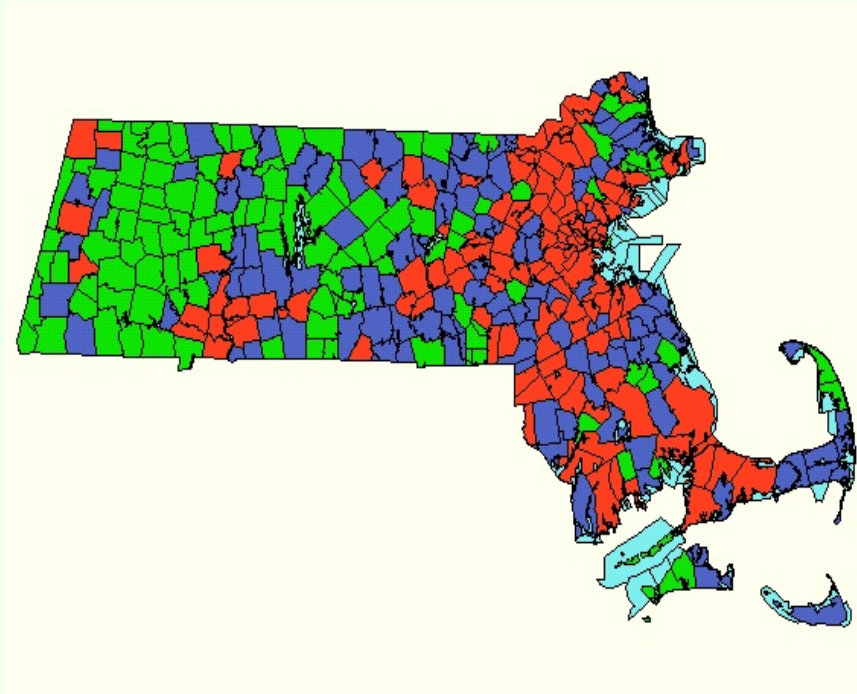


**UNEQUAL EXPOSURE TO ECOLOGICAL HAZARDS 2005:
ENVIRONMENTAL INJUSTICES
IN THE COMMONWEALTH OF MASSACHUSETTS**



EXECUTIVE SUMMARY

**A Report by the Philanthropy and Environmental Justice Research Project
Northeastern University**

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Methodology: How Do We Measure Environmental Injustice?

In 2001, we published a report entitled *Unequal Exposure to Ecological Hazards: Environmental Injustices in the Commonwealth of Massachusetts*. Making use of the 1990 Census, the report found that environmentally hazardous industrial facilities, power plants, municipal solid waste combustors (incinerators), toxic waste sites, landfills of all types, and trash transfer stations were unequally distributed with respect to the income and/or racial composition of a community in the Commonwealth of Massachusetts. The report received national attention, and contributed to the first-time adoption of a comprehensive environmental justice policy by the Executive Office of Environmental Affairs (EOEA) in Massachusetts.

This new report, *Unequal Exposure to Ecological Hazards 2005*, is an updated and expanded version of the last report. For instance, new data on community exposure to carcinogens and reproductive toxins, etc., are included in this report. The environmental rankings of low income towns and communities of color are also included. Utilizing demographic data from the 2000 Census, as well as data collected in mid-October of 2004 from the Massachusetts Department of Environmental Protection (DEP), United States Environmental Protection Agency (EPA), and the Massachusetts Toxics Use Reduction Institute, we analyze the exposure rates of all 350 cities and towns (minor civil divisions, or MCDs) in the state to the environmentally hazardous industrial facilities and sites listed above. As the 351st MCD, the City of Boston as a whole is excluded from the analysis. Instead, the study incorporates twelve sub-towns or neighborhoods within the larger city of Boston: Allston/Brighton; Charlestown; Dorchester; East Boston; Hyde Park; Jamaica Plain; Mattapan; Roslindale; Roxbury; South Boston; West Roxbury; and Downtown Boston (for the purposes of the report, Downtown Boston encompasses Central Boston and Chinatown, Back Bay and Beacon Hill, the South End, and the Fenway/Kenmore neighborhoods). Because these more specific neighborhoods making up all of Boston are included, summary data for all-Boston are excluded from the totals. As a result, a total of 362 communities are analyzed in the report.¹

Each of the 362 communities are classified by class and racial composition. In the 2001 report, we utilized data from the 1990 Census to identify the class status of a community by utilizing median household income figures: (1) *low income*: \$0 to \$29,999; (2) *medium-low income*: \$30,000-\$39,999; (3) *medium-high income*: \$40,000-\$49,999; and (4) *high income*: \$50,000 and greater. These categories reflected reasonable cutoff points in the data for the following reasons: First, no distinct “gaps” in the income distribution of towns existed. Second, the \$40,000 cutoff point was used because it divided the lower- and higher-income communities into roughly equal sized halves (see table below). Finally, a \$10,000 decrease/increase from

¹ In the 2001 report, *Unequal Exposures to Ecological Hazards*, 368 communities were analyzed, including all Boston and the seven sub-towns or neighborhoods within the larger town of Barnstable: Barnstable; Centerville; Cotuit; Hyannis; Marstons Mills; Osterville; and West Barnstable. Data limitations did not allow us to make these separations for this report.

\$40,000 was selected on the basis of generating reasonably sized groups with easily recognizable boundaries.

In this 2005 study, we have utilized the updated median household income figures from the 2000 census. However, we have adjusted the income classifications to take into account the rate of inflation over the 10 year period since 1990. We do this by using a Consumer Price Index (CPI) inflation conversion factor of .759 (multiplying the 2000 income levels by .759 will yield the equivalent figures for 1990). Using this method, we developed the following classifications:

Class Status of a Community: Median Household Income

Class Status of Town	1990 Median Household Income	2000 Median Household Income (adjusted for CPI rate of inflation)	Number of Towns	Percentage of all Towns	Cumulative Percentage of all Towns
low income	\$0 to 29,999	\$0 to 39,524	37	10.2	10.2
medium-low	\$30,000 to 39,999	\$39,525 to 52,700	133	36.7	47.0
medium-high	\$40,000 to 49,999	\$52,701 to 65,875	106	29.3	76.2
high income	\$50,000 or more	\$65,876 or more	86	23.8	100
totals			362	100	

For the purposes of this study, the term *lower income communities* will refer to the combination of both low income and medium-low income communities. The term *higher income communities* refers to the combination of medium-high and high income communities.

Although these lower income classifications may appear to be inflated, the reality is that Massachusetts is a very expensive place to live. In fact, Greater Boston is the most expensive metropolitan area in the United States. It now costs a family of four \$64,656 to pay for basic necessities in Greater Boston (\$6000 more than in New York).² Similarly, the National Low Income Housing Coalition ranked Massachusetts the least affordable state in the country for residential rents in 2003. As a result, traditional measures like the 2003 federal poverty level of \$18,400 (for a family of four) do not reflect the actual high cost of living in the Bay State. High rents and housing costs create a number of severe economic hardships for poor residents and the underemployed (between 1992-2002, the total number of manufacturing jobs in the state

² See Bonnie Heudorfer and Barry Bluestone, *The Greater Boston Housing Report Card 2004: An Assessment of Progress on Housing in the Greater Boston Area* (a report prepared by: The Center for Urban and Regional Policy, Northeastern University for the Boston Foundation and Citizens' Housing and Planning Association, September 2005).

decreased by 20 percent).³ More than 25 percent of Massachusetts workers have low-wage jobs that pay less than \$8.84 per hour, or \$18,387 per year working full-time. It is generally accepted that people should strive to spend no more than one-third of their income on rent or mortgage payments. In Massachusetts over three-quarters of low-wage working families spend more than one-third of their income on housing. Under the Massachusetts Family Economic Self-Sufficiency Standard – a measure of the real income needed to meet the basic housing, health care, child care, food, and transportation needs of different types of families in specific regions – 25 percent of all families in the state (and nearly 50 percent of all urban families) did not earn enough to meet their basic needs in 1998. In Worcester, the self-sufficiency standard for 1 adult and 2 children is \$40,598, while in Boston this figure rises to \$51,284.⁴ As a result of these considerations, our lower income classifications should actually be considered conservative.

The racial composition of a community is determined by the percentage of nonwhites in the general population: (1) *low minority*: less than 5% people of color; (2) *moderately-low minority*: 5 to 14.99%; (3) *moderately-high minority*: 15 to 24.99%; and (4) *high minority*: 25% and greater. These categories were decided upon on the basis of what are considered reasonable increases in the size of a community’s nonwhite population. The vast majority of towns in Massachusetts have very small minority populations of “less than 5%.” However, when the remaining towns are analyzed, 10% increases in population proportions seemed logical for generating relatively acceptable frequencies in each category.

Racial Status of a Community: Percentage of Population that is Non-White

Racial Status of Town	Percentage of Town that is Non-White	Number of Towns	Percentage of all Towns	Cumulative Percentage of all Towns
low minority	less than 5%	231	63.8	63.8
moderately-low	5 to 14.99%	97	26.8	90.6
moderately-high	15 to 24.99%	14	3.9	94.5
high minority	25% or more	20	5.5	100
totals		362	100	

³ See Robert Vinson and Navjeet Singh, “Manufacturing: Losses and Gains,” (Boston: Commonwealth Corporation, 2003), p.1.

⁴ The real cost of living in Massachusetts has gone up 17-35 percent in regions across the state between 1998 and 2003, as low-wage working families faced severe job losses and stagnant wages. As a result, it is likely that more than 25 percent of Massachusetts families now earn less than the income needed to meet their basic needs without public or private supports. For a full discussion, see Hanna Bailey Boyle, Sheelah A. Feinberg, and Martin Liebowitz, *Investing in Massachusetts Working Families: A Framework for Economic Prosperity* (Boston, MA: A Report by The Women’s Union, April 2004), pp.5-11, 39.

There are only fourteen communities in the state where 15 to 24.99% of the population consists of people of color (moderately-high minority); and twenty communities where 25% or more of the population consists of people of color (high minority). For the purposes of this study, the term *communities of color* will refer to the combination of moderately-high minority and high minority communities. The term *white communities* will refer to the combination of low minority and moderately-low minority communities.

Comparisons of low-to-high income communities and low minority-to-high minority status communities are made in terms of the location of environmentally hazardous industrial facilities and pollution releases, hazardous waste sites, power plants, incinerators, trash transfer stations, and landfills of all types. As seen in Section Six of this report, a point total is assigned to each facility or site based upon our assessment of the relative risks it typically represents to the community. These hazard points are then totaled for each community, and divided by total area to calculate the average hazard points per square mile for each community. This point system provides a more accurate assessment to the environmental hazards confronting a given community because it controls for the size the community and the severity of the facility/site.

Unfortunately, there are many other disparate environmental impacts that are beyond the scope of the data presented here in this report. Proximity to major traffic arteries, bus stations, large warehouses, and parking facilities that generate traffic noise and pollution (particularly from diesel vehicles), as well as smaller polluting businesses and other facilities (such as bioterrorism research labs), can pose major environmental health hazards to community residents. Furthermore, a lack of parkland and greenspace, along with the predominance of substandard housing and related home hazards such as mold and lead paint, should also be considered environmental justice issues. Furthermore, the location of neighborhoods in areas vulnerable to flooding and other weather-related problems can also be a problem. These issues need to receive greater attention from researchers and decision-makers. Policies also need to be put into place to ensure that the state collects the data necessary to assess the potential magnitude of these impacts.

Despite the limitations outlined above, this report is [perhaps] the most comprehensive environmental justice study of any state in the country. Most other researchers focus on exposure to a single hazard, such as toxic waste sites. Others reports are limited to much smaller geographic areas, such as a major metropolitan area. Our analysis looks at exposure rates to many different types of environmental hazards for every community in the state. Among our findings: *low income communities face a cumulative exposure rate to environmentally hazardous facilities and sites which is four times greater than high income communities.* In addition, *high minority communities face a cumulative exposure rate to environmentally hazardous facilities and sites which is over twenty times greater than low minority communities.* As we shall demonstrate in this report, not all communities in Massachusetts are polluted equally. Environmentally hazardous sites and facilities of all kinds are disproportionately located in working class towns and communities of color.

Acknowledgments

The authors would like to thank Henderson Pritchard for his recommendations around the use of specific data on toxic emissions. We would also like to thank Megan Amundson, Tina Clarke, Cindy Luppi, and Penn Loh for their helpful comments and suggestions on an earlier draft of this report. The authors remain solely responsible for the content of this final report.

A significant contribution to the study of these problems is the creation of and public access to data sources that less than 20 years ago were often unavailable and/or non-existent. Access to certain types of environmental data was mandated under the Superfund Amendment and Reauthorization Act (1986); however, while some states have adopted aggressive approaches to the collection and distribution to data, not all states have responded equally to the call for environmental monitoring. Massachusetts is a leader among states in the compilation of and provision of public access to environmental data. This study would not be possible without the exemplary work done by the Massachusetts Department of Environmental Protection (DEP) in organizing and making this data available to the public. In addition, the Toxics Use Reduction Institute (TURI) at the University of Massachusetts at Lowell maintains an excellent database on the use and release of chemicals by large manufacturers in the Bay State. Much of the information presented in this report around industrial pollution was made possible by the work of TURI.

SECTION ONE

UNEQUAL EXPOSURE TO ECOLOGICAL HAZARDS: EXECUTIVE SUMMARY

While the quality of life for all citizens in Massachusetts is currently compromised by the contamination of the air, land, and water with toxic chemicals and other pollutants, not all segments of the citizenry are impacted equally. In order to bolster profits and competitiveness, industry typically adopts pollution strategies which are not only more economically efficient but that also offer the path of least political resistance. The less political power a community possesses, the fewer resources a community has to defend itself; the lower the level of community awareness and mobilization against potential ecological threats, the more likely they are to experience arduous environmental and human health problems at the hands of business and government. As a result, poorer towns and communities of color suffer an unequal exposure to ecological hazards.

This is not say that white and middle-to-upper income communities are not also being impacted by industrial pollution in the Commonwealth. But in contrast to the types of economic and social constraints confronting white working-class families and people of color (including discriminatory mortgage lending practices), higher- income salaried and professional workers can often afford access to ecological amenities and a cleaner environment in non-industrial urban, suburban and rural areas. In fact, working class families and people of color face a “triple unequal exposure effect” to toxic pollution and other environmental hazards in comparison with higher-income residents. For lower income communities and communities of color, this takes the form of exposure to: (1) greater concentrations of polluting industrial facilities and power plants; (2) greater concentrations of hazardous waste sites and disposal/treatment facilities, including landfills, incinerators, and trash transfer stations; and (3) higher rates of “on the job” exposure to toxic pollutants inside the factory.⁵ Unequal exposure to environmental hazards is thus experienced by working class families and people of color in terms of where they *work, live, and play*.⁶

⁵ Over 1,600 workers were diagnosed with invasive cancers in 2004 alone. An estimated 1,430 Bay State workers died from occupational diseases during 2003-2004, while some 50,000 workers are seriously injured each year on the job, mainly because Massachusetts employers fail to institute or maintain basic safety measures. See *Dying for Work in Massachusetts: The Loss of Life and Limb in Massachusetts Workplaces*, A Report by the Massachusetts AFL-CIO, MassCOSH, and Western MassCOSH (April 26, 2004).

⁶ See Dana Alston (ed.), *We Speak for Ourselves: Social Justice, Race, and Environment* (Washington, DC: The Panos Institute, 1991).

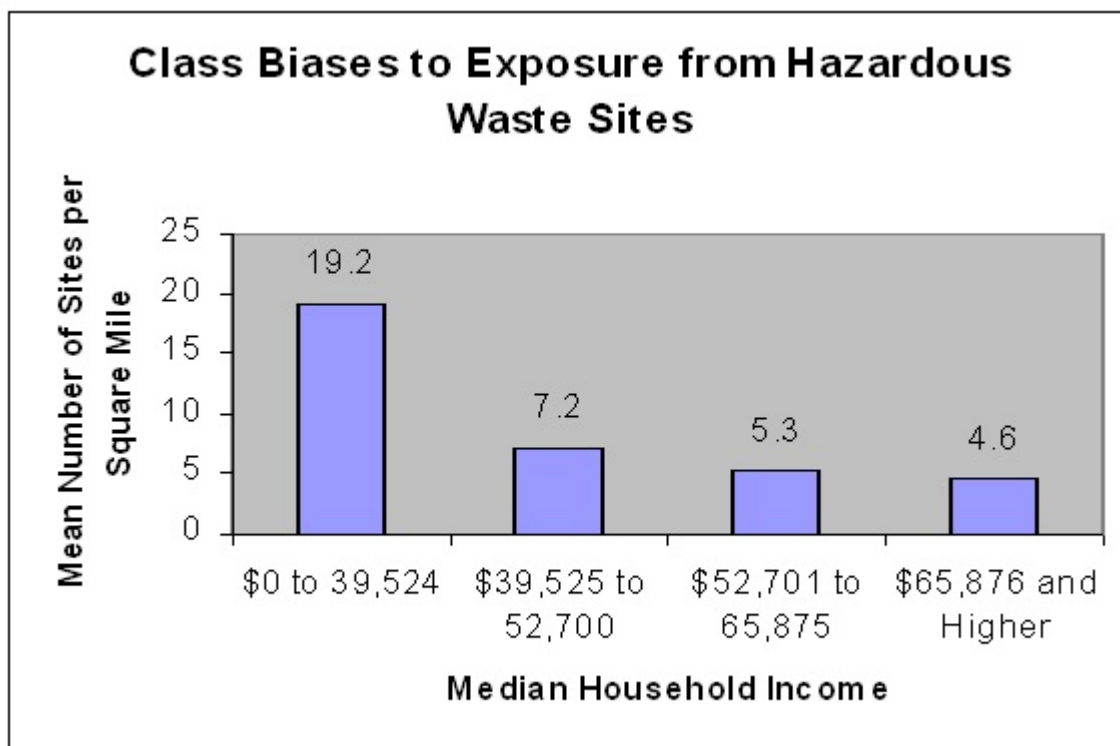
Unequal Exposure to Ecological Hazards 2005 documents Massachusetts residents' unequal exposure to environmental hazards. More specifically, the report analyzes both income-based and racially-based disparities in the geographic distribution of some 17 different types of environmentally hazardous sites and industrial facilities in the Commonwealth of Massachusetts. This report provides evidence that working class communities and communities of color are disproportionately impacted by toxic waste disposal, incinerators, landfills, trash transfer stations, power plants, and polluting industrial facilities. In some cases, not only are new toxic facilities and dump sites located in poorer neighborhoods and communities of color, but as in the case of the public housing development and playgrounds near the Alewife station in Cambridge, housing for people of color and low income populations is sometimes located on top of pre-existing hazardous waste sites and/or nearby polluting facilities. We conclude that striking inequities in the distribution of these environmentally hazardous sites and facilities are placing working class families and people of color at substantially greater risk of exposure to human health risks. We advocate the adoption of a number of measures, including a comprehensive environmental justice act, to reduce pollution and address unequal exposure to ecological threats

In this report, we will document the disproportionate environmental burden borne by these communities in the following areas:

(A) Unequal Exposure to Hazardous Waste Sites:

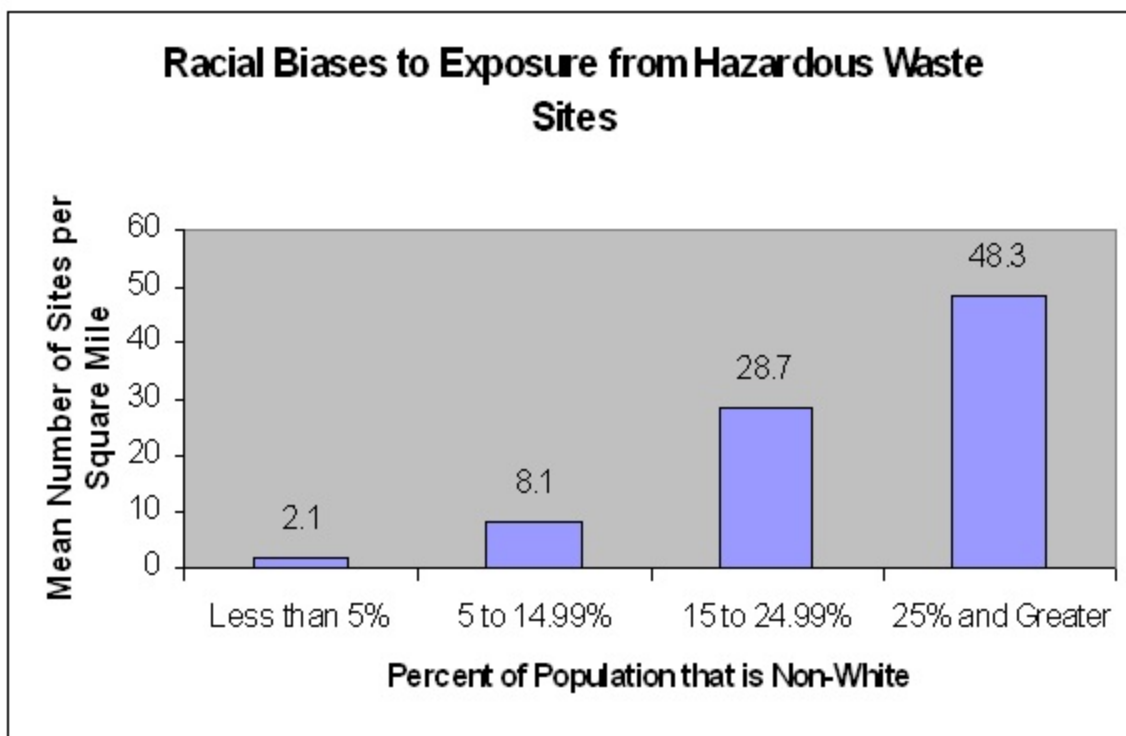
In Massachusetts, there are over 30,570 Department of Environmental Protection (DEP) hazardous waste sites. Some 3,741 of these sites are considered to pose serious environmental and human health threats, and include 31 sites on the Environmental Protection Agency's National Priorities List (NPL) or Superfund list. Our findings indicate that communities of color and low income communities experience a far more profound exposure rate to Department of Environmental Protection (DEP) hazardous waste sites than do wealthier and/or white communities, indicating that race and class are strongly associated with the location of both serious (Tier I-II) and less serious (Non-Tier) hazardous waste sites.

- ❑ In Massachusetts, low income communities, where the average household medium income is less than \$39,524, contain an average of 203 DEP hazardous waste sites per town. In contrast, medium-high income communities (\$52,701 - 65,875) average 66 hazardous waste sites per town. High income communities (\$65,876 or greater) average 71 waste sites per town. As a result, *low income communities average roughly three times more DEP hazardous waste sites than higher income communities.*
- ❑ Low income communities also average nearly 19.2 hazardous waste sites per square mile. In contrast, high income communities average 4.6 hazardous waste sites per square mile. As a result, low income communities have *over four times* the number of hazardous waste sites per square mile as high income communities. These disparities remain consistent with comparisons of the more serious Tier I-II hazardous waste sites. In short, low income communities in Massachusetts experience a far more profound exposure rate to DEP hazardous waste sites than higher-income communities.



- Likewise, low minority communities, where less than 5% of the population is made up of people of color, average 39 hazardous waste sites per town. In contrast, high minority communities, where 25% or more of the population is made up of people of color, average 297 sites per town. Communities of moderately-high minority status, where 15 to 24.99% of the population is made up of people of color, average nearly 280 sites. As a result, *communities of color average well roughly seven-and-a-half times as many hazardous waste sites per town as low minority communities.*

- In high minority communities there is an average of 48.3 DEP hazardous waste sites per square mile (see chart on page 4). In contrast, low minority communities experience an average of 2.1 hazardous waste sites per square mile. As a result, *high minority communities average twenty-three times more hazardous waste sites per square mile than low minority communities.* These figures remain consistent with comparisons of the more serious Tier I-II hazardous waste sites. In short, *communities of color experience a far greater exposure rate to DEP hazardous waste sites than white communities.*



(B) Unequal Exposure to Landfills, Trash Transfer Stations, and Incinerators

There are a total of 980 landfill-type operations in the Commonwealth of Massachusetts, including 599 garbage dumps and 262 transfer stations. Most of the state’s landfills and trash transfer stations are more heavily concentrated in lower-income towns and/or communities of color.

- ❑ In comparison to low minority communities (less than 5% people of color) that average .13 of all landfill types per square mile, high minority communities (25% or more people of color) average .35 of these facilities per square mile, *a rate nearly three times higher.*
- ❑ In low income communities, there are .22 of these landfill-types per square mile, a figure slightly higher than the .15-.17 rates for higher-income communities. However, when municipal solid waste landfills are excluded, it is clear that low and medium-low income communities have a higher proportion of most other types of landfill sites than higher income communities. For instance, while low and medium-low income communities together make up 46.9 percent of all towns in the state, they are home to 65.2 percent of all demolition landfills, 50 percent of all illegal sites, 73.3 percent of all sludge landfills, and 58 percent of all transfer stations.

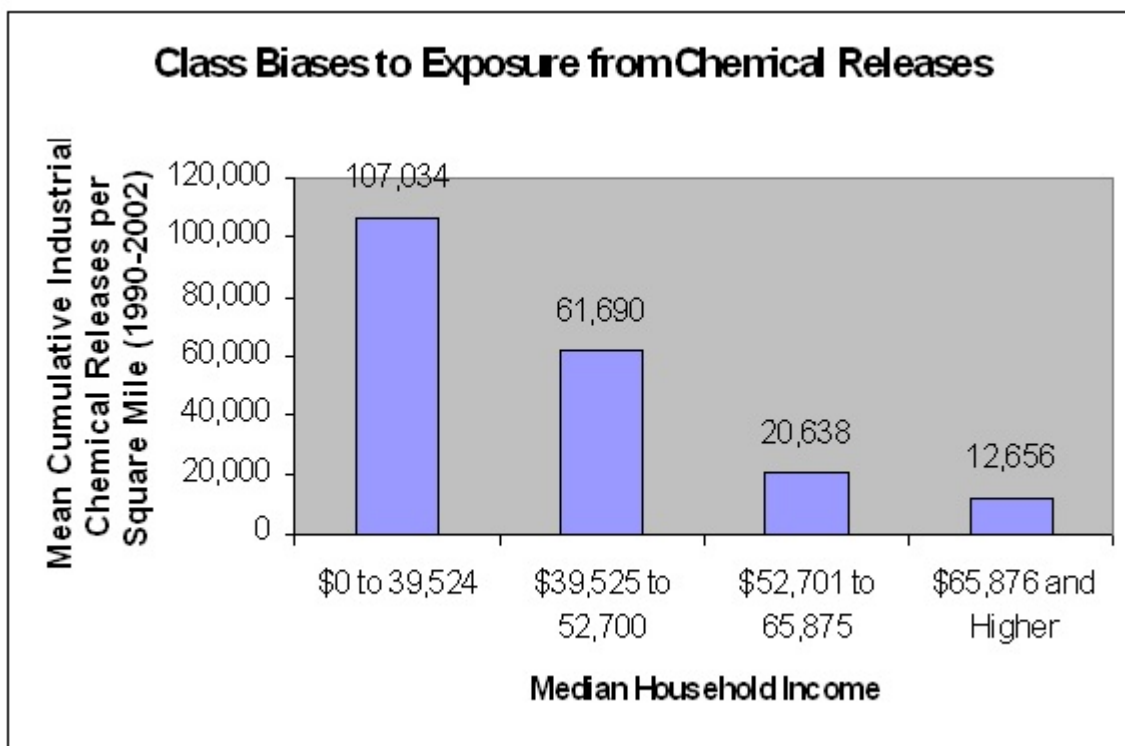
- ❑ Racial biases are also present for some types of landfill sites. Although communities of color make up 9.4 percent of all towns in the study, they are home to 27.8 percent of all incinerator ash landfills, 41 percent of all illegal sites, and 45.9 percent of all inactive municipal incinerators.
- ❑ Incinerators are implicated in causing serious water and air pollution and related public health problems, and emit more mercury than any other source in the state. Five of the eight active municipal incinerators analyzed in the study are located in lower income communities. Only one was located in a minority community. Low income communities make up 10.2 percent of all towns in the study, but are home to 29.2 percent of all inactive municipal incinerators. In addition, high income communities comprise 23.8 percent of all towns, but hold 33.3 percent all incinerators. On the other hand, communities of color (15%> minority) comprise 9.4 percent of all towns, but are home to 45.9% of all inactive incinerators in the state. In this respect, there appears to be a class and racial bias in the siting of municipal incinerators in Massachusetts.

(C) Unequal Exposure to Polluting Industrial Facilities:

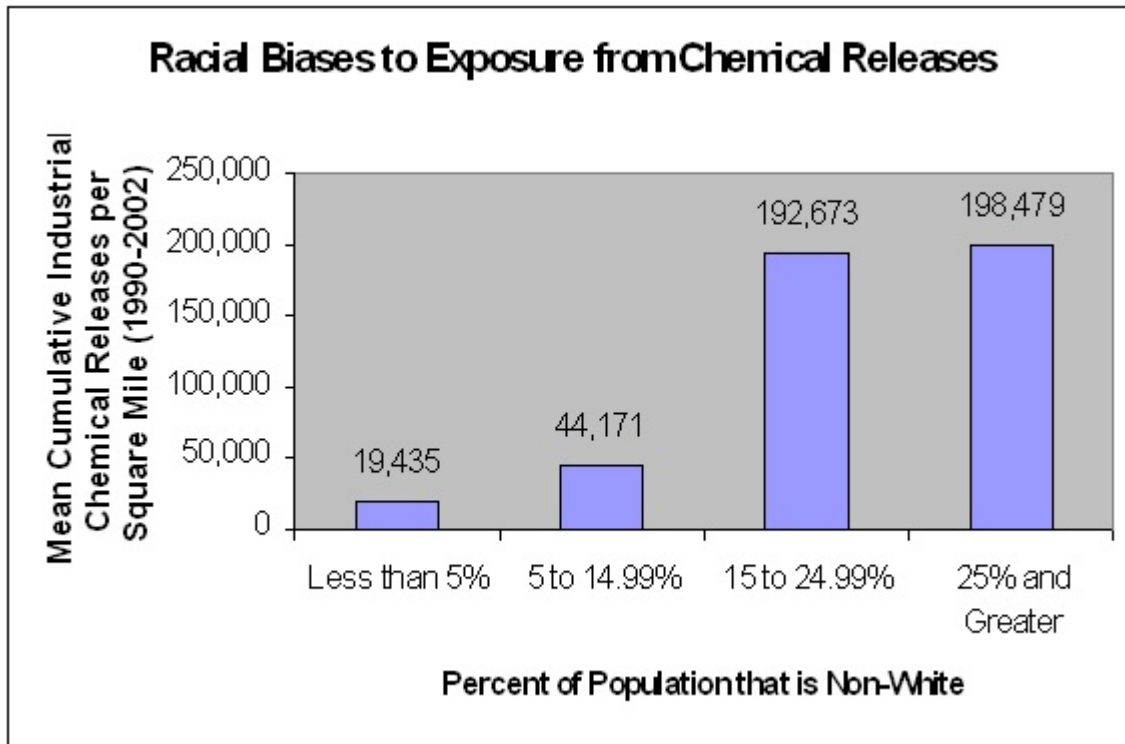
In Massachusetts between 1990-2002, some 1,298 large industrial facilities released over 204.3 million pounds of chemical waste directly into the environment (discharged into the air, ground, underground, or adjacent bodies of water) of the communities in which they were located. This figure is an amount equivalent to over 2,550 tractor-trailer trucks each loaded with 80,000 pounds of toxic waste. In recent years every county in Massachusetts has levels of air-borne toxic chemicals in the form of volatile organic compounds (VOCs) that exceed health-based state levels. For instance, concentrations of benzene, 1,3-butadiene, formaldehyde and acrolein -- chemicals which are known to cause numerous adverse health effects, including neurological disorders, birth defects, reproductive disorders and respiratory diseases -- exceed the health-based risk standards in all counties *by up to 80 times*. As a result, air pollution kills 1,300 people in the state each year. Our findings indicate that pollution release rates by large industrial facilities are significantly greater in lower income communities and communities of color.

- ❑ Low and medium-low income communities (\$52,700 or less median household income) comprise 47 percent of all towns in Massachusetts, but *received 74.6 percent of all chemical releases from large-scale industries reporting under the Toxics Use Reduction Act (TURA) between 1990-2002*.
- ❑ In fact, low income communities (\$39,524 or less household median incomes) average 9.9 TURA industrial facilities per town, some 1.569 million pounds of chemical releases into the environment per town, and 107,034 pounds of chemical releases per square mile for 1990-2002. This contrasts sharply in comparison to high income communities (\$65,875 or more), which have an average of 2.6 TURA polluting facilities per town, an average of 246,428 pounds of chemical releases per town, and 12,656 pounds of chemical releases per square mile.

- ❑ In comparison to high income communities, *low income communities average over 3.7 times more TURA industrial facilities, three times as many TURA industrial facilities per square mile, 6.7 times more total chemical releases into the environment per town; and over 8.5 times as many chemical releases per square mile.* Thus, it would appear that the class status of a community is a major factor in the level of exposure to TURA industrial facilities and pollution.
- ❑ Low income communities are also over-exposed to the most dangerous families of chemical releases. *Although they represent just 10.2 percent of all towns, low income communities received 23.7 percent of all carcinogens; 30.8 percent of all organochlorines; 27.8 percent of all persistent bioaccumulative toxins; and 45.8 percent of all reproductive toxins*



- ❑ Communities of color are also overburdened. High minority communities (25% or more people of color) average 11.4 TURA industrial facilities per town and 1.28 TURA facilities per square mile, compared to an average of just 1.5 facilities and .08 facilities per square mile for low minority communities (less than 5% people of color).
- ❑ *Thus, high minority communities average over seven times as many TURA industrial facilities per town and over sixteen times as many TURA industrial facilities per square mile as low minority communities in the Commonwealth.*



- ❑ Furthermore, communities of color averaged well over 1.77 million pounds of chemical releases into the environment from TURA industrial facilities, and 192,000 pounds of chemical releases per square mile. In contrast, low minority communities averaged 303,516 pounds of chemical releases per town, and 19,435 pounds of releases per square mile from 1990-2002.
- ❑ Thus, *in comparison to low minority communities, communities of color average about six times more chemical releases into the environment from local TURA facilities; and ten times as many pounds of chemical releases per square mile.*
- ❑ Communities of color are also over-exposed to the most dangerous families of chemical releases. Although they represent just 9.4 percent of all towns, communities of color received 37.6 percent of all carcinogens; 41.8 percent of “more hazardous” toxic chemicals; 32.8 percent of all persistent bio-accumulative toxins; and 37.2 percent of all reproductive toxins.

(D) Unequal Exposure to Power Plants:

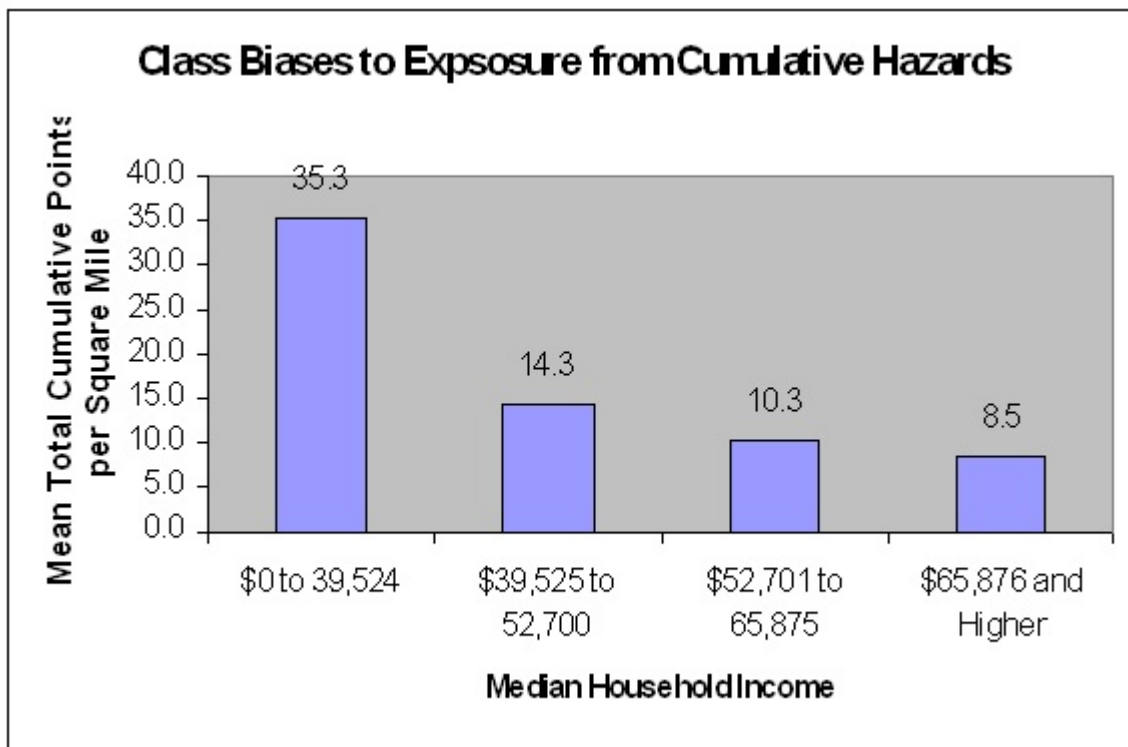
In Massachusetts, coal and oil-burning power plants, specifically those plants built prior to 1977, are also a major source of air pollution. In fact, some twenty seven plants in Massachusetts are responsible for over 114,545 tons of combined sulfur dioxide, nitrogen oxide, and volatile organic compounds emissions. These emissions are a major cause of respiratory disease in Massachusetts residents, especially in working class communities, which are burdened by the some of the worst polluting power plants in all of New England.

- ❑ Fossil-fuel power plants are also responsible for more than 230 pounds of airborne mercury emissions every year. Mercury causes severe damage to the neurological system and has developmental effects on fetuses and small children.
- ❑ Although communities of color comprise just 9.4 percent of all communities in the state, they are home to 29.6 percent of all active power plants. They receive 14.6 percent of plant releases of sulfur dioxide, nitrogen oxide, and volatile organic compounds.
- ❑ Likewise, while low and medium-low income communities comprise 47.9 percent of all towns, they are home to 66.7 percent of all power plants and 73.6 percent of all releases of sulfur dioxide, nitrogen oxide, and volatile organic compounds. In contrast, high income communities (\$65,876 or more household median income) comprise 23.8 percent of all communities but are home to only one power plant, and 0.2 percent of these emissions.
- ❑ In addition, five of the six dirtiest power plants in the state – the Brayton Point (Somerset), Salem Harbor (Salem), Mount To (Holyoke), and Somerset Operations (Somerset) facilities – are all located in low to medium-low income communities. Both the Mount Tom (Holyoke) and Mystic (Everett) power plants are located in communities of color. Along with the Canal power plant in Sandwich, these plants are the largest industrial sources of greenhouse gasses in the state.

(E) Unequal Exposure to Cumulative Environmental Hazards:

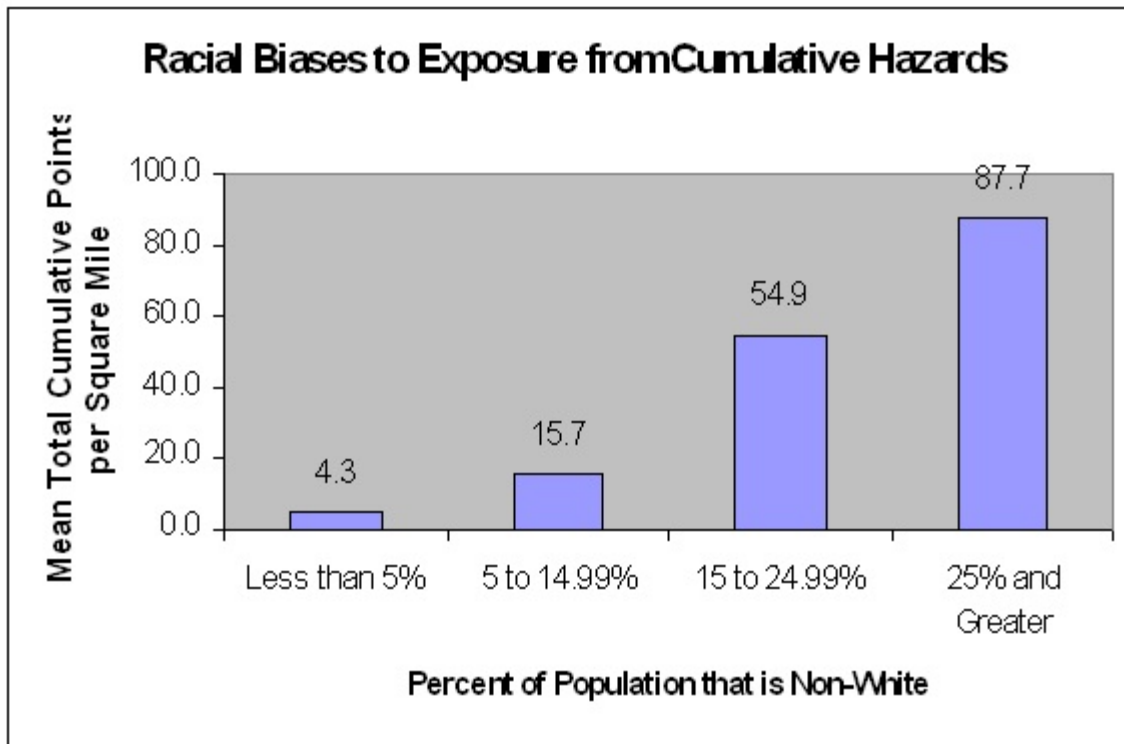
Many past studies on the disproportionate exposure of low income communities and communities of color have focused on a single type of hazardous facility or waste site. This study provides a cumulative method for measuring community exposure rates to all the types of environmentally hazardous facilities and sites listed above. This is accomplished by assigning a point system which weighs the average risks of various hazardous facilities and sites. These points are totaled for each community and then divided by total area to arrive at an exposure rate.

- According to this cumulative measure, low income communities (\$39,525 or less median household income) average an exposure rate of 35.3 environmental hazard points per square mile. This rate stands in dramatic contrast to the exposure rates for all other communities, which ranges from 8.5 to 14.3 points per square mile. As a result, *low income communities face a cumulative exposure rate to environmentally hazardous facilities and sites of all types which is two-and-a-half to four times greater than all other communities (measured by income) in the state.*



- In terms of racial disparities, low minority communities (less than 5% people of color) average only 4.3 environmental hazard points per square mile, compared to 87.7 environmental hazard points per square mile for high minority communities (25% or more people of color).

- Put another way, *high minority communities face a cumulative exposure rate to environmentally hazardous facilities and sites of all types which is over twenty times greater than low minority communities.* In fact, there is a consistently sharp increase in the cumulative exposure rate to these hazardous facilities/sites which directly corresponds to increases in the size of the minority population in all communities. Without question, *it would appear that communities of color are greatly overburdened in comparison with white communities and are disproportionately exposed to environmental hazards of almost every kind.*



- In Section Six of this report, we present a list of the thirty most environmentally overburdened towns in the state, as determined by the greatest number of hazardous sites and facilities per square mile. The system takes into account the severity of the threat posed by the site or facility. *Communities of color make up 24 (or 80 percent) of these towns.* If the numbers were egalitarian, then you would expect to have only three communities of color (or 10%) to be among the most overburdened towns. Thirteen low income communities also appear on this list. However, all of these towns are also communities of color.
- As a consequence of these disparities, if a person lives in a predominantly white community, then they would have a 1.8 percent chance of living in one of the most environmentally overburdened communities in the state. However, if that individual resides in a community of color, then there is a 70.6 percent chance that person is in one of the most contaminated towns. As a result, a person living in a community of color is thirty-nine times more likely to live in one of the most environmentally hazardous communities in Massachusetts. In short, residents of minority communities face a cumulative exposure to environmental hazards far in excess of the typical white community.

(F) Recommendations for Addressing Environmental Injustice

For advocates of environmental justice (EJ), the most immediate mission is to dismantle the mechanisms by which government agencies and private business displace social and ecological burdens onto people of color and working-class families. To achieve this aim, the state should adopt *An Act to Promote Environmental Justice in the Commonwealth*. The overall priorities of any new EJ legislation should be to: (1) *increase public participation* and outreach through EJ training programs for government staff (including greater language accessibility); (2) *minimize risks* by targeting compliance, enforcement and technical assistance to EJ populations, and enhance Massachusetts Environmental Policy Act (MEPA) review of new or expanding large sources of air emissions and regional waste facilities in EJ neighborhoods; (3) *encourage investments* by expediting MEPA review of brownfields redevelopment projects that offer opportunities to clean up contaminated sites and bring them into clean productive use; (4) *expand existing brownfields efforts* to support the development of an inventory of Underutilized Commercial/Industrial Properties in the Commonwealth, incorporating EJ as a criterion for awarding technical assistance, grants, audits and toxic waste site investigations in affected communities, as well as targeting resources to more effectively create, restore, and maintain open spaces located in EJ neighborhoods; and (4) *promote cleaner development* by encouraging economic development projects that incorporate state-of-the-art pollution control technology, and alternatives to hazardous chemicals in neighborhoods where EJ populations reside.

Secondly, in addition to working to address disparities in exposure to environmental hazards, policy makers need longer-term approaches aimed at reducing the overall amount of pollution, including: the implementation of proactive, prevention-oriented policies that make use of a precautionary approach (the Precautionary Principle) to toxic hazards; the adoption of safer alternatives (the Substitution Principle); and creation of a transition blueprint to a clean economy that is beneficial for workers and EJ communities (Clean Production). As our research demonstrates, the release of toxic chemicals by industry is disproportionately concentrated in communities of color and working class towns. *An Act for a Healthy Massachusetts: Safer Alternatives to Toxic Chemicals* aims to create a model for the gradual replacement of toxic chemicals with safer alternatives, and could be a critical step in implementing longer-term solutions. Finally, a number of other legislative initiatives could also push the state toward the adoption of more effective environmental justice policies. These are outlined in greater detail in section seven of the report.

The following sections of this report provide a more elaborate presentation of our findings, as well as in-depth discussion and analysis of the current environmental injustices plaguing working class communities and people of color in the Commonwealth of Massachusetts.

Table 2A: Class-Based Disparities in the Location of Hazardous Waste Sites

Median Household Income 2000 U.S. Census N=Number of Towns (Percent of all Towns)		Number of all DEP Hazardous Waste Sites	Number of DEP Tier I-II Hazardous Waste Sites	Number of EPA Superfund Sites	Average Number of DEP Hazardous Waste Sites per Town	Average Number of DEP Hazardous Waste Sites per Square Mile
\$0 to 39,524 (Low Income) N=37 (10.2%)	Count	7,497	998	3	203	19.2
	Percent	24.5%	26.7%	9.7%		
\$39,525 to 52,700 (Med. – Low Income) N=133 (36.7%)	Count	10,038	1,283	8	75	7.2
	Percent	32.8%	34.3%	25.8%		
\$52,701 to 65,875 (Med. – High Income) N=106 (29.9%)	Count	6,943	819	7	66	5.3
	Percent	22.7%	21.9%	22.6%		
\$65,876 and greater (High Income) N=86 (23.8%)	Count	6,100	641	13	71	4.6
	Percent	19.9%	17.1%	41.9%		
Totals N=362 (100%)	Count	30,578	3,741	31	84	7.3
	Percent	(100%)	(100%)	(100%)		

** Information on all hazardous waste sites was provided by the Massachusetts Department of Environmental Protection (DEP) and U.S. Environmental Protection Agency (EPA) databases on October 15, 2004. All DEP waste site information provided above includes EPA Superfund sites as part of the count.

Table 2B: Racially-Based Disparities in the Location of Hazardous Waste Sites

Non-White Population 2000 U.S. Census N=Number of Towns (Percent of all Towns)		Number of DEP Hazardous Waste Sites	Number of DEP Tier I-II Hazardous Waste Sites	Number of Towns with EPA Superfund Sites	Average Number of DEP Hazardous Waste Sites per Town	Average Number of DEP Hazardous Waste Sites per Square Mile
Less than 5% (Low Minority) N=231 (63.8%)	Count	8,934	1,079	7	39	2.1
	Percent	29.2%	28.8%	22.6%		
5 to 14.99% (Moderate - Low) N=97 (26.8%)	Count	11,795	1,306	21	122	8.1
	Percent	38.6%	34.9%	67.7%		
15 to 24.99% (Moderate - High) N=14 (3.9%)	Count	3,918	519	2	280	28.7
	Percent	12.8%	13.9%	6.5%		
25% and greater (High Minority) N=20 (5.5%)	Count	5,931	837	1	297	48.3
	Percent	19.4%	22.4%	3.2%		
Totals N=362 (100%)	Count	30,578	3,741	31	84	7.3
	Percent	(100%)	(100%)	(100%)		

Table 4B: Class-Based Disparities in the Exposure Rate to TURA Industrial Facilities (1990-2002)

Median Household Income 2000 U.S. Census N=Number of Town (Percent of all Towns)	Average Number of TURA Facilities per Town (1990-2002)	Average Number of TURA Facilities per Square Mile (1990-2002)	Average Total Chemical Releases (lbs.) Per Town (1990-2002)	Average Total Chemical Releases (lbs.) per Square Mile (1990-2002)
\$0 to 39,524 (Low Income) N=37 (10.2%)	9.9	.68	1,569,294	107,034
\$39,525 to 52,700 (Medium –Low Income) N=133 (37.7%)	2.9	.24	709,995	61,690
\$52,701 to 65,875 (Medium – High Income) N=106 (29.9%)	2.9	.24	288,831	20,638
\$65,876 and greater (High Income) N=86 (23.8%)	2.6	.14	246,428	12,656

Table 4D: Racially-Based Disparities in the Exposure Rate to TURA Industrial Facilities (1990-2002)

Non-White Population 2000 U.S. Census N=Number of Town (Percent of all Towns)	Average Number of TURA Facilities per Town (1990-2002)	Average Number of TURA Facilities per Square Mile (1990-2002)	Average Total Chemical Releases (lbs.) Per Town (1990-2002)	Average Total Chemical Releases (lbs.) per Square Mile (1990-2002)
Less than 5% (Low Minority) N=231 (63.8%)	1.5	.08	303,516	19,435
5 to 14.99% (Low-Moderate Minority) N=97 (26.8%)	5.9	.37	757,182	44,171
15 to 24.99% (Moderate-High Minority) N=14 (3.9%)	11.4	1.00	1,775,518	192,673
25% and greater (High Minority) N=20 (5.5%)	10.6	1.28	1,794,303	198,479

**Table 6D: Most Intensively Overburdened Communities in Massachusetts
(Total Environmental Hazard Points per Square Mile)**

Rank	Town Name	Points per Square Mile	Class Status of Town	Racial Status of Town
1	Boston – Downtown	321.2	Medium-Low Income \$45,053	High Minority (29.9%)
2	Boston – South Boston	211.2	Medium-Low Income \$40,311	Moderately-Low Minority (13.0%)
3	Chelsea	187.9	Low Income \$30,161	High Minority (42.1%)
4	Boston - Charlestown	183.2	Medium-High Income \$56,110	Moderately-High Minority (17.7%)
5	Boston – East Boston	173.2	Low Income \$31,310	High Minority (32.2%)
6	Cambridge	167.1	Medium-Low Income \$47,979	High Minority (31.9%)
7	Everett	165.5	Medium-Low Income \$40,661	Moderately-High Minority (20.3%)
8	Somerville	139.6	Medium-Low Income \$46,315	Moderately-High Minority (23.0%)
9	Boston - Dorchester	127.7	Low Income \$37,890	High Minority (65.8%)
10	Boston - Roxbury	123.9	Low Income \$27,133	High Minority (89.9%)
11	Boston – Allston/Brighton	107.3	Low Income \$38,941	High Minority (26.5%)
12	Watertown	91.6	Medium-High Income \$59,764	Moderately-Low Minority (8.6%)
13	Malden	75.6	Medium-Low Income \$45,654	High Minority (27.9%)
14	Lawrence	74.4	Low Income \$27,983	High Minority (51.4%)
15	Boston – Jamaica Plain	72.0	Medium-Low Income \$41,524	High Minority (41.0%)
16	Lowell	55.5	Low Income \$39,192	High Minority (31.4%)
17	Boston – Hyde Park	46.2	Medium-Low Income \$44,704	High Minority (52.7%)
18	Woburn	45.7	Medium-High Income \$54,897	Moderately-Low Minority (9.4%)
19	Medford	44.8	Medium-Low Income \$52,476	Moderately-Low Minority (13.6%)
20	Worcester	44.0	Low Income \$35,623	Moderately-High Minority (22.9%)

* 17 of the 20 towns are of lower-income status (\$52,700<)

** 16 of the 20 towns are communities of color (15%> minority)

Table 6E: Environmental Rankings of Low Income Communities (37 Total)

Town	Income	Total Points	State Ranking by Total Points	Points per Square Mile	State Ranking by Points per Square Mile
GOSNOLD	\$22,344	13	338	0.1	362
MONROE	\$25,500	17	322	1.6	281
BOSTON - ROXBURY (minority)	\$27,133	488	25	123.9	10
NEW BEDFORD (minority)	\$27,569	964	5	40.1	23
NORTH ADAMS	\$27,601	197	96	9.6	110
LAWRENCE (minority)	\$27,983	552	22	74.4	14
FALL RIVER	\$29,014	658	11	17.2	64
CHELSEA (minority)	\$30,161	466	30	187.9	3
SPRINGFIELD (minority)	\$30,417	1222	3	36.8	28
HOLYOKE (minority)	\$30,441	445	35	19.5	57
BOSTON - EAST BOSTON (minority)	\$31,310	781	7	173.2	5
ADAMS	\$32,161	116	159	5.1	166
PROVINCETOWN	\$32,716	85	199	4.9	170
BOSTON - MATTAPAN (minority)	\$32,748	107	169	38.1	26
GREENFIELD	\$33,110	259	64	11.8	96
ATHOL	\$33,475	145	131	4.3	177
MONTAGUE	\$33,750	46	259	1.5	284
SOUTHBRIDGE	\$33,913	198	95	9.6	109
WARREN	\$34,583	86	197	3.1	213
WORCESTER (minority)	\$35,623	1698	1	44.0	20
PITTSFIELD	\$35,655	596	15	14.1	82
CHICOPEE	\$35,672	502	24	21.0	50
ORANGE	\$36,849	113	161	3.1	212
WARE	\$36,875	91	186	2.3	244
FITCHBURG (minority)	\$37,004	454	32	16.2	73
TISBURY	\$37,041	74	210	9.2	111
REVERE (minority)	\$37,067	402	37	40.1	24
SUNDERLAND	\$37,147	19	318	1.3	286
PLAINFIELD	\$37,250	14	334	0.7	326
GARDNER	\$37,334	266	62	11.6	97
LYNN (minority)	\$37,364	576	19	42.7	22
BOSTON - DORCHESTER (minority)	\$37,890	770	8	127.7	9
HAWLEY	\$38,125	9	354	0.3	354
WEBSTER	\$38,169	208	89	14.3	80
BOST.-ALLSTON/BRIGHT. (minority)	\$38,941	468	29	107.3	11
LOWELL (minority)	\$39,192	807	6	55.5	16
BROCKTON (minority)	\$39,507	709	9	32.8	32

Table 6F: Environmental Rankings of Communities of Color (34 Total)

Town	Percent of Population that is Non-White	Total Points	State Rank by Total Points	Total Points per Square Mile	State Rank by Total Points per Square Mile
BOSTON - MATTAPAN	94.3	107	169	38.1	26
BOSTON - ROXBURY	89.9	488	25	123.9	10
BOSTON - DORCHESTER	65.8	770	8	127.7	9
BOSTON - HYDE PARK	52.7	202	92	46.2	17
LAWRENCE	51.4	552	22	74.4	14
AQUINNAH	46.5	13	338	0.3	351
SPRINGFIELD	43.9	1222	3	36.8	28
CHELSEA	42.1	466	30	187.9	3
BOSTON - JAMAICA PLAIN	41.0	221	84	72.0	15
BROCKTON	38.5	709	9	32.8	32
BOSTON - ROSLINDALE	37.6	128	148	34.4	29
RANDOLPH	37.2	180	104	17.1	66
HOLYOKE	34.2	445	35	19.5	57
BOSTON - EAST BOSTON	32.2	781	7	173.2	5
LYNN	32.1	576	19	42.7	22
CAMBRIDGE	31.9	1191	4	167.1	6
LOWELL	31.4	807	6	55.5	16
BOSTON - DOWNTOWN	29.9	1449	2	321.2	1
MALDEN	27.9	387	39	75.6	13
BOSTON - ALLSTON/BRIGHTON	26.5	468	29	107.3	11
SOMERVILLE	23.0	589	16	139.6	8
WORCESTER	22.9	1698	1	44.0	20
NEW BEDFORD	21.1	964	5	40.1	23
AMHERST	20.7	135	142	4.9	171
QUINCY	20.4	578	18	21.5	49
EVERETT	20.3	606	13	165.5	7
FRAMINGHAM	20.2	654	12	24.7	44
BROOKLINE	18.9	267	61	39.2	25
FITCHBURG	18.1	454	32	16.2	73
BOSTON - CHARLESTOWN	17.7	251	68	183.2	4
WALTHAM	17.0	598	14	43.9	21
SHIRLEY	16.1	39	274	2.5	240
REVERE	15.7	402	37	40.1	24
LANCASTER	15.5	91	186	3.2	207