish beds permanently or conditionally closed for harvest are located in densely populated areas. Although the total acreage of open, productive shellfish beds has increased over the years, primarily due to offshore beds that have been opened to harvesting, the percentage of closed beds has increased. A disturbing trend in the last two decades is an increase in shellfish bed closures near suburban and rural areas (Fig. 2).

In the effort to open healthy shellfishing beds for commercial and recreational use, the tension between development and conservation is quite apparent. As the landscape becomes developed, previously vegetated areas are converted to impervious surfaces such as parking lots and rooftops. As a consequence, storm water runoff, which carries with it contaminants, increases dramatically. Instead of being absorbed into the ground and taken up by plants, rainwater is washed directly into streams and estuaries — carrying with it any pollutants in its path. As a result of this phenomenon, shellfish beds often suffer; on Cape Cod, for instance, one of the fastest growing areas in New England, the acreage of productive clam flats closed

Figure 2

Summary of Classified Shellfish Water Acreage in New England Estuaries



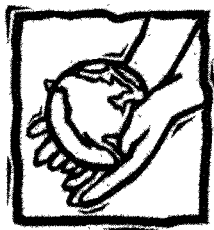
Data Source: NOAA National Shellfish Register of Classified Estuarine Waters, 1985 & 1990

Greenwich Bay Initiative

Greenwich Bay in Rhode Island encompasses some of the most productive clam beds on the East Coast. After a severe Nor'Easter in December 1992, elevated levels of bacteria triggered an extended closure of the bay to shellfishing. In response, EPA, the Narragansett Bay National Estuary Program (NBNEP), the City of Warwick, Save the Bay, the Natural Resource Conservation Service (NRCS), the RI Shellfisherman's Association, and the RI Coastal Resource Management Council pooled resources and established the "Greenwich Bay Initiative" to improve water quality and re-open the shellfish beds. The NBNEP and the University of Rhode Island received a federal grant to pinpoint sources of contamination to the bay. Untreated sewage from

rest rooms at an old mill and a farm manure storage pile turned out to be the major sources of the bacterial contamination.

The rest room discharges have been eliminated and the NRCS is working with the farm owner on a manure storage plan. Shellfishing resumed in June, 1994 on a partially restricted basis. In the last year, EPA has been working with its many partners toward full restoration of Greenwich Bay. The goal is to open the shellfishing beds unconditionally and to ensure that a sustainable yield shellfish management plan is in place to protect the bay in the future.



polychlorinated biphenyls (PCBs), pesticides, and polycyclic aromatic hydrocarbons (PAHs), which come from the use of petroleum products.

These contaminants accumulate in sediments over time. They are a problem because they pose a direct risk to the health of bottom-dwelling plants and animals. Fish and shellfish, which are further up the food chain, sometimes develop lesions and other abnormalities and in turn can be hazardous to humans consuming them. A winter flounder, for instance, is more at risk of developing cancer in estuaries with contaminated sediments like Salem Sound, Boston Harbor, New Bedford Harbor, and New Haven Harbor than in areas with clean sediments, such as Pleasant Bay on Cape Cod.

Contaminated sediments are a particularly challenging environmental issue because the problem cannot be fixed simply by eliminating the source of pollution. For example, sediments in Salem Sound in Massachusetts still exhibit high levels of chromium, a compound formerly used to cure leather in tanneries. The vast majority of the tanneries in that area, however, are no longer operating. EPA and its sister agencies are addressing the problem of contaminated sediments in two ways. Where possible, we are working with the states and local communities to prevent pollutants from getting in the water in the first place. And where it is already too late to prevent the pollution, EPA is working to find suitable options for the treatment and disposal of contaminated sediments. These tasks can be complex and expensive. But because keeping the navigational channels of New England's ports open and safe is such a necessity, this work is very important to the economic and environmental health of the region.

or restricted rose from 700 acres in 1980 to 3500 acres in 1986.

To combat these unwanted side effects of development, EPA has spearheaded community-based efforts to protect Casco Bay in Maine; Great Bay in New Hampshire; Massachusetts Bays and Buzzards Bay in Massachusetts; Narragansett Bay in Rhode Island; and Long Island Sound off Connecticut. This approach relies on coordination among federal agencies, local towns and state shellfish staff to increase monitoring, identify and address sources of pollution, and re-open formerly closed shellfish beds. In part thanks to these pollution control efforts, 40,000 acres of shellfish beds have been opened in Massachusetts in the last year, including 10,000 acres on Cape Cod.

gation, excess sediment must be dredged regularly, or removed, to ensure safe passage through shipping channels. Fully one million cubic yards of sediment are dredged from New England harbors on an annual basis to allow for the shipment of about 70 million tons of cargo.

The discharge of wastewater, often treated sewage, and the runoff of stormwater, bringing with it pollutants from industrial activities and urban centers, often end up contaminating the sediment that needs to be dredged to allow boats to pass. While most of the sediment is not contaminated, the U.S. Army Corps of Engineers estimates that between 5 and 15 percent of sediment is unsafe for disposal in open waters and requires particular care. These contaminants must be disposed of in a safe manner. Sediments can build up toxic contaminants such as trace metals (cadmium, lead, mercury).

Contaminated Sediments

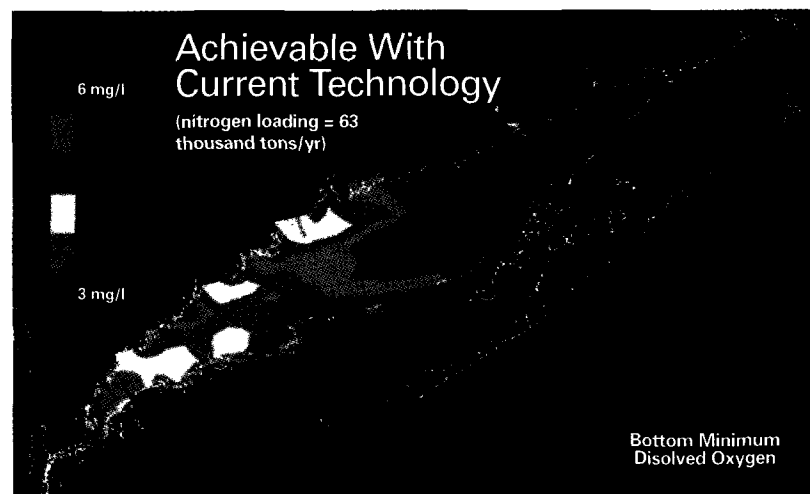
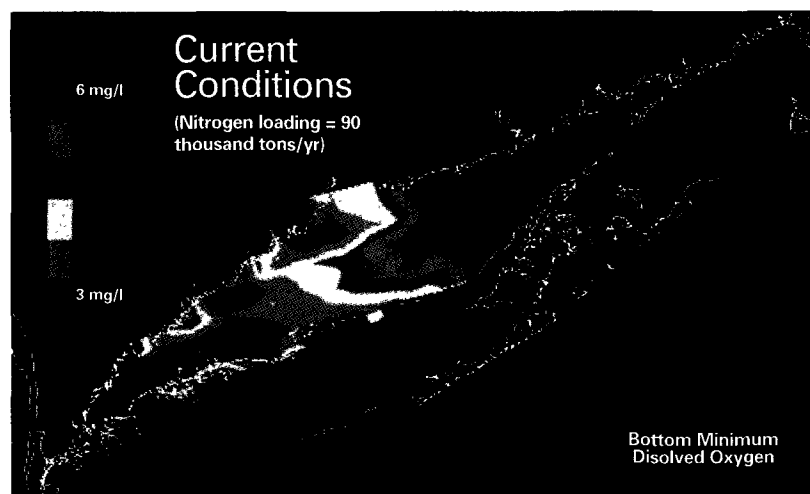
Harbor Masters, Port Authorities, and state and federal agencies continually grapple with the management of the large volumes of sand, silt, and mud — known as sediment — that accumulate in harbors and estuaries. For safe navi-



Figure 3

Long Island Sound Dissolved Oxygen Concentrations

Scenarios are for the month of August, reflecting worst-case conditions.
Impacts occur at dissolved oxygen levels below 3.5 mg/l



Preserving Long Island Sound

Just as a houseplant needs the right combination of water and sunlight, plants and marine life in estuaries need the right amount of nitrogen for healthy growth. If there is too little nitrogen, plants do not get enough of a nutrient they need; if there is too much nitrogen in an estuary, then planktonic algae grows, which can cause a problem for plant and animal life in the estuary. When the surplus algae that grew because of the high level of nitrogen dies, decays and settles to the bottom, large volumes of oxygen are consumed in the process. This shortage of oxygen causes a condition known as hypoxia. Hypoxia means that there are inadequate levels of dissolved oxygen to support healthy populations of lobsters, fish, and other aquatic life.

As part of the Long Island Sound Study (LISS) — which is funded in substantial part by EPA — academic, state and federal scientists have conducted extensive monitoring over the past decade to characterize water quality and provide direction to state and federal management efforts. The study confirmed that excessive nitrogen discharges were the primary cause of hypoxia in the Sound. Ammonia in sewage treatment plant effluent is a major source of nitrogen to the Sound. Every day, over a billion gallons of partially treated sewage is released into the Sound — a product of the 8 million people who live and work in the Long Island Sound watershed area. Recently, we have been able to stop additional environmental degradation from occurring thanks to major efforts in installing de-nitrofication equipment at municipal wastewater treatment plants along the Sound. In Connecticut, installation of control equipment at 12 treatment plants will be completed by December 1996, resulting in a decrease of 5,000 pounds per day of nitrogen discharged to Long Island Sound. Long Island Sound protection efforts today are focused on pursuing additional nitrogen reduction from both point and nonpoint sources. Using a computer model to pre-

dict the changes in dissolved oxygen levels that would result from varying levels of nitrogen reduction, EPA and the state environmental agencies in New York and Connecticut are working together to implement a phased approach to reducing “nitrogen loadings” — instances in which nitrogen accumulates in the water — from sewage treatment plants and non-point sources. The model allows EPA to compare dissolved oxygen levels in the Sound with different nitrogen loading scenarios, from pre-settlement times to the present day. The model can also predict what conditions will be like after we have reduced the level of nitrogen in the future (Fig. 3).

Losing Critical Habitat: Eelgrass Beds

Among our most important coastal wetlands are the extensive eelgrass meadows found in protected shallow bays along the New England coast. One of the reasons that Penobscot Bay in Maine, for instance, is such a critical environmental resource is that it boasts the most extensive eelgrass beds in New England. These meadows consist of a single species of plant, *Zostera marina*, and the numerous animals and seaweeds that live on or among its long thin blades. In addition to providing important habitat and nursery areas for juvenile fish and other estuarine life, eelgrass meadows function as natural pollution control systems by keeping sediments near the shore in place and absorbing nutrients from the water column. Eelgrass is also a valuable indicator of how clear the water is because, like all plants, it cannot thrive without adequate light.

The abundance of eelgrass meadows has declined since the 1800s in part because of naturally-occurring disease. More recently, their recovery has been hampered by waters that are too rich in nutrients, erosion of the surrounding coastline, dredging, and boating. EPA and its state and local partners are becoming increasingly interested in protecting the remaining eelgrass meadows.

Locating and mapping existing eelgrass beds is the first step in protecting them. Over the past year, EPA’s New England office has begun to develop a detailed regional inventory which has already been used in planning dredging projects and in influencing port development. For example, the need to protect exten-

sive eelgrass beds near Sears Island — the largest uninhabited island on the Maine coast — was a major factor in EPA’s efforts to insure adequate environmental protection associated with the development of a shipping port on the island.

Developing Waquoit Bay’s Watershed Management Strategy

Waquoit Bay is a beautiful, shallow estuary on the south coast of Cape Cod, Massachusetts. Since 1950, population in the watershed area has increased more than tenfold, while eelgrass bed cover has declined (Fig. 4).

Contamination of the groundwater supply that feeds into the estuary is of particular concern. Nitrogen loading from on-site septic systems has contributed to the growth of “nuisance algae”, as well as the loss of eelgrass and bay scallops. Organic solvents from the Massachusetts Military Reservation (a hazardous waste site being cleaned up under the Superfund program) have leached into groundwater upstream of the Bay; contaminated plumes from the site could reach the waters of the estuary in the next decade.

EPA is putting its commitment to community-based environmental protection to work at Waquoit Bay.

The goal is to evaluate different options for protecting this important area and coming up with ways that make sense for the people who live there. Area residents, local scientists, civic groups and environmental professionals worked cooperatively to develop goals and environmental indicators (such as the abundance of eelgrass and how it is distributed) to track our progress in restoring and preserving the Bay’s health.

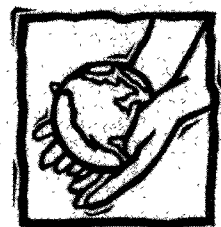
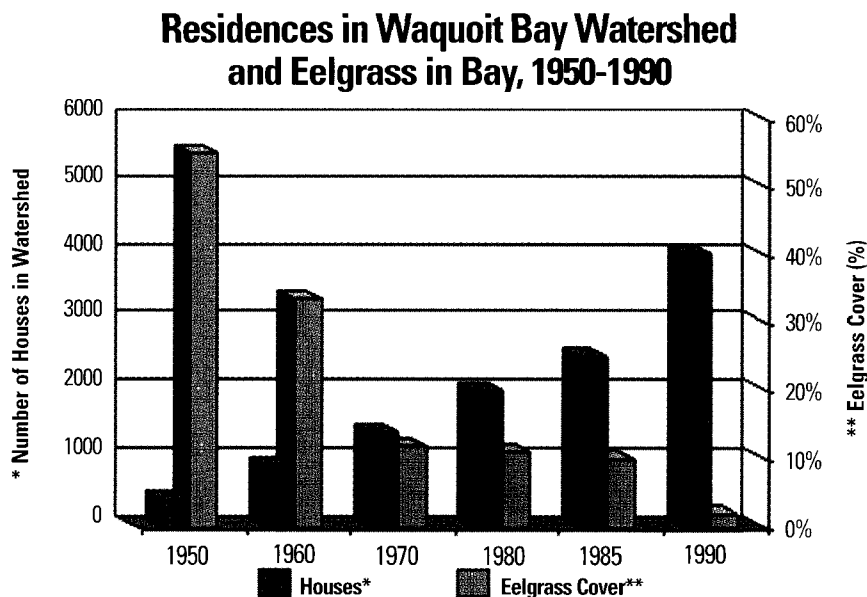


Figure 4



Air Quality & Transportation

"The promise of clean air is a promise we have made to ourselves and to our children. Profits come and go. You only get one chance at life."

SENATOR EDMUND S. MUSKIE

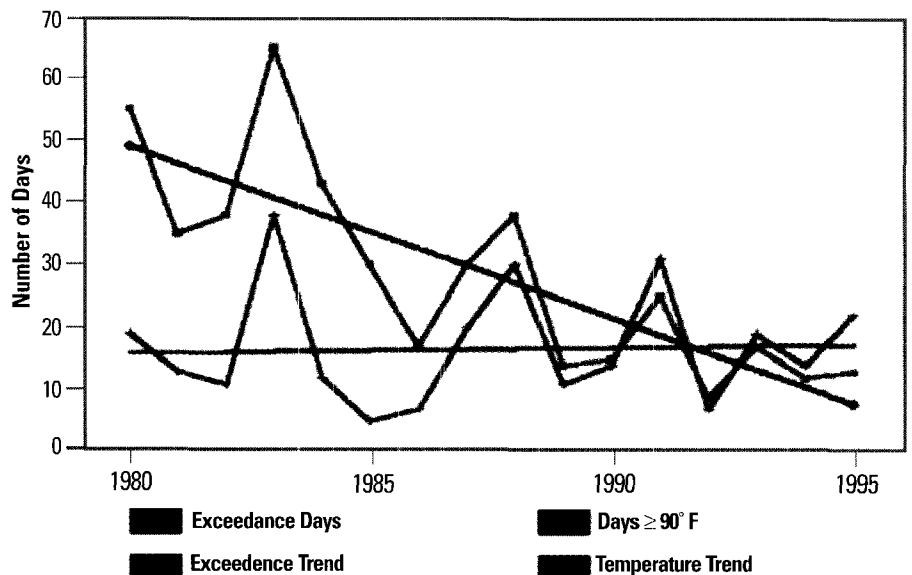
The air quality in New England has improved tremendously over the past 25 years. Of the various environmental issues facing New England, air quality is the one for which we have developed the most accurate indicators of the health of our environment. We have reduced many of the negative human health, ecological and economic impacts associated with air pollution in the region. The air pollution problems that remain — many of which are more complex than those we have overcome — call for new, innovative solutions.

Ozone

Today, the air that New Englanders breathe meets the health-based standards

Figure 6

Ozone; Exceedance Days vs. Maximum Temperature



for all air pollutants with the exception of ground level ozone, (O₃), the main constituent of summertime smog. The number of days on which the air has been considered unhealthy in New England has decreased dramatically since 1980 (Fig. 5). Smog, which

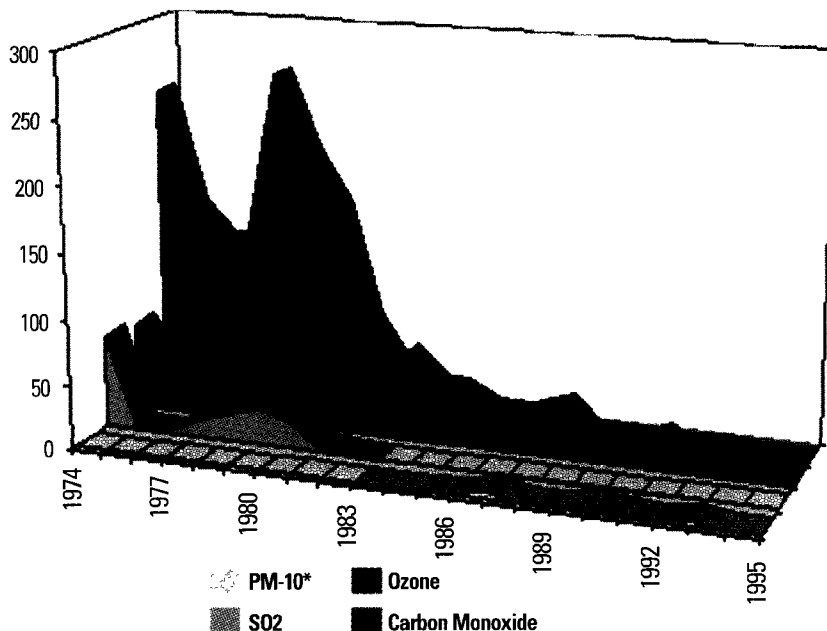
includes fine particulates and chemical pollutants in addition to ozone, is formed during warm summer periods when air polluted with organic compounds and oxides of nitrogen undergo chemical reactions triggered by strong sunlight.

As a society, we have made great strides in reducing unhealthy smog in New England through significant pollution controls on new automobiles and industrial emissions and cleaner fuels. The New England states, with assistance from EPA, have put in place sweeping air pollution control programs. As a result, the summer air in New England in the 1990s has been cleaner than in each of the last three decades.

Ozone levels are closely linked to the weather in the summer. To determine the trend in ozone levels, it is necessary to consider the summer meteorological conditions. For example, during the period from 1983 to 1986, the number of high ozone days (days exceeding the air quality standard) dropped significantly (Fig. 6). However, notice that 1983 was a very warm summer, while 1985 and 1986 were much cooler; in short, the downward trend was caused more by meteorology than by emission reduc-

Figure 5

Number of Violation Days in New England; 1974-1995



Source: EPA AIRS Database as of 3/96 * PM-10 Standard was Promulgated in 1987

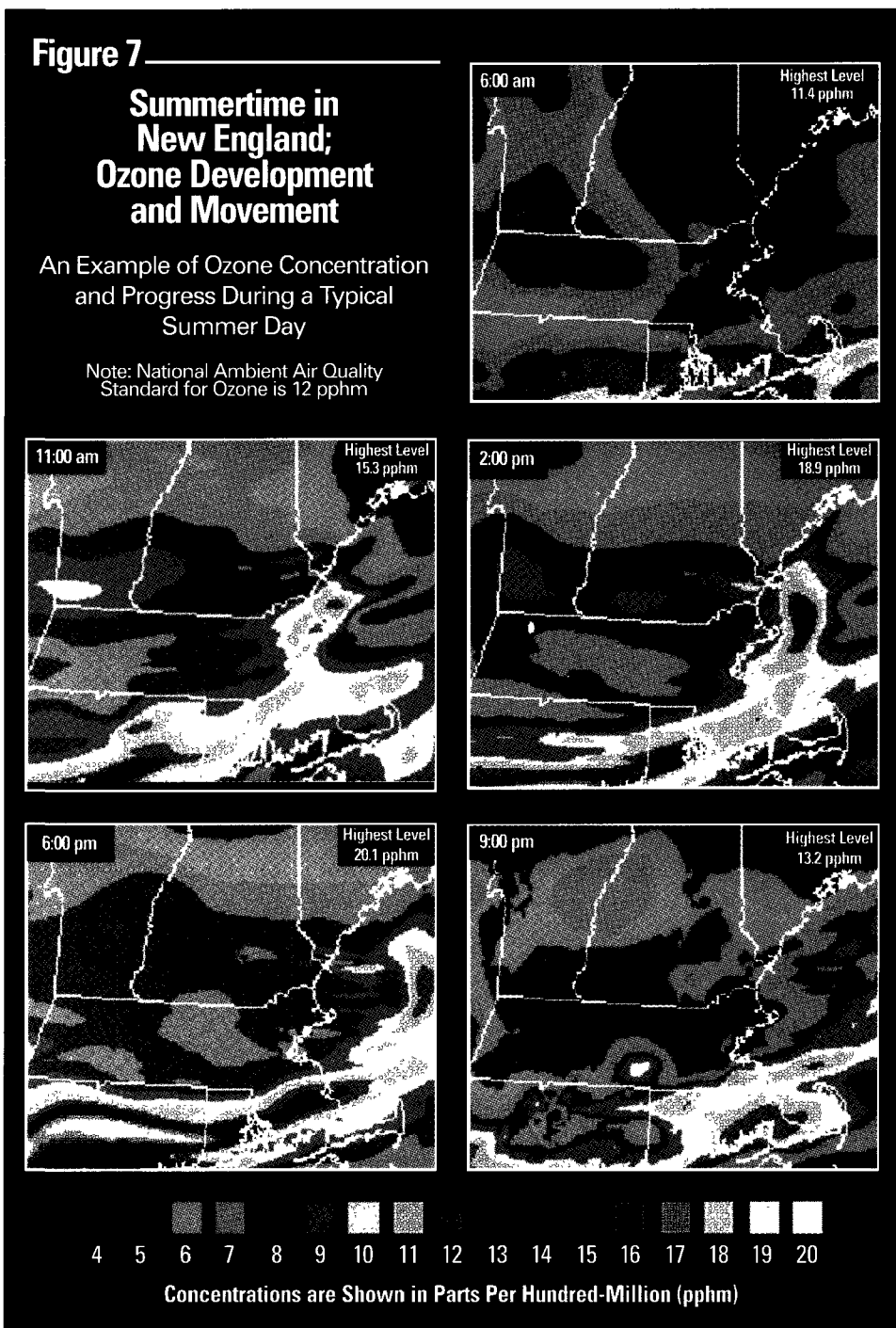
tions. The summer of 1995 was the first season in which the number of ozone exceedance days was less than the number of days above 90°F.

To determine whether air quality is generally improving or getting worse in New England, we can compensate for the effects of meteorology by examining a lengthy period of time. While it is clear what happens during hot summers (1983, 1988 and 1991) and cool summers (1985, 1986 and 1992) hotter summers have worse air quality, cooler summers pose less of a health threat — there is no increasing or decreasing trend in the number of days per year with temperatures greater than or equal to 90°F. When we compensate for the meteorology, we see a downward trend in the number of days above the ozone standard — a good sign for the health of people in New England and an indication that our pollution controls are working. Over the last couple of years, regardless of the temperatures, we see a trend of improvement in air quality — an even better sign.

EPA's New PAMS Network

(Photochemical Assessment Monitoring Stations), operated by New England states, characterizes the concentrations of the compounds that cause ground-level ozone (VOCs and NO_x) and ozone entering and leaving the densely populated areas of the east coast.

Complementing this effort, during the past year EPA, other federal agencies, the Northeast and Mid-Atlantic states, several universities and industrial groups began a cooperative study of ground-level ozone. This project, called NARSTO-NE, provides new information on how ozone is produced and transported. These two systems will provide extensive measurements of air pollutants during smog episodes at more than 200 (50 in New England) ozone and 27 (15 in New England) PAMS monitoring sites from West Virginia to Maine. We will have key information on the influence of natural precursors to ozone, coastal



meteorology (sea breeze influence), transport of ozone and ozone precursors, and the concentration of some important urban toxic organic compounds (such as formaldehyde, benzene, and xylene). Ultimately, the data obtained from these studies and networks will provide a basis for determining the effectiveness of local and regional ozone control programs. Data can also be used for computer-generated photographs of the evolution and

movement of high-concentration ozone episodes across New England and can be helpful in predicting concentrations under various control strategies (Fig. 7).

Transportation

"The biggest change in industrial structure since the microchip will be a revolution in what cars are."

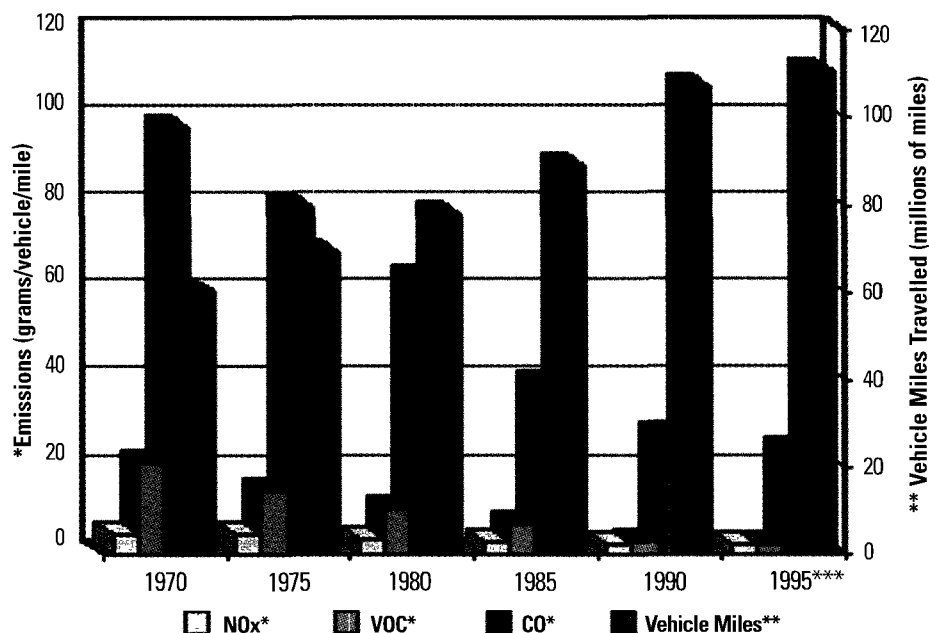
AMORY LOVINS

Despite improvements in motor vehicle technology over the past 25 years, cars and trucks are the largest single source of air pollution in the region, emitting approximately one half of all Volatile Organic Compounds (VOCs), Nitrous Oxides (NOx) and air toxics. This is primarily because the number of vehicles on the road keeps growing and the number of miles driven has doubled since 1970 (Fig. 8).

Two federal laws provide the framework for reducing motor vehicle pollution. The Clean Air Act Amendments of 1990 call for more protective vehicle standards and fuel requirements, expanded vehicle emissions inspection and maintenance programs, and encourage transportation planning to reduce growth in miles traveled. The 1990 Intermodal Surface Transportation Efficiency Act (ISTEA) complements the Clean Air Act by requiring states and Metropolitan (or Regional) Planning Organizations (MPOs) to develop Transportation Plans that consider, from the earliest planning

Figure 8

Lower Vehicle Emissions... But More Vehicles are Being Driven



* NOx, VOC & CO are emissions measured in grams/vehicle/miles, ** Vehicle Miles Travelled are measured in millions of miles, *** Vehicle Miles Travelled is estimated for 1995

stages, environmental objectives, land use impacts and alternative modes of transportation (such as mass transit, riding bikes, and walking).

EPA's New England office is working with the US Department of

Transportation (DOT), the New England States, and local organizations to incorporate environmental concerns into transportation planning. In June, 1995, national and regional leaders, as well as 300 environmental professionals and activists, gathered to identify strategies that enhance mobility without harming the quality of our environment. The participants in that conference proposed that we work to improve coordination among environmental and transportation planners at the federal, state and local level, from the earliest stages of project planning. Early coordination helps identify and resolve potential environmental problems, reduces environmental impacts of a project and, in many cases, overcomes costly delays.

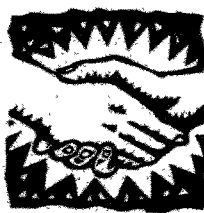
The new organizational structure of EPA's New England office, which emphasizes "place-based" and "community-based" environmental protection is collaborating with state and regional planning agencies to document effective strategies for integrating environmental considerations into transportation plans.

Air Permit Flexibility - Emissions Trading/ Pollution Prevention

Air Emissions Trading - Emissions trading is an effective tool for achieving environmental results in a more cost-effective manner. This initiative uses market incentives to help the environment and the economy. Emissions trading has fostered innovation, saved companies money, and reduced emissions that cause smog problems. During 1995, EPA's New England office helped transact approximately 45 trades of NOx emissions, resulting in a cost savings of several million dollars.

P4 Project - EPA in New England is one of 5 regional offices participating in

the National Pollution Prevention in Permitting Pilot Project. EPA, the State of Connecticut and Cytec Industries of Wallingford, CT are exploring ways to allow greater flexibility in the operating permit program under the Clean Air Act. The goal of this partnership is to demonstrate that regulatory flexibility and proactive environmental strategies are appealing, profitable, and protective of the environment.



EPA's National Heavy Duty Engine Initiative

Heavy-duty engines (trucks, buses, and non-road equipment) contribute 59% of the oxides of nitrogen (NOx) emissions and 82% of the particulate matter (PM-10) emissions from mobile sources nationally (**Fig. 9**). In the Northeast, heavy duty engines account for approximately 20-30% of total NOx emissions. Given these significant emissions, strategies to control pollution from heavy duty engines are critical if we are to improve the quality of our air.

EPA, working with the California Air Resources Board and leading national manufacturers of heavy duty engines, is meeting this challenge through a national initiative to reduce emissions from new trucks and buses substantially. The goal of this initiative is for engine manufactures to produce engines that

emit only half as much NOx as current engines by model year 2004.

Here in New England, EPA is working with private companies and public agencies to demonstrate innovative technologies for reducing pollution from heavy duty engines. One such project, at Logan International Airport, is demonstrating the benefits of bio-diesel fuel and compressed natural gas in a variety of passenger service vehicles. This project is a showcase for what one facility — New England's gateway airport — can do to reduce pollution from heavy duty engines.

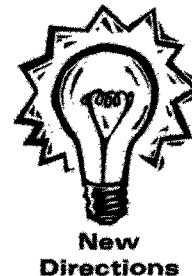
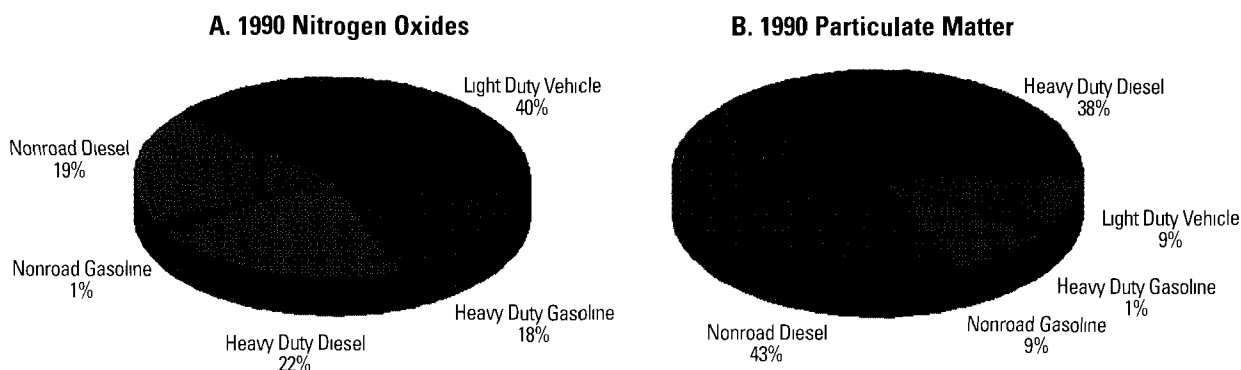


Figure 9

Mobile Source Emissions of Nitrogen Oxides (NOx) and Particulate Matter (PM-10)



Mercury in New England Waters

"The perch swallows the grub-worm, the pickerel swallows the perch, and the fisherman swallows the pickerel; and so all the chinks in the scale of being are filled."

HENRY DAVID THOREAU

The pollution of lakes and waterways with mercury was once thought to be primarily an isolated problem that affected only a few areas. Today, growing evidence shows that mercury contamination in our national water resources is widespread. States with quite serious mercury pollution problems began to issue a statewide fish advisory for mercury as early as 1975. Now, five of the six New England states — and 33 of the 50 United States — have issued advisories restricting freshwater fish consumption due to mercury.

Mercury occurs naturally in the earth's crust, but the release of small amounts of this toxic metal by a large number of sources over time has led to high concentrations of mercury in New England's soils, sediments, and waterways. Today, mercury traveling through the air and landing in the water a process called atmospheric deposition — is considered the primary way that the metal contaminates the waters of New England. Much of the problem comes from the emissions of distant power plants and nearby municipal and medical waste incinerators.

High concentrations of mercury pose a risk both to human and ecological health in New England. Mercury deposited on New England's landscape is slowly released from soils into water bodies. Once in lakes and ponds, mercury generally does not remain suspended in the water column, but is deposited in the sediment. A tiny amount is incorporated into the food chain and undergoes

biomagnification — a natural process whereby contaminants like mercury are found at progressively higher concentrations as they pass from prey to predator up the food chain. Biomagnification of mercury can lead to concentrations in fish flesh that exceed safe levels for human consumption. Mercury can be toxic to both humans and animals, caus-

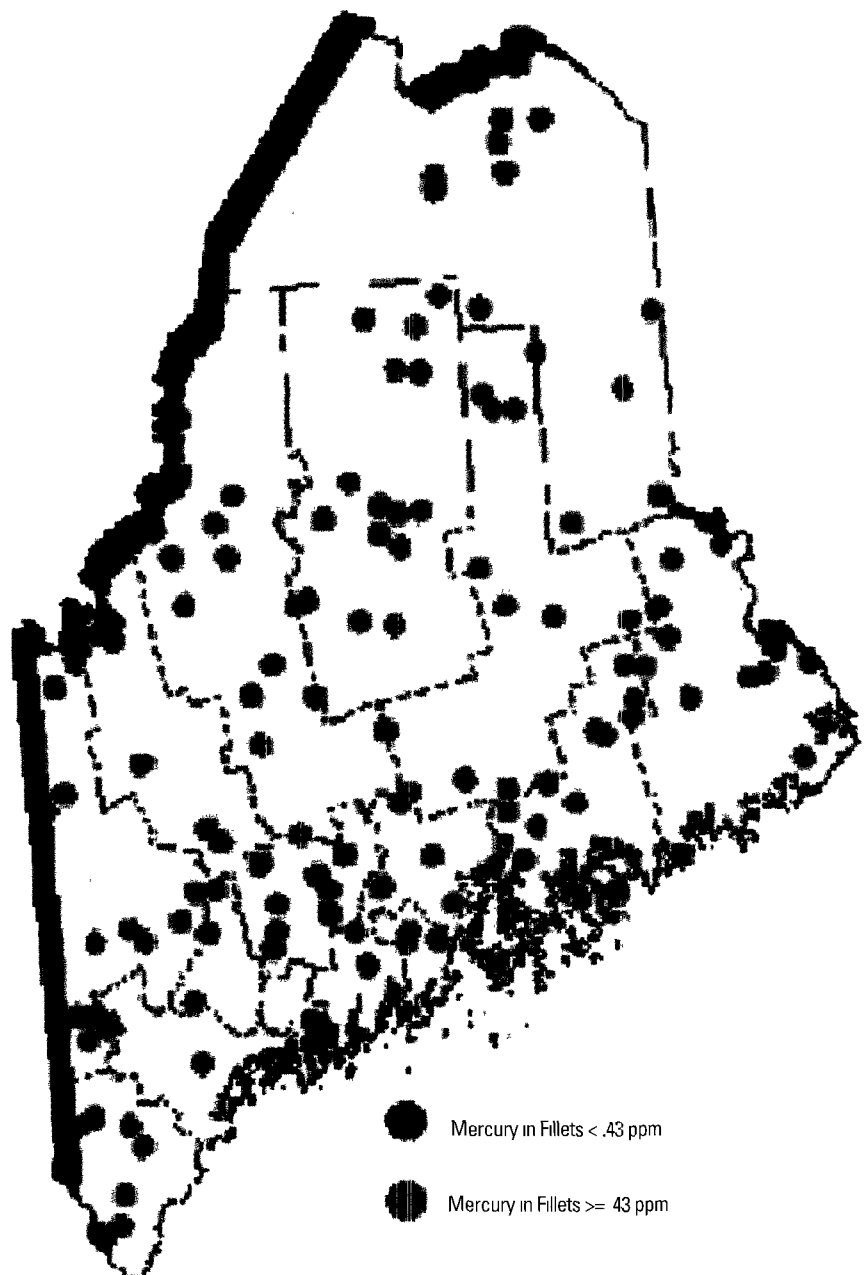
ing impairments in nervous systems and kidney functions.

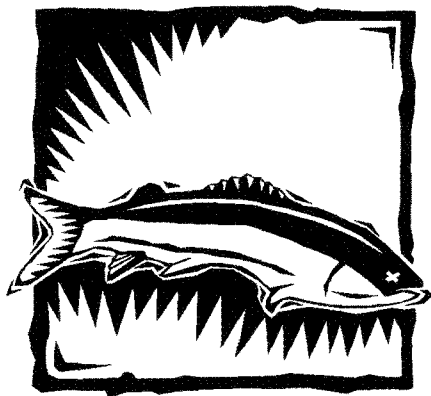
Extent of the Problem in New England

All six New England states are investigating mercury contamination in fish tissue, and all except Rhode Island have

Figure 10

Distribution of Lakes in Maine with Fish Tissue Concentrations of Mercury Above and Below Maine's Health Standard





issued fish consumption advisories for all lakes and rivers. The primary health risk is to young children, pregnant women, and women of child-bearing age. These advisories are the result of monitoring efforts which have shown that some freshwater game fish have mercury levels in excess of the recommended levels set by state health agencies. Some states set health standards which are more protective than the U.S. Food and Drug Administration's standard of 1.0 ppm (parts per million), such as Maine, which has a standard of 0.43 ppm.

The State of Maine was the first in New England to issue a state-wide fish consumption advisory, which is based on fish tissue data from the Regional Environmental Monitoring and Assessment Program (R-EMAP), a study funded by EPA which investigated mercury contamination in Maine lakes. The results strongly suggest that there is no consistent pattern of mercury distribution across the State, (**Fig 10**) and no obvious correlations between mercury contamination and any lake characteristics or water chemistry. This supports the belief that atmospheric deposition is the primary source of mercury.

What is Being Done?

EPA is committed to reducing mercury pollution. The 1990 Clean Air Act Amendments established new rules for reducing the amount of mercury emitted from incinerators by an estimated 90%. Several New England states already require mercury emissions limits and testing for mercury in the stacks of municipal incinerators. In addition, pol-

lution prevention and recycling programs to reduce mercury-bearing wastes — such as thermometers, batteries, fluorescent lights and switches — have led to significant reductions in the amount of mercury in solid waste streams.

A national mercury study, examining the sources of mercury pollution and the associated risks to humans, fish and wildlife will be released by EPA within a year. A companion report, the Utility Mercury Study, which characterizes the nature and importance of emissions from the utility industry will also be released. In addition, EPA's New England office, other federal agencies, our states and interstate organizations are working to compile current regional data and identify information gaps. This year, EPA is preparing to launch a second R-EMAP project to supplement state fish tissue investigations and provide sediment and additional atmospheric deposition information. The effects on New England's waterfowl is also under investigation.

Mercury and Individual Citizens

While EPA and the states are working hard to gain a better understanding of and figure out new ways to control the major sources of mercury contamination, citizens also have important roles to play. Mercury contamination of freshwater fish occurs throughout New England, but not all fish are unfit for eating. As a first step in being smart consumers, citizens should learn more about mercury contamination in their state and avoid any associated health risks.

New Englanders can help control and prevent further mercury contamination by recycling and eliminating mercury products from household waste. In addition, adopting energy conservation practices, such as the use of energy efficient appliances and fixtures, can reduce the demand for electricity and hence reduce power plant emissions of mercury.

Resource Protection

*"I do not blindly oppose progress.
I oppose blind progress."*

DAVID BROWER

A major challenge to EPA and to all New Englanders is to protect our natural resources and ecosystems before they become impaired. To do this we need to tackle the less conspicuous, but widespread, threats posed by problems like polluted runoff and habitat alteration. Often these problems are difficult to address and the effects are cumulative. And we need to do a better job of land-use planning before it is too late. EPA cannot ensure success in the protection of our natural resources without individ-

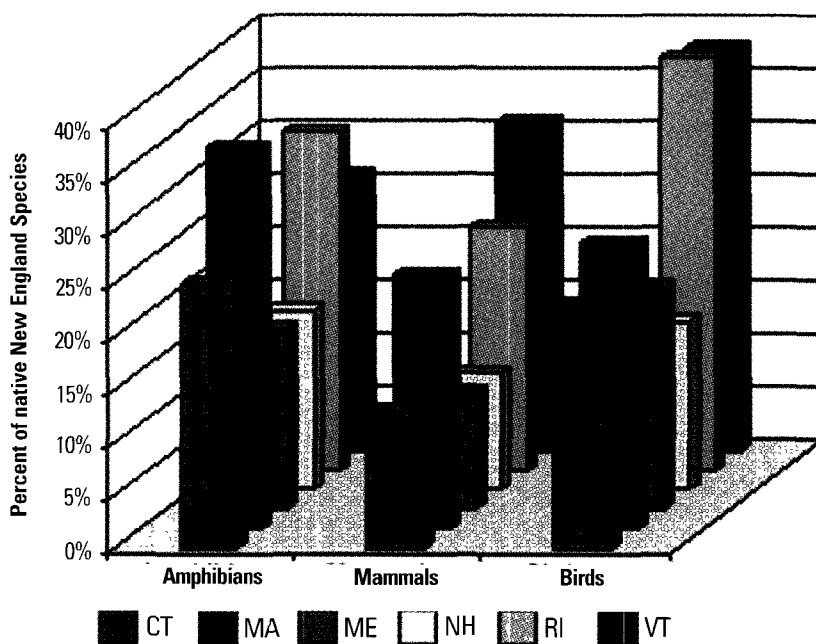
Vernal Pools

Vernal pools are temporary freshwater pools that provide critical breeding habitat for many amphibians and their invertebrate prey, such as fairy shrimp. Vernal pools are protected under the Massachusetts Wetlands Protection Act only if breeding by certain species — including some frogs, toads and salamanders — is documented. In 1992, a local environmentalist, Leo Kenney, and his students formed the Reading Memorial High School Vernal Pool Association in Reading, Massachusetts. The Association has since certified 200 vernal pools in the state, close to one-third of all the pools documented to date. Mr. Kenney's students also present instructional workshops in vernal pool natural history and certification to students, teachers, and Conservation Commissions.

This innovative effort has prompted many public school and college instructors to initiate their own certification projects. The work of Mr. Kenney and his students has been recognized with a number of prestigious regional and national awards.

Figure 11

Amphibians, Mammals and Birds at Risk; as a percentage of Native New England Species



Source: The Nature Conservancy

uals and communities working with us as partners in meeting this challenge.

Sensitive Species as Ecological Indicators

Some species are particularly sensitive to ecological threats and may herald changes in the environment before they become obvious. Amphibians (frogs, toads, newts, and salamanders) are important indicators of water quality and quantity, and habitat degradation and fragmentation. Their moist and permeable skin, plant and animal diet, and tendency to remain in the same area throughout their lives make these familiar animals especially sensitive to changes in the environment.

Long term ecological studies in New Hampshire have shown salamanders to be critical links in northeastern forest food webs. In a healthy forest ecosystem, the weight of all the woodland salamanders may equal that of all other small mammals combined and twice the weight of breeding birds. Amphibians

are also an important pharmaceutical resource. Hundreds of compounds have been found in their skins, some of which are used as painkillers and to treat heart attack and burn patients.

Troubling worldwide declines and the extinction of a number of amphibian species, even in protected natural areas, were first noted in 1990. Investigations are underway both here and abroad to determine the causes and extent of the decline in amphibians, but most experts believe that the loss and degradation of habitat, including wetlands and uplands, is the most widespread cause. New England is unfortunately no exception to worldwide trends, and declines have been reported in numerous species. Since a number of our native amphibians are rare, the prospect of further declines is worrisome. Each of the New England states has a signifi-



cant percentage of their native species of amphibians, bird and mammals at risk (Fig. 11).

Fragmentation of Habitat

Amphibians are not the only animals affected by changes in habitat. The fragmentation of forests, grasslands, and other habitats can cause problems for a variety of wildlife. In order to breed successfully, many species need large tracts of forest or open habitat far from human disturbance. The problem is particularly well known in birds, including a number of neotropical species that winter in Latin America and breed in New England. The patchwork quilt of increasingly small "habitat islands" in an intensively used landscape is contributing to declines in sensitive species.

Increased human demand for land

Charles River - Swimmable and Fishable by 2005

The Charles River, which flows into Boston Harbor, is one of the premier urban rivers in America and a crown jewel of the Boston area. The Charles and its banks provide boating, jogging and other recreational opportunities for hundreds of thousands of city dwellers who have limited access to natural resources. But after a heavy rain, the lower river becomes notable not for its recreation potential, but for the stench of sewage. This year, EPA set an ambitious goal: to make the lower Charles River swimmable and fishable by Earth Day, 2005. This plan relies on cooperation among federal, state, and local governments; citizen participation; good science; and, where necessary, strong enforcement. Many actions are already underway, including the elimination of illegal sewage discharges to storm drains, control of combined sewer overflows, and implementation of comprehensive storm water management programs.

resources is challenging all of us who care about the environment and the economy to identify creative and reliable strategies for conserving valuable habitat in New England. A number of organizations, from small local land trusts to national organizations such as The Nature Conservancy, have been successful in preserving important habitat by buying land from willing sellers. Although EPA does not conserve land directly, the agency can help with these efforts. For example, the EPA-sponsored Lake Champlain Basin Program obtained \$600,000 in North American Wetland Conservation Act funds to protect 1,500 acres of important waterfowl habitat.

A second strategy protects against habitat fragmentation through land use planning. In New England, the authority to make land use decisions is vested in the hands of local governments. Providing better information to local decision makers about important natural resources in their area is one way EPA and others help local governments make well-informed land use choices. Comprehensive land use planning, including broad public participation, reduces the potential for environmental "train wrecks" — avoidable circumstances in which economic interests are pitted against environmental protection.

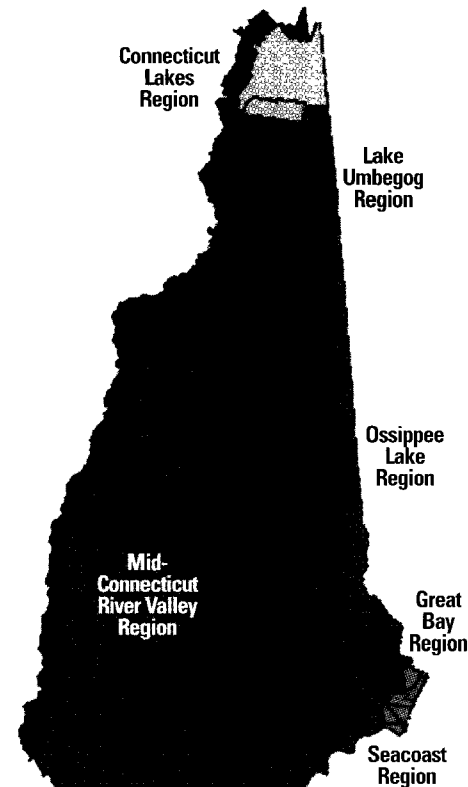
Partnerships for Resource Protection in New England

Instead of reacting to crises, EPA and its partners are working together to prevent them from occurring in the first place. EPA's New England office has teamed up with the New England Interstate Water Pollution Control Commission, other federal and state agencies, and environmental organizations to identify and protect New England's most important natural resources — an effort called the Resource Protection Project. The goal of the project is two-fold: to identify high priority natural resources and to develop and implement plans to protect these resources.

The project's pilot phase took place in

Figure 12 **High Priority Natural Resource Areas in New Hampshire**

Sites selected through
New Hampshire Resource
Protection Project



New Hampshire, with the participation of more than 20 public agencies and private organizations with regulatory, conservation, development, or planning interests. Six areas in New Hampshire have been identified as high-priority environmental resources, based on the value of their wildlife habitats and drinking water supplies (Fig. 12). Participants in the project are working through existing programs and using partnerships with communities to protect the targeted resources. Currently, Rhode Island and Connecticut are engaged in similar efforts to identify their own high priority natural resources.

The Built Environment

"What's the use of a house if you haven't got a tolerable planet to put it on?"

HENRY DAVID THOREAU

People living in New England's urban areas often bear a disproportionate share of society's environmental hazards: high levels of lead paint in older housing; increased smog caused by traffic congestion; hazardous materials running through storm drains and streets; and illegal dumping of household and industrial waste in vacant lots. Combined with other socio-economic factors, the result is best described as environmental injustice.

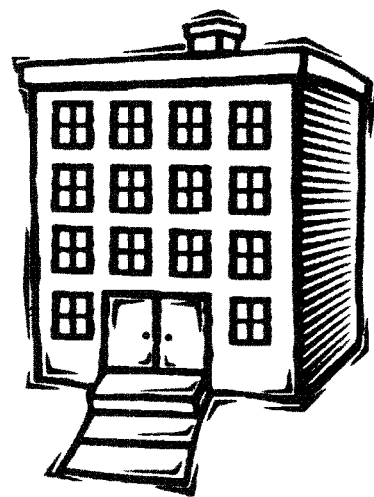
The Urban Environmental Agenda

This past fall, recognizing that "citysheds" are as important as watersheds, EPA in New England officially launched its Urban Environmental Agenda to work with communities to

address these pressing issues. EPA's goals are to develop environmental capacity at the community level, involve communities more substantially in the environmental decision-making process, and build the public-private partnerships necessary to address urban environmental issues. The principles of community-based environmental protection, environmental justice, pollution prevention and economic redevelopment are the cornerstones of this effort.

EPA has targeted three pilot cities for this initiative. Three new EPA city project managers are now leading efforts in Hartford, Connecticut; Providence, Rhode Island; and Boston, Massachusetts, to join community organizations, city, state and federal officials, and the private sector in building the necessary environmental protection infrastructure at the local level. The initiative involves the following components:

The Youth and the Environment and National Service Project joins EPA's New England office with City Year, for the fourth consecutive semester, and other youth organizations and communi-



ty partners to reduce environmental hazards in urban neighborhoods. City Year teams have transformed abandoned, trash-strewn lots into community gardens, developed afterschool environmental programs and worked with EPA and others to perform environmental indoor air and energy efficiency audits in low-income Roxbury homes last year. This year, an additional indoor audit program will focus primarily on asthma prevention in low income neighborhoods.

The Economic Redevelopment Program develops ways to make environmental protection economically beneficial to urban communities. A centerpiece of this effort is the Brownfields program, through which EPA provides grants to return abandoned and formerly contaminated commercial and industrial sites to productive use, and to ensure that future development is sustainable and environmentally sound. To date, EPA has awarded Brownfields grants totaling \$1 million to five pilot cities in New England: Boston, Bridgeport, Lawrence, Worcester, and the Providence Metropolitan area.

The Regional Lead Initiative aims to reduce the incidence of lead poisoning in young children through an education and outreach program concerning the hazards of lead in paint, soil and water. According to the Centers for Disease Control, one in six children have levels of lead in their blood above the level believed to be safe. Children living in New England's cities are far more likely

Once Vacant, Now Productive

One of the Urban Environmental Agenda's first endeavors has taken a life of its own in Roxbury's Dudley Street neighborhood. Only a year after EPA, City Year and the Dudley Street Neighborhood Initiative turned their attention to revitalizing a 1/2 acre vacant lot on the corner of Langdon and George streets, the property has now been taken over by the Food Project for use this summer as a vegetable and fruit garden. Food from the garden will be used to supply homeless shelters, and will also be sold in a farmer's market that will open up in the Dudley Street neighborhood this year.

In addition, the Magazine Street lot, another nearby lot that EPA worked with City Year to prepare, was used by residents this past summer for vegetable

gardens. After years of neglect, not one section of the former vacant lot went unattended once it had been transformed into a garden.



Greenleaf Composting, the firm that supplied compost for the Langdon Street Lot, is now interested in providing clean compost to additional vacant lots in the Dudley Street Area. The company currently has a grant to supply compost to lots in the Dudley area and wants to work with the Urban Environmental Agenda in Roxbury on a larger organic composting project, employing local residents in the composting operation.

to suffer from lead poisoning than children living in suburban areas. To address this problem, EPA is developing an English as a Second Language curriculum; expanding Geographic Information System efforts to map lead sources; and marketing sustainable design guidelines for reducing exposures to environmental contaminants in urban areas.

The Strong, Targeted Enforcement Program (STEP-UP) Team identifies strategies and goals for environmental enforcement in urban areas. Over the past year, EPA increased by tenfold the number of inspections in New England's urban areas. Moreover, EPA has targeted New England's auto repair industry as businesses to which we will offer environmental assistance, like advice on how to prevent pollution. The program has performed more than 100 multimedia inspections (covering more than one environmental medium) in Boston, Massachusetts; New Haven, Hartford, and Bridgeport, Connecticut; and Providence, Rhode Island, since September, 1994.

Education, Research and Technical Assistance helps communities secure the resources they need to understand and work on complex environmental issues and statutes. EPA is providing access to the research and technical assistance of universities and colleges and helping to develop environmental curricula for public schools, community colleges and vocational schools. With an emphasis on Environmental Justice and Pollution Prevention, EPA's New England office awarded nearly \$2 million in grants last year to community and academic institutions, including Roxbury Community College to establish a Center for Environmental Education. This includes the training of minority contractors and community residents on lead abatement and the establishment of a two-year degree program in environmental management.

EPA is building The New England Urban Environmental Infrastructure, including the establishment of a New England-

Nonpoint Education for Municipal Officials

In Connecticut, EPA is one of several agencies involved in the "Nonpoint Education for Municipal Officials" (NEMO) Project, which educates local land use officials about water resource protection and watershed management. Developed and led by the University of Connecticut's Cooperative Extension Service, the NEMO project uses colorful maps and images generated by geographic information system (GIS) mapping technology to help local decision makers understand the complex relationships between land use and water quality.

NEMO places particular emphasis on the growth of impervious (impermeable or paved) surfaces as an indicator of potential water quality problems. In general, the greater the amount of impervious surface (parking lots and rooftops) in a watershed, the poorer the

water quality. Using a zoning-based "build-out" analysis to project future problem areas, the NEMO message is that water resources can be protected while allowing for compatible economic growth and urban development through a three-tiered strategy of natural resources-based planning, protective site design, and use of so-called best management practices that protect the environment (Fig. 13).

NEMO relies heavily on land cover data obtained by EPA. In addition, EPA has supported two watershed projects conducted by NEMO and The Nature Conservancy (TNC) in the lower Connecticut River valley. This area has been singled out by several agencies as having critically important high quality tidal marsh habitat. Municipalities and private land owners in the two watersheds are working with the NEMO/TNC team on a range of land use issues that include forest stewardship, stream buffers and other nonpoint source pollution controls.

Figure 13 Existing Imperviousness

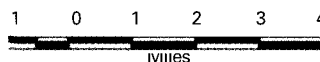
Impervious Surface Areas in Chester Creek Watershed in Connecticut

Current Status and Future Projection Based Upon Current Zoning

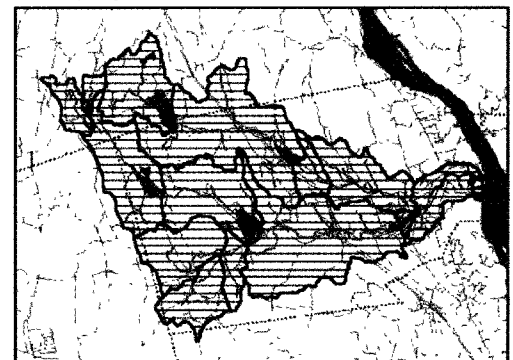
Percent Imperviousness

- 0 - 14.9%
- 15 - 29%
- >=30%

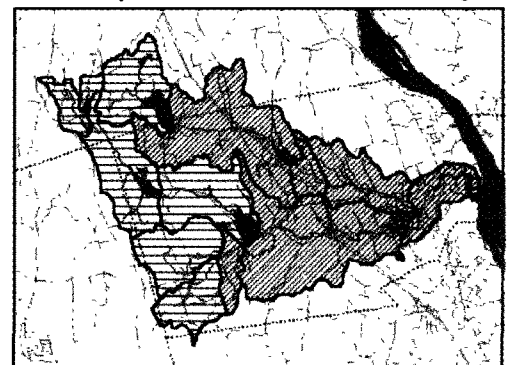
- Local Basins
- Lakes/Open Water
- Brooks/Streams
- Town Boundaries
- Roads

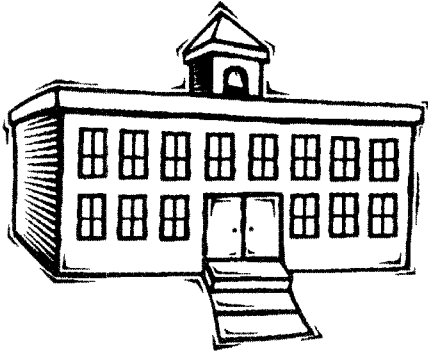


Source: University of Connecticut Extension System



Buildout Imperviousness based on current zoning





wide forum for all public and private constituencies to address urban environmental policy issues. This network will offer accessible information to the public through an annual conference, periodic meetings and, we hope, a consortium of academic institutions, including local community colleges. EPA is holding a series of roundtable discussions throughout the spring and summer in eight cities throughout New England to engage public and private constituencies in discussions of pressing environmental issues. A New England-wide conference in Hartford is being planned for late September 1996.

Indoor Air Quality, Schools and You

Most people are aware that outdoor air pollution can damage their health. Many people, though, do not know that indoor air pollution can also cause significant health effects. EPA studies of human exposure to air pollutants indicate that indoor levels of pollutants may be two to five times higher than outdoor levels. These levels of indoor air pollutants are of particular concern because most people spend about 90% of their time indoors.

Indoor air pollution comes in a number of forms: combustion products, such as carbon monoxide, nitrogen dioxide and particulate matter, which result from the burning of fuel; biological contaminants, including dust mites, bacteria, fungi, and viruses; and inorganic pollutants such as radon, lead, and asbestos. Pesticides, volatile organic compounds, and environmental tobacco smoke are also sometimes found in poor indoor air quality

and can pose a risk to people's health. Long term exposure to these additional three pollutants could lead to the development of cancer and other chronic diseases in humans.

Children may be especially susceptible to air pollution. Exposure to the same concentration of pollutants can result in a higher intake of pollution in children than adults compared to the size of their bodies because children breathe a greater volume of air relative to their body weight. Children as well as the elderly — are also generally more sensitive to air contaminants than healthy adults due to some critical physiological changes that occur in humans.

Air quality in schools is of particular concern to EPA. A recent US General Accounting Offices' report, *School Facilities - the Condition of America's Schools*, notes that "about 50 percent of the schools reported at least one unsatisfactory environmental condition; while

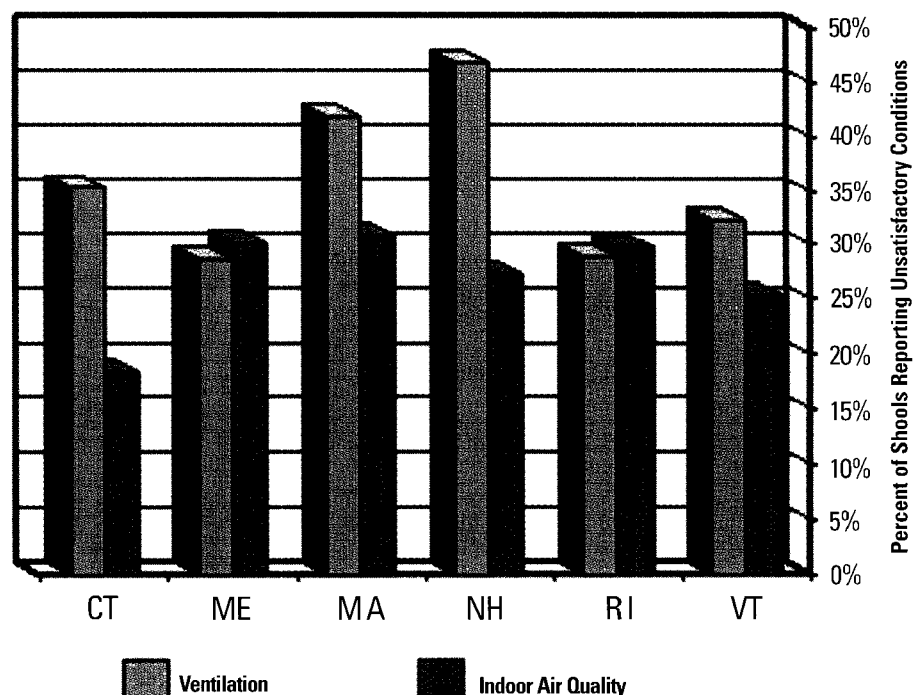
33 percent reported multiple unsatisfactory conditions." (Fig. 14).

According to the GAO report, "the nation's schools need about \$112 billion to repair or upgrade America's multibillion dollar investment in facilities to good overall condition."

To address the issue of indoor air quality in schools — an issue of particular concern to EPA — the agency has recently published *Indoor Air Quality Tools for Schools Action Kit*, a voluntary guide for school officials. The goal of this kit is to provide clear guidance that will help prevent indoor air quality problems and resolve such problems promptly if they do arise. It recommends practical action that can be carried out by the school staff without the need for extensive training, and is flexible enough to conform to the specific needs of any school. The kit can easily be used to form an indoor air quality management plan for the school.

Figure 14

New England Schools Reporting Unsatisfactory Environmental Conditions



Data Source: GAO School Facilities Report April 1995

Building Environmental Stewardship

"We should have learnt by now that laws and court decisions can only point the way."

HUBLERT HUMPHREY

At EPA in New England, the new Office of Environmental Stewardship (OES) is the focal point for encouraging and rewarding responsible environmental management by industry and other regulated entities — and for enforcing the law against those who do not act responsibly.

The Assistance and Pollution Prevention Unit, the largest organization of its kind in the country, provides technical and regulatory assistance to industry and the public sector that we regulate — cities, towns and other agencies. In addition to encouraging environmental compliance, this team promotes pollution prevention, the development and use of innovative environmental technologies, and advanced environmental management systems through partnerships with states and those we regulate.

The Enforcement Unit of OES enforces the nation's environmental laws — combining strong, targeted enforcement with penalty strategies designed to provide direct benefits to the public and the environment of New England. The EPA enforcement staff work in cross-media teams of attorneys and technical experts — teams that look at air, water and waste as interconnected rather than as separate from one another — which are targeting their efforts to those industrial sectors and sensitive ecosystems where the likelihood of environmental law-breaking is greatest and the consequence is most severe in terms of public health and ecological integrity.

Pollution Prevention

"Unless the reformer can invent something which will substitute attractive virtues for attractive vices, he will fail."

WALTER LIPPMANN

The command-and-control system of environmental protection — the backbone of the American environmental protection system for the last twenty years — has yielded many impressive results in the preservation of our natural resources and the safeguarding of our public health. Elements of that system, like the enforcement and permitting programs, are tools which are still necessary in protecting New England's environment. Nevertheless, we are working hard to improve them continually. But at EPA in New England, we believe that we will achieve even greater environmental results by adopting new approaches and strategies.

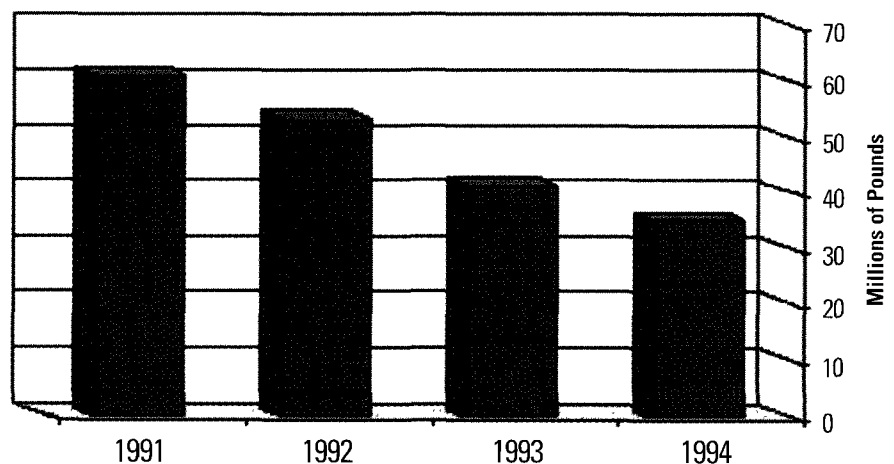
That is why EPA's New England office has launched an unprecedented series of assistance programs designed to help prevent pollution. These initiatives offer assistance to communities, companies and others to educate and empower them to protect the environment better and grow the economy — in large part by preventing pollution before it becomes a problem.

Encouraging Pollution Prevention Through the Community's Right to Know

Since 1988, companies have been required to disclose to the public a great deal of information about the release and storage of toxic and hazardous substances under the Community Right to Know laws. Expansion of these provisions to cover more chemicals and more facilities is a top priority for EPA. To help people make the most of this information, EPA's New England office has been training local librarians and community groups in using the computerized Toxics Release Inventory (TRI).

Those who have taken advantage of their right to know about toxics emitted into their neighborhoods have likely noticed that industry continues to reduce dramatically their impact on the environment. Figure 15 shows very clearly the

Figure 15 Toxic Releases to Land, Air and Water in New England



progress New England companies are making in reducing toxic releases to the environment. Companies have told EPA that this public reporting requirement and the potential for them to be identified as major emitters has been a major incentive in decreasing toxic releases.

Targeting Assistance to Sectors

The New England Environmental Assistance Team (NEEAT) provides extensive pollution prevention assistance to targeted sectors of the community. The first sectors we identified — chosen in no small measure based on their impact on the environment — were metal finishers, printers, manufacturers of computers and electronics, and municipalities. This year, we're adding auto repair shops to that list. The NEEAT team builds on the successes of EPA Administrator Carol Browner's Common Sense Initiative and offers:

- pollution prevention audits;
- workshops on regulatory and pollution prevention issues;
- user-friendly compliance manuals;
- model facility and technology demonstration projects;
- a pollution prevention financing guide for small and medium-sized businesses;
- on-site assistance to municipal waste water treatment plants;
- an awards and recognition program;
- a toll free regulatory assistance hotline (1-800-90NEEAT).

NEEAT team members are finding new ways for EPA staff to help protect the environment. For example, one team member played an important role in developing a pilot program to transfer useful equipment from abandoned metal plating operations to active companies that could use it. In past years, the equipment would have been treated as a

hazardous waste; today, it's helping to drive the economy. Making these kind of connections is what the NEEAT team is all about.

Promoting New Environmental Technologies

The environmental technology industry of New England is one of the best friends the environment of this region — and EPA, for that matter — could have. This industry churns out innovative ways to protect the environment and public health more efficiently and with a lower price tag — making it possible to protect more with less. At the same time, the industry employs 150,000 people in this good work and contributes over \$10 billion to the region's economy.

To promote these new ideas, and the environmental and economic benefits associated with them, EPA's New England office opened the nation's first regional Center for Environmental Industry and Technology (CEIT) last year. In October, 1995, CEIT celebrated a successful first year by awarding \$4.9 million in environmental technology grants to New England institutions and businesses. In addition to these grant funds, the center made huge strides in its first year in all five of its goal areas:

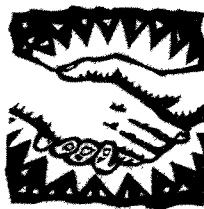
- **Increase Access To Public and Private Capital:** EPA sponsors Venture Capital Forums that link technology developers with investors and assists entrepreneurs to access grant funding through the Environmental Technology Initiative and other federal and state technology funding programs.
- **Easy Access to Information:** New England's environmental technologists can attend our Golden Opportunities seminars held six to eight times a year in partnership with the Environmental Business Council of New England as well as visit the CEIT World Wide Website(<http://www.epa.gov/region01>), receive informative mailings or call into a toll-free hotline (800-575-CEIT).

HADCO & IBM

Two New England facilities, IBM in Vermont and HADCO in New Hampshire, have been accepted into the XL program with projects that will result in improved waste management at lower cost.

The first to be approved was HADCO Corporation, which has four facilities in NH and two outside of New England. HADCO contended that their sludges no longer contain the toxic chemicals that led them to be listed as hazardous, and that they should be allowed to ship these sludges directly to a smelter for reclamation, as non-hazardous waste. HADCO has indicated that the cost savings associated with direct recycling will allow it to recycle other non-hazardous process wastes containing high copper content. EPA and the states will monitor HADCO's compliance with the agreement; if the experiment is successful, we will change the rules for all companies in the same situation.

The second New England XL project to be approved is for the IBM semiconductor manufacturing facility in Essex Junction, VT. IBM proposed to treat its isopropyl alcohol (IPA) solvent waste (which is currently identified as an ignitable hazardous waste) using an existing biological treatment system. This solvent waste contains a high concentration of carbon and treating it with the wastewater (which contains high concentrations of nitrogen) already treated in the biological treatment system would optimize the operating efficiency of that system and reduce the total pollutants discharged to the Winooski River. The proposal would also eliminate the hazards associated with off-site transport and incineration of over 150,000 gallons of solvent per year of IPA.



- **Increase Innovative Technology Demonstrations:** The center is field-testing promising technologies for innovative waste remediation and monitoring methods at Superfund sites and elsewhere.
- **Remove Regulatory and Institutional Barriers:** EPA is funding environmental business ombudsmen in two of our states and working with our state partners to develop technology certification procedures common to all states.
- **Improve International Technology Assistance:** EPA has co-led two trade missions in the last year and sponsors technical training and technology transfer in Eastern Europe.

Fostering Environmental Leadership

EPA's New England office has several new initiatives geared toward businesses and communities that have already proven that they are environmental leaders or who demonstrate a sincere commitment to going beyond what the law requires of them.

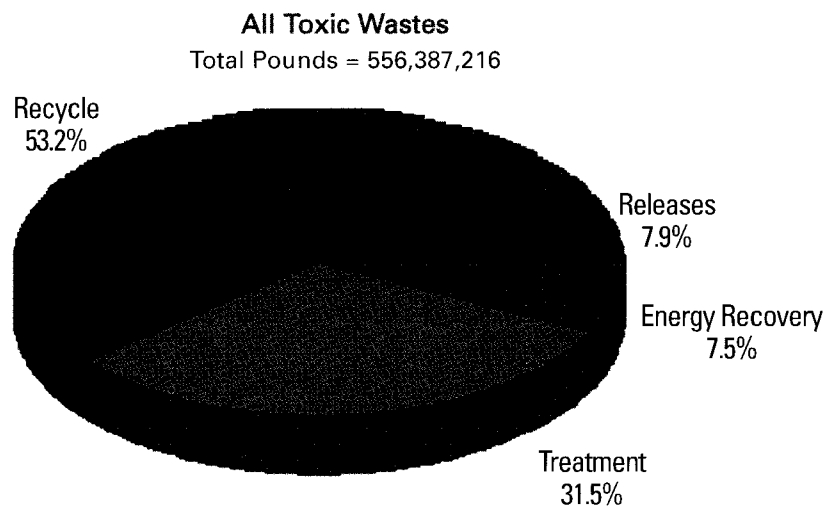
Compliance Leadership through Enforcement, Audits, and Negotiation (CLEAN):

Pollution prevention has been proven, time after time, to save money and preserve the environment at the same time. No two institutions have found this to be more true than EPA's partners in the CLEAN initiative — the University of New Hampshire and the Maine Metal Products Association. With the help of these able partners and backed by federal grant funding, EPA is offering free environmental audits to metal platers in Maine and New Hampshire to help them find ways to prevent pollution. Companies that participate are receiving this audit free of charge and are offered relief from enforcement if violations are found during the audit and corrected promptly.

The Environmental Leadership Program (ELP): New England not only had 2 of the charter companies in the national

Figure 16

1994 National Waste Management Profile



Environmental Leadership Program in the past year — The Gillette Company of Massachusetts and Ocean State Power of Rhode Island — but a new regional program has added 19 more New England leaders to the initiative this spring. ELP encourages and rewards companies to go beyond compliance, with a heavy emphasis on pollution prevention. In return for this leadership, EPA offers a tailor-made combination of enforcement amnesty, simplified and expedited permitting, reduced inspections and public recognition.

The Excellence and Leadership Program (Project XL) is a flagship of President Clinton's environmental reinvention initiatives. Two New England companies — HADCO of Derry and Salem, N.H. and IBM's Essex Junction Facility — have already been selected for this competitive national program. Through Project XL, EPA says to businesses and communities that if they can come up with more effective ways to protect public health and the environment than the way the law requires, then the agency will throw out the ineffective set of rules and regulations and contract with the company to achieve greater environmental benefits at less cost and complexity.

Creating Jobs by Recycling

Most New Englanders today know that an important and popular way to prevent

pollution and enhance our environment is by recycling. Many fewer people, though, recognize the full extent of the economic potential of recycling. Today, there are 26,897 jobs in New England associated with the processing and manufacturing of recyclables, contributing \$1.1 million to New England's economy every year.

Since EPA's "Jobs Through Recycling" grant program was launched in 1994, it has resulted in the creation of over 250 jobs and sparked over \$36 million in capital investments in recycling businesses across the nation. New England states have received five of these grants that create new jobs and investment while reducing solid waste. The Rhode Island Department of Environmental Management received a grant to help manage the growing amount of "litter" along the information superhighway. The state is developing a business plan and providing consulting services to start an "End-of-Life" Electronics Demanufacturing Facility for used computers and other electronic equipment. The facility is expected to create 75 jobs. A national summary of how our toxic wastes are managed also reflects the types of jobs that have been created in the waste management arena (**Fig. 16**).

Enforcing The Law

"The mightiest corporation, like the humblest private citizen, must be held in strict adherence to the law of the land."

THEODORF ROOSEVELT

Despite the vastly increased emphasis that EPA's New England office has placed on helping those we regulate prevent pollution and come into compliance, enforcement of the law remains at the core of the agency's work. In fact, without enforcement, many of the agency's innovative programs — like pollution prevention and compliance assistance — would be far less effective.

Since the agency opened its doors in

1970, EPA has taken over 60,000 enforcement actions and assessed over \$615,000,000 in judicial and

administrative penalties. These actions have played an important role in the many environmental successes of the past quarter century. But, like any tool, EPA's enforcement authority needs to be honed and sharpened continually to achieve greater environmental results.

The reinvention of the enforcement program at EPA's New England office is centered on two key areas. First, the agency is targeting 80 percent of our inspections on four key sectors — public agencies, urban ecosystems, industrial



sectors, and sensitive ecosystems — where we believe the greatest environmental and public health benefits can be achieved. And second, the agency is using creative approaches to settle disputes in ways that benefit the environment and involve local communities in reaching acceptable solutions.

Alternative Dispute Resolution

EPA's New England office is becoming a national leader in using alternative dispute resolution (ADR) to settle cases and to increase community involvement in controversial environmental decisions. ADR encompasses many techniques; in New England we have relied primarily upon mediation, in which a neutral third party helps the negotiating parties reach

Massachusetts Highway Department Settlement

Between April and December 1993, EPA inspected several Massachusetts Highway Department (MHD) facilities in response to an anonymous citizen's complaint and uncovered numerous RCRA violations, including failure to label open and leaking containers, violations of storage requirements, failure to train personnel responsible for managing hazardous wastes properly and failure to prepare contingency plans for their facilities. EPA also discovered that this careless management of hazardous waste was widespread at MHD facilities throughout the Commonwealth and had, in fact, been identified by MHD several years earlier.

In September 1994, EPA simultaneously signed an administrative complaint proposing penalties of \$3.9 million and a consent agreement settling the case. After lengthy negotiations, the case was settled for a penalty of \$100,000 and an agreement to spend \$5 million on supplemental environmental projects. In addition, MHD agreed to spend approximately \$20 million to audit and remediate, if necessary, all of its 139 facilities.

In FY95, EPA approved four SEPs and is reviewing two other SEP proposals from MHD. The approved SEPs were initiated in this past year and have significant environmental benefits. They include the following:

City of Lawrence Site Reclamation and Recreational Area Development Partnership Project: \$1.5 million has been committed by MHD to assess, cap, close and convert a former incinerator site and adjacent incinerator residue landfill in the City of Lawrence into a multi-use recreation area. The site is located on the bank of the Merrimack River, adjacent to an environmental justice neighborhood, and will be connected to a city "river walk" that continues off-site.

Contribution to the Holyoke Initiative: MHD will contribute \$750,000 to the Holyoke Initiative, which is being undertaken as part of a cooperative agreement between EPA and the state (a pilot project to integrate federal and state removal and site assessment programs). The funding will be

used to assess and remediate two sites in the Churchill neighborhood of Holyoke, an environmental justice area.

Government Training: MHD is developing an environmental education program for the state and local highway and public works departments of 351 cities and towns in the Commonwealth, covering the environmental regulatory requirements which typically govern state and municipal maintenance facilities, at a cost of \$500,000.

Computer-Aided Management of Emergency Operations (CAMEO)

Donation and Training: MHD is donating CAMEO software and IBM hardware to run CAMEO, and providing requisite training to 80 local emergency planning committees in Massachusetts, at a cost of \$685,000. This project will enable local fire departments and emergency planning committees to more effectively respond to emergency releases of hazardous materials in their communities.

a mutually acceptable solution. Our ADR experience has grown from a one-day mediation of one penalty case in 1992, to a total of over 30 cases involving a range of statutes and negotiating challenges. We are currently in various stages of mediation in 10 Superfund cases and 8 non-Superfund cases.

Building consensus around divisive environmental decisions is a key focus of our current ADR efforts. For Superfund cases such as the Pine Street Barge Canal in Vermont and New Bedford Harbor in Massachusetts, ADR was initiated at a time when relationships had deteriorated to the point where it was impossible to discuss key issues on their merits. In both cases, clean up measures are now underway with a broader base of support and the parties have gone on to address a wider range of issues than those which originally drove the process.



Supplemental Environmental Projects

Supplemental environmental projects (SEPs), which can be negotiated as part of enforcement settlements, are excellent means of getting polluters to comply with environmental laws while improving the environmental condition of sites beyond what would be required by law. Cash portions of the penalty that would be paid to the agency are reduced somewhat in lieu of expenditures that provide long-term benefits to the environment. Over the past year, EPA has negotiated 11 SEPs, yielding over \$4 million to fund projects that directly benefit the health and the environment of New England communities.

Criminal Enforcement

In the fall of 1995, an unknown source began to dump large volumes of acid into a municipal sewer system late at night. Unable to treat the strong acid, the city's wastewater treatment plant failed on at least three occasions, releasing a great deal of raw sewage into one of our New England rivers. The treatment plant operator called EPA's Criminal Investigation Division (CID) to ask for help.

With assistance from federal, state, and local environmental engineers, CID immediately began tracing the acid back up the sewer line and gathering information on the industrial users of the city's sewer system. Before long, the investigation team had identified the suspected source of the illegal discharge. CID obtained a federal search warrant, placed monitoring devices in the sewer lines surrounding the facility, and waited for the company to take the next step. Late that same night, during severe blizzard conditions, the treatment plant started receiving another acidic dump. When CID's monitoring devices confirmed the source of the discharge, the investigation team entered the facility. Once inside, they found two very surprised company employees in the act of dumping sulfuric acid into the sewer system.

This true story is a good example of the type of case EPA pursues as a criminal case. Criminal enforcement authority sits atop EPA's environmental enforcement pyramid, targeting the most significant and flagrant violations. Two factors guide EPA in determining whether to pursue criminal charge: significant environmental harm and culpable conduct. Culpability distinguishes violations that are committed knowingly from those that are the result of accident or inadvertence. Some indicators of culpable conduct include history of repeat violations, deliberate misconduct, concealment, and tampering with monitoring or pollution control equipment.

Conrail

On April 7, 1994, an oil/water separator failed at Conrail's Beacon Park Yard in Allston, Massachusetts, spreading a soupy film of oil over several hundred yards of the Charles River. A subsequent criminal investigation determined that the separator had failed because of improper operation and maintenance. Further investigation revealed that Conrail had been discharging oil without a permit since 1992, when its previous permit expired. Prior to 1992, Conrail had consistently failed to submit required monthly reports that would have disclosed the excessive discharges.

On November 24, 1995, Conrail was convicted of six felonies for knowingly violating the Clean Water Act. Pursuant to a plea agreement, Conrail agreed to pay \$2.75 million in fines — \$1.5 million of which have been directed to the Oil Spill Liability Trust Fund. Conrail also agreed to undertake an environmental compliance program at the Beacon Park Yard and donate \$250,000 to the Charles River Watershed Association for the creation of a laboratory for monitoring water quality in the river.

Cases like this one require a team approach, with assistance provided by state and municipal agencies, as well as other EPA staff. EPA's criminal enforcement program has worked hard to establish close partnerships with state and local environmental regulators and law enforcement organizations throughout New England.

CID currently has ten agents in New England, with offices in Boston, Massachusetts and New Haven, Connecticut. These agents conduct criminal investigations in all six New England States under every environmental statute administered by EPA.

Restoring Contaminated Sites

Protecting Human Health and Promoting Economic Reuse

"No child should have to live near a toxic waste dump."

PRESIDENT WILLIAM J. CLINTON

EPA is bringing bold thinking to our work to clean up hazardous waste sites. New England has almost 100 of the nation's roughly 1400 priority hazardous waste sites.

Last year, EPA's New England office launched an ambitious reform effort to reinvent the way we address sites contaminated by hazardous waste. This reform agenda is designed to achieve faster Superfund cleanups at sites with high economic reuse potential. This reinvention also involves a series of steps to ensure greater community involvement in cleanup decisions, earlier and fairer settlements for small businesses, and increased development of new technologies for improved cleanups. The success of these reforms will be measured in hard and fast environmental results — by more timely, appropriate, and cost-effective site clean ups.

Beneficial Reuse of Brownfields

A centerpiece of the Superfund Reform Agenda, the Brownfields Initiative, is designed to promote the economic reuse of previously contaminated sites. "Brownfields" are abandoned or under-used industrial or commercial sites where development is complicated by environmental contamination. People who might otherwise consider redeveloping these sites are held back by concerns

about their liability they may face because of hazardous waste at the site. There are over 10,000 such Brownfields in New England today.

EPA's goal is to remove liability barriers to redevelopment and return hazardous waste sites to productive economic reuse without sacrificing protection of the environment. EPA is committed to providing grants to communities, clarifying the liability of potential developers through "covenants not to sue", and building partnerships with states, cities and community representatives through aggressive outreach efforts. Recent successes include the award of a \$200,000 grant to the City of Boston to inventory and prioritize contaminated properties in the Dudley Street area. The goal of this project: to achieve redevelopment at five sites. Other pilot projects — adding up to \$1 million in Brownfields funding for New England communities — include the Lawrence Gateway Project and Worcester, Massachusetts; the State of Rhode Island, with a focus on the Woonasquatucket and Blackstone Rivers area; and an ongoing project in Bridgeport, Connecticut. Communities from every corner of New England are encouraged to apply for Brownfields funding or call EPA's New England office for assistance.

The Small Parties Initiative

The Small Parties Initiative is designed to provide liability relief to small parties more efficiently and earlier in the process — through a legal mechanism known as de minimis settlements — and provide understandable, practical information.

This process has been successfully implemented at Somersworth Landfill in New Hampshire where a de minimis settlement was reached with 15 parties — parties which, individually, had contributed little to the overall problem. EPA was able to craft this settlement on

the volumetric evidence typical of many landfill sites by performing extensive evaluation of the evidence and taking a more aggressive and creative approach to interpreting this evidence. This approach will help to establish a favorable precedent for similar landfill settlements.

Supporting Innovative Technology

The goal of EPA's Innovative Technology Initiative is to enhance environmental management and the marketplace by promoting greater use of innovative monitoring, measurement, and remediation technologies at hazardous waste sites. This goal is being realized through a variety of avenues: grant awards, field demonstrations and co-sponsorship of technology forums with venture capitalists, universities and interstate organizations. Many of these new technologies show promise in achieving better protection at less cost or in less time.

In New England, innovative remediation technologies are being designed, constructed or operated at 31 Superfund sites. For example, in-situ bioremediation is expected to begin in the spring of 1996 at Hocomonco Pond in Westboro, Massachusetts. The ultimate goal of the in-situ bioremediation process is to degrade site contaminants to carbon dioxide and water by stimulating indigenous microorganisms that normally use organic compounds as a source of carbon in their diet.



One challenge we face in developing new technologies is the financial risk involved in testing them. Communities and companies are understandably reluctant to serve as "guinea pigs" for technologies without an established track record. EPA's New England office was the first in the nation to share in the risk involved with an innovative technology. EPA will share the financial risk with the community of Somersworth, NH and private parties for an innovative in-situ ground water treatment system at the Somersworth Landfill that will save those responsible more than \$15 million.

Getting the Cleanup Job Done More Quickly

The Community Empowerment Initiative expands our efforts to involve local communities fully in decisions about site cleanup and future property uses. EPA has targeted three New England sites for particular attention under this initiative: New Bedford (MA) Harbor; Massachusetts Military Reservation (Otis AFB), and Pine Street Canal (Burlington, VT). In each case, a public/private forum has been created to ensure participation by citizens, local and state officials, and potentially responsible parties in the design of the cleanup process.

The goal of the Responsible Alternatives to Superfund Listing Initiative is to maximize environmental results by ensuring EPA resources are directed where they will be most effective. This process helps clean up sites in a more cost-effective and timely fashion by facilitating cleanup by states and property owners where appropriate. As incentives for redevelopment and reuse, EPA removed 899 New England sites from the Superfund inventory — the "master list" of sites. By taking these sites off the list, EPA is indicating that no further federal action is planned at the site. This simple act often reduces the stigma associated with hazardous waste sites and can help spur economic redevelopment.

Recognizing that information and technologies can become outdated, the

Bristol Sandblasting Site

In the summer of 1994, the State of Rhode Island asked for EPA's help in mitigating the threat to human health and the environment at the Bristol Sandblasting Site, located in Warren, Rhode Island. Sandblasting had been performed for many years on vehicles, farm machinery, residential and commercial facilities on and near the site. The residue from this sandblasting was used as fill at the site resulting in high concentrations of lead in surface and subsurface soil as well as varying concentrations of PCBs from unknown sources. The site consisted of two residences with a total of seven adults and seven children, aged fourteen and younger, and town conservation land. One of the children has had elevated blood lead levels in the past.

Remedy Decision Update Initiative reviews old decisions at Superfund sites where construction has not yet started. This "re-review" determines whether the clean up plan should be modified in favor of more cost-effective remedies. EPA is using this process to amend its plan for the clean up of the Norwood PCB Superfund Site in Norwood, Massachusetts, which was finalized in 1989. Changes to the original remedy will protect public health, allow for reuse of the property within a relatively short time, and save taxpayers big money — in the case of the Norwood site, close to \$50 million at no cost to the environment.

Cooperative Cleanups at RCRA Regulated Facilities

Start RCRA Cleanup 2000 is designed to get RCRA Corrective Action work started in more cooperative — and often more efficient — manner. What makes a RCRA site different from a Superfund site is that RCRA sites are often contaminated facilities that are still in business and subject to hazardous waste management laws. The short term goal of this

After sampling to determine the extent of contamination, EPA began work at the site in April, 1995. By November, EPA and its contractors had completed the majority of removal activities. The team excavated a total of 8,500 tons of soil and removed the soil from the site for proper disposal. The clean up involved shipping 8,000 of the 8,500 tons to a local landfill and running leaching tests to ensure that the lead would not leach into the ground in unsafe amounts. Approximately half of this 8,000 tons failed the leaching tests the first time and required stabilization before being shipped. The remaining 500 tons were shipped to a chemical landfill in New York State due to the higher PCB concentration in the soil.

initiative is to implement final solutions or stabilize the highest priority RCRA facilities — a group of approximately 160 out of the 500 or so RCRA Corrective Action sites in the region — by the year 2000.

EPA's New England office is pursuing this goal using methods like voluntary corrective action by industry; expanding the role of the New England states; and improving cooperative efforts with our Superfund Removal Program. Voluntary commitments have been received from General Dynamics Electric Boat Division; Sikorsky-Bridgeport; Tech Systems; and Technicircuits to begin field work consistent with our initiative goals.

New Directions:

Meeting The Environmental Challenges Of Today, And Tomorrow

"A new ethic is required, a new attitude toward discharging our responsibility for caring for ourselves and for the earth. This ethic must motivate a great movement, convincing reluctant leaders and reluctant peoples themselves to effect needed change."

TWO THOUSAND SCIENTISTS, INCLUDING 102 NOBEL LAUREATES, FROM AROUND THE GLOBE

We live in a time of great change in New England. Environmental policies must keep up with the times. To meet the next generation of environmental challenges in an era of dwindling federal resources, those of us at EPA are bringing a new ethic to our work: a belief that consensus, rather than confrontation, will achieve greater environmental results.

With this ethic in mind, EPA's New England office is transforming itself into a laboratory for bold experimentation in environmental policy. In the last year, many innovative ideas have gone from action plans to plain action. Pilot projects launched last year — such as the Urban Environmental Initiative, our environmental technology initiative, targeted enforcement, third-party certification, enforcement amnesty in return for pollution prevention, and the New England Environmental Assistance Team — have become the day-to-day work of EPA staff. Most important, these innovative approaches are beginning to yield measurable environmental results.

This report is filled with new directions in environmental policy. Many of these-

new initiatives have taken hold already; several are still in development. A few of those initiatives that are still in their infancy are set out below as indicative of where the region's efforts are headed. EPA's reinvention agenda for New England falls into three thematic areas:

Cultural and organizational change at EPA: EPA is making its operation in New England more efficient and more accountable to the public through a major management restructuring set in place this past fall. This re-engineering has flattened the management structure from one manager for every five employees to one manager for every

eleven employees. The restructuring has also gotten rid of our old media divisions — air, water and waste — and replaced them with place-based, sector-based divisions.

In addition, EPA is encouraging and rewarding high performance by its employees. Three years ago at EPA, 80% of the region's employees received performance bonuses — which amounted to little more than a modest salary supplement. This year, 20% of the workforce received bonuses, rewarding and encouraging truly outstanding performance on behalf of public health and the environment.

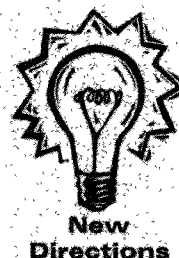
Sounder science and smarter economics: Our decisions, increasingly, must be grounded in sound science and smart

Redevelopment of the Raymark Facility - "A Model for the Country"

From 1919 to 1989, Raymark Industries operated a brake manufacturing facility on 33 acres in Stratford, Connecticut. During these 70 years of operation, manufacturing wastes containing asbestos, lead and polychlorinated biphenyls (PCBs) were commonly disposed of as fill on the property and on residential, commercial and municipal properties throughout the town of Stratford. In 1993, a public health advisory was issued by the Agency for Toxic Substances and Disease Registry in cooperation with the Connecticut Department of Health warning of the risks from exposure to Raymark's manufacturing waste found throughout the town.

In response to the health advisory, EPA began hazardous waste removal work at several residential properties in September, 1993. Over the next two years, EPA completed the excavation of Raymark waste from the yards of 47 homes while, at the same time, the State of Connecticut completed excavation activities on the baseball fields at the

town's middle school. These excavation activities have resulted in the return of approximately 100,000 cubic yards of Raymark waste to the original facility where it presently sits in 20-30 foot high stockpiles.



EPA signed a Record of Decision — the document which lays out the cleanup plan — on July 3, 1995, which included the demolition of all buildings on-site and the capping (with a geosynthetic clay liner) of the entire 33-acre-facility. EPA quickly began demolition at the facility in September 1995. As of this spring, over 90% of the 15 acres of buildings had been demolished. The ultimate goal is to make this Superfund site the first in the nation that is put back into beneficial economic use. EPA Administrator Carol Browner called the Raymark cleanup "a model for the country."

economics. To this end, EPA is pushing forward on an initiative to define environmental results based on scientific evidence also known as developing environmental indicators. These indicators will improve our future State of the New England Environment Reports by providing a clearer sense of whether the quality of our environment is improving or getting worse. And the indicators will provide EPA staff with a better idea of which efforts yield the most meaningful environmental results as measured in sound scientific terms.

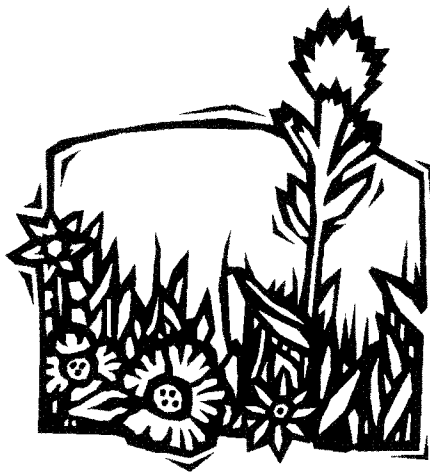
And we are continuing to bring the market to bear on environmental problems. Initiatives like Market-Based Emissions Trading are already letting the invisible hand work its magic on behalf of New England's environmental and economic health. A new effort to promote effluent trading will bring the same principles that are working to improve air quality to protect our waterways. And a new \$2 billion tax incentive, proposed by President Clinton this winter, would use the tax structure to promote redevelopment of formerly contaminated sites, or Brownfields.

Education and empowerment:

EPA recognizes that we must draw upon the ingenuity and love for the environment of New Englanders to help us protect our shared environment. That is the precept behind our many community-based environmental protection efforts — EPA's partnerships with environmentalists at Waquoit Bay on Cape Cod and dairy farmers near Lake Champlain, with metal platers in Maine and major corporations like The Gillette Company in Boston.

Empowerment is also what new programs, like StarTrack, are all about. EPA's New England office recognizes that some companies are superb environmental citizens and deserve to be regulated differently than others. StarTrack offers companies with proven records of environmental leadership the opportunity to have an independent third party audit and monitor their environmental perfor-

mance in the place of EPA inspectors. This initiative has the potential to create a whole new class of professional environmental auditors upon which, in the future, EPA will rely to ensure the environmental integrity of corporations much the way the SEC relies on CPAs to ensure the financial integrity of those same corporations today.



Conclusion

In our first State of the New England Environment Report, we promised to issue an annual report on our progress as a society in protecting our public health and our resources. Each year, we will strive not only to improve our environment but also to improve the quality of the data and other information that we provide the public.

We encourage all New Englanders to challenge those of us at EPA to reach greater heights, hold us accountable when we fall short of our ambitious goals, and most important, to join us in our work to provide a cleaner, safer, healthier environment for all who will follow.

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