

# **Governing Greater Boston**

*The Politics and Policy of Place*

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### 3. *The Nature of Greater Boston: Integrating Environmental and Urban Spaces*

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*Laura A. Siegel*

CARTER HILL, 27 ACRES OF ROLLING HAYFIELDS and woodlands in suburban North Andover, a prime sledding and hiking spot that overlooks a dairy farm and connects to other town hiking trails, almost became a housing subdivision. But in July 2001, North Andover finalized a \$1.51 million deal to keep it open space. After years of effort, North Andover became the first community to fully preserve open space under the Community Preservation Act (CPA), a new state law that allows communities to combat sprawl by raising funds for conservation as well as affordable housing and historic preservation. Robert Durand, head of the state Executive Office of Environmental Affairs and a supporter of the CPA since his days in the state legislature, was exultant: “With this purchase, North Andover is saving a scenic vista for people to enjoy for all time, increasing the environmental value of adjacent protected land and protecting a drinking water supply.”<sup>1</sup>

Saving Carter Hill from development not only preserves green space. It also keeps the community’s water clean. Carter Hill drains into Lake Cochichewick, the town’s only source of drinking water. Located next to the 105-acre Mazurenko Farm, which North Andover purchased in 1988, the hill now provides a permanent ecological system that could regenerate the whole area. A subdivision on that spot would have further strained natural resources in the town and fragmented the ecosystem on the hill and on an adjacent 105-acre farm. Beyond saving Carter Hill, the CPA funds also helped the town to establish a trust fund for acquiring other open space.

Meanwhile, in the aging industrial city of Fall River in southeastern Massachusetts, the state Executive Office of Environmental Affairs and the Trustees of Reservations, the oldest land trust in the nation, are teaming up to create a 14,000-acre “bioreserve” permanently protected from development.

The project combines the existing 5,200-acre Freetown-Fall River State Forest and 4,300 acres of watershed and conservation lands owned by the city with 3,800 acres of the former Acushnet Saw Mills property. Intended to protect natural habitats typical of the region, the bioserve includes several that the state's Natural Heritage and Endangered Species Program considers at risk, such as Atlantic white cedar swamps, which host other threatened species. The concept is based on a United Nations initiative to create large patches of contiguous land that protect ecosystems and water supplies while integrating human uses such as recreation and agriculture. The Fall River bioserve is the first of five such areas planned for the state.

To purchase the Acushnet property, the state contributed \$10 million, the Trustees \$2 million, and the Fall River Redevelopment Authority \$2.4 million, the latter in exchange for 300 acres of state forest to offset the city's overall loss of developable land. The bioserve includes conservation easements to restrict development on the acres controlled by the Trustees and on land abutting the acres sold to the redevelopment agency. The challenge now, according to Ule Amundsen of EOE, is to bring together parties with different land-use priorities, including the City of Fall River and the state Department of Fish and Wildlife, to cooperate in managing the bioserve for public recreation as well as conservation.

The initiatives in North Andover and Fall River represent the vanguard of efforts to protect the environment in the Greater Boston region and throughout the state. Urban and suburban communities alike are wielding new tools that clean and preserve water supplies, conserve open space, curb air pollution, and contain sprawl. These tools often rely on complex interactions among public agencies and private actors as well as broad-based approaches to land-use planning that are just beginning to materialize.

## **The Elements of Environmental Policy**

Although the region's environmental quality rests on three main elements—air, water, and land—a coherent strategy for ensuring environmental health depends on numerous programs that attack their interactions as well as each specific problem. With leadership by numerous nonprofit environmental groups and state and local agencies, the region has made progress in cleaning up air and water pollution, and is taking long-term measures to preserve open space and clean brownfields to solidify progress on all three fronts.

### *The Quality of the Air*

The quality of the air in Greater Boston is better than it once was: the number of “good” air-quality days in Suffolk County—which includes Boston—

rose from 150 in 1985 to 300 in 1995. Still, the region faces difficult challenges in the years ahead to assure clean air, as the region and the state still violate federal air-quality standards during significant portions of the summer each year. The state and region are now taking further steps to control both large- and small-scale sources of pollutants.

The worst pollution problem in New England—and Greater Boston—is ground-level ozone, also known as smog. (Concern over ground-level ozone should be distinguished from depletion of the beneficial ozone layer in the stratosphere.) Ground-level ozone forms when two types of pollutants—volatile organic compounds (VOC) and nitrogen oxide (NO<sub>x</sub>)—react. Smog can aggravate asthma and bronchitis, damage lung tissue, and lower resistance to respiratory diseases. Stationary sources such as power plants emit about half these pollutants. Mobile sources (such as vehicles) and “area” sources (such as small businesses and consumer products) split the remaining amount. To control area sources of VOCs since the mid-1990s, the federal government has required gas station owners to install specially designed nozzles, and the state has obligated paint manufacturers to reformulate their products.<sup>2</sup>

While Eastern Massachusetts has finally reached the 1990 federal ozone standard of 0.12 parts per million of ozone measured over one hour, it will probably violate the U.S. Environmental Protection Agency’s new, stricter standard of 0.08 parts per million measured over eight hours. The Supreme Court recently rejected a challenge to this new standard, but the EPA has not yet announced which regions do not comply with it.

The state recorded 124 violations of the new eight-hour standard during the summer of 2001, after seeing only 15 violations during 2000, 22 during 1999, and 12 during 1998, according to Leslie Collyer of the Air Assessment Branch of the Massachusetts Department of Environmental Protection. She cites stagnant weather patterns as the dominant factor in the high number of violations in 2001.

The other major pollution problem in Greater Boston concerns particulate matter, also known as soot. These extremely small particles suspended in midair penetrate deep into the lungs, causing severe health problems. Particulate matter emanates from power plants, diesel trucks, wood stoves, and industrial processes, often in the form of sulfur dioxide, which also causes acid rain. Particulates are more closely linked with elevated death rates than any other kind of air pollution. Eastern Massachusetts is just barely meeting the federal minimum standard of 15 micrograms per cubic meter, with a 24-hour limit of 65 micrograms per cubic meter.

Toxic pollutants such as mercury also contaminate the air and precipitate into the water supply, contaminating that as well. Fish in almost half of

all lakes and ponds in Massachusetts are unsafe to eat because of high mercury levels. In July 2001 the state Department of Public Health issued a health advisory warning women who are pregnant or who could become pregnant, as well as children under the age of 12, to avoid eating five kinds of saltwater fish and all freshwater fish caught within the state. One meal of contaminated fish by a pregnant woman can harm her fetus, and mercury can cause learning disabilities in children. Mercury also causes cancer and damages brain, spinal cord, kidneys, and liver in both children and adults.<sup>3</sup>

Mercury in Massachusetts comes from several sources. Solid waste combustors release over 6,000 pounds each year into the air by burning discarded products such as batteries and thermometers. Factories, power plants, and hospitals also release mercury, and former tanneries and paint factories have contaminated soil with mercury. Much of the state's air-borne mercury comes from out of state. The EPA estimates that from 1,800 to 3,700 pounds of mercury in the air contaminate the land and water each year.<sup>4</sup>

Both state and local actors are working hard to address this problem. In 1998, for example, DEP required municipal waste incinerators to install cleanup technology to remove 85 percent of their mercury emissions.

**Power plants:** Coal-fired power plants known as the Filthy Five contribute 90 percent of power plant pollution in the state, according to the Massachusetts Public Interest Research Group. The Filthy Five include Brayton Point Station in Somerset, Canal Station in Sandwich, Salem Harbor Station in Salem, Mystic Station in Everett, and Mount Tom Station in Holyoke. The Clean Air Act of 1970 grandfathered these plants, some of which date from the 1930s, from meeting modern standards: Mount Tom, for example, exceeds limits on sulfur dioxide, a source of particulate matter, by 446 percent.

Governor Jane M. Swift in April 2001 approved regulations by the Executive Office of Environmental Affairs requiring the Filthy Five to clean up or close down. The EOEA mandates that plant owners cut NO<sub>x</sub> and SO<sub>2</sub> emissions 50 to 70 percent over three to five years. The new rules are also the first in the nation to limit mercury and greenhouse gas emissions from power plants: owners must cut CO<sub>2</sub> by 10 percent. The Massachusetts Public Interest Research Group estimates that bringing these plants to modern standards will have the same impact as taking three-quarters of a million cars off the road.

The newest power plants fueled by natural gas run 99 percent cleaner and are twice as efficient as older plants that run on oil and coal, according to the Conservation Law Foundation. Seven such combined-cycle power plants had come on line by the summer of 2001, while some 13 others will join them over the next year. These new plants will add 10,500 megawatts of cleaner power to the New England grid, for a total of 34,000 megawatts,

or nearly 50 megawatts more than peak demand in the summer of 2001. The new plants are easier to site because they are much smaller. The new 16-megawatt plant planned for Somerset, powered by liquid natural gas, will be the most powerful in New England yet fit into the parking lot of its Filthy Five sister facility, according to Richard Kennelly of CLF.

Industry deregulation since 1997, designed to break up the power monopolies and create competition, spawned many of these new plants. The law required utilities to divest themselves of their generating facilities; the utilities would focus instead on transmitting and distributing the power supply. New England Electric, for instance, sold its plants for \$1.6 billion to U.S. Generating Company, which in turn sold them to California-based Pacific Gas and Electric Generating Company.<sup>5</sup> Opponents of restructuring argue that deregulation bailed out the utility industry for bad investments, but supporters claimed that it will yield important consumer and environmental benefits.

The law required an initial 15 percent cut in consumer electricity rates, but dramatic rises in the price of oil and natural gas offset those rate cuts in the winter of 2000–2001. Richard Rosen of the Tellus Institute, a nonprofit energy consulting firm, says the deregulation formula allowed consumer prices to rise significantly faster than they would have under the old system. However, prices are expected to fall with oil and gas prices, and as new plants provide excess capacity for the region.

If all the new plants supply baseline power to the system, CLF's Richard Kennelly expects a dramatic reduction in SO<sub>2</sub> and NO<sub>x</sub> from this sector, with carbon dioxide, the main greenhouse gas, also declining by one-third. In fact, the plants may enable the region to achieve the 7 percent cuts in overall CO<sub>2</sub> emissions by 2007 called for by the international Kyoto accords, even though President George W. Bush has declined to participate in treaty negotiations.

Energy industry restructuring also requires power producers to increase the percentage of their energy that comes from renewable sources to 10 percent over eight years, which they must report beginning in 2003. A small surcharge on electricity bills is supplying an Energy Trust Fund, which will begin distributing \$150 million in 2003 to jumpstart commercialization of conservation efforts and renewable energy sources. One proposal is to include a 40-acre photovoltaic power plant on top of Boston's new convention center.

Of course, not all air pollution in the region stems from sources within the state of Massachusetts. In May 2001, the U.S. Court of Appeals for the D.C. Circuit upheld an order by the U.S. Environmental Protection Agency that power plants in the Midwest and Southeast must cut their NO<sub>x</sub> emissions by May 2004 by 75 to 85 percent.<sup>6</sup> Although this ruling could cut air

pollution in New England significantly, the EPA may withdraw its suits owing to pressure from the Bush Administration. If the ruling takes effect, Midwest states will participate in an ozone trading commission much like the regional Ozone Transport Commission that now encompasses 12 states from Maine to Washington, D.C.

**Logan Airport:** As the Filthy Five clean up or shut down, Environmental Affairs Secretary Robert Durand projects that Logan Airport will become the state's top air polluter by 2010.<sup>7</sup> The airport is now the sixth-worst source of smog in the state. Logan produced 2,444 tons of NO<sub>x</sub> in 1999, mainly from airplanes as well as service vehicles and associated traffic. According to David Luberoff, associate director of the Taubman Center on State and Local Government at Harvard University's John F. Kennedy School of Government, airport pollution has received much less scrutiny than other sources of air emissions. In fact, according to the Massachusetts Environmental Protection Agency, aircraft are the only mobile source of air emissions not targeted for meaningful cuts under the "state implementation plan" that Massachusetts must file with the U.S. EPA because it is out of compliance with the Clean Air Act.

The outlook for air emissions from Logan changed when airport officials filed an environmental impact statement as part of their petition to build a new runway. Durand approved the project in June 2001, provided that Logan fulfills an air-quality initiative.<sup>8</sup> This initiative has two main components. First, Logan has committed to a first-in-the-nation agreement to cap NO<sub>x</sub> and VOCs at or below 1999 levels, regardless of future increases in passenger volume. Massport, which runs Logan, will obtain one-third of these cuts on site by converting ground transport vehicles to cleaner fuels, and cut the balance by financing reductions by off-site emitters. Massport will pass the costs of these efforts on to the airlines under the "polluter pays" principle.

Logan has also agreed to implement a peak-period pricing or other demand-management scheme as the number of flights grows. Under peak pricing—originally implemented by the Dukakis Administration in 1990 but abandoned soon after—airlines pay more for takeoffs and landings during popular times. Peak-period pricing encourages airlines to consolidate flights and encourages small planes to fly during off-peak hours, easing pollution from planes queued to take off and land. According to Jay Wickersham, the director of Massachusetts Environmental Protection Agency, experiences in the late 1980s showed that demand management systems can work. The Federal Aviation Administration and the Port Authority of New York and New Jersey have instituted a prototype plan for LaGuardia Airport. As part of its agree-

ment, Logan will also continue to monitor air quality in surrounding towns. Cutbacks in demand for air travel, in the aftermath of the terrorist attacks on the U.S. on September 11, 2001, may delay implementation of the system.

**Cars:** Policymakers point to three strategies to reduce air pollution from cars, trucks, and buses. One is to create cleaner vehicles; a second is to manage traffic better; and a third is to convince people to drive less. Residents of the City of Boston already own only 0.87 cars per household compared with 1.67 nationwide.<sup>9</sup> Some 14 percent walk to work; while 32 percent take transit. The Greater Boston area includes some 33,000 park-and-ride spaces to encourage people to carpool and use transit.<sup>10</sup>

Residents of Eastern Massachusetts made some 776,000 daily trips by transit in 1995. Boston's Central Transportation Planning Staff expects that figure to grow by 45 to 49 percent—to reach a total of 1.13 million to 1.16 million—by 2025. The growth reflects a projected rise of 31 percent in the number of employees in the area, and a 25 percent rise in the number of households. The forecasted transit needs exceed the capacity of buses and trains, according to the agency.<sup>11</sup>

Despite a higher-than-average regional reliance on transit, the use of cars is growing in Greater Boston and beyond. Between 1986 and 1996, the state saw a 21 percent increase in the number of vehicles, bringing it to the same level of cars per person as the national rate.<sup>12</sup> And according to an analysis by the Surface Transportation Policy Project of data compiled by the Texas Transportation Institute, the number of vehicle miles traveled in the state rose 32 percent from 1982 to 1999 while population grew by only 5 to 8 percent.

To reduce the effects of car use and comply with the 1990 federal Clean Air Act, the state implemented a more stringent emissions testing program in 1999. Besides measuring hydrocarbon and carbon monoxide emissions more accurately, the new tests also measure NO<sub>x</sub>, the key ingredient in smog. The state estimates that this program, which relies on a dynamometer to simulate real-world driving conditions, will cut smog-causing pollution by 25 percent, if the experience of other states is any guide.<sup>13</sup> In February 2001 the state also began testing heavy-duty vehicles that burn diesel fuel, and will expand this program to include light-duty cars and trucks in 2002. More stringent standards for car emissions take effect in 2004, and low-sulfur gasoline phases in over several years.

In 1999 Massachusetts adopted California's zero emission vehicle (ZEV) mandate, which requires that manufacturers boost the number of cleaner-burning vehicles they sell in the state to 10 percent by 2003. Such vehicles can include gas-electric hybrids as well as purely electric vehicles.

However, in November 2001, Massachusetts, along with New York and Vermont—which also adopted the California mandate—announced a postponement of the mandate’s implementation for four years, owing to technological constraints facing automakers. Environmental groups contend that the delay is illegal under federal law and threatened to take legal action to force implementation by 2003.<sup>14</sup>

Congestion or peak-period pricing—charging more for driving during busy times—can also discourage rush-hour traffic and thus lower emissions. Under this system, electronic devices placed on a car’s windshield provide toll discounts to road users during off-peak hours. The approach is controversial because it rewards users whose lifestyles and work schedules happen to occur outside normal working hours. Many policymakers argue that public facilities should charge all customers equally. Christine Kirby of DEP says that the state decided it could avoid adopting such a controversial system by cutting emissions from power plants and instituting a stringent vehicle inspection scheme.

More modest tactics also aim to reduce the number of cars on the road. For example, the state began a Ride Share program in the early 1970s, and revitalized it in the early 1990s to comply with pollution standards under the 1990 revisions to the Clean Air Act. The program asks employers to cut their employees’ car trips by 25 percent. Ride Share requires companies that are major emitters of pollution and also have 250 employees—as well as all employers with at least 1,000 daytime commuters—to provide incentives to cut the number of “drive-alone commutes.” Such incentives can include annual match-making of carpoolers, subsidizing transit passes, and providing showers and bike racks for bicycle commuters. Susan Lyon, head of the Ride Share program, says many employers already provide such incentives because it helps them attract employees. However, the state has so far not compiled information on whether companies are meeting their targets or what environmental impact the program has produced.

The state also has established the high-occupancy-vehicle lane on Interstate 93 south to cut the number of car commuters under the central artery mitigation scheme. Critics have complained that the HOV lanes fail to attract the carpools needed to make it a success and urge the state to abandon the experiment.

Cambridge and Boston have frozen the number of parking spaces to control the number of vehicles on their roads. The effectiveness of these parking freezes is limited, however, because of loopholes that allow the creation of new garages directly connected with office or residential buildings. Officials in Boston privately state the parking freeze in the city’s downtown should be repealed, but they would face bureaucratic obstacles and the ire of

environmentalists if they tried to seek a repeal. In any event, thousands of new parking spaces have been created in the city in recent years.

Car-sharing offers another strategy to reduce the number of people who own and drive cars. In 2000, a for-profit firm called Zipcar began placing cars all over the region for use on an hourly basis. The thinking is that if occasional drivers can get access to a car when they absolutely need it—to make a big grocery shopping trip, for example, or to get goods from a lumber yard—many of them might avoid buying a first or second car. Because car ownership entails significant “sunk costs,” car owners often drive more than they would if a car were simply made available to them. Real-estate companies have responded to the new auto option by providing spaces for Zipcar in their buildings, and city councilors are considering requiring large developers and all city-owned garages to include parking for short-term rental cars. Meanwhile the MBTA has announced a pilot program to donate four spaces at four of its parking garages to Zipcars, give subway riders easy access to them. Even if short-term rental cars reduce the number of cars on the road by only 10 percent in urban neighborhoods, significant reductions in congestion are possible.<sup>15</sup> Zipcar officials are considering new strategies for promoting widespread car-sharing in transit-oriented neighborhoods such as Jamaica Plain. The company has found that its best opportunity for gaining customers might be when car owners’ vehicles “die” and they face the possibility of spending \$15,000 to \$20,000 for a new vehicle.

**Buses:** Buses are one of the largest single source of particulates at the neighborhood level, especially in the heavily trafficked streets of Boston, Cambridge, and Somerville, according to Seth Kaplan of the Conservation Law Foundation. The Massachusetts Bay Transit Authority runs one of the oldest and dirtiest bus fleets in the country. Until very recently, nearly all of the MBTA’s 1,000 buses ran on heavily polluting high-sulfur diesel fuel. The U.S. National Institute for Occupational Safety has classified the exhaust created by the combustion of this fuel as a probable carcinogen.<sup>16</sup>

According to the MBTA’s May 2001 analysis, the average bus in its fleet produces 5.6 grams of NO<sub>x</sub> and .214 grams of particulate matter per “brake horsepower hour.” These figures exceed the 1998 EPA standards of 4.0 grams of NO<sub>x</sub>—stricter limits have already been proposed for 2004—and .05 grams of particulate matter for buses produced after 1996 and .10 grams for older buses.

In September 2000, an administrative consent order issued by Massachusetts DEP required that, as part of efforts to mitigate environmental fallout from the Central Artery project, the MBTA must replace 358 of its diesel buses with vehicles that run on alternative fuels such as compressed

natural gas. The MBTA announced in October 2001 that it had ordered the last 75 of these buses. The consent order also requires the MBTA to retrofit old buses with emissions controls to sharply reduce particulate matter and other emissions. However, the agency maintains that engine rebuilds already completed under the federal Clean Air Act meet that requirement—an argument rejected by both state regulators and environmental organizations. They are pressing the agency over its failure to meet the December 2000 deadline for such retrofits.

Emissions from privately operated coach buses, shuttle buses, and city school buses remain largely unregulated. In fact, New York and other municipalities removed many of these buses from their municipal fleets and resold them to private companies. Officials are uncertain how many of these buses operate in the Boston area, though a best estimate is about 1,000. The U.S. Environmental Protection Agency has issued rules that would mandate substantially reduced levels of sulfur in all diesel fuel sold in the U.S. by 2006. Simply switching a diesel bus to this ultra-low-sulfur fuel would reduce particulate emissions by 20 to 30 percent, as long as the dirty bus is permanently removed from the street.

## **The Quality of the Land**

A region as well developed as Greater Boston requires making full advantage of the parcels that exist—for housing, business, social and cultural spaces, and, last but not least, parks and recreation. But much of the land in the region has been contaminated or poorly maintained. A complete environmental policy requires strategic attention to these challenges.

***Brownfields:*** Like much of New England, the Boston area once supported a thriving industrial and manufacturing sector that helped shape its history and culture. Those industries also left another legacy: large swaths of contaminated land known as brownfields. These vacant sites are a health risk to those who live or work near them and are a blight in their neighborhoods. But brownfields are difficult and expensive to clean up, and the fact that developers can be held legally liable for the contamination leaves many wary about pursuing redevelopment.

The City of Boston alone contains some 2,247 contaminated sites, accounting for 29 percent of the state's 7,700 contaminated sites.<sup>17</sup> The most severely affected parts of Boston include former industrial areas such as East Boston, Dorchester, Roxbury, and Allston-Brighton, with the highest number of sites in central Boston itself. Government officials and other experts interviewed for this report say that no one really knows how many brownfield sites exist in Greater Boston and Massachusetts.

The Massachusetts Waste Site Cleanup Program of 1993 sped up brownfield remediation by privatizing it and allowing developers to calibrate the level of cleanup to a site's intended use. At the federal level, the Environmental Protection Agency launched the Brownfields Action Agenda in 1995, which included brownfields pilot projects, clarification of owner liability, partnerships, and job training nationwide. Two years later, Vice President Albert Gore created the Brownfields National Partnership Action Agenda.

In 1998, Massachusetts passed landmark brownfields legislation to reduce the risk of developing contaminated property and offer \$50 million in assistance and funding. Key components include a tax credit to encourage private-sector brownfield revitalization, protection from liability for developers who clean up a site, and insurance through the Massachusetts Business Development Corporation for private-sector brownfields lending. The Brownfields Redevelopment Fund, a grant program administered by the Massachusetts Development Finance Agency, also provides up to \$50,000 per site for environmental assessments and up to \$500,000 for remediation. The Governor's Office for Brownfields Revitalization, the Department of Environmental Protection, the Office of the Attorney General, and the Department of Revenue help administer this package of programs.<sup>18</sup>

The program has provided some 393 sites with funding or direct assistance, another 139 sites are applying for such assistance, and the state has conveyed information to owners or developers of another 118 sites, according to Catherine Finneran, brownfields coordinator for DEP. These efforts have contributed to some notable successes, especially in the Dudley Square area of Boston's Roxbury neighborhood. The Modern Electroplating plant, a five-acre site shut down by court order in 1994 because the company had dumped wastes directly into sewers, was once a conglomeration of wastes, including hydrochloric acid and potassium cyanide. The City of Boston worked with the U.S. Environmental Protection Agency to remove hundreds of barrels of paints and solvents and a thousand gallons of acidic waste. The new owner, Cruz Construction, is now investigating the condition of soils and buildings on the property and fashioning a financing package before committing to a planned \$20 million four-story office and retail building and garage.<sup>19</sup>

Other important brownfields projects include the creation of Centennial Park on a capped landfill in Boston's West Roxbury neighborhood, and Danehy Park in Cambridge, once a 50-acre city dump. The East Boston Greenway, a stretch of former rail corridor contaminated by coal and coal ash, is being cleaned and covered for conversion to a greenway with a

bike and pedestrian path. The Massachusetts Highway Department and the MDC are converting the Columbia River Tire site into a park on the Neponset River Greenway in Boston's Mattapan neighborhood.

The City of Somerville is considering proposals for Assembly Square that include office, research, residential, retail, open space, and arts uses. That development would include a new Orange Line rapid-transit stop, funded by the developer. Meanwhile, the EPA has designated nearby Telecom City—a partnership among Malden, Everett, and Medford to convert a 200-acre site contaminated by power plants and chemical facilities into an high-technology research and development park—as a brownfields pilot project. Under this program, EPA sends a staff member onsite fulltime for two years and helps leverage other federal resources for the project. The state has granted some \$21 million to help fund Telecom City.<sup>20</sup>

Todd Fernandez, director of the Governor's Office for Brownfields Revitalization, says that state and local agencies such as the Dorchester Bay Economic Development Corporation have tackled some of the most difficult brownfield sites in Greater Boston. For example, Dorchester Bay pulled together funding from 10 sources to convince the Spire Printing Company, a high-technology firm, to lease a Bay Street site for 10 years with an option to buy. The key, according to Jay Wickersham of MEPA and Mark Norton of Dorchester Bay, is finding a use for a brownfield that meshes with the site's location. The Bay Street site abuts the Ashmont MBTA station on the Red Line—a plus for attracting employees. Dorchester Bay is also working with a group of artists to develop a 25,000-square-foot warehouse in Uphams Corner that formerly housed an industrial dry-cleaning operation. That site, although not severely contaminated, had stood vacant for a decade until the artists saw its potential as a cooperative work space.

In conjunction with Niall Kirkwood of Harvard University, Fernandez's office is planning to inventory brownfield sites throughout the state to provide some benchmarks for redevelopment efforts. No one really knows how many sites exist, he says, because tallying them requires investigating tax and ownership records and conditions at each potential site.

**Urban parks:** The recreational benefits of parks in cities are obvious: places to escape the cars and pavement, to cool down in summer, to experience nature, to enjoy sports. The environmental benefits are less obvious but real. Parks can help support a diversity of plants and wildlife. They can also help recharge and filter groundwater and prevent floods.

Boston is blessed with the Emerald Necklace, an extensive network of green spaces and borders to roads and rivers that run from the Boston

Common near Beacon Hill out to Franklin Park in Roxbury and Dorchester 6.4 miles to the south. Among high-density cities, Boston has a relatively high number of acres of parkland per person—around 8.7 acres of open space per 1,000 residents, exceeded only by San Francisco's 10.3 acres per 1,000 residents.<sup>21</sup>

Parks advocates and officials agree that Boston's parks system is underfunded for the tasks it is required to perform. The budget for Boston's Department of Parks and Recreation totals some \$13 million for responsibilities that include maintaining 2,200 acres of parkland, including 215 parks and playgrounds, as well as 65 squares, 3 active cemeteries, 16 historic burying grounds, and 2 golf courses—as well as programming activities.<sup>22</sup>

Boston plans to expand its parkland by 25 percent by 2005. By making improvements on the waterfront land and at the Boston Harbor Islands, creating pocket parks, and protecting wetlands.<sup>23</sup> Boston is in the process of incrementally developing a 43.5-mile Harborwalk, a process begun in 1984. The Harborwalk will offer access to almost the entire shoreline of Boston. Recent additions include segments at Long Wharf and Sergeant Wharf in the North End, the Fan Pier interim walkway, and stretches at the University of Massachusetts at Boston's Columbia Point campus in Dorchester.

The highest-profile project for Boston's parks and open spaces in the early twenty-first century will be the "restoration" project of the Central Artery. On 27 acres that now stand in the shadow of Interstate 93, planners are deciding what kinds of parks and other public amenities to build along the future Rose Kennedy Greenway. Greenspace advocates envision a series of parks along its surface from the Museum of Science to the New England Aquarium. But urban designers say the corridor should include both parks and buildings that connect the two sides of the corridor. Ultimately, funding issues could settle the matter. Neither the state nor the city has committed the capital or operating funds necessary to realize the parks vision. Observers say that some kind of public-private partnership—in which developers allowed to build on the corridor will finance nearby parks—will be necessary to transform the area. The Surface Artery Legislative Commission, composed of 12 legislators, recommended in July 2001 that a new governmental entity should be created to manage the parks, but ownership and financing responsibilities remain unresolved.

The Harbor Islands National Park, established in 1996, is fast becoming a major recreational and historical resource in Greater Boston. The park encompasses 34 islands, ranging in size from one to 274 acres, that provide an ecological transition between a densely settled urban area and the open ocean. The park's 35 miles of undeveloped shoreline reflect an intricate coastal ecology as well as complex geological processes. The islands are the

only instance in the United States where glacial drumlins, deposited by the movement of ice 15,000 years ago, intersect a coast.

The area's archeology testifies to thousands of years of occupation by Native Americans, while three national historic landmarks—Boston Light, Fort Warren, and Long Wharf—bear witness to more recent use. The National Park Service, along with other federal, state, city, and private members of the Boston Islands Partnership, is working on a master plan that encourages public access to the park as both a recreational haven and an informational resource while preserving the region's unique ecology. Under the master plan, parks would operate under an operating budget of some \$8 million, with capital costs ranging from \$61 to \$88 million.<sup>24</sup>

The Metropolitan District Commission (MDC) maintains the first regional park system in the country, established in 1893. Charles Eliot envisioned a metropolitan park system whose greenways would connect three major hills—Belmont Hill, Blue Hill, and the Middlesex Fells—to the seashore. Today the MDC continues to administer an amalgam of coastal areas, parkways, and greenspace, providing direct services often to underserved populations.

The agency is in the midst of a \$30 million effort to restore habitat, landscaping, and bathhouses on beaches along Boston Harbor from Winthrop to Wollaston to complement the Boston Harbor cleanup. This work has entailed collaborating with the City of Quincy to create a stormwater management system that diverts sewage from the bay, as well as improvements to Carson Beach in South Boston, Tenean Beach in Dorchester and Constitution Beach in East Boston. The MDC is also working with the Boston Harbor Islands Alliance to restore piers and other structures on islands within the harbor. The agency is pursuing the largest beach restoration project in New England, which will entail mining sand eight miles offshore to replenish MDC beaches.

The MDC also is collaborating with the Charles River Conservancy to implement a master plan that expands greenway connections along the river from Watertown to the Museum of Science at the mouth of the Charles. And the agency is working with the Neponset Greenway Council to create a master plan for the lower Neponset River that entails reclaiming a brownfield site and using a piece of the old B&M rail line to create a trail connecting two parks. The agency is also collaborating with Tufts University to study the habitat and water quality of the Mystic River watershed, and will create 40 acres of new parkland in the Charles River basin as part of the effort to mitigate the effects of the Central Artery Project.

**Biodiversity:** Preserving an area's biodiversity—its variety of life and natural processes—is essential to preserving healthy ecosystems, which in turn support human life. The City of Boston alone includes over 100 acres of wetlands, a rich source of biodiversity. One Boston pond recorded over 400 birds from 21 species on a single day.<sup>25</sup>

The Boston area faces two major threats to its biodiversity: sprawl and invasive species. When people develop buildings, parking lots, and roads on green space, they not only destroy wildlife habitats and ecosystems but also shatter the continuity of remaining habitats, threatening the survival of native species. According to Holly St. Clair of the Metropolitan Area Planning Council (MAPC), the region's 101 cities and towns lost more than 22,000 of 919,000 acres of forests, meadows and agricultural land from 1991 to 1999, with undeveloped land shrinking from 59 to 57 percent overall.

Article 97 of the state constitution prevents the transfer of publicly held open land to other uses without a two-thirds vote of the legislature. However, lawmakers have routinely approved such transfers for schools and other purposes, pitting environmental interests against other public purposes. The Massachusetts Public Interest Research Group reports that 239 land transfers occurred under Article 97 between 1989 and 2000. Of these, 34 percent were designated for private development, 15 percent for city use, 13 percent for water supply and sewage, and 11 percent for education. The number of annual transfers has also grown.<sup>26</sup>

The Act to Preserve Natural and Historic Resources, sponsored by Senator Pam Resor, a Democrat of Acton, would establish strict criteria for the sale of public lands to private developers. The bill would require municipalities to perform an analysis showing there are no feasible alternative sites for developing schools or hospitals. The bill also would require the city or town to provide replacement parkland to make up for the loss of open space. A priority of Environmental Affairs Secretary Robert Durand, this bill enjoys broad support, and awaits consideration in the Senate Committee on Ways and Means.

Non-native species often lack natural predators, overrunning an area and driving out native species, drastically lowering the area's diversity and threatening its ecological health. According to a state Blue Ribbon Committee on Lakes and Ponds appointed by Environmental Affairs Secretary Durand in October 2000, invasive species such as purple loosestrife and phragmites (reeds) are strangling numerous bodies of water in Massachusetts, including the Fens in Boston's Emerald Necklace.

Biodiversity is a relatively new issue for the EOEA. The release of *Our Irreplaceable Heritage: Protecting Biodiversity in Massachusetts*—a report

issued by the Department of Fisheries and Wildlife and the Nature Conservancy in 1998—drew attention to the broad sweep of land protection issues for the first time in Massachusetts. The report cited the loss of 75 species in Massachusetts and the degradation of the state's remaining biodiversity.

Over the last two years, the state has permanently set aside 100,000 acres of open space, including the 14,000-acre bioreserve in Fall River.<sup>27</sup> In 2000, the state also began sponsoring annual Biodiversity Days, which enlist the public in collecting information on species in their cities and towns. The state has used this information to help compile a database on state biodiversity.

The Massachusetts Department of Fisheries, Wildlife, and Environmental Law Enforcement also recently completed the BioMap Project, which locates exemplary habitats, rare species, and minimally fragmented natural environments across the state critically in need of protection. The Massachusetts Ocean Resource Information System does the same for the seas, and the fisheries and wildlife department is beginning to map biodiversity in the state's inland waterways. These blueprints will be used to prioritize open space for state acquisition, steer local permitting away from sensitive habitats, and guide local and state land-use planning.

An environmental bond bill that Governor Jane M. Swift filed in June 2000 would authorize the state to issue bonds up to \$750 million to buy land for preservation, such as 2,000 acres near the headwaters of the Charles, and fund projects such as a bike path between Newton, Waltham, and Weston. The state approved a \$400 million bond bill in 1996, the last time such a measure was considered. But even if the new bill passes, the state would not necessarily issue those bonds. The environmental agencies would bump into the state spending cap, of which their share is estimated to be \$132 million this year. The bill awaits action in the Committee on Long-Term Debt.

Another tool to protect natural spaces from development is the conservation restriction, which permanently protects private land from development. Private owners retain ownership and management control, but under a legal agreement they grant ultimate control over land usage to a government agency or non-profit organization, which monitors and enforces this restriction on development. The state authorized this conservation tool under Massachusetts General Laws Chapter 184 in 1969.

In a record-setting year, Massachusetts approved restrictions on over 7,401 acres last year. Former Governor A. Paul Cellucci pledged to protect 100,000 more acres by 2002 and 200,000 by 2010.<sup>28</sup> Some controversy surrounds these programs: some people see them as money given to the wealthy to protect their property, with little or no access for the general public. But at a time when land values are causing many large landowners to sell their

property to developers, private ownership with restrictions might be the most pragmatic approach to protecting the landscape.

Agricultural preservation restrictions are a variation of conservation restriction designed to ensure that land stays agricultural. The state protected over 3,597 acres of working farmland in 2000.<sup>29</sup> Several proposals in the legislature would strengthen and expand these programs.

## **Toxic Materials and the Land**

Each resident of Massachusetts creates an average of four pounds of trash every day—totaling 7 million tons in 1996. The state produces 31 percent more trash than it did a decade ago, and exports 1 million tons of solid waste annually to other states.<sup>30</sup> In 1999 alone, Bostonians created 287,000 tons of trash.<sup>31</sup>

Ultimately, environmental policy requires the reduction of wastes, as the state's new master plan for solid wastes acknowledges. Despite the rise in the amount of trash, the region is using innovative programs to expand recycling programs, reduce solid waste, and cut the overall use and production of toxics, focusing particularly on controlling mercury.

**Recycling:** Boston has a much lower recycling rate than other cities and suburbs—12 percent in 2000 compared to about 34 percent statewide, 31 percent in Cambridge, 23 percent in Somerville, 35 percent in Brookline, 52 percent in Worcester, and 56 percent in Wellesley.<sup>32</sup> Boston Mayor Thomas M. Menino announced a new push for recycling in January 2001, centering on a public awareness campaign, placing recycling bins in rental apartment buildings, and recycling in city-owned buildings by 2002.<sup>33</sup> Boston already operates programs to recycle several hazardous materials, including paint and motor oil, as well as electronic products such as television sets and computers, which contain cathode ray tubes.

Recycling can save money. The fees for disposing of non-recyclable trash are \$50 to \$80 per ton, while recycling fees are substantially less, according to John Crisley, director of recycling for DEP, although the overall cost varies with the program and the end use of the recycled material.

The state's new solid waste master plan, unveiled in December 2000 by DEP, calls for a 70 percent reduction in the waste stream by 2010, an ambitious target. The agency aims to aggressively expand recycling and is promoting "pay-as-you-throw" programs, under which communities charge consumers per bag of trash they set out but pick up recyclables for free.

Worcester—which once had one of the worst records for recycling in the Commonwealth but now has one of the best—has achieved its extraordinary 52 percent recycling rate by instituting such a program, also known as unit

pricing. The city saw its solid waste drop 45 percent during the first full year of operation and saved some \$1 million in lower disposal fees and staff time. And contrary to initial concerns, the city has not seen a rise in illegal dumping. Over 100 Massachusetts communities now rely on pay-as-you-throw systems, including Needham (50 percent recycling rate), and Scituate (30 percent), Taunton (43 percent). Lexington saw a 32 percent increase in its recycling rate and a 24 percent drop in solid waste after adopting unit pricing, according to Joseph Lambert of DEP, while Brockton saw recycling rates climb 74 percent and trash volume drop by 44 percent.

The state's Municipal Recycling Incentive Program rewards cities and towns that take steps to improve their recycling programs by providing two payments each year for each ton of material recycled by residents. These payments are then invested back into the community to make further program improvements. The government has awarded over \$8 million through this program in the past three years. Last winter and spring alone it gave almost \$1.4 million to 188 cities and towns. Funds for the program come from the Clean Environment Fund, which is financed by unclaimed bottle deposits.<sup>34</sup>

DEP also plans to launch partnerships with manufacturers to redesign packaging, reduce their use of toxics, and develop products that they take back and reuse.<sup>35</sup> The department's solid waste master plan forbids building new incinerators but allows for a few more landfills, which DEP says will be needed even if the state meets the 70 percent reduction goal. The plan also focuses on shifting the waste industry's role from disposal to broader waste management services.

The legislature is considering several bills to boost recycling and cut solid waste. One bill would establish a "green dot" labeling program—a kind of "Good Housekeeping Seal of Approval"—for products that meet state standards for environment-friendly packaging. Other bills would mandate recycling of used oil filters and oil and the removal of phosphorus from dishwasher detergent. Yet another proposal would expand the popular bottle bill—which requires consumers to pay deposits on returnable bottles and cans—to include water and juice cans and bottles.

**Toxics:** The Massachusetts legislature passed the Toxics Use Reduction Act (TURA) in 1989 with the goal of reducing toxic wastes 50 percent by 1997. Under this landmark program, each manufacturer must publicly report its use, generation, and releases of toxic materials, and identify cost-effective methods to reduce its use of toxics relying on a biennial planning process. EOEA's Office of Technical Assistance and the Toxics Use Reduction Institute at the University of Massachusetts use some \$3.6 million in annual

user fees from 520 large toxics users to perform research and provide technical assistance to companies under TURA.

This effort has yielded great success. In 1990, Massachusetts manufacturers used more than 800 million pounds of toxic chemicals and produced over 100 million pounds of toxic byproducts. Between 1990 and 1999, manufacturers cut their toxic chemical waste by 57 percent, cut their use of toxic chemicals by 41 percent, and cut their toxic releases by 87 percent even while expanding production by 52 percent.

Many manufacturers argue that TURA's reporting requirements are too stringent, and that the law has exerted little real impact. Critics would prefer the use of tax credits as incentives for reducing toxic chemical emissions. Other states without TURA laws have also greatly reduced their toxic emissions, though none measure chemical use the same way that Massachusetts does. And Massachusetts companies use less than one-half the toxics as Connecticut firms.<sup>36</sup>

**Mercury:** EOEa has launched a Mercury Elimination Strategy, spending \$1 million in 2001 to examine current efforts to control or eliminate mercury, identify new policies, and develop an education and outreach strategy. The near-term goal is to reduce releases of mercury by 50 percent by 2003. The agency banned cathode-ray tubes, which contain mercury as well as four pounds of lead, from landfills and incinerators beginning in April 2000, according to DEP documents. The state also began a mercury diversion program in communities that send waste to incinerators, swapping mercury thermometers with digital ones. (Boston banned the sale of mercury thermometers within city limits beginning in May 2001.) Finally, EOEa lowered the level of mercury at which industries must report its use from 10,000 pounds to 10 pounds per year.

Representative Doug Peterson, a Democrat of Marblehead, has filed a bill—reported favorably out of the Natural Resources Committee—that would phase out the sale of products that contain mercury over a six-year period. Companies could gain exemptions, but they would have to clearly label their products as nondisposable, and establish and fund a system to take them back and recycle the mercury. Another bill filed by Jim Marzilli, a Democrat of Arlington, would ban the sale of mercury thermometers in the state, as Boston has already done.

## **Preserving Water Quality**

Thanks to its industrial history, Massachusetts ranks among the 10 worst states in the nation for the quality of its waterways. Reflecting this record, many of the rivers in the Greater Boston area fail the state water-quality

standard for boating and swimming. The region is also facing water shortages that reflect long-term threats to the viability of its watersheds. Yet federal, state, and local actors are making marked progress in cleaning up the region's waterways, and are beginning to take steps to protect the health of the larger natural systems of which they form an integral part. Tackling these problems requires a combination of two interrelated concepts: watershed management and local stewardship.

The state encompasses 27 major watersheds—areas in which all water flows to a common point such as a river, lake, or wetland. In the absence of human interference, water naturally cycles within these areas, as rain and snow seeps into the ground or runs into ditches, streams, lakes, wetlands, and coastal waters. Vegetation slows and filters runoff, while pavement and other impermeable surfaces hasten it. Water that is unable to seep back into the ground carries gasoline, lawn fertilizer, and other pollutants into rivers and harbors. Development that paves over green areas also boosts water demand and deposits wastewater far from its source, producing an imbalance in the local watershed. Environmentalists use the watershed lens to examine problems such as sewage contamination, pollution runoff from roads, threats to drinking water, water shortages, damage to the watershed environment, and harm to marine life.

Along with watershed management, local stewardship has become the leading principle guiding protection of water quantity and quality. Local stewardship means managing wastewater, drinking water, and stormwater as three aspects of a single water supply. First, communities within a watershed area need to capture rainwater and return it to groundwater instead of letting it flow and carry pollution into rivers and seas. Second, communities must clean wastewater and return it to where it came from so it can reenter the ecological cycle. Third, communities need to plan land use around systems of land and water interaction, protecting the most critical areas from pollution.

Balancing a local area's water budget, like its financial budget, means shifting from big sewer plants to septic systems and "package plants"—small water treatment plants that serve an office park or other development. It is a concept that encourages working with environmental systems rather than engineering over them. Done well, this approach reduces waste, protects communities against water shortages, and promotes healthy watersheds.

The Massachusetts Watershed Initiative—a partnership of federal, state, and local agencies, non-profit groups, businesses, and individuals—aims to overcome the fragmented approach to using and protecting water supplies that leads to shortages and degraded water quality. A team composed of representatives from the participating groups coordinates water

protection efforts for each watershed. The team establishes annual priorities and develops a plan to pursue those priorities, as well as to obtain funding for them. The overall goal is to restore natural river flows and habitats and promote shared responsibility for managing each watershed.

***Boston Harbor cleanup:*** Watershed management and local stewardship run counter to a key measure underlying one of the region's most notable success stories: the cleanup of Boston Harbor. During the 1988 presidential campaign, George H.W. Bush memorably attacked then-Governor Michael S. Dukakis for the harbor's condition, but in fact major cleanup efforts were already under way. In 1982, the City of Quincy sued the Metropolitan District Commission, claiming that the polluted harbor violated state law, and in 1985 the MWRA became the lead agency in the harbor cleanup. That same year the EPA and the U.S. Department of Justice successfully sued the state in federal district court for violating the federal Clean Water Act by discharging sewage into the harbor. In 1986, the judge ordered Massachusetts to build new wastewater treatment facilities to stop the pollution.<sup>37</sup>

The state banned sludge discharges in 1991, began primary sewage treatment in 1995, and started secondary sewage treatment in 1998, and the court-ordered cleanup finished on time and on budget—at a cost of \$4.5 billion. The Deer Island Treatment Plant, the second-largest sewage facility in the United States, is nearly complete. Deer Island removes human, household, business, and industrial pollutants from wastewater for 43 Greater Boston municipalities. Begun in 1989, major parts of the facility have been operating since 1995.

The effort left the harbor so clean that dolphins have returned to the water, waterfront development has occurred at a historic pace, and people have returned to the beaches. Some eight miles of beaches in Boston are swimmable on most days. The cleanup has been cited as a model for environmental remediation and community development, leading to a nationwide shift in understanding about the role of natural areas as a spur to development.

Deer Island is a magnificent feat of engineering. Yet despite significantly reducing water pollution in Boston Harbor, Deer Island and other large-scale treatment plants run counter to the concept of watershed management because they do not help refresh local water resources. This is particularly important given that more than half of the 340 million gallons that Deer Island treats every day is fairly clean groundwater that has leaked into sewers in numerous communities. By siphoning off such water resources, the Deer Island treatment has broad implications for the health of watersheds throughout the region.

***Combined sewer overflows:*** The biggest water pollution problem for Boston, Cambridge, Somerville, and Chelsea comes from pipes that combine water runoff and sewage in different parts of the same pipe. During heavy rainfalls, those materials run together, and the effluent flows into the Charles River, the Alewife Brook, and Boston Harbor. Statewide, 23 communities use these combined sewer and storm water systems, built in the early 1900s.

The state and the federal EPA have required communities to study CSOs and come up with improvement plans. The Massachusetts Water Resources Authority's Combined Sewer Overflow Plan, projected to cost some \$530 million, addresses this problem for the four CSO communities in the Greater Boston area. The most expensive component is a planned North Dorchester Bay and Reserved Channel project in South Boston, which calls for eliminating CSO sewer discharges to "sensitive use areas" such as beaches, reducing or treating discharges to other water, and controlling any sewage that remains. Approaches include replacing some pipes with dual pipes, creating sewage storage facilities, and enhancing treatment facilities.

Since 1994, the MWRA has closed 21 CSO outlets, reducing CSO volume by 70 percent. The agency has also begun to treat at least 60 percent of the remaining flow. These efforts have helped the cleanup of the Charles River now under way.

***Charles River cleanup:*** Beginning near the Rhode Island border and flowing 47 miles, the Charles River wraps around Newton from the south, creates the border between Boston and Cambridge, and joins the Mystic River to form the inner harbor on its northernmost end. In 1995, the EPA's Clean Charles program set a deadline of 2005 for a complete restoration of the waterway. With its closures of CSO outlets as part of this effort, the MWRA has removed 1.6 billion gallons of untreated wastewater annually from the Charles River, according to Robert Zimmerman of the Charles River Watershed Association. Communities in the lower Charles have also removed illegal tie-ins to sewer pipes, cutting illicit discharges by 1 million gallons a day.

Water quality has improved dramatically. During 2000 alone, the cleanliness of the river improved from a "B-minus" to a "B" grade—much better than the "D" five years ago. According to EPA and Zimmerman, in 2000 the river was clean enough for boating 90 percent of the time, compared with 39 percent in 1995, and met swimming standards 59 percent of the time, compared with 19 percent in 1995. However, the river's cleanliness varies from place to place depending on the day, rain conditions, and land- and water-based accidents. And 23 percent of the Charles' surface water rates as impaired or threatened.<sup>38</sup>

The EPA, the Charles River watershed team, and the watershed association are now working with communities to manage storm water runoff, water laced with pollutants other than sewage that flows directly into the river during stormy weather. Ten communities in the lower watershed have filed storm water management plans with EPA. Along with actions such as sweeping streets more often, this effort entails educating residents about the need to control the use and disposal of fertilizer, pet waste, and automotive products.

But closing CSO outlets and cleaning up stormwater overlook the core problem: that current water systems are designed to treat rainwater as waste. Massive parking lots funnel rain water down storm drains rather than allowing it to percolate into the ground and recharge groundwater. Lawns sit higher than pavement, which in turn rests above street level. The design funnels rainwater—along with contaminants such as pesticides—quickly down storm drains.

The result, according to Zimmerman, is that area wetlands and aquifers essentially go dry between April 15 and November 1. Building bigger storm drains only hasten the inevitable: that every town within Route 495 faces a serious shortage of water within 20 years.

***Other rivers:*** As on the Charles, cleanups are under way for the Mystic, Chelsea, and Neponset rivers. Janet Kovner of the Mystic River Watershed Association says 150 years of industrial development directly abutting the Mystic—from its headwaters as the Aberjona River in Reading through Woburn, Winchester, Medford, and on to the sea—have taken a toll. The Amelia Earhart Dam behind Somerville's Assembly Square, built in the 1960s, for example, dramatically changed the water flow and eliminated the river's twice-daily tidal flushing.

The MWRA is now working with the City of Cambridge to address combined sewer overflows that contaminate Alewife Brook, which feeds into the lower Mystic. In December 2001 the EPA announced an effort to collect and distribute real-time data on water quality at five remote monitoring sites to inform area residents—some 10 percent of the state's population—when they can fish and swim in the river.<sup>39</sup> The watershed association is also collaborating with researchers and students at Tufts University to monitor water quality at 10 sites along the river.

The Neponset River has made great strides over the past five to ten years. Some 80 miles of the waterway and its tributaries—two-thirds to three-quarters of the total—are now swimmable, according to Ian Cook of the Neponset River Watershed Association. Water quality remained poor even after the federal Clean Water Act helped eliminate pollution from point

sources such as factories in the 1970s. As part of a watershed pilot project in 1994, the state and federal governments devoted significant resources to assessing water quality. The project found that municipal sources posed the problem in the form of “sanitary overflows.” In contrast to combined sewer overflows, which result from the combination of stormwater and sewage, in this case groundwater leaks into sewage pipes, causing sewage to overflow into the river.

To target this problem, volunteers from the watershed association monitor water quality at 39 locations 10 times per year, producing federally and state-certified data (the state itself performs comprehensive sampling only every five years). The results have been used to pinpoint and remediate municipal leaks and sanitary overflows. Despite significant progress, the need to further identify and control these sources continues.

The goal now, says Cook, is to go beyond simply avoiding illness from the river to restore stream flow and support native biodiversity by adopting a watershed approach. Doing so will require determining how much volume the river needs to remain healthy, and working with communities to maintain local water balance and use water efficiently. That, in turn, will entail weaning communities from reliance on Deer Island for treating waste and thus drawing more water out of the watershed than they restore. This local stewardship approach, Cook notes, will require convincing Neponset watershed communities of the wisdom of septic systems, and to respond to residents’ requests for towns to take responsibility for maintaining septic systems just as they do sewage systems.

Local activists on the Chelsea River see water access and cleanup as the focal point for a larger strategy to improve the area’s environment and attract sustainable development. The two-mile Chelsea Creek, as it is colloquially known, snakes through one of Greater Boston’s mostly densely populated and developed areas. The riverfront’s designation as a port area has allowed an influx of oil tank farms as well as storage of a 15,000-ton salt pile for use on the region’s roadways that is laced with a cyanide-based anti-caking agent. The port designation and private ownership of riverfront property, meanwhile, has excluded public access to the river.

The Chelsea Creek Action Group, composed of two nonprofit agencies from East Boston and Chelsea, is dedicated to cleaning up contaminated land along both sides of the river and transform it into a recreational and economic resource. The group has enlisted residents in a multimillion-dollar project to restore a 38-acre saltwater estuary on nearby Mill Creek and create public access, and is also working with federal and state funders and businesses as well as residents to remediate and redevelop an abandoned oil

tank site. The old Hess Oil Terminal and the urban wild take up over 12 acres of waterfront property and are unusable for either recreational or economic purposes. The longterm goal of the CCAG is to involve ethnically diverse communities in the transformation of the Chelsea Creek into an environmental, recreational, educational and economic resource for East Boston, Chelsea, and the region.

Because the area's diverse, low-income population sustains asthma rates three times the state average, the group has also won commitments from tank farm owners to retrofit trucks to control diesel emissions and limit the hours of operation for heavy trucks.<sup>40</sup>

**Water shortages:** Boston and its surroundings are wet. With its 42 inches of precipitation annually, Boston is even wetter than Seattle, which gets 36 inches annually. But the area still suffers from water shortages in areas that have depleted underground sources of water. Over a third of Massachusetts communities, many in Eastern Massachusetts, issued water-use restrictions in 1999; well over half of those restrictions were mandatory. Twelve communities exceeded their state-imposed municipal water budgets in 2001, and 12 more communities are likely to exceed those limits in the next 25 years.<sup>41</sup> Boston and its immediate neighbors have so far been spared.

Municipalities on the edge of Greater Boston, especially along Interstate 495, are growing exponentially even as their water sources are draining dry. The towns of Wilmington, Reading, and Stoughton have petitioned to join the MWRA's service area and expand its scope from the 61 communities it already serves. Every 100 new houses drink up another 25,000 gallons of water daily. The town of Franklin alone built 300 to 400 new houses each year during the 1990s. Suburban lawns alone suck up water quickly—a 5,000 square-foot lawn needs up to 6,000 gallons of water each week.<sup>42</sup> A few towns such as Wareham have established a progressive rate structure. These systems are designed to encourage people to conserve water: the more they use, the higher the rates they pay.

Many communities on the upper Charles—some of the fastest-growing cities and towns in the state—treat and release wastewater downstream of their water supply, short-circuiting the hydrologic cycle and producing unsustainable net losses, says Sara Cohen, leader of the Charles River watershed team. Karl Honkonen, head of the state Watershed Management Initiative, says that depleted water supplies require more aggressive treatment for drinking as the impacts of rising population undercut water quality. To help remedy this problem, the Watershed Initiative's Upper Charles Regional Groundwater Modeling Project, pursued with the Charles River Watershed Association, aims to measure how much water communities are

taking out of the ground and how much they are returning, and to determine the minimum flow needed to sustain natural habitat. A second phase of the project will evaluate different scenarios for recharging groundwater to ensure the long-term health of the watershed.

***Drinking water quality:*** In direct contradiction of the local stewardship approach, the Boston area has long imported much of its water from the Quabbin and Wachusett reservoirs in central and Western Massachusetts. The MWRA is constructing two treatment plants to improve drinking water quality at Walnut Hill in Marlborough and Quabbin, with the former designed to serve almost all Greater Boston residents.

Boston's water system comes at great expense to consumers, who paid an average of \$675 in 1998. The city's water pipes themselves contaminate drinking water. Often over a century old, many of the pipes contain dangerous levels of lead. The Boston Water and Sewer Commission is working toward its pledge to replace all pipes over 100 years old by 2010.<sup>43</sup> The BWSC has upgraded 150 miles worth since 1992.<sup>44</sup>

When cities such as Boston tap far-away reservoirs for water, assigning responsibility for cleaning up water can provoke controversy. In July 2001, the First Circuit Court of Appeals ruled in favor of the MWRA in *United States v. the Massachusetts Water Resources Authority and the Metropolitan District Commission*. The EPA had ordered the MWRA to install an expensive water filtration facility to treat water from Quabbin and Wachusett reservoirs. The MWRA claimed—and the appeals court agreed—that its joint efforts with the MDC to acquire and protect forested land around the reservoirs, among other measures, would ensure water quality. The MDC has spent \$75 million since 1991 on acquiring sensitive lands in three watersheds to protect drinking water, and plans to spend \$64 million more from 2000 to 2007.<sup>45</sup>

## **Environmental Actors in Greater Boston**

Environmental policies and programs in Greater Boston reflect a dynamic interplay among federal, state, and local actors. In particular, the region has a long history of strong statewide and local nonprofit groups successfully pressing public agencies to clean up and preserve the environment.

### ***The Federal Government***

On the federal level, the Region 1 office of the U.S. Environmental Protection Agency—responsible for New England—plays a significant role in shaping and leading policy. Robert Varney, who led New Hampshire's environmental agency for 12 years, was named regional director in the summer of 2001. Varney's record in New Hampshire included banning mercury thermometers

and lead fishing sinkers and working to improve air quality. Varney has stated that he aims to create strong state partnerships, and he is known for his ability to work with both environmentalists and business groups.<sup>46</sup>

EPA Region 1 addresses region-wide as well as community and site-specific problems. The agency has taken the lead in enforcing action on combined sewer overflows, for example, and has spent \$50 million assessing and cleaning up brownfield sites, as well as providing revolving loans to redevelopers. The agency's Urban Environmental Initiative targets lead poisoning, which continues to affect as many as 20 percent of children in Lawrence and some 10 percent in Boston, as well as diesel emissions. The agency has required Big Dig companies to use cleaner equipment and school bus companies to retrofit their vehicles with emissions controls. EPA New England is also aiming to extend energy efficiency guidelines to hospitals, schools, and supermarkets, and is enrolling communities such as Cambridge in the Cities for Climate Change Protection program, which measures an urban area's CO<sub>2</sub> footprint and tries to shrink it.

### *The Commonwealth*

The state's Executive Office of Environmental Affairs, directed by Secretary Robert Durand, manages and coordinates all of the state's environmental programs. A former Democratic state senator from Marlborough, Durand worked closely with environmental groups as chair of the Natural Resources Committee and developed a reputation as one of the strongest advocates for the environment in the State House. He authored the 1996 Rivers Protection Act, which creates a 200-foot development-free zone along streams and rivers, the Open Space Bond Act of 1996, and the Brownfields Bill. Durand also initiated the Community Preservation Act and worked for a decade to pass it.

EOEA includes several departments, including the Department of Environmental Protection and the Department of Environmental Management, which runs the state parks. The Office of Coastal Zone Management approves Municipal Harbor Plans for all waterfront development projects and thereby exerts great influence on implementation of environmental policy.

The Massachusetts Environmental Policy Act (MEPA) office is responsible for reviewing the environmental impact of all development projects, and therefore has a great influence on implementation of environmental protection. Some of its top priorities include open space protection, brownfields remediation, water quality and air quality. The director is Jay Wickersham, a lawyer who has embraced a wide range of smart-growth issues and who is

widely respected around the state for his balanced and imaginative approach to environmental and development issues. Wickersham has been a champion of the Urban Ring, a 15-year effort to develop a new transit line that connects the transit system's existing spokes. As assistant secretary of EOE, Wickersham interpreted laws and regulations regarding the 30 acres reserved for open space under the Central Artery Project.

The Massachusetts Water Resources Authority, created in 1985, provides water and sewer services to 61 cities and towns in Eastern Massachusetts and led the Boston Harbor cleanup. The MWRA, with an annual budget of \$502 million, has managed the replacement of combined-sewer lines since the authority's early days. Fred Laskey, formerly Massachusetts revenue commissioner, became MWRA head in June, having held various state finance and management positions since 1980.

The Metropolitan District Commission manages ice rinks and pools as well as parks and parkways throughout the Boston region. Directed by David B. Balfour, Jr., the MDC owns and manages fully half of all open space in the city of Boston. Created as the Metropolitan Park Commission in 1893 and renamed in 1919, the MDC's regional parks and roadways fall within a 15-mile radius from the State House, an arc formed by hills from Quincy and Milton in the south, Waltham in the west, and Lynn in the north. Perhaps the most notable parklands in the system are the Charles River Esplanade and the Blue Hills Reservation.

Governors as different as Democrat Michael S. Dukakis and Republican Jane M. Swift have proposed abolishing the \$55.6 million-a-year agency. Critics claim the MDC fails to maintain its parks and roads adequately, duplicates services, does not fulfill legislative mandates, and fills its payroll with patronage appointments. In the 1980s, the brand-new MWRA assumed MDC's water and sewer responsibilities. In 1991, the state gave control over the area's zoos to a nonprofit organization, and shifted control over the MDC police to the state police. In 2001, Governor Swift suggested allotting the MDC's 162 miles of parkways to the highway department and privatizing rink and golf course management. That would strip the MDC of all its responsibilities except management of parks—and another bill would fold the parks into the Department of Environmental Management.<sup>47</sup> But environmentalists fear that moving the parkways from the MDC to the highway department would put these nationally renowned corridors under the control of highway engineers, who might be more concerned about traffic flows than the quality of green spaces. Bills limiting the MDC's role have thus far been reported unfavorably out of committee, indicating that they are unlikely to pass soon.

### *Local Actors and Advocates*

The Boston Environmental Department, directed by Andrea d'Amato, works on all the environmental review processes occurring under city and MEPA review of new development. The department also oversees several other agencies and projects, including the Boston Transportation Department, the Boston Parks and Recreation Department, the Boston Conservation Commission, the Air Pollution Control Commission, and the Central Artery Environment Oversight Program. The Boston Urban Resources Partnership, a coalition of public and private groups that works on projects that combine community and environmental issues, also falls under the department's purview. The Boston Redevelopment Authority and the Department of Neighborhood Development oversee development, public facilities, and federal block grants for the city. Their project development and review have critical environmental components.

A number of nonprofit organizations are active in Greater Boston's environmental policy. The Conservation Law Foundation (CLF) has been a persistent voice on issues such as the Boston Harbor cleanup, the development of the South Boston Waterfront, the Central Artery mitigation agreements, mass transportation, urban sprawl, and energy policy. The CLF has a large staff headed by Douglas Foy that is willing to back its public words with legal action when it sees fit.

The Boston Harbor Association, headed by Vivien Li, aims to improve the harbor through bringing together stakeholders to lobby the state and city on issues related to open space, development, and access to the waterfront. The Charles River Watershed Association has played a central role in the cleanup of the river, development of programming, and development of a master plan for the Esplanade. The Boston GreenSpace Alliance (BGSA), under the leadership of Patrice Todisco, has addressed high-profile issues as well as small neighborhood parks, playgrounds, and gardens. The BGSA is developing an update of the acclaimed 1987 *Greening of Boston* report with a new vision entitled *The Emerald City*. The Boston Natural Areas Fund, led by longtime activist Valerie Burns, has helped to create greenways in East Boston and along the Neponset River in the Dorchester and Mattapan neighborhoods of Boston.

Influential lobbyists include the Massachusetts Audubon Society and the Environmental League of Massachusetts (ELM). Founded in 1896 to stop the slaughter of birds for women's hats, Mass Audubon combines extensive work in conservation and environmental education with research-based advocacy at the state and local level for protecting native habitats. The group owns outright—or development rights to—28,000 acres encompassing 100

conservation areas. Mass Audubon is working with a coalition of environmental groups to pass a five-year \$750,000 state environmental bond act, and is joining the Nature Conservancy and the Trust for Public Land to promote a \$1 billion program to protect an additional 1.3 million acres of important habitat.

Established as the Massachusetts Forestry Association over 100 years ago, the Environmental League conducts research, advocates for legislation, and promotes enforcement of regulations regarding conserving land, protecting water resources, and cutting the use of toxics. ELM has pushed for the Rivers Protection Act and the Open Space Bond Act, monitored companies' compliance with the state's Toxic Use Reduction Act, and authored the environmental justice bill now before the legislature. Some 2,000 individuals and households compose the league, which five years ago also created the Environmental Collaborative. The collaborative speaks out on behalf of 55 local, regional, and statewide organizations, including The Trustees of Reservations and the Appalachian Mountain Club as well as watershed management and land-use groups.

### **Policy Options for the Environment**

Some of the most pressing environmental challenges facing the Greater Boston area entail creating and implementing regional planning and management strategies. Many of these strategies require steering a middle course between environmental purity and pragmatism.

For example, 12 states have adopted a regional trading mechanism known as the Ozone Transport Commission, which aims to reduce smog-causing ground level ozone in the Northeast and Mid-Atlantic. The commission's NO<sub>x</sub> budget program allows a certain amount of emissions during the summer smog season (218,000 tons in 1999), which states allocate among power plants. This approach is a combination of a mandate and an incentive policy: it mandates a limited number of pollution units but gives companies a financial incentive to clean up their operations. Plants receive credits for beating their targets, and they can trade them or use them in the future. In 1999, emissions totaled less than half the amount in 1990, and more than 20 percent below the target. The commission will set stricter standards in 2003.<sup>48</sup>

Proponents claim that this market-based mechanism allows polluters to make greater reductions at less cost—especially since plant efficiencies and emissions levels vary dramatically across the region. Opponents are concerned that pollution will concentrate in “hot spots,” that certain communities will be dumping grounds for wastes of all kinds, and that trading could become

unenforceable and be abused. Critics also oppose the idea of pollution trading because it condones a certain amount of pollution. The idea that pollution can be a good with market value seems a perversion.

### *Transportation and the Environment*

Whether people are traveling by planes, trains, or automobiles, the transportation system of the region poses serious challenges for the environment. In almost all cases, the problem can be summarized in one word: congestion. The environmental challenges include airplanes circling over Logan Airport waiting to land, commuters stuck in rush hour traffic on Interstate 93 or the Massachusetts Turnpike, trucks rumbling through the region's old and narrow streets, buses belching diesel fumes in inner-city neighborhoods, and new commuter train lines cutting through marshlands and other sensitive habitats.

*Airport options:* Similar tradeoffs occur in the case of Logan Airport. When Virginia Buckingham resigned as executive director of Massport in 2001 after controversy over security lapses, Massport lost its most effective advocate for a new runway. Led by Mayor Thomas M. Menino of Boston and Congressman Michael Capuano of Somerville, opponents in Boston-area neighborhoods claim the runway would increase air and noise pollution. Massport claims that it does not plan to increase flights, but rather to accommodate existing flights more efficiently, thereby cutting air and noise pollution. But runway opponents say the new runway is a Trojan horse, and that Massport will increase the number of flights as soon as it builds the runway.

The number of people living near Logan affected by annualized 65-decibel noise levels has declined by half—roughly from 44,000 to 20,000—since 1990. At that point, the Federal Aviation Administration began requiring all commercial carriers to convert to Stage III aircraft or retrofit their existing fleets. The newer planes burn fuel more efficiently and thus more cleanly, so they are not only quieter but also produce lower levels of VOCs and CO. However, the new engines emit more ozone-producing NO<sub>x</sub>. The FAA and the International Civil Aviation Organization are now considering standards for Stage IV aircraft that might require a cut in NO<sub>x</sub>, greenhouse gasses, or both.<sup>49</sup>

Massport is pursuing a parallel approach to a new runway that could exert complex effects on the region: creating a regional network of airports in Worcester, Providence, R.I., and Manchester, N.H. These facilities could provide more convenient service to many New Englanders: a resident of Sutton, for example, could fly out of nearby Worcester rather than Logan, more than an hour's drive away. The regional strategy requires a concerted

effort to improve highway and rail connections among these airports and other transportation hubs.

The September 2000 Central Artery air pollution mitigation commitments require the state to develop transportation alternatives for passengers using T.F. Green Airport in Providence, which saw the number of passengers grow from 3 million in 1995 to 6 million in 1998. The city of Providence is currently seeking funding to build a train station at the airport itself. The MBTA has agreed to run trains there; the open question concerns how much funding would come from the T and how much from Rhode Island. If such service begins, the Route 128 parking lot could then be used as satellite parking for T.F. Green Airport. Policymakers need to consider whether that strategy might have the unintended consequence of making commuter rail less attractive to Boston's western suburbs, since parking is already limited at the Route 128 site.

The route between Boston and Manchester now includes much less transportation infrastructure. However, southern New Hampshire has experienced significant growth, and the airport could reduce the need for residents to travel to Logan. Indeed, traffic at Manchester Airport expanded by 75 percent in 2000. Massport is also planning to expand the use of Worcester Airport, which has a new \$15.7 million passenger terminal.

A regional air travel system could relieve pressure on Logan and distribute air and auto traffic—and thus pollution—more widely. The impact of the regional approach depends on how the airports are used. If they become hubs that allow fliers from, say, Chicago to transfer to flights to Miami, they might lessen travel from Logan; otherwise, they might be impractical for many travelers. And if people decide to drive from the Boston region to the smaller airports for cheaper fares or more convenient flights, a regional network could actually increase automobile traffic.

***Intercity rail:*** High-speed rail offers another approach to reducing air travel and thus air and noise pollution. The United States has long invested much more in air and car travel than in rail, but Amtrak's acting chair, Michael S. Dukakis, says a rail renaissance could become reality if the nation invests billions in track upgrades and new trains. Amtrak service on the new "high-speed" Acela is supposed to reduce the travel time between Boston and New York from five hours to three hours and thereby be competitive with air travel. The High Speed Rail Investment Act, now before Congress, would allocate \$12 billion in bond financing over 10 years for rail projects nationwide, including up to \$3 billion for the Northeast Corridor.<sup>50</sup> The problem—for both Amtrak and Acela—is that Acela has produced a disappointing early record. Amtrak is counting on Acela to provide a new stream of revenues to

help it balance its books. Because of rail lines and tunnels built a century or more ago and because those rails must be shared with cargo and other trains, Acela reaches its peak speed of 150 miles per hour for only one brief part of the Boston-to-New York trip. For the rest of the trip, Acela travels at around 100 miles per hour. The trip to New York takes three and a half hours under the best circumstances, when there are few stops and no rail delays. But the Acela is often brought to a crawl because of problems with systems or rights of way. To make the Acela competitive with air shuttles, even in the post-September 11 world, the train will have to perform better.

In December 2001, Amtrak resumed service from Boston to Portland, Maine, for the first time since 1965. The federal government invested \$55 million in the equipment and track upgrades that made it possible to begin service on the Downeaster route. Amtrak officials say the Downeaster will serve 320,000 riders annually and produce \$3.3 million in revenues (\$2 million less than the \$5.3 million in operating costs).

Despite high hopes about a new age in American rail travel, critics are unpersuaded. They say that Amtrak's management record and outdated infrastructure will prevent any significant shift in travel patterns between Boston and New York. When Congress passed the Amtrak Reform and Accountability Act of 1997, it required the quasi-governmental entity to become self-sufficient within five years. If Amtrak fails to wean itself from government subsidies, which totaled \$22 billion in the past quarter-century, it could be dismantled altogether. In December 2001, the Amtrak Reform Council began considering "day after" scenarios for Amtrak for the time when it is dissolved. Council members discussed the possibility of breaking up Amtrak into pieces for public, quasi-public, or private operation. The Council is expected to present a proposal for restructuring Amtrak in February 2002.

### *Smart Growth*

Many regional environmental efforts fall under the heading of smart growth, an idea that addresses environmental problems across the board. The primary goal of smart-growth advocates is to prevent the excessive "sprawl" of development—which gobbles precious open space, fosters traffic congestion, bleeds old cities and towns of population and economic activity, and creates an ugly and dysfunctional landscape of office parks, strip malls, and tract housing.

One element of smart growth is transit-oriented development: concentrating housing, retail, offices, and other development near existing transit nodes to increase transit use and reduce car traffic, as well as to create a

lively neighborhood. Much zoning currently prohibits transit-oriented development, but the Boston Redevelopment Authority is developing a citywide policy to encourage it. The town of Ashland recently changed its zoning code to create a “rail transit district,” a possible model for the Boston area. The district centers on the MBTA rail station and is intended to encourage development of high tech, research and development, incubator, and office space, along with retail and multi-unit housing. Design will be pedestrian and bicycle friendly, and in accord with the area’s natural setting.<sup>51</sup>

EOEA has already been advancing TOD through the MEPA process, requiring developers to include transit-oriented plans to gain environmental approval. Examples of new projects that would support transit-oriented development include the Urban Ring, the commuter rail extensions to Fall River and New Bedford, and the South Weymouth Naval Air Station, the largest development site in Greater Boston.

Smart-growth proponents also hope that the Community Preservation Act will prove a powerful way to preserve open space and reduce sprawl. The CPA, passed in September 2000, allows communities to impose a property tax surcharge of up to 3 percent to raise funds to protect open land, build affordable housing, and finance historic preservation. CPA advocates such as Elizabeth Adams of the Trust for Public Land maintain that revitalizing city and town centers and creating affordable housing are crucial to curbing sprawl—hence the links among the three activities.

### *City and Town Planning*

Creative approaches to environmental problems require smart local planning. Localities have the opportunity to enhance their ecological quality block by block, park by park, river by river.

Many towns and cities still lack the resources to conduct long-term planning. Executive Order 418, issued by then-Governor A. Paul Cellucci in 2000, established the multi-agency Community Development Plan program, provides technical assistance of up to \$30,000 to help towns create strategic plans.<sup>52</sup> According to Priscilla Geigis of the Department of Environmental Protection, 110 communities have signed on to the program so far.

The Livable Communities Act—sponsored by Senator Mark Pacheco, a Democrat of Taunton, and pending in the Senate Ways and Means Committee—would build on this process by allocating \$35 million for local and regional planning. The state’s 13 regional planning agencies, including the MAPC and the Cape Cod Commission, would each create a blueprint that encompasses air and water quality and transportation resources in their areas. These blueprints would target investment in locations with existing

infrastructure and discourage growth in environmentally sensitive areas. Communities would then develop a local plan that and submit it to the regional planning agency for certification. Communities with certified plans would receive priority in applying for state grants. A state Council for Sustainable Development would approve capital expenditures by each state agency to ensure that they do not subsidize sprawl. The bill is designed to create statewide consistency in land-use planning that does not now exist, according to Nancy Goodman of the Environmental League of Massachusetts.

Veronica Eady, director of environmental justice for EOEA, says her office has also made preserving land in urban centers a priority, even though the state's new biomaps do not necessarily correlate with urban neighborhoods. For example, EOEA's Urban Self-Help Program focuses on acquiring open space for public use, and has amended its regulations to consider environmental justice in scoring projects for approval. EOEA is also working with the Urban Ecology Institute at Boston College to inventory brownfields within the Mystic River watershed for use as open space, and the North Coastal watershed team has made reclaiming brownfields in Salem and Lynn as open space a priority.

***Community Preservation:*** Under the Community Preservation Act, communities have the opportunity to raise new funds for housing, historic preservation, and open space acquisition. To access the funds, the community must approve a ballot referendum to enact a surcharge on property taxes and establish a committee that plans specific projects. A fee imposed by the Registry of Deeds finances an annual state matching pool of over \$25 million. Thirty-six communities that have voted on the ballot question have passed it, including Cambridge (Boston defeated the question in the most recent election). By approving the full 3 percent surcharge, Cambridge voters agreed to raise some \$4.71 million each year for the three purposes.<sup>53</sup> At least 33 more communities will consider the ballot question in the spring of 2002.<sup>54</sup>

Smart-growth initiatives such as the CPA require strong planning, which in turn requires educated estimates of future growth. However, many cities and towns lack the resources to perform such research. To fill this gap, the EOEA's buildout project provides communities with long-term projections of population, school needs, and water use—as well as maps showing maximum development (“buildout”)—that will occur given current zoning. These scenarios, which the agency has completed for communities throughout the state, are designed to alert them to the need to plan future development. (The

Metropolitan Area Planning Council is coordinating the buildout analyses for the 101 cities and towns in the Greater Boston area.)

**Zoning reform:** Zoning provides an important tool to control the use of land in cities and towns. Communities create specific areas where certain kinds of development and activities may and may not occur. In addition to designating certain areas of the community as parks, gardens, or wilds, cities and towns have the capacity to create special districts to protect the environment. Overlay districts for open space, transit-oriented development, or historic areas can help to maintain the appropriate mix of activities in an area.

Ironically, the encouragement of urban styles of development—with high levels of density, a mix of residential and commercial buildings, and restrictions on parking—might be the most effective strategy to protect the environment. By channeling development away from so-called “greenfields” and toward already urbanized areas, cities and towns can protect their natural assets from development. Many communities resist density, however, making the classic “urban village” style of development difficult to create except after long periods of community process.

### ***Environmental Justice***

In recent years, community activists in urban neighborhoods have rallied under the banner of “environmental justice” to address the ecological problems that are concentrated in urban and minority communities. For years, poor communities have served as “dumping grounds” for noxious materials and facilities, such as manufacturing plants, garbage dumps, toxic waste disposal, and parking facilities.

Advocates of environmental justice aim to address environmental and public health problems in the hardest-hit communities such as Boston’s Roxbury neighborhood, home to 14 truck and bus depots within a one-mile radius. Roxbury, a predominantly minority community, is now fighting a planned influx of satellite parking lots owned by Northeastern University, Longwood medical institutions, Boston University, and the Red Sox. Neighborhood activists say that choking traffic and idling cars unfairly affect their residents.

The burgeoning environmental justice movement has begun to look beyond air pollution and take on the need to clean up brownfields and reclaim vacant land. Penn Loh of Alternatives for Community and Environment says the same regulatory dynamics that create suburban sprawl have discouraged investment in housing and cleaner jobs in minority and poor neighborhoods while allowing too many noxious facilities such as trash transfer facilities. Now that new investment is pushing back into poor

neighborhoods, the challenge is to ensure that development benefits rather than harms residents.

Regulators, Loh says, tend to focus on isolated environmental problems. For example, the Clean Air Act regulates pollutants only in outdoor air—even though people spend 90 percent of their time indoors. Medical workers respond to air-quality problems by expanding residents' access to treatment for asthma—even though the causes of the ailment are environmental. Approaches to both issues lack a comprehensive view that encompasses capital improvements in public housing to reduce contributors to the disease such as mold and cockroach droppings. Meanwhile projects to build new parking garages raise indoor and outdoor air pollution, use vacant parcels, and cut off neighborhoods from the larger urban community. Loh says access to high-quality affordable housing and better public transportation have become a significant focus of environmental justice advocates to reverse these trends.

Growing attention to environmental justice has resulted in the first steps toward policy initiatives. EOEA has created a draft environmental justice policy, which it submitted for public comment in December 2000.<sup>55</sup> The policy would require EOEA to set criteria for designating communities at risk and to determine whether development projects disproportionately impact minority, low-income, or immigrant neighborhoods, based on Title VI of the federal Civil Rights Act. Eady, the EOEA's director of environmental justice, says the agency is awaiting analysis of the 2000 Census, expected by June 2002, before implementing the policy.

A parallel bill sponsored by state Senator Dianne Wilkerson, a Democrat of Boston, would require EOEA to identify "areas of critical environmental justice concern," modeled on the agency's "areas of critical environmental concern." Wilkerson's bill would subject assessments of projects' overall environmental burden and public health to the scrutiny for uneven impacts on poor and minority communities during environmental permitting. Such areas would also receive priority for state funds directed toward sustainable economic development.<sup>56</sup>

Opponents claim that such designation would stifle economic development. "This bill is too broad," said David Begelfer of the National Association of Industrial and Office Properties. "Any project could be under scrutiny. This would affect any kind of growth." Other opponents fear that restrictions on siting power plants could lead to energy crisis.<sup>57</sup> However, the measure has won support from Environmental Affairs Secretary Robert Durand, and the Environmental League of Massachusetts and other environmental groups are actively working to pass it.

## **Making Greater Boston Green**

Across the region, elected officials and policy makers have developed a keener awareness of the importance of the environment for the quality of life in the region. Parks, waterfronts, gardens, wilderness areas, and farmland do not simply provide a much-needed respite from the rigors of metropolitan life. They also can lower the everyday costs of metropolitan living by reducing waste and cleanup costs, and they create a more attractive and efficient setting for businesses and families in Greater Boston. The challenge of environmental policy is to balance and integrate the needs of urban communities with the needs of a sustainable ecology.

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