Environmental Justice Inventory for Ten Communities in the Greater Boston Area

Tufts University Urban and Environmental Policy and Planning (UEP)
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Table of Contents

Acknowledgements............................................................................................................ i
Executive Summary ............................................................................................................. ii
I. Introduction: Purpose and Scope of Project ........................................................................ 1
II. Background of Project. .................................................................................................... 2
   A. 2002 Environmental Justice Policy .............................................................................. 4
   B. Identification of Environmental Justice Populations .................................................. 6
III. General Information on Environmental Data Collected ................................................... 9
   A. Brownfields ................................................................................................................. 9
   B. Chemical Releases ...................................................................................................... 11
   C. Facility Air Emissions ................................................................................................. 14
   D. Air Monitoring ........................................................................................................... 14
   E. Water Pollution .......................................................................................................... 18
   F. Fish Consumption ...................................................................................................... 20
   G. Health Indicators ....................................................................................................... 21
      i) Asthma .................................................................................................................... 20
      ii) Lead Exposure ....................................................................................................... 24
      iii) Lung Cancer ......................................................................................................... 25
      iv) Cardiovascular Disease ....................................................................................... 27
IV. Methodology .................................................................................................................. 30
   A. Brownfields Methodology ......................................................................................... 30
   B. Chemical Release Methodology ............................................................................... 33
   C. Air Emissions Methodology ...................................................................................... 34
   D. Water Pollution Methodology .................................................................................. 37
   E. Health Indicator Methodology ................................................................................... 38
V. Community Profiles ......................................................................................................... 42
   A. Boston ....................................................................................................................... 42
      i) Census Data ............................................................................................................ 42
      ii) Brownfields ......................................................................................................... 42
      iii) Chemical Release ............................................................................................... 43
      iv) Air Emissions ....................................................................................................... 44
      v) Health Indicators ................................................................................................. 46
   B. Brookline ................................................................................................................... 47
      i) Census Data ............................................................................................................ 48
      ii) Brownfields ......................................................................................................... 48
      iii) Chemical Release ............................................................................................... 49
      iv) Air Emissions ....................................................................................................... 49
      v) Health Indicators ................................................................................................. 49
   C. Cambridge .................................................................................................................. 50
      i) Census Data ............................................................................................................ 50
      ii) Brownfields ......................................................................................................... 51
      iii) Chemical Releases .............................................................................................. 51
      iv) Air Emissions ....................................................................................................... 52
      v) Health Indicator Data ......................................................................................... 53
   D. Chelsea ....................................................................................................................... 53
VI. Potential “Hot Spots”.................................................................................. 76
VII. General Recommendations........................................................................... 77
References........................................................................................................... 82
List of Figures:

- **Figure 1**: TURA and TRI Chemical Releases 2002 ................................................. 13
- **Figure 2**: 2003 Drinking Water Test Results for MWRA Communities ......................... 20
- **Figure 3**: Percentage of PBT Chemical Usage - Boston ............................................. 43
- **Figure 4**: Number of Facilities Using PBT Chemicals -Boston .................................. 44
- **Figure 5**: Percentage of PBT Chemical Usage - Cambridge ..................................... 51
- **Figure 6**: Percentage of PBT Chemical Usage - Chelsea .......................................... 55
- **Figure 7**: Percentage of PBT Chemical Usage - Everett ........................................... 58
- **Figure 8**: Number of Facilities Using PBT Chemicals -Everett ................................. 58
- **Figure 9**: Exelon Mystic LLC Air Emissions in tons, from EPA AirData Database, 1999, and BWP Facility Emissions Inventory, 2003 ..................................................... 60
- **Figure 10**: Percentage of PBT Chemical Usage - Somerville ................................. 72

List of Tables:

- **Table 1**: NAAQS and MAAQS ............................................................................... 15
- **Table 2**: Exposure Limits for Lead Levels ............................................................... 25
- **Table 3**: Air Pollutants and Potential Health Effects .................................................. 35
- **Table 4**: Site/Reportable Releases within Boston Communities .................................... 43
- **Table 5**: Air Polluting Facilities within 10 Communities ............................................. 45
- **Table 6**: EPA-regulated air-polluting facilities in Boston, NEI data, 1999 .................... 46
- **Table 7**: Boston Public Health Data ......................................................................... 47
- **Table 8**: EPA-regulated air-polluting facilities in Brookline, NEI data, 1999 .......... 49
- **Table 9**: Brookline Public Health Data ....................................................................... 50
- **Table 10**: EPA-regulated air-polluting facilities in Cambridge, NEI Data, 1999 .... 52
- **Table 11**: Cambridge Public Health Data ................................................................... 53
- **Table 12**: EPA-regulated air-polluting facilities in Chelsea, NEI data, 1999 ............ 56
- **Table 13**: Chelsea Public Health Data ......................................................................... 56
- **Table 14**: EPA-regulated air-polluting facilities in Everett, NEI data, 1999 .......... 61
- **Table 15**: Everett Health Data ................................................................................. 62
- **Table 16**: EPA-regulated air-polluting facilities in Medford, NEI data, 1999 .... 64
- **Table 17**: Medford Health Data ............................................................................... 65
- **Table 18**: EPA-regulated air-polluting facilities in Quincy, NEI data, 1999 ............ 67
- **Table 19**: Quincy Health Data .................................................................................. 67
- **Table 20**: EPA-regulated air-polluting facilities in Revere. Source: NEI, 1999 .... 70
- **Table 21**: Revere Health Data .................................................................................. 70
- **Table 22**: EPA-regulated air-polluting facilities in Somerville, NEI data, 1999 .... 73
- **Table 23**: Somerville Health Data ............................................................................. 73
- **Table 24**: EPA-regulated air-polluting facilities with missing census tract info in Winthrop, NEI data, 1999 ................................................................. 75
- **Table 25**: Winthrop Health Data ............................................................................... 75
- **Table 26**: Potential Hot Spots ..................................................................................... 76
Appendices

Appendix A - EJ Census and Background Information
   I. GIS Map of EJ Communities with the Study Communities
   II. Spreadsheet of Census and Environmental Data at Tract Level
   III. Environmental Justice Policy of the MA EOEA

Appendix B - Brownfields Data
   I. Tier Classified Sites
   II. Summary Table of Brownfields within Study Communities
   III. Spreadsheets of Tier Classified and Brownfield Sites within Study Communities
   IV. Brownfields Located within Chelsea

Appendix C - Chemical Release Data
   I. Table of Facilities Reporting under TRI
   II. Table of Facilities Reporting under TURA

Appendix D - Air Pollution Data
   I. EPA-Regulated Air Polluting Facilities
   II. DEP-Regulated Air Polluting Facilities
   III. GIS Map of Facility CO Emissions in tons
   IV. GIS Map of Facility pm Emissions in tons
   V. DEP-Regulated Dry Cleaners, Printers, and Photo Processors

Appendix E - Health Data
   I. Asthma Hospitalization Rates Boston
   II. High Risk Communities for Childhood Lead Poisoning

Appendix F - Required Documentation
   I. Memorandum of Understanding
   II. IRB Exemption Form
   III. Informed Consent Documents
   IV. Student Authors and Client Contact Information
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Executive Summary

Under the guidance of the Environmental Justice Policy Team at the Massachusetts Executive Office of Environmental Affairs (EOEA), our field project team, from the Department of Urban and Environmental Policy and Planning (UEP) at Tufts University, developed a data collection methodology and compiled and analyzed existing environmental justice data for ten communities in the greater Boston area. The purpose of this field project was to create an inventory and clearinghouse of regional demographic, health, and environmental data. This inventory will be utilized as a resource by organizations and communities seeking to achieve environmental justice in the state. The report and its appendices will benefit the EOEA and other state agencies or departments, the U.S. Environmental Protection Agency (EPA), municipalities within and outside of the study area, non-profit groups, and the people of the Commonwealth of Massachusetts.

Our methods are meant to serve as a framework for future research by government agencies, and community and advocacy groups in the implementation of the Commonwealth’s Environmental Justice Policy. The model created is the first of its type, as the group was unable to find any other regional-level clearinghouses devoted to understanding environmental justice. We also recommend changes in current data collection and research methods, future planning, and the EJ Policy itself.

The group has collected data for the following cities in Eastern Massachusetts: Boston, Brookline, Cambridge, Chelsea, Everett, Medford, Quincy, Revere, Somerville, and Winthrop. These communities were chosen because our client specifically requested
them and because they constitute the majority of the greater Boston Environmental Justice Region. The choice of these communities was arbitrary to the extent that it may not include every community within the region. However, EOEA hopes to complete a similar study in the other regions.

The EOEA lacks a centralized depository containing the integration of community demographic information with environmental data. The data that we have collected falls into six broad categories, which includes census, Brownfield, chemical release, air emissions, water information, and environmental health indicators. This demographic and environmental data has been analyzed to gain insights about which populations are potentially most at risk. The health data can be used to show potential relationships between environmental releases and poor environmental quality with health problems within the designated EJ communities.

The project culminated with the identification of potential “hot spots” that warrant immediate attention due to the perceived vulnerability of the population and a heavy concentration of environmental burdens. Census tract 3424 in the City of Everett clearly emerged as the area most in need of additional research. Minorities and foreign born individuals accounted for over 25 percent of the population, and the median household income is only 76 percent of the statewide figure. In addition, the tract hosts 16 sites listed on the EPA’s National Emissions Inventory for facility air emissions, 9 TURA-listed facilities, and 16 Brownfields. Other census tracts such as 3515 in Somerville and census tract 1 in Boston also contain vulnerable populations and a large number of environmental insults. As such, EOEA should direct state resources toward these EJ communities.
Our general recommendations to the EOEA and the Commonwealth of Massachusetts include the following:

1. Utilize this inventory for better assessment of localized environmental injustices.

2. Identify additional and future environmental threats.

3. Continue and enhance community involvement in environmental decision-making.

4. Strengthen the EJ Policy to better address injustices.

5. Integrate the EJ Policy and the concept of environmental justice into other major state policies and plans.

The findings of this research suggest that environmental injustices continue to occur in the Greater Boston region. EOEA can lessen the impact of environmental hazards on the most susceptible populations by following the above recommendations.
I. Introduction: Purpose and Scope of Project

This report is meant to provide an inventory of environmental justice data and a methodology for undertaking the process of the collection of such data. It includes a great deal of quantitative information about the study area and qualitative recommendations for the 2002 Environmental Justice Policy. The report does not include data on every area of concern for environmental justice purposes. Environmental justice is a very broad topic and it was not within the time constraints of this project to include all relevant data and precise, detailed information about every location. It is outside of the scope of this project to discuss all problems that revolve around environmental injustices or the exact threats to specific communities in our region.

The main objectives of this project, as outlined in this report, include the following:

- Collect demographic and environmental data for selected communities within the Greater Boston area
- Develop a methodology that can be reproduced in other EJ regions
- Analysis to locate potential EJ “hot spots” in the study area
- Provide recommendations on environmental justice policy and future planning
- Provide EJ Data Inventory to the Commonwealth of Massachusetts

We believe that this inventory will be a useful tool in future analysis, policy-making, and planning for environmental justice in the greater Boston region as well as the Commonwealth of Massachusetts. It should be viewed as a stepping stone in the process of creating more sustainable and equitable communities under the 2002 EJ Policy. The next section provides detailed information on the background of the project.
II. Background of Project

Environmental Justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthy environment. Unfortunately, this right has not been equally enforced on behalf of all members of society. Research has revealed that segments of the population, most often low income and minority communities, have historically been, and continue to be, disproportionately affected by environmental degradation and denied equal access to environmental benefits. The existence of these injustices is frequently attributed to the lack of meaningful involvement granted to these groups in the decision making process.

Recognition of environmental justice has grown in recent years. Concerns for equity and justice have come to occupy a distinct place on the environmental policy agenda at both the federal and state levels. The Environmental Protection Agency (EPA) established an Office of Environmental Justice and a National Environmental Justice Advisory Council, and has also undertaken an investigation into claims of environmental discrimination under Title VI of the 1964 Civil Rights Act.¹

Most notably, President Clinton issued Executive Order 12898 in February 1994, directing all federal agencies to take steps to ensure that minority and low-income communities are not disproportionately affected by environment burdens.² According to environmental justice advocate, Robert Bullard, “the Executive Order calls for improved methodologies for assessing and mitigating impacts, health effect from multiple and

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¹ Sandweiss, Steven. Social Construction of Environmental Justice.
² Ibid.
cumulative exposure, collection of data on low income and minority populations who may be disproportionately at risk…”

The states have also responded to the need for increased vigilance in ensuring the environmental rights of its citizens are protected. In particular, the Commonwealth of Massachusetts has demonstrated a clear commitment to upholding environmental justice. In October 2002, an environmental justice policy developed by EOEA was adopted by then Secretary Bob Durand. Article 97 of the Constitution of the Commonwealth of Massachusetts forms the foundation upon which the state’s environmental justice policy is built. It reads:

The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air and other natural resources is hereby declared to be a public purpose.

The policy was informed by an advisory committee of stakeholders known as the Massachusetts Environmental Justice Advisory Committee (MEJAC) with representatives from community groups, industry, the faith community, academia, and the indigenous community. It seeks to direct EOEA resources to service those neighborhoods in Massachusetts where the residents are most at risk. These resources are designed to ensure that EJ populations have a strong voice in environmental decision-making, receive the full protection afforded them through existing environmental rules and regulations, and increase access to investments that will enhance the quality of life in these communities.

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4 Environment Justice Policy of the Massachusetts Executive Office of Environmental Affairs
5 Constitution of Commonwealth of Massachusetts, Article 97
6 Environment Justice Policy of the Massachusetts Executive Office of Environmental Affairs
Community groups also figure prominently in the regional commitment to environmental justice. The Network for Infrastructure and Technology Research, Inc. (NITRI), a Somerville, Massachusetts-based non-profit organization, in partnership with EOEIA, applied for an EPA grant to fund the development of an Integrated Environmental Justice Data Inventory and Clearinghouse for the Greater Boston Environmental Justice region. Unfortunately, NITRI was not granted the funds to undertake this project. However, this provided an opportunity for EOEIA to utilize the skills of Tufts UEP students in the risk analysis and decision-making process for the Environmental Justice Policy. Further, it provided graduate students from Tufts University with an opportunity to gain a better understanding of environmental justice issues and socio-economic impacts in the Greater Boston area and gain access to state-level environmental policy implementation and enforcement.

A. 2002 Environmental Justice Policy

One of the greatest strengths of the EJ policy is the incorporation of enhanced analysis and enhanced public participation, for proposed projects in EJ communities. This occurs during MEPA (Massachusetts Environmental Policy Act M.G.L. Ch.30, Sections 61-62H) review. “Under the MEPA statute, EOEIA reviews the potential environmental impacts of state agency actions that exceed certain regulatory thresholds. MEPA involves public review and comment, and is subject to strict statutory deadlines on the length of review.”

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7 Environment Justice Policy of the Massachusetts Executive Office of Environmental Affairs
EOEA EJ Policy Section 14: Enhanced Public Participation Under MEPA

Under MEPA enhanced public participation is required for the following projects, as they undergo MEPA review:

- Any project that exceeds an Environmental Notification Form (ENF)\(^8\) threshold for air, solid and hazardous waste (other than remediation projects), or wastewater and sewage sludge treatment and disposal; and

- The project is located within one mile of an EJ population (or in the case of projects exceeding an ENF threshold for air, within five miles of an EJ population).\(^9\)

EOEA EJ Policy Section 15: Enhanced Analysis of Impacts and Mitigation Under MEPA.

In addition to Section 14 requirements, projects undergoing MEPA review shall require enhanced analysis of impacts and mitigation for an Environmental Impact Report (EIR) scope under the following two conditions:

- The project exceeds a mandatory EIR threshold for air, solid and hazardous waste (other than remediation projects), or wastewater and sewage sludge treatment and disposal; and

- The project site is located within one mile of an EJ Population (or in the case of projects exceeding a mandatory EIR threshold for air, water within five miles of an EJ Population).\(^10\)

Additionally, the creation of Regional Agency EJ Outreach Teams, which meet on a quarterly basis, has facilitated enhanced community involvement, and further identified EJ focal points (language issues, grant funding opportunities, enforcement issues, economic development opportunities, etc.). There are many other strategies and requirements outlined in the EJ policy that seek to enhance distribution of information and increase interagency commitment to environmental justice. See Appendix A.

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\(^8\) ENF thresholds: 301 CMR 11.03(5)(b)(1),(2),(5), and 301 CMR 11.03(8)(b), or 301 CMR 11.03(9)(b).

\(^9\) 301 CMR 11.03(5)(a)(1),(6), 301 CMR 11.03(8)(a), and 301 CMR 11.03(9)(a)
B. Identification of Environmental Justice Populations

The need for environmental justice has been most widely recognized in low-income and minority communities. As such, EOEA has identified these communities in an attempt to address the potential vulnerability associated with their demographic composition. Environmental justice populations are those segments of the population that EOEA has determined to be most at risk of being unaware of or unable to participate in environmental decision-making or to gain access to state environmental resources.\textsuperscript{11} The EJ populations in Massachusetts have been mapped by MassGIS.\textsuperscript{12} These populations are defined as neighborhoods that meet one or more of the following criteria:

- The median annual household income is at or below 65 below percent of the statewide median income for Massachusetts
- 25 percent or more of the residents are minority
- 25 percent or more of the residents are foreign-born
- 25 percent or more of the resident are lacking English language proficiency

These “neighborhoods” correspond to US Census Bureau census block groups. The Census Bureau is responsible for the delineation of block groups which is often based on prominent geographical features such as roads and rivers. While block groups

\textsuperscript{11} EOEA EJ Policy
\textsuperscript{12} See Appendix A1 for a GIS map of EJ communities within the study area.
average about 1,500 people, the size (area) of block groups can vary greatly due to population density.

The demographics of these populations are characteristically similar to those communities in which environmental injustices are commonly found. Median annual household income is the economic indicator used to determine low income communities. Household income “includes the income of the householder and all other individuals 15 years old and over in the household, whether they are related to the householder or not” (Census website). Additionally, median income is used to control for income disparities, as the median divides the income distribution into two equal parts. A neighborhood is deemed to be at risk if its median annual household income is at or below 65 percent of the statewide median income for Massachusetts. Using a baseline figure of $46,947, neighborhoods are deemed to be environment justice populations if income levels are at or below $30,515, or 65 percent of $46,947.

The EJ policy also identifies potentially vulnerable neighborhoods on the basis of minority and foreign born populations. Minorities are individuals that are non-white, or white, but identify themselves as Hispanic or Latino. Foreign born individuals are those born outside of the United States. However, individuals born outside of the United States, but to parents who are U.S. citizens, are not included in these figures. Neighborhoods are identified as environmental justice populations if either minority or foreign born residents account for at least 25 percent of the population.

Linguistic isolation serves as the basis for the English language proficiency criterion. A household is considered linguistically isolated if all members 14 years old and over speak a non-English language and also speak English less than “Very well,”
implying some difficulty with English. Neighborhoods are identified as environmental justice populations where at least 25 percent of the households are linguistically isolated.
III. General Information on Environmental Data Collected

A. Brownfields

The definition of Brownfield sites used for the purposes of this research is the EPA definition. This definition is used by the EPA for funding purposes because it sets limits to those sites that are eligible for grant money for the clean up and redevelopment of Brownfields.

In order to meet the objectives of this project, the MA DEP database of site/reportable releases was used as the source of contaminated sites. From this list those sites that had a status of Tier 1A, Tier 1B, Tier 1C, Tier 1D or Tier 2 were counted as a site that contains some level of contamination. These sites have experienced a spill that was large enough to be required under Chapter 21E of the Massachusetts Contingency Plan (MCP) to be reported and then classified. They are known as “DEP Tier Classified oil and hazardous material disposal sites\(^\text{13}\)”. A ranking system called a Tier system is assigned to each site to identify the level of contamination of each site. The Tier classification is based on a ranking system where a score is assigned to each release based on risk to human health and the environment. A description of each is as follows:

- Tier 1A sites - Sites that are the most hazardous, require Immediate Response Actions (IRAs) and DEP oversight\(^\text{14}\). Receives a total National Ranking System (NRS) score equal to or greater than 550. A high score can be because of the close proximity of a site/release to drinking wells and the potential for human health to be affected by the contaminant(s). These sites require supervision by DEP until a permit is obtained.


\(^{14}\) MassGIS DEP Tier Classified Oil or Hazardous Material Sites (MGL c. 21E) Datalayer March 2005.
• Tier 1B sites - Received a total NRS score of less than 550 and equal to or greater than 450. A permit is required but supervision by DEP is not.

• Tier 1C sites - Received a NRS score of less than 450 and equal to or greater than 350. A permit is also required but DEP approval is not required.

• Tier 2 sites - Received a total NRS score of less than 350. Permits are not required and response action may be performed under the supervision of a Licensed Professional, without prior Departmental approval.

• Tier 1D sites are sites where the responsible party fails to provide a required submittal to DEP by a specific deadline. Please note that the 21E site map contains only sites that have been classified and does not contain those sites/releases that have been reported to DEP but have not yet been classified, this number is unknown as accidental spills occur at an unknown rate.

The list of 21E sites was last updated in March 2005.

It is important to note that sites/reportable releases can also have a compliance status of Response Action Outcome (RAO). This identifies locations where an RAO Statement was submitted. “An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.” The submittal of an RAO indicates that the release/spill has been cleaned up; a Licensed Site Professional (LSP) has assessed the condition of the site and determined that additional remediation is not necessary. These sites are no longer contaminated but did experience a spill at one point. These sites are not included in this report.

15 Definitions obtained from MassGIS DEP Tier Classified Oil or Hazardous Material Sites (MGL c. 21E) Datalayer March 2005.
16 See Appendix B I and III
B. Chemical Releases

There is a great deal of publicly available information about chemical use and releases for the state of Massachusetts. The TRI and TURA databases provide a lot of useful information and unlike other areas that we are researching we were not able to find other sources of data on a community level. There is sufficient information accessible, however, for the purposes of this study.

Both databases use the expression “release” this term is somewhat misleading since a facility that reports a release under these databases is not necessarily discharging chemicals into the air or water in the vicinity of the site. They may be transporting all of the chemicals that they use to a treatment and/or disposal facility, or the entire chemical may be used up in the processes used at the site. The tables in Appendix C (II) show exactly how much chemical is used, discharged, and transported off-site by each facility.

The TURA database provides information about (TURA) listed chemicals when the following criteria is met:

- 10,000 lbs.- 25,000 lbs. are used (amount depends on how it is used)
- Information is not considered a trade secret to make chemical usage publicly available.
- The company has more at least 10 employees.

Companies that do not meet the previously mentioned criteria or are hospitals, municipal or state facilities, educational institutions, or construction operations are not required to report chemical usage and release under TURA. Under TURA companies are required to report on their toxic chemical releases and use. They also must prepare a

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18 According to the TURI website (http://www.turadata.turi.org/WhatIsTURA/FAQ.html) this list includes TRI reportable chemicals Comprehensive Environmental Response and Compensation Liability Act (CERCLA) list chemicals, (except for chemicals that are delisted). There are over 1400 chemicals that are subject to reporting, although only about 250 have been used and reported in Massachusetts.
Toxics Use Reduction Plan. Under TRI companies are only required to report their toxic chemical releases.

Yet under TRI information is available about chemical transfers to wastewater treatment plants and amount of chemicals recycled on and off-site. Additionally other differences in criteria make it necessary to study both databases in order to be able to best analyze chemical use and release data in Massachusetts.

The TRI is a “publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990.”

The TURA was passed in 1989 with the goal of reducing the amount of toxic chemicals used and toxic waste created. The program is on its way toward meeting this goal. Indeed the 2002 reported data, adjusted for production, shows that “TURA filers have decreased their toxic chemical use by 42% from the 1990 base year to 2002. Using the same method of adjustment, TURA filers are generating 67% less byproducts or waste per unit of product and have reduced releases of TRI reported on-site chemicals by 92%. Quantities of chemicals shipped in product have varied over the past years, yielding a production adjusted reduction of 58% since 1990.”

We met with Paul Richards, director of EOA Office of Technical Assistance (OTA). The OTA was set up to provide non-regulatory technical support to

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20 Toxic Use Reduction Institute. “Results to Date” http://www.turadata.turi.org/Success/ResultsToDate.html (accessed April 1, 2005)
Massachusetts businesses to help them reduce the amount of toxics used in their production processes. The program is confidential and attempts to provide businesses with alternatives to toxic chemicals that help their business perform “cheaper, faster, and better”. Paul informed us that the OTA has implemented a Massachusetts High Priority Substances Strategy (HPS). The five chemicals that were chosen; arsenic, dioxin, lead, mercury, and trichloroethylene are chemicals identified on the TRI as Persistent, Bioaccumulative, and Toxic (PBT). These substances were seen as the most dangerous to human health and the environment.

The TRI has a PBT list that includes the 5 chemicals identified by OTA, but Polyaromatic Compounds (PAC) are also included on this list. In the analysis of the chemical release data the total number of reporting facilities were counted for each community and the total number of facilities using the 6 PBT chemicals, as well as Benzoperylenes (a type of PAC) were also counted for each facility (See Figure 1).

![Figure 1: TURA and TRI Chemical Releases 2002](image1.png)

<table>
<thead>
<tr>
<th>Boston</th>
<th>Cambridge</th>
<th>Everett</th>
<th>Chelsea</th>
<th>Somerville</th>
<th>Quincy</th>
<th>Medford</th>
<th>Revere</th>
</tr>
</thead>
<tbody>
<tr>
<td>seven PBT</td>
<td>23</td>
<td>4</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>All Chemicals</td>
<td>61</td>
<td>18</td>
<td>13</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 1: TURA and TRI Chemical Releases 2002
C. Facility Air Emissions

The first type of air pollution data collected for this project is emissions released from facilities regulated by the government. The facilities are regulated at the state level by the DEP’s Bureau of Waste Prevention (BWP) and at the federal level by the EPA. Although facility air emissions represent less than half of the air pollution in New England, it is important to recognize where geographically these emissions are originating from for environmental justice purposes. Many of these pollutants from industry may contribute to the poor health of the surrounding communities. The methodology for obtaining and analyzing this data and the findings will be discussed in later sections.21 22

D. Air Monitoring

Air monitoring in the Boston area has been relatively limited. The state owns a small amount of monitoring sites that exist within our area of study. Monitoring sites measured each criteria air pollutant as defined by the Clean Air Act. Federal regulations require such monitoring to be done by each state. Massachusetts has done monitoring, but only to the extent that the state’s budget allows. Unfortunately, according to the EOEA, the monitoring station in Kenmore Square discontinued its service. Now, there is only one site that monitors for all criteria air pollutants as defined by the Clean Air Act. This site is located in Dudley Square in Roxbury. The site keeps track of daily air pollution levels in the Roxbury area through the AirBeat system online. This station was setup at this location because it is just “one block from the busiest bus station in the

21 See Appendix D (I & II) for air pollution data tables
22 See Appendix D (III& IV) for GIS maps for CO and PM emissions
public transit system." We were unable to find any other similar systems for air quality monitoring in our study area.

For the purposes of this report, values for each of the criteria air pollutants monitored by sites in Boston are reported. The following table illustrates the criteria air pollutant standards set by the Clean Air Act and adopted by the Commonwealth of Massachusetts:

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Average Period</th>
<th>NAAQS Primary (ug/m3)</th>
<th>Secondary</th>
<th>MAAQS Primary (ug/m3)</th>
<th>Parts per million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen Dioxide</td>
<td>Annual (1)</td>
<td>100</td>
<td>Same</td>
<td>100</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>Annual (1)</td>
<td>80</td>
<td>----</td>
<td>80</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>24-hour (2)</td>
<td>365</td>
<td>----</td>
<td>365</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>3-hour (2)</td>
<td>----</td>
<td>1,300</td>
<td>----</td>
<td>0.50</td>
</tr>
<tr>
<td>PM-10</td>
<td>Annual (4)</td>
<td>50</td>
<td>----</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>24-hour (3)</td>
<td>150</td>
<td>----</td>
<td>150</td>
<td>-</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>8-hour (2)</td>
<td>10,000</td>
<td>Same</td>
<td>10,000</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>1-hour (2)</td>
<td>40,000</td>
<td>Same</td>
<td>40,000</td>
<td>35</td>
</tr>
<tr>
<td>Ozone</td>
<td>1-hour (3)</td>
<td>235</td>
<td>Same</td>
<td>235</td>
<td>0.12</td>
</tr>
<tr>
<td>Lead</td>
<td>3-month(1)</td>
<td>1.5</td>
<td>----</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

(1) Not to be exceeded.
(2) Not to be exceeded more than once per year.
(3) Not to be exceeded more than one day per year over three years.
(4) Not to be exceeded by the arithmetic average of the annual arithmetic averages from three successive years.
Source: 40 CFR 50 and 310 CMR 6.00, Department of Environmental Protection

**Table 1: NAAQS and MAAQS**

With the limited monitoring data available it is difficult to assess the area for environmental justice purposes. However, since 72.7% of neighborhoods in Boston are considered to be “environmental justice communities” according to the state’s EJ Policy, it is important to discuss findings reported in the state’s annual report on air quality.

In 2003, the Ambient Air Quality Report was released for New England. A small number of monitoring sites were evaluated in Massachusetts\textsuperscript{24}. Pollutants measured by sites in the area of our study include carbon monoxide, 1-hour and 8-hour ozone, nitrogen dioxide, particulate matters, and sulfur dioxide. The site at Kenmore Square in Boston also measures the amount of lead in the air. These pollutants either play a role in ozone formation or are themselves damaging to the environmental health of the community.

Other information was obtained through EPA’s AirData system. Upon entering a geographic area (in this case: the state of MA), one is able to obtain information on monitor values reported for each criteria air pollutant. These values are from 2004.

The Dudley Square station measured 4.1 parts per million (ppm) as the highest value for 1-hour carbon monoxide in 2003 and 2.6 ppm as the highest value for 8-hour carbon monoxide. The station at Kenmore Square recorded 2.1 ppm as the highest value for 1-hour CO and 1.7 ppm as the highest value for 8-hour CO. According to the annual report, “no exceedances of the 8-hour NAAQS for CO were recorded at any site in Massachusetts since 1996.” Data for the state show a decrease overall for concentrations of CO. But, according to the AirData system, the Kenmore Square station recorded a high of 2.2 ppm of CO in 2004 which is 0.1 ppm higher than the value for 2003. The Dudley Square station recorded a high value of 1.8 ppm of CO in 2004 which is relatively lower than the Kenmore concentration.

\textsuperscript{24} See “Ambient Air Quality Summary-Massachusetts”
Four stations in our area measured concentrations of nitrogen dioxide for 2003. The sites were located at Kenmore Square, 531A East First Street, Long Island Hospital and Dudley Square. An annual mean of 25.1 parts per billion of NO$_2$ was recorded for the Kenmore Square station in 2003. This is well below the NAAQS which is set at 53 ppb. The Kenmore figure was the highest annual mean concentration of NO$_2$ for any site in Massachusetts. The AirData data shows that for 2004 the concentration of NO$_2$ was also 25 ppb. This data also shows that the ppb of nitrogen dioxide did reach 0.080 ppm or 80 ppb sometime during the year. It is good to note that “no upward or downward trend…can be detected in the 20-year trend data” according to the annual summary.

Two stations in our area of study recorded ozone concentrations at the 1-hour level and 8-hour level. The highest concentrations of ozone (O$_3$) for the state were not in any of the communities that we are studying. Both stations in our area that monitored O$_3$ recorded a maximum value of 0.106 ppm for 2004 for 1-hour ozone. This is below the 0.12 ppm EPA Air Quality Standard.

For 8-hour ozone the highest value recorded was 0.094 ppm for the Long Island Hospital station and 0.088 ppm was the highest value recorded for the Dudley Square station. Both of these concentrations are above the 0.08 ppm standard set by the EPA. Out of 180 days of monitoring, only 1 day at each station recorded levels greater than the standard. It appears from the AirData system that the Long Island Hospital station actually recorded 3 days above the NAAQS for ozone.

The particulate matters with diameter less than 2.5 and those less than 10 were both recorded at three sites in our area of study, all within the Boston city limits. In 2003 the annual average according to the annual summary for pm-2.5 was 13.6 ug/m$^3$. In
2002, this average was 12.9 ug/m$^3$. The concentration for 2004 acquired through the AirData system was 13.4 ug/m$^3$. In Charlestown, the One City Square station recorded concentrations of 13.9 ug/m$^3$ and 12.6 ug/m$^3$ for its two sets of monitoring observations. This information needs to be studied at greater depths in order to fully recognize potential impacts on EJ communities in the Greater Boston area.

E. Water Pollution

Drinking water, groundwater, and surface water pollution data is difficult to obtain at levels necessary for environmental justice analysis purposes. However, some significant issues concerned with water pollution have been found in environmental justice communities in our areas.

MWRA provides drinking water to all of the cities included in this study except Cambridge. The drinking water originates in the Quabbin and Wachusett Reservoirs. The water supply can be affected by materials that enter these reservoirs. The MWRA’s report on drinking water testing confirms that no material entering these reservoirs was above any threshold levels set by the EPA or the state.

There are concerns over lead in drinking water throughout the state. There is no lead found in the water at the source or in the distribution pipes. Lead can enter through poor household plumbing and piping systems. According to the EPA:

Lead is rarely found in source water, but enters tap water through corrosion of plumbing materials. Homes built before 1986 are more likely to have lead pipes, fixtures and solder. However, new homes are also at risk: even legally “lead-free” plumbing may contain up to 8 percent lead. The most common problem is with brass or chrome-plated brass faucets and fixtures which can leach significant amounts of lead into the water, especially hot water.\textsuperscript{25}

\textsuperscript{25} U.S. Environmental Protection Agency (EPA). “Lead in Drinking Water”
http://www.epa.gov/safewater/lead/index.html (accessed April 1, 2005)
Notably, in the MWRA-served communities “lead levels exceeded the Action Level in 2003.” The action level is “the concentration which, if exceeded, triggers treatment or other requirements which a water system must follow” according to EPA guidelines. The EPA requires that 9 out of 10 or 90% of the samples tests for individual homes’ tap water must meet the 15 parts per billion standard. In 2003 the lead measure in MWRA communities reached 17 ppb.

As a whole, MWRA testing does reflect that levels have been “dramatically declining” since 1996. In 2002, the action level was not exceeded and preliminary testing has shown that 2004 has similar results. The overall decrease in lead concentrations is due to the construction of facility in Marlborough which adds sodium carbonate and carbon dioxide to the system to alter pH levels and buffering capacity. High levels of lead may be disproportionately related to environmental justice communities, but more detailed testing results are needed to demonstrate where exactly each household problem occurs. The following illustration demonstrates the general lead findings in drinking water of the communities served by MWRA:

Another important finding reported in the MWRA’s drinking water report was for bacteria levels. Only one community tested above the EPA’s standard for *coliform*. The EPA requires that no more than 5% of the samples in a given month be contaminated with this bacterium. In Quincy 9.4% of the samples were positive. A follow-up test was done for *E-coli*, and fortunately it was not found. This is an area of concern for this report because 29% of Quincy is made up of environmental justice communities.

F. **Fish Consumption**

A study done by Tufts students in December of 2003 shows that there may be environmental justice concerns over consumption of fish with potentially dangerous levels of toxins. The report, *Implementation of the Massachusetts Environmental Justice Policy: Public Health Issues Related to Fish Consumption*, draws a couple of important conclusions to recognize.
First, there has been a limited amount of testing done in certain portions of the Mystic River. In the Boston area, the Mystic is surrounded by the study area for this report. Several of these populations are environmental justice population, although at this time there is no precise data on exactly who comprises these populations. The group that undertook the Tufts study was “unable to find a relevant saltwater fish toxics monitoring program in Massachusetts.” This may be an environmental injustice as much of the surrounding population in Everett, Chelsea, Somerville and Medford is classified as an EJ Population by the 2002 EJ Policy.

Another concern for environmental justice is in regards to the proper advisories. As the Tufts study illustrates, non-English speaking and non-English reading EJ Populations may be poorly notified of the dangers of the consumption of fish. Statewide advisories exist for mercury levels, but EJ communities may be unaware of such dangers.

G. Health Indicators

It is difficult to confirm a link between exposure to pollution and an adverse health impact, other possible causes of the disease must be considered. While it is tempting to look at health indicator trends that appear to be related to an environmental exposure, for example high rates of lung cancer near a noxious power plant, evaluation of health data requires a more thorough analysis. This data must be critically analyzed to factor out other possible causes of disease, such as smoking rates or possible workplace exposure in the case of lung cancer. Additionally, access to quality healthcare must also be considered. This study will not attempt to use health data to make direct causal relationships as this type of analysis is beyond the scope of our work. We will however

provide rates of incidents of the identified diseases (asthma, lung cancer, and cardiovascular disease) as well as identification of high risk communities for childhood lead poisoning. In addition, we will provide background information on several studies that attempt to explore the links between exposure to environmental pollution and adverse health impacts.

i) Asthma

Asthma is one of the most well studied environmental health indicators. As described by the Asthma Regional Council of New England asthma is “characterized by inflammation of the airways that causes wheezing, coughing and difficulty in breathing” (Lichter 2004 p3.). The cause of asthma is not known however there is speculation that environmental pollutants may contribute to the onset of the asthmatic attacks and potentially the disease.

It is known that environmental pollutants, such particulate matter, can trigger asthma attacks. Additionally, indoor pollution from mold, mildew, dust, pets and cigarette smoke can trigger attacks. In 1999 the Massachusetts Department of Public Health (DPH) issued “A Report on Issues Related to Indoor Air Quality (IAQ) among Massachusetts Elementary Schools” they found the following:

- 2/3 of the schools had indoor air quality problems;
- There was a significantly higher rate of asthma among students in schools with IAQ problems (7.9% versus 5.9%);
- Mold was the top IAQ problem identified by school officials (34%); and
- Few school officials (28%) knew of the free EPA Tools for Schools kit available to help identify and correct IAQ problems in the schools.²⁸

The IAQ problems in schools combined with environmental pollution triggers create a difficult situation for families living in EJ communities. Children who suffer from asthma and are growing up in low income EJ communities are surrounding by these triggers. They attend under funded schools that are more prone to have these IAQ problems and they are living in neighborhoods where they are disproportionately exposed to environmental pollutants, which can cause asthma attacks.

*Asthma in the context of high asthma rates in New England:*

The New England Asthma Regional Council analyzed prevalence of adult and childhood asthma in the six New England states in their Reports “Asthma in New England: Part I: Adults” and Part II: Children. They found that approximately 1 million adults in New England currently have asthma. They also discovered that New England had a higher self-reported adult asthma rate (8.9%) compared to the combined rate for 44 other U.S. states and three territories that participated (7.1%). When the study was conducted for children in New England they were not able to compare the results to other states as in the adult study. They did feel that the childhood asthma rates suggested a “significant burden”. More than one in every nine children in New England, and close to one in every five households with children has been affected by asthma. Additionally, they found that lifetime childhood asthma rates were similar in all six states. Rhode Island had the lowest rate, 10.7% and Maine the highest at 13.2%. The rate in Massachusetts was 12.3%.²⁹

An annual Center for Disease Control (CDC) health, performed prior to the New England Regional Council study, found that five of the seven states in the U.S. with the

highest levels of adult asthma were in New England (Massachusetts, Maine, Rhode Island, and New Hampshire). In Massachusetts 9.5% of adults self-reported that they had asthma, the national average is 7.2%. There are various theories as to why New England has a high rate of asthma. Environmental pollution within New England and air pollution from the Midwest as well as harsh weather and older buildings and homes with poor ventilation systems and IAQ issues are possible causes.\(^\text{30}\)

\textit{ii) Lead Exposure}

Lead is a highly toxic metal and basic element that can combine with a number of other compounds and substances to form numerous Lead Containing Materials. Exposures to lead can occur in the workplace and the home. The primary routes of exposure are through inhalation of lead dust and consumption of drinking water containing lead.\(^\text{31}\)

The inhalation and ingestion of lead can cause serious and debilitating diseases in adults and children. Acute lead poisoning is very rare and is almost always fatal. Generally, the health affects associated with lead exposure are long term. Lead is absorbed into the bloodstream and deposited throughout the skeletal system. Often, lead affects the functions of the kidneys, immune system, the central nervous system and reproductive system. The most sensitive organ system affected by lead is the central nervous system.

Exposure to lead is more dangerous for young and unborn children. Effects to unborn children, exposed in utero to lead, include premature births, smaller size and birth weight, decreased mental ability, learning difficulties, and reduced growth.

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\(^{31}\) From non-security sensitive internal Federal Aviation Administration (FAA) Lead Management Program document. Karen Petho works as a government contractor for the FAA.
In adults, lead exposure may decrease reaction time, cause weakness in the fingers, wrists or ankles, and possibly affect the memory. Lead can cause anemia, a disorder of the blood as well as inducing abortion and damage to the male reproductive system.

In 1978 the Consumer Product Safety Commission banned the sale of LBP to consumers and the use of lead paint in residences and other areas where consumers have direct access to painted surfaces. Lower quality, older homes often have problems with chipping lead-based paint and older plumbing systems that may contain lead. This has become a major health issue for low income neighborhoods and EJ communities. Indeed “Lead poisoning is more prevalent in children who live in older housing, and in children of low income families”.32

| In blood:                                                                                      |
|                                                                                               |
| **10 ug/dl** (CDC) for children                                                                |
| CDC Action Level                                                                             |
| **40 ug/dl** (OSHA) permissible blood lead level                                           |
| OSHA 29 CFR 1926.62 and                                                                     |
| **50 ug/dl** (OSHA) (blood level requiring medical removal of worker)                        |
| OSHA 29 CFR 1910.1025                                                                         |
| **10 ug/dl** Minnesota limits for pregnant women                                             |
| **25 ug/dl** for adults                                                                        |
| EPA Standard for Lead In drinking water                                                      |
| **15 ppb** (ug/liter)-EPA Maximum Containment Level                                           |
| EPA 40 CFR part 141.80                                                                        |

**Table 2: Exposure Limits for Lead Levels**

iii) **Lung Cancer**

As the “leading cause of cancer deaths in both men and women in the United States and throughout the world”33, lung cancer was an important health indicator to

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32 Source: [http://www.epa.gov/region8/ej/lead.html](http://www.epa.gov/region8/ej/lead.html)
33 Source: eMedicine Health 2005 p1
research as part of this report. By the year 2004 lung cancer was projected to claim 160,440 lives in the United States alone.\(^{34}\)

There are many conditions that may lead to lung cancer, including cigarette smoke, asbestos and other environmental conditions. Of the patients who develop lung cancer, between 80-90% of the patients have smoked in the past or are current smokers.\(^{35}\) Despite the strong connection between smoking and lung cancer, researchers are interested in the other factors such as work setting and environmental conditions that lung cancer patients were exposed to which may increase the likelihood of developing lung cancer.

The American Cancer Society (ACS) mentions additional “risk factors” that may lead to lung cancer (The American Cancer Society 2005). These factors include asbestos, radon (radioactive gas), radiation treatment to the lungs, diseases such as tuberculosis or pneumonia, diet, and air pollution. The ACS also mentions hazardous substances often found in the workplace that could lead to lung cancer such as uranium, arsenic, vinyl, chloride, nickel chromates, coal products, mustard gas, chloromethyl ethers, gasoline, and diesel exhaust.\(^{36}\)

One study that is currently underway in Boston is being led by Dr. David C. Christiani. The study is called The Harvard School of Health Lung Cancer Susceptibility and Outcomes Study.\(^{37}\) The main goals of the study includes to learn more about identifying other factors beyond cigarette smoke as potential causes of lung cancer, the role that genetics play in the onset of the disease, and special types of lung cancers that

\(^{34}\) This information was obtained from www.emedicinehealth.com/articles/15405-1.asp  
\(^{35}\) Harvard School of Public Health 2005 p1.  
\(^{36}\) The American Cancer Society 2005  
\(^{37}\) For additional information regarding this study please refer to: http://www.hsph.harvard.edu/lungcancer/
occur in some patients. The patients that are the focus of this study are lung cancer patients that have been seen at Massachusetts General Hospital between 1992 and 2003 for the study. According to the website the report has not been completed yet. Once finished it may be a good resource to obtain cancer data and information for the greater Boston area.

There are many types of lung cancer, such as small cell and large cell cancers, which can be broken down further into specific types of cancer. This report focuses on the overall number of lung cancer deaths within the ten study communities and does not focus on one type of lung cancer. The lung cancer data included in this report was obtained from the Massachusetts Community Health Information Profile.  

iv) **Cardiovascular Disease**

There is a growing field of research exploring the connection between exposure to particulate matter and cardiovascular disease. Indeed “Numerous studies link particle levels to increased hospital admissions and emergency room visits and even to death from heart or lung diseases. Both long- and short-term particle exposures have been linked to health problems.

**Long-term exposures**, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis, and even premature death.

**Short-term exposures** to particles (hours or days) can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not

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38 Harvard School of Public Health 2005  
39 MassCHIP
been reported to suffer serious effects from short-term exposures, although they may experience temporary minor irritation when particle levels are elevated.\textsuperscript{40}

For people suffering from heart disease, particle exposure can cause serious problems in a short period of time even heart attacks with no warning signs.\textsuperscript{41}

Researchers at the University of Washington (UW) are currently exploring the relationships between exposure to particulate matter and cardiovascular disease in a 10-year $30 million study funded by a grant from the U.S. Environmental Protection Agency (EPA).

The subjects will be about 8,700 people from nine communities in California, Illinois, New York, North Carolina, Maryland and Minnesota. The UW is working on this study in collaboration with researchers from the University of California, Los Angeles; Columbia University; Northwestern University; University of Minnesota; Johns Hopkins; Wake Forest; University of Vermont; Tufts-New England Medical Center; and the University of Michigan.\textsuperscript{42}

While the link between heart disease and exposure to particulate matter has been widely studied, Dr. Eliseo Guallar, Assistant Professor of Epidemiology at the Johns Hopkins Bloomberg School of Public Health, focuses his work on the role of environmental exposure to mercury, arsenic, lead, and cadmium in the development of heart disease.\textsuperscript{43} One of his studies, funded by the American Heart Association and the National Heart, Lung, and Blood Institute explored the link between lead and cadmium exposure and cardiovascular disease.\textsuperscript{43}

\begin{thebibliography}{99}
\bibitem{epa}“Particle Pollution and Your Health”. \url{http://www.epa.gov/airnow/particle/cover.html} accessed April 26, 2005
\bibitem{ibid}Ibid
\bibitem{uw}“EPA funds UW-led study on air pollution and cardiovascular disease”. \url{http://depts.washington.edu/mednews/vol8/no30/epa.html} accessed April 26, 2005.
\bibitem{jhsp}Johns Hopkins School of Public Health, Faculty. \url{http://faculty.jhsphs.edu} accessed April 15, 2005. Study published in the peer reviewed, June 2004 issue of \textit{Circulation}.
\end{thebibliography}
exposure and peripheral artery disease (PAD). The study of 2,125 adults found that those with the highest blood concentrations of lead or cadmium were almost three times as likely to develop PAD then those with the lowest levels of the two metals. More research is necessary in order to determine if there is indeed a relationship, however, it is interesting that Dr. Guallar’s work focuses on exploring this relationship.

45 Eliseo Guallar, M.D., Dr. PH. http://americanheart.org/presenter accessed on April 15, 2005.
IV. Methodology

Prior to initiating our research for this project our team applied for and received approval from the International Review Board (IRB). The IRB approval made possible several methods of research including phone and person-to-person interviews, internet research of governmental and organizational websites, analysis of environmental and health reports, geographical mapping, integration of data through spreadsheets, table and chart creation. The main technique used to gather quantitative data for this report was to start with the Federal Agencies for general information and then narrow the scope to the local level for specific data.

We first consulted Federal data such as US Census Data from year 2000 and information from the Environmental Protection Agency (EPA). Massachusetts state resources such as EOEA, Department of Environmental Protection (DEP), Massachusetts Global Information System group (MassGIS), and Massachusetts Community Health Information Profile (MassCHIP) were also used. Then we progressed to the local level to obtain location specific information that local officials had knowledge of. The majority of the data collected for and included in this report is publicly available information.

The methodologies for each of the data collection topics varied slightly and are included below.

A. Brownfields Methodology

The first step was to clearly identify the definition of a Brownfield. There are at least two definitions that were applicable to this project. The definitions are provided by the EPA and the Massachusetts DEP. The EPA’s definition states that a Brownfield is:
“Real property, the expansion, redevelopment, or reuse of which may be complicated by
the presence or potential presence of a hazardous substance, pollutant, or contaminant” 46.

Although the state of Massachusetts DEP does not have a formal definition of
Brownfields it relies on certain characteristics to identify Brownfields. These include;
“the sites are typically abandoned or for sale or lease; they typically have been used for
commercial or industrial purposes; they may have been reported to DEP because
contamination has been found; or they may not have been assessed due to fear of
unknown contamination conditions” 47. Because there were slight differences between the
two definitions a new approach to researching Brownfields was taken.

In order to gain a clear understanding of the definition of a Brownfield the
Brownfields Coordinator for DEP, Ms. Catherine Finnernan was interviewed. Based on
the opinion of Ms. Finnernan the term Brownfields is often misused partially because the
MA DEP does not have a formal definition. In reality it is difficult to classify a site as a
Brownfield unless it is in the process of being purchased or sold and testing of the site
has confirmed some level of contamination. Ms. Finnernan also stated that DEP has been
working to obtain a list of Brownfield sites from local municipalities for Massachusetts
for the past year and has been unsuccessful.

In the interest of time and resources for this project, the definition used to classify
a site as a Brownfield was the EPA definition: “real property, the expansion,
redevelopment, or reuse of which may be complicated by the presence or potential
presence of a hazardous substance, pollutant, or contaminant”. 48 Those sites that have
been abandoned within communities and may contribute to neighborhood blight were

only included in this count if Brownfields if it contained contamination and was classified by DEP or was labeled a Brownfield by the local Planner.

The DEP database was used to obtain the list of sites within each of the 10 communities that had experienced a release or contained contamination and was Tier classified under the MA 21E regulation.

Once the data regarding the presence of hazardous substance, pollutant or contaminate for each of the 10 towns was collected from the DEP database, those sites that contained the potential presence of a hazardous substance, pollutant or contaminate had to be identified. The method used to collect this information included contacting the Planner or Community Development Employee from each of the 10 municipalities.

The planners were contacted via email, phone, or interviewed in person to obtain additional information. Upon contact with the officials they were asked to identify the sites they would consider Brownfield sites. They were asked to provide the street address of the site and current use if the information was available. If the planner was unable to identify Brownfield sites he was asked to review the list of DEP Tier classified sites to see if any stood out as priority sites, properties that have the potential for redevelopment and should be cleaned-up as soon as possible\footnote{Table summarizing these findings can be located within each community profile and also in Appendix B II.}.

In addition to the DEP web page other Internet sources were used in the research of Brownfields and contaminated sites. Some resources include the web pages of EOEA, Massachusetts Geographic Information System (MassGIS), and EPA.

As the release and/or contaminated sites were identified information such as the site address, current use, release tracking number (RTN), compliance status, and Tier
classification, was entered into an Excel spreadsheet. If the site had an address fact
finder was used to obtain the tract number where the site was located. Excel was used so
that the data could be exported into an Access database and merged with additional data
such as population, health indicators, sources of pollution, water quality data, etc. for use
in further research\textsuperscript{50}.

Once the data was entered into the spreadsheet the number of sites located within
the same tract was noted. Trends were difficult to identify because many of the spills
were classified as Tier 1D sites, whose status is unknown. Areas that contained the
potential for exposure to high risks are noted in Section VI Potential “hot spots”. The
threat that each Brownfield poses to the community was determined based on the number
of Brownfields as well as their level of contamination, as reported through the Tier
classification system. The levels of contamination have the potential of harming human
health, which should be the first concern. The Tier 1A sites are the most contaminated
and therefore pose the greatest threat to a community; followed by Tier 1B, Tier 1C, and
Tier 2.

B. Chemical Release Methodology

Chemical release information was obtained via the online databases of the federal
Toxic Release Inventory (TRI) database (a database available on the EPA’s website) and
the Massachusetts Toxic Use Reduction Act (TURA) reportable release, and toxic
substance usage database (a database created by the University of Massachusetts at
Lowell’s Toxic Use Reduction Institute (TURI).

\textsuperscript{50} Electronic form of the data can be located on CD included with this report
The information obtained from the TRI database was found at the county level and the TURA information was found at the city/town level. The TURA data was easily downloaded into a Microsoft Excel spreadsheet (spreadsheet). The TRI data was not. In order to use this data, the information for each facility was printed out and mapped using Mapquest. This data was then entered into a spreadsheet. In order to make this information compatible and comparable to the other data sets collected for this study a column was added to the TURA and TRI spreadsheets that included the Census tract number for each facility.

C. Air Emissions Methodology

The sources of air emissions in the communities under study have been inventoried by the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection. The EPA’s AirData website draws information from the National Emissions Inventory (NEI) database. This information is from 1999, but an updated inventory for the year 2002 is expected to be released in December of 2005. Any of the information, therefore, must be viewed in 1999 terms. The DEP’s Bureau of Waste Protection (BWP) provided a list of emissions from regulated facilities. These lists are very similar to the NEI, except the DEP’s list provides information that may be from as recently as 2003, depending on the site. The NEI database was used for GIS purposes because it contained the necessary geographical information. This report will discuss findings from both inventories.

For each community, it is not useful for environmental justice means to look at all air pollutants. It is most useful to look only at those pollutants that do not disperse great distances and do pose the greatest threats to the surrounding communities. This report, in
general, will show where all the facilities emitting pollutants are located, but it is beyond
the scope of this project to analyze the dispersion of these pollutants. The pollutants
chosen for this study each have impacts on human health. Some, such as carbon
monoxide and particulate matter, may have a direct impact on the health of the
surrounding communities. Others, such as nitrogen oxides and ammonia, are precursors
to ozone or smog which is also damaging to human health. The following table lists the
pollutants studied in this report and their health impacts:

<table>
<thead>
<tr>
<th>Air Pollutant</th>
<th>Negative Health Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>Visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, and difficulty in performing complex tasks are all associated(^{51})</td>
</tr>
<tr>
<td>Particulate matter</td>
<td>Premature mortality, aggravation of respiratory and cardiovascular disease, aggravated asthma, acute respiratory symptoms, chronic bronchitis, decreased lung function, and increased risk of myocardial infarction(^{52})</td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td>Breathing difficulty, respiratory illness and disease, aggravation of existing heart disease, premature death, and visibility impairment(^{53})</td>
</tr>
<tr>
<td>Ammonia/nitrogen oxides/carbon monoxide/volatile organic compounds</td>
<td>Precursors to ground-level ozone</td>
</tr>
<tr>
<td>Ground-level ozone (smog)</td>
<td>Aggravation of asthma, respiratory infection, coughing, throat irritation, reduced lung function, difficulty breathing(^{54})</td>
</tr>
</tbody>
</table>

Table 3: Air Pollutants and Potential Health Effects


\(^{53}\) U.S. Environmental Protection Agency. [http://www.epa.gov/airurbanair/so2/hlth1.html](http://www.epa.gov/airurbanair/so2/hlth1.html) 30 March 2005

\(^{54}\) U.S. Environmental Protection Agency. [http://www.epa.gov/airnow/aqibroch/aji.html#11](http://www.epa.gov/airnow/aqibroch/aji.html#11) 30 March 2005

35
The NEI database monitors the releases of four of the criteria pollutants comprising the National Ambient Air Quality Standards (NAAQS) of the U.S. Clean Air Act. These pollutants include carbon monoxide (CO), particulate matter (pm < 2.5 micrometers in diameter, pm < 10 micrometers in diameter), sulfur dioxide (SO₂), and nitrogen oxides (NOₓ). A standard for each of these pollutants has been set based on health impacts through the CAA. For the AirData system all the emissions from facilities are listed in tons. In addition to these four criteria pollutants, the NEI database also monitors volatile organic compounds (VOCs) which react with nitrogen oxides (NOₓ) to form ground-level ozone (smog). The other chemicals that the database measures were ammonia NH₃ and particulate matter (pm-2.5 and pm-10) which combine to form harmful secondary particulate matters. The information was obtained in spreadsheet format.

To fit into the purpose of this environmental justice project it was necessary to locate each facility listed on the spreadsheets by census tract. To do this, we used the Federal Financial Institutions Examination Council's (FFIEC) Geocoding System. This system allowed us to enter each address for the air emission source facilities on the spreadsheet for all of the towns in our study. The census tract information made it simple to locate air polluting facilities within environmental justice populations.

The other facility emissions inventory collected was requested from Barbara Kwetz of the BWP. She and her colleagues created a list of all facilities regulated for the same pollutants that were found in the EPA’s AirData system. This allowed for a direct comparison between the two sets of data. Unfortunately, the BWP information did not

55 The following URL was used to collect census tract data from a given address: http://www.ffiec.gov/geocode/default.htm
include latitude and longitude information or other GIS applicable geographic data. The pollutants studied, CO, NO\textsubscript{x}, pm-2.5 and pm-10, NH\textsubscript{3}, VOCs and SO\textsubscript{2}, were chosen because of either their health effects on the surrounding communities or because they are precursors to ozone formation (see figure 2 above). After an initial analysis of this BWP data, it was decided that there were no sites listed that emitted large amounts of these pollutants into the air that were not also on the EPA’s AirData system. The best use for the BWP data was to update the NEI data.\footnote{Detailed spreadsheets for the BWP and EPA air emissions data are available in the appendix.}

Data was also obtained from the BWP for air polluting dry cleaners, printers, and photo processors.\footnote{See Appendix D V} It was not within the scope and time frame of this project to analyze this information. There was also an attempt to collect data from the Massachusetts Bay Transit Authority (MBTA) for air pollution data. The response from the MBTA was not useful for this report because the information was too general.

D. Water Pollution Methodology

Information on water pollution and concerns was collected from community groups’ websites, the EPA, and the Massachusetts Water Resources Authority (MWRA). Also, a 2003 Tufts University study on fish consumption by environmental justice populations along the Mystic River was analyzed. Since much of the information about water pollution is general information about a large area or region, it is very difficult to make conclusions about environmental injustices concerning water pollution. However, general trends are noted above in the “Background and General Information on Study Communities” Section.

\footnote{See Appendix D V}
E. Health Indicator Methodology

The research of the health indicators for the 10 communities focused on in this report was completed by using the internet, reviewing preexisting reports, and interviewing health officials and activists within several of the communities of interest.

Our first step was to determine which health indicators to study. We chose to focus on lead poisoning, asthma, cardiovascular disease, and lung cancer. These areas were our focus because of conversations with our client and the following:

Based on recommendations from Dr. David Gute, Associate Professor Environmental and Occupational Epidemiology, Tufts University Department of Civil and Environmental Engineering, we reviewed the Center for Disease Control’s (CDCs) environmental public health indicators (EPHI) framework. “Environmental public health indicators (EPHIs) can be used to assess our health status or risk as it relates to our environment. They may be used to assess baseline status and trends, track program goals and objectives, and build core surveillance capacity in state and local agencies.”

The framework “was designed to be needs-based to assist the states in meeting Healthy People 2010 objectives and provides a foundation for developing environmental public health surveillance (EPHS) (i.e., environmental public health tracking). The indicators are general to allow states flexibility to choose specific measures on the basis of individual needs and priorities.” Within this framework indicators are broken down into categories that describe the type of indicator. Asthma, cardiovascular, and respiratory events were all identified under the category “Unusual pattern of illness or

59 Ibid.
condition with suspected or confirmed environmental contribution”. Lead poisoning was identified under the category of Poisoning.

We also reviewed the Massachusetts Department of Public Health Massachusetts Community Health Information Profile (MassCHIP) Health Status Indicators Reports which identified lung cancer and cardiovascular disease rates for each city/town in Massachusetts. Due to the knowledge of on-going research on the connection between these chronic diseases and the availability of lung cancer and cardiovascular disease rates specifically, we choose to focus on these areas for the 10 communities.

When we began contacting representatives from local health departments they indicated that asthma was a major local health concern. Since there is no state registry for asthma it is difficult to obtain asthma rates so we relied on hospital discharge rates in the MassCHIP database and information from local health departments.

We also chose to focus on lead poisoning. Research indicates that this is a major concern for low income and environmental justice communities. The Massachusetts Department of Public Health (DPH) Childhood Lead Poisoning Prevention Program (CLPPP) provides information on Childhood Lead Poisoning Screening and Incidence Statistics. We were able to find information on rates of childhood lead poisoning in our target communities from this source.

The source used to obtain the data for the rates of asthma, bronchus and lung cancer, and cardiovascular disease was the MassCHIP Health Status Indicators Reports accessed on-line at, http://masschip.state.ma.us. The data obtained from MassCHIP is measured in area count and age adjusted rates, both use the units per 100,000 people. The data obtained is believed to be a 5-yr. Composite.
We were also able to use the Boston Public Health Commission’s web page at www.bphc.org to obtain community health series which contained reports for several of the communities within Boston. Additional sources include the Cambridge Health Alliance, and the Chelsea Creek Community Based Comparative Risk Assessment.

When we were aware of a group working in a community to collect environmental health data we contacted them to obtain this information. For example we contacted T.J. Hellman with the Chelsea Creek Action Group (CCAG). He discussed the Chelsea Creek Community Based Comparative Risk Assessment a combined project between the CCAG and the U.S. Environmental Protection Agency (EPA), published in the spring of 2003. We also contacted Penn Loh with Alternatives for Community and Environment (ACE) he indicated that their health data was not current but he was able to help us with other aspects of the project.

We also attempted to contact health departments for each community. Some communities such as Boston, Brookline, Cambridge, and Somerville have a staff devoted to environmental health concerns we contacted the following people from those communities:

- Sam Lipson, the Director of Environmental Health for Cambridge,
- Noreen Burke, Director of the Somerville Board of Health,
- Mary Austrom, Boston Public Health Commission, and
- Ellen Stockmann, Program Associate Brookline Health Department.

Other towns, like Winthrop, either did not have a health department or were primarily focused on the prevention of contagious diseases and did not have resources devoted to environmental health concerns. We contacted the following people from these communities:

- Carol Donoven, Revere Health Department
• Beth Debski, Everett City Planner

Other towns that did not respond to our requests for health information includes Medford.

Upon the collection of health indicator data it was entered into an Excel spreadsheet divided by health indicators and town/city. The data collected was analyzed and compared with the other environmental data collected by other group members. Analysis of our findings included the type of health indicators identified in the 10 communities that make up the study area of Greater Boston as well as their occurrence.
V. Community Profiles

A. Boston

One of the oldest cities in America, founded in 1630, the Greater Boston region is a unique mix of historic culture and modern change. A vibrant and diverse business sector, prestigious colleges and universities, unrivaled hospitals, world-renowned museums, and rich history characterize this coastal city. Approximately 589,141 people live in the city of Boston’s 4,466 square miles. 60 61

The city of Boston is made up of 20 neighborhoods: Allston, Back Bay, Beacon Hill, Brighton, Charlestown, Chinatown, Dorchester, Downtown, East Boston, Fenway, Kenmore, Hyde Park, Jamaica Plain, Mattapan, Mid Dorchester, Mission Hill, North End, Roslindale, Roxbury, South Boston, South End, West End, and West Roxbury.

i) Census Data

The median household income for the City of Boston is $39,639. This is 84 percent of the statewide median household income. Minorities account for 51 percent of the population. Foreign born individuals account for 26 percent of the population. 11 percent of the population is linguistically isolated.

ii) Brownfields

Boston contains many sites that have been Tier classified. Table 4 separates the number of site/reportable releases within Boston Communities.

---


<table>
<thead>
<tr>
<th>Town</th>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alston</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>No Data Available</td>
</tr>
<tr>
<td>Boston</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>75</td>
<td>43</td>
<td>&quot;</td>
</tr>
<tr>
<td>Brighton</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>4</td>
<td>&quot;</td>
</tr>
<tr>
<td>Charlestown</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>9</td>
<td>&quot;</td>
</tr>
<tr>
<td>Dicechester</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>31</td>
<td>33</td>
<td>&quot;</td>
</tr>
<tr>
<td>East Boston</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>33</td>
<td>15</td>
<td>&quot;</td>
</tr>
<tr>
<td>Hyde Park</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>&quot;</td>
</tr>
<tr>
<td>Jamaica Plain</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>9</td>
<td>&quot;</td>
</tr>
<tr>
<td>Mattapan</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>6</td>
<td>&quot;</td>
</tr>
<tr>
<td>Roxbury</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>34</td>
<td>10</td>
<td>&quot;</td>
</tr>
<tr>
<td>South Boston</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>22</td>
<td>&quot;</td>
</tr>
<tr>
<td>West Roxbury</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

**Table 4: Site/Reportable Releases within Boston Communities**

According to the DEP database of site/reportable releases downtown Boston contains the highest number of Tier 1C, Tier 2, and Tier 1D sites.

**iii) Chemical Release**

There are 61 facilities reporting under the TURA and/or TRI databases\(^{62}\). Of those 23 (38\%) are using at least one of the seven chemicals identified as Persistent, Bioaccumulative and Toxic (PBT), the remaining 62\% use other chemicals (others).

![Figure 3 Percentage of PBT Chemical Usage- Boston](image)

\(^{62}\) For more information on specific facilities reporting under the databases see Appendix C (I & II)
The graph shows the number of facilities reporting releases for each of the seven PBT chemicals, for example six facilities report releases of benzoperylenes. There were no facilities reporting releases of arsenic.

**iv) Air Emissions**

The table that follows lists the number of air polluting facilities reported in the NEI, the number of air polluting facilities reported in the BWP data, the percent of air facilities in EJ communities, the number of air polluting facilities in EJ communities, and the total number of facilities within each city in the study area. The table shows that Boston has the most facilities.

<table>
<thead>
<tr>
<th>CITY</th>
<th>Air polluting Facilities (NEI)</th>
<th>Air polluting Facilities (BWP)</th>
<th>% NEI Air Facilities in EJ</th>
<th>NEI Facilities in EJ</th>
<th>Total Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>206*</td>
<td>268</td>
<td>65.00%</td>
<td>130</td>
<td>201</td>
</tr>
<tr>
<td>Brookline</td>
<td>10</td>
<td>8</td>
<td>80%**</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Cambridge</td>
<td>38</td>
<td>65</td>
<td>94.44%**</td>
<td>35</td>
<td>38</td>
</tr>
<tr>
<td>Chelsea</td>
<td>16</td>
<td>14</td>
<td>100%</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>
The table below shows the top twenty air polluting facilities in total emissions by tons located within Boston city limits. This data is from the AirData system. The table also shows the census tract that each facility is located within and whether or not the surrounding population is considered an EJ Population. For Boston, an additional column contains the name of the community that the facility is located within.\(^{63}\) The EPA spreadsheet in the appendix contains additional information about each plant. This information includes measures of each individual pollutant and the plant address.

\(^{63}\) For the most up-to-date emissions please see the BWP facilities spreadsheet in the appendix. EPA data only was used to locate census tracts for air polluting facilities.

---

<table>
<thead>
<tr>
<th>Community</th>
<th>Emissions 1</th>
<th>Emissions 2</th>
<th>Emissions 3</th>
<th>Emissions 4</th>
<th>Emissions 5</th>
<th>Emissions 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everett</td>
<td>17</td>
<td>52</td>
<td>94%**</td>
<td>1</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Medford</td>
<td>11</td>
<td>13</td>
<td>0%</td>
<td>0</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Quincy</td>
<td>19</td>
<td>19</td>
<td>42%**</td>
<td>8</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Revere</td>
<td>5</td>
<td>9</td>
<td>40%</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Somerville</td>
<td>12</td>
<td>14</td>
<td>92%**</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Winthrop</td>
<td>1</td>
<td>1</td>
<td>n/a*</td>
<td>n/a*</td>
<td>n/a*</td>
<td></td>
</tr>
</tbody>
</table>

*denotes incomplete geographical information available resulting in no census tract data (see Table 24)
**denotes "disproportionate" location of facilities

Table 5: Air Polluting Facilities within 10 Communities

v) Health Indicators

The Boston Public Health Commission produces individual Health Status Report for each of the communities within Boston. Data was collected for each of these reports in regards to the overall health of the community. This report summarizes that information found in the report that relates to health indicators connected to the environment.64

64 See Appendix E for graphs of Asthma Hospitalization Data for Boston
Asthma

Of the health indicators reviewed asthma data was collected for 13 of the 20 communities that make up the city of Boston. Roxbury had the highest annual number of hospitalizations of children under 5 years old due to asthma at 14 per 1000 people. Dorchester was the second highest occurrence with 13 per 1000 people.  

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>298</td>
<td>62</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>1310</td>
<td>259.6</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Discharges for Primary Care Manageable Conditions</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>1509</td>
<td>297</td>
<td>128.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High Risk Communities for Childhood Lead Poisoning</th>
<th>Area Count</th>
<th>Adjusted Rate</th>
<th>State Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Poisoning</td>
<td>276</td>
<td>4.5</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Table 7: Boston Public Health Data

B. Brookline

Brookline is a unique mixture of busy streets and rolling countryside, upscale shops, village pubs, gracious apartment buildings and large estates. It is home for legions of academic and scientific professionals, who work at the nearby medical centers in Boston. Brookline has staunchly refused to be absorbed by Boston, which surrounds it like a horseshoe. Brookline has kept its town meeting form of government since 1705.

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65 See Appendix E for graphs of Asthma Hospitalization Data for Boston
Among its many unusual resources, Brookline has its own working farm, with a farm stand. The community of 6.6 square miles has almost 55,000 people. Brookline is 4 miles west of Downtown Boston.66 67

i) Census Data

The median household income is $66,711. This is 142 percent of the statewide median household income. Minorities account for 22 percent of the population. Foreign born individuals account for 27 percent of the population. 6 percent of the population is linguistically isolated.

ii) Brownfields

The number of Tier classified sites within Brookline is slightly lower than those in the other study communities.

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

A discussion with the City Planner, Jeff Levine, proved that the city does not have a long list of sites it would label as Brownfields. Mr. Levine stated that there are not many known Brownfield sites in the city partially because historically the city was not used for heavy industrial purposes. Those sites that are Brownfields are usually obtained and developed by private firms.


iii) Chemical Release

There were no facilities in the town of Brookline reporting releases in the TURA or TRI databases.

iv) Air Emissions

Eight of ten or 80% of the EPA-regulated air-polluting facilities in Brookline are found within EJ communities. The following table shows these air polluting facilities reported in the NEI located by census tract:

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>BROOKHOUSE CONDOMINIUMS</td>
<td>BROOKLINE</td>
<td>33.741</td>
<td>4009</td>
<td>Y</td>
</tr>
<tr>
<td>REGENCY PARK</td>
<td>BROOKLINE</td>
<td>13</td>
<td>4005</td>
<td>N</td>
</tr>
<tr>
<td>EXPRESS CLEANERS</td>
<td>BROOKLINE</td>
<td>4</td>
<td>4001</td>
<td>N</td>
</tr>
<tr>
<td>BARCLAY HOUSE THE</td>
<td>BROOKLINE</td>
<td>4</td>
<td>4004</td>
<td>Y</td>
</tr>
<tr>
<td>VERNON TOWERS ASSOCI</td>
<td>BROOKLINE</td>
<td>3</td>
<td>4008</td>
<td>Y</td>
</tr>
<tr>
<td>COUNTRY CLUB THE</td>
<td>BROOKLINE</td>
<td>3</td>
<td>4012</td>
<td>Y</td>
</tr>
<tr>
<td>BROOKLINE HOUSING AU</td>
<td>BROOKLINE</td>
<td>2</td>
<td>4002</td>
<td>Y</td>
</tr>
<tr>
<td>RUNKLE SCHOOL</td>
<td>BROOKLINE</td>
<td>1</td>
<td>4006</td>
<td>Y</td>
</tr>
<tr>
<td>BROOKLINE VALET SERV</td>
<td>BROOKLINE</td>
<td>1</td>
<td>4007</td>
<td>Y</td>
</tr>
<tr>
<td>MWRA BROOKLINE PUMP</td>
<td>BROOKLINE</td>
<td>0.061</td>
<td>4012</td>
<td>Y</td>
</tr>
</tbody>
</table>

Table 8: EPA-regulated air-polluting facilities in Brookline, NEI data, 1999.

v) Health Indicators

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>16</td>
<td>28.6</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>138</td>
<td>200.1</td>
<td>276.9</td>
</tr>
<tr>
<td>Hospital Discharges for Primary Care Manageable Conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Area</strong></td>
<td><strong>Age-adjusted Rate</strong></td>
<td><strong>State Age-adjusted Rate</strong></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>44</td>
<td>90</td>
<td>128.3</td>
</tr>
</tbody>
</table>

**Table 9: Brookline Public Health Data**
Brookline was not identified as a High Risk Community for Childhood Lead Poisoning.

**C. Cambridge**

Cambridge became a city in 1846. Over fifty languages may be heard on the streets of the city. Children from 82 different countries of origin attend the public schools. College students from around the world study at Harvard, Radcliffe, the Massachusetts Institute of Technology, and Lesley College. The heavy industries of the nineteenth and early twentieth centuries have been replaced by technology-based enterprises, including electronics, self-developing film and cameras, software and biotechnology research. With over 100,000 people located in a 6.5 square mile area, Cambridge is a unique community with a strong mix of cultural and social diversity, intellectual vitality and technological innovation.\(^{68}\)

\(i)\) **Census Data**

The median household income is $47,979. This is 102 percent of the statewide median household income. Minorities account for 35 percent of the population. Foreign born individuals account for 26 percent of the population. 7 percent of the population is linguistically isolated.

\(^{68}\) City of Cambridge. “A Brief History of Cambridge, Massachusetts, USA”  
ii) Brownfields

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>3</td>
<td>41</td>
<td>36</td>
<td>6</td>
</tr>
</tbody>
</table>

After comparing the data provided by DEP to those sites identified by Ms. Susanne Rassmussen, the City of Cambridge Planner, all of the sites are included in the Tier classified list. She specifically identified eight sites as being eligible for redevelopment.

iii) Chemical Releases

There are 18 facilities reporting under the TURA and/or TRI databases. Of those 4 (22%) are using at least one of the seven chemicals identified as Persistent, Bioaccumulative and Toxic (PBT), the remaining 78% use other chemicals (others).

Figure 5 Percentage of PBT Chemical Usage- Cambridge

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69 For more information on specific facilities reporting under the databases see Appendix C (I & II)
Of the facilities that report under the databases; two report releases of TCE, one reports releases of benzo(g,h,i)perylene and PAC, and one reports releases of benzoperylene and PAC. There were no reported releases arsenic, dioxin, lead, or mercury.

iv) Air Emissions

The table below shows the top twenty EPA-regulated air polluting facilities in Cambridge located by census tract. Seventeen of these facilities are located within and EJ Population.

<table>
<thead>
<tr>
<th>PLANT NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUTHERN ENERGY KEND</td>
<td>CAMBRIDGE</td>
<td>661</td>
<td>3523</td>
<td>Y</td>
</tr>
<tr>
<td>CAMBRIDGE ELECTRIC BLACKSTONE</td>
<td>CAMBRIDGE</td>
<td>318</td>
<td>3534</td>
<td>Y</td>
</tr>
<tr>
<td>MIT POWER PLANT</td>
<td>CAMBRIDGE</td>
<td>188</td>
<td>3531</td>
<td>Y</td>
</tr>
<tr>
<td>ARTHUR D LITTLE INC</td>
<td>CAMBRIDGE</td>
<td>55</td>
<td>3549</td>
<td>Y</td>
</tr>
<tr>
<td>WASHINGTON ELMS APTS</td>
<td>CAMBRIDGE</td>
<td>33</td>
<td>3527</td>
<td>Y</td>
</tr>
<tr>
<td>PUTNAM GARDENS</td>
<td>CAMBRIDGE</td>
<td>23</td>
<td>3535</td>
<td>Y</td>
</tr>
<tr>
<td>RADCLIFFE PERKINS CAMPUS</td>
<td>CAMBRIDGE</td>
<td>21</td>
<td>3540</td>
<td>Y</td>
</tr>
<tr>
<td>MT AUBURN HOSPITAL</td>
<td>CAMBRIDGE</td>
<td>21</td>
<td>3542</td>
<td>N</td>
</tr>
<tr>
<td>CAMBRIDGE HOSPITAL</td>
<td>CAMBRIDGE</td>
<td>19</td>
<td>3529</td>
<td>N</td>
</tr>
<tr>
<td>MIT EDUCATIONAL FACILITY</td>
<td>CAMBRIDGE</td>
<td>19</td>
<td>3531</td>
<td>Y</td>
</tr>
<tr>
<td>CAMBRIDGE BRANDS INC</td>
<td>CAMBRIDGE</td>
<td>15</td>
<td>3531</td>
<td>Y</td>
</tr>
<tr>
<td>YOUVILLE HOSPITAL</td>
<td>CAMBRIDGE</td>
<td>11</td>
<td>3537</td>
<td>Y</td>
</tr>
<tr>
<td>SANCTA MARIA NURSING FACILITY</td>
<td>CAMBRIDGE</td>
<td>11</td>
<td>3546</td>
<td>Y</td>
</tr>
<tr>
<td>GRACE CONSTRUCTION P</td>
<td>CAMBRIDGE</td>
<td>9</td>
<td>3550</td>
<td>N</td>
</tr>
<tr>
<td>ECKEL INDUSTRIES INC</td>
<td>CAMBRIDGE</td>
<td>8</td>
<td>3546</td>
<td>Y</td>
</tr>
<tr>
<td>MWRA PRISON POINT PU</td>
<td>CAMBRIDGE</td>
<td>7</td>
<td>3521</td>
<td>Y</td>
</tr>
<tr>
<td>CALIFORNIA PRODUCTS</td>
<td>CAMBRIDGE</td>
<td>7</td>
<td>3532</td>
<td>Y</td>
</tr>
<tr>
<td>CHARLES STARK DRAPER</td>
<td>CAMBRIDGE</td>
<td>5</td>
<td>3524</td>
<td>Y</td>
</tr>
<tr>
<td>WALDEN PARK ASSOCIATES</td>
<td>CAMBRIDGE</td>
<td>5</td>
<td>3546</td>
<td>Y</td>
</tr>
<tr>
<td>CAMBRIDGE TOWER CORPORATION</td>
<td>CAMBRIDGE</td>
<td>4</td>
<td>3538</td>
<td>Y</td>
</tr>
</tbody>
</table>

v) Health Indicator Data

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>50</td>
<td>66.9</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>193</td>
<td>250.2</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Discharges for Primary Care Manageable Conditions</th>
<th>Area Count</th>
<th>Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>99</td>
<td>130.7</td>
<td>128.3</td>
</tr>
</tbody>
</table>

Table 11: Cambridge Public Health Data

Cambridge was not identified as a High Risk Community for Childhood Lead Poisoning.

D. Chelsea

The City of Chelsea is located in Suffolk County directly across the Mystic River from the City of Boston. A glorious view of Boston's nearby skyline can be enjoyed from the waterfront and from numerous hills and high points throughout the City. Three rivers surround Chelsea: Mill Creek, Chelsea Creek, and the Island End River. Chelsea's waterfront areas support industries and port businesses. The City was established as a Town in 1739 and was incorporated as a City in 1857. The City has an estimated population of 35,080 and occupies a land area of 1.8 square miles. About half the
residents are Latino and the remainder are whites, blacks, Asians, and refugees from
countries such as Bosnia and Somalia.\textsuperscript{70, 71}

\textit{i) Census Data}

The median household income is $30,161. This is 64 percent of the statewide
median household income. Minorities account for 62 percent of the population. Foreign
born individuals account for 36 percent of the population. 18 percent of the population is
linguistically isolated.

\textit{ii) Brownfields}

\begin{tabular}{|c|c|c|c|c|c|}
\hline
Tier 1A & Tier 1B & Tier 1C & Tier 2 & Tier 1D & Brownfields \\
\hline
0 & 0 & 1 & 16 & 14 & 30 \\
\hline
\end{tabular}

Of the Tier classified sites located in Chelsea all of them have been labeled as
Brownfield sites, which have been identified on a map titled \textit{City of Chelsea Brownfields
and Spill Inventory}.\textsuperscript{72}

\textit{iii) Chemical Release}

There are 10 facilities reporting under the TURA and/or TRI databases\textsuperscript{73}. Of
those 4 (40\%) are using at least one of the seven chemicals identified as Persistent,
Bioaccumulative and Toxic (PBT), the remaining 60\% use other chemicals (others).

\textsuperscript{70} Narrative Compile by the Massachusetts Department of Housing and Community Development (DHCD).
“Description of Chelsea, Massachusetts”. http://www.mass.info/chelsea.ma/description.htm
(accessed March 29, 2005).
\textsuperscript{71} City of Chelsea. “About the City of Chelsea”.
http://www.ci.chelsea.ma.us/Public_Documents/ChelseaMA_WebDocs/about  (accessed April 2,
2005)
\textsuperscript{72} See Appendix B3
\textsuperscript{73} For more information on specific facilities reporting under the databases see Appendix C (I & II)
Of the facilities that report under the databases; two report releases of lead, and two report releases of both benzoperylene and PAC. There were no reported releases of arsenic, dioxin, mercury, or TCE.

**iv) Air Emissions**

The following table shows the air polluting facilities found in Chelsea. All are located in EJ communities because 100% of Chelsea is considered EJ.

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>GULF OIL LP CHELSEA</td>
<td>CHELSEA</td>
<td>54</td>
<td>1605</td>
<td>Y</td>
</tr>
<tr>
<td>CHELSEA SANDWICH LLC</td>
<td>CHELSEA</td>
<td>33</td>
<td>1603</td>
<td>Y</td>
</tr>
<tr>
<td>GLYPTAL INC</td>
<td>CHELSEA</td>
<td>17</td>
<td>1605</td>
<td>Y</td>
</tr>
<tr>
<td>CHELSEA SOLDIERS HOM</td>
<td>CHELSEA</td>
<td>14</td>
<td>1606</td>
<td>Y</td>
</tr>
<tr>
<td>COASTAL OIL OF NEW ENGLAND</td>
<td>CHELSEA</td>
<td>10</td>
<td>1601</td>
<td>Y</td>
</tr>
<tr>
<td>PILLSBURY BAKERIES</td>
<td>CHELSEA</td>
<td>7</td>
<td>1604</td>
<td>Y</td>
</tr>
<tr>
<td>PILLSBURY BAKERIES</td>
<td>CHELSEA</td>
<td>6</td>
<td>1604</td>
<td>Y</td>
</tr>
<tr>
<td>KAYEM FOODS, INC</td>
<td>CHELSEA</td>
<td>6</td>
<td>1604</td>
<td>Y</td>
</tr>
<tr>
<td>EMTEX INC</td>
<td>CHELSEA</td>
<td>4</td>
<td>1605</td>
<td>Y</td>
</tr>
<tr>
<td>NETEC INCORPORATED</td>
<td>CHELSEA</td>
<td>3</td>
<td>1605</td>
<td>Y</td>
</tr>
<tr>
<td>E CIARDI COMPANY INC</td>
<td>CHELSEA</td>
<td>2</td>
<td>1601</td>
<td>Y</td>
</tr>
<tr>
<td>MWRA CHELSEA CREEK</td>
<td>CHELSEA</td>
<td>2</td>
<td>1601</td>
<td>Y</td>
</tr>
<tr>
<td>THOMAS STRAHAN INC</td>
<td>CHELSEA</td>
<td>1</td>
<td>1604</td>
<td>Y</td>
</tr>
</tbody>
</table>

v) Health Indicator Data

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>21</td>
<td>68.6</td>
<td>56</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>92</td>
<td>278.7</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Discharges for Primary Care Manageable Conditions</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>68</td>
<td>207.7</td>
<td>128.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High Risk Communities for Childhood Lead Poisoning</th>
<th>Area Count</th>
<th>Adjusted Rate</th>
<th>State Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Poisoning</td>
<td>26</td>
<td>4.6</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Table 13: Chelsea Public Health Data

E. Everett

A blue-collar working class community, Everett has served as a gateway city to immigrants for most of its history. In 1870 Everett became its own town, and in 1892 a city. The community has a diversified industrial and commercial base with manufacturing accounting for approximately 31% of all jobs and more than 35% of the total annual payroll, followed by services and retail trade. The city has a population of 38,037 living within its 3.36 square miles yet is able to provide a high level of
educational, public safety, public works and recreational services to its citizens at a modest tax rate. Everett has a convenient and accessible location abutting Boston on the Mystic River; indeed Boston is only 4 miles south of Everett. The city is close to Interstate Highways 93 and 95.74

i) Census Data

The median household income is $40,661. This is 87 percent of the statewide median household income. Minorities account for 25 percent of the population. Foreign born individuals account for 22 percent of the population. 8 percent of the population is linguistically isolated.

ii) Brownfields

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>21</td>
<td>23</td>
<td>10</td>
</tr>
</tbody>
</table>

The City Planner, Beth Debski, mentioned that the city is experiencing a lot of growth and in the process a large majority of these sites are being cleaned up and redeveloped. Ms. Debski identified 10 Brownfield sites; of which all have been included in the Site/Reportable Release list. Each of the sites Mrs. Debski pointed out had a compliance status of either Tier 2 or RAO. Those sites identified as RAO sites are in the process of being redeveloped now that they have completed the remediation process. Five of the ten sites identified are currently under construction and being developed into housing units or mixed used.

iii) Chemical Release

There are 13 facilities reporting under the TURA and/or TRI databases. Of those 9 (69%) are using at least one of the seven chemicals identified as Persistent, Bioaccumulative and Toxic (PBT), the remaining 31% use other chemicals (others).

---

**Figure 7 Percentage of PBT Chemical Usage - Everett**

**Figure 8 Number of Facilities Using PBT Chemicals - Everett**

---

75 For more information on specific facilities reporting under the databases see Appendix???
The graph shows the number of facilities reporting releases for each of the seven PBT chemicals, for example seven facilities report releases of lead. There were no facilities reporting releases of arsenic or dioxin.

iv) Air Emissions

The largest facility emitter of air pollution in our study area is found in Everett. The population in the census tract in which this plant is located is an environmental justice population according the state’s EJ Policy. The plant, Exelon Mystic Llc. polluted 16,352 tons of sulfur dioxide, 86 tons of ammonia, 3427 tons of nitrogen oxides, and 563 tons of carbon monoxide. Meanwhile, the neighborhood surrounding the plant is 32.1% minority with an estimated mean family income for 2004 of $50,936. Exelon Mystic also polluted 285 tons of pm-10 and 272 tons of pm-2.5 in 1999.

Furthermore, the plant violated state monitoring provisions during the period of 1998-2003. According to engineering sources, the plant agreed to a $6 million enforcement case settlement.76 These penalty fees include $1 million for a civil penalty; and project funding for environmental projects in the Boston area stretched to $5 million. During the five year period, the EPA alleged that Exelon violated the Clean Air Act 6000 times. According The Chief Engineer “Most of the violations took place at the three oldest units, which virtually ceased operations in March 2003.”77

In 2003, the Exelon Mystic plant reported much lower but still considerable amounts of these pollutants to the BWP. Figure 9 below shows decreases in nitrogen

---

76 In Appendix see “Settlement Includes Largest School Bus Pollution Control Project in Country” from The Chief Engineer at http://www.chiefengineer.org/content/content_display.cfm/seqnumber_content/1534.htm
77 Also see “EPA/DOJ Enforcement Case Brings Clean Air Benefits to Boston” at http://www.epa.gov/boston/pr/2004/jan/040116.html
oxide and carbon monoxide emissions, but increases in particulates and ammonias. This plant may disperse some of these chemicals to other nearby communities (EJ and non-EJ) as well.

![Exelon Mystic LLC Air Emissions in tons, from EPA AirData Database, 1999, and BWP Facility Emissions Inventory, 2003](image)

Figure 9: Exelon Mystic LLC Air Emissions in tons, from EPA AirData Database, 1999, and BWP Facility Emissions Inventory, 2003

Sixteen of the seventeen sites in Everett which are listed by the EPA on the AirData website are in this census tract (3424.00). Totaled together these polluters emitted 401 tons of volatile organic compounds, 607 tons of carbon monoxide, 3462 tons of nitrogen oxides, 302 tons of particulate matter-2.5, and 317 tons of particulate matter-10 into the air of the surrounding environmental justice population in 1999. Once the current NEI is released by the EPA an updated study should be done for this census
tract.\textsuperscript{78} It is also important that the dispersion of these emissions is monitored to see these plants affect communities nearby, perhaps in Somerville or Chelsea.

The following table shows all air polluting facilities in Everett:

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXELONG MYSTIC LLC</td>
<td>EVERETT</td>
<td>20833</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>HUB FABRIC LEATHER</td>
<td>EVERETT</td>
<td>100</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>EXXON EVERETT TERMINAL</td>
<td>EVERETT</td>
<td>95</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>EVERETT MARINE TERMINAL</td>
<td>EVERETT</td>
<td>91</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>MERRILL DANIELS CORP</td>
<td>EVERETT</td>
<td>49</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>DUNCAN GROUP THE</td>
<td>EVERETT</td>
<td>19</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>WHIDDEN MEMORIAL HOSPITAL</td>
<td>EVERETT</td>
<td>15</td>
<td>3421</td>
<td>N</td>
</tr>
<tr>
<td>MBTA EVERETT SHOPS</td>
<td>EVERETT</td>
<td>11</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>LEE PRODUCTS COMPANY</td>
<td>EVERETT</td>
<td>11</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>MARKET FORGE INDUSTRIES INC</td>
<td>EVERETT</td>
<td>5</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>DAMPNEY COMPANY INC</td>
<td>EVERETT</td>
<td>3</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>ARROW INTERNATIONAL</td>
<td>EVERETT</td>
<td>2</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>EMCO PRINTERS INCORPOR</td>
<td>EVERETT</td>
<td>2</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>WA WOOD COMPANY</td>
<td>EVERETT</td>
<td>1</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>BAYSTATE GALVANIZING</td>
<td>EVERETT</td>
<td>1</td>
<td>3424</td>
<td>Y</td>
</tr>
<tr>
<td>HK GRAPHICS INC</td>
<td>EVERETT</td>
<td>1</td>
<td>3424</td>
<td>Y</td>
</tr>
</tbody>
</table>

Table 14: EPA-regulated air-polluting facilities in Everett, NEI data, 1999.

v) Health Indicators

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate\textsuperscript{**}</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>32</td>
<td>78.4</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>140</td>
<td>322.6</td>
<td>276.9</td>
</tr>
</tbody>
</table>

Hospital Discharges for Primary Care Manageable Conditions

\textsuperscript{78} See Recommendations section
<table>
<thead>
<tr>
<th>Area</th>
<th>Count</th>
<th>Area Age-Adjusted Rate</th>
<th>State Age-Adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>52</td>
<td>143.9</td>
<td>128.3</td>
</tr>
</tbody>
</table>

Table 15: Everett Health Data

Everett was not identified as a High Risk Community for Childhood Lead Poisoning.

F. Medford

The city of Medford is an historic suburban city located on the Mystic River with several small streams that provided waterpower for early industries. It became a town in 1695 and a city in 1892. There are now many suburban neighborhoods in Medford resulting from the rapid and dense development that followed the First World War. Yet the city retains a rich architectural heritage. Additionally, Medford is home to Tufts University, founded in 1852. The city is served by the Massachusetts Bay Transportation Authority (MBTA) commuter rail line and orange line. Medford is located 5 miles northwest of Boston. The city’s 8.21 square miles house 55,765 people.79

i) Census Data

The median household income is $52,476. This is 112 percent of the statewide median household income. Minorities account for 15 percent of the population. Foreign

born individuals account for 16 percent of the population. 5 percent of the population is linguistically isolated.

**ii) Brownfields**

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>24</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

Two of the Tier 2 sites had two site/releases and were listed twice with different RTNs, each was included in the total count.

The Environmental Agent for the City of Medford, Ms. Kim Lundgren, mentioned one site that the City classifies as a Brownfield. This site is listed on the DEP site/reportable release list and has a compliance status of Tier 2. That site is the River’s Edge Project (formerly known as TeleCom City Project). This site is located along the Malden River and is shared with the cities of Everett, Malden, and Medford.

**iii) Chemical Release**

For the 2002 reporting year there were 3 facilities reporting chemical releases in the Massachusetts TURA database. There were no reportable releases of lead, mercury, dioxin, arsenic, PACs, or benzoperylenes in the TURA database.

There were no facilities in the city of Medford reporting releases in the TRI databases.

**iv) Air Emissions**

Medford does not contain any EPA-regulated air polluting facilities found within EJ communities. However, these facilities may disperse pollutants into EJ communities.
and should be studied in the future. The following table shows all of the air polluting facilities located in Medford:

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROSS COUNTRY GROUP</td>
<td>MEDFORD</td>
<td>66</td>
<td>3398</td>
<td>N</td>
</tr>
<tr>
<td>TUFTS UNIVERSITY MED</td>
<td>MEDFORD</td>
<td>63</td>
<td>3395</td>
<td>N</td>
</tr>
<tr>
<td>GENERAL ELECTRIC GLOBAL APPARATUS</td>
<td>MEDFORD</td>
<td>39</td>
<td>3398</td>
<td>N</td>
</tr>
<tr>
<td>LAWRENCE MEMORIAL HOSPITAL</td>
<td>MEDFORD</td>
<td>30</td>
<td>3391</td>
<td>N</td>
</tr>
<tr>
<td>ROYAL INSTITUTIONAL SERVICES</td>
<td>MEDFORD</td>
<td>14</td>
<td>3398</td>
<td>N</td>
</tr>
<tr>
<td>MYSTIC VALLEY TOWERS</td>
<td>MEDFORD</td>
<td>6</td>
<td>3398</td>
<td>N</td>
</tr>
<tr>
<td>BOSTON METAL PRODUCT</td>
<td>MEDFORD</td>
<td>5</td>
<td>3398</td>
<td>N</td>
</tr>
<tr>
<td>MBTA WELLINGTON CARHOUSE</td>
<td>MEDFORD</td>
<td>3</td>
<td>3398</td>
<td>N</td>
</tr>
<tr>
<td>MATERIALS DEVELOPEMENT CORPORATION</td>
<td>MEDFORD</td>
<td>2</td>
<td>3397</td>
<td>N</td>
</tr>
<tr>
<td>LACEY TRUCK EQUIP</td>
<td>MEDFORD</td>
<td>1</td>
<td>3395</td>
<td>N</td>
</tr>
<tr>
<td>MVP REALTY CO</td>
<td>MEDFORD</td>
<td>1</td>
<td>3398</td>
<td>N</td>
</tr>
</tbody>
</table>

Table 16: EPA-regulated air-polluting facilities in Medford, NEI data, 1999.

v) Health Indicators

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>44</td>
<td>61.8</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>201</td>
<td>253.6</td>
<td>276.9</td>
</tr>
</tbody>
</table>

Hospital Discharges for Primary Care Manageable Conditions
<table>
<thead>
<tr>
<th></th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>63</td>
<td>122.9</td>
<td>128.3</td>
</tr>
</tbody>
</table>

**Table 17: Medford Health Data**

Medford was not identified as a High Risk Community for Childhood Lead Poisoning.

**G. Quincy**

Established as a town in 1792 and incorporated as a city in 1888 Quincy is linked to Boston by rapid transit. Quincy has some characteristics of a suburban bedroom community, including comfortable and pleasant neighborhoods, while retaining the earmarks of an urban center with its strong commercial and shopping areas. Quincy is the birthplace of the second and sixth U.S. Presidents, John Adams and his son, John Quincy Adams. Quincy is located on the Boston Harbor and Quincy Bay, 9 miles south of Boston. The boardwalk at Marina Bay is the largest marina in the Northeast and has restaurants and shops that attract locals and visitors. Approximately 88,000 people live in Quincy’s 16.51 square miles.\(^{80,81}\)

**i) Census Data**

The median household income is $47,121. This is roughly equal to the statewide median household income. Minorities account for 22 percent of the population. Foreign born individuals account for 20 percent of the population. 6 percent of the population is linguistically isolated.

---

\(^{80}\) Narrative Compile by the Massachusetts Department of Housing and Community Development (DHCD). “Description of Quincy, Massachusetts”. http://www.mass.info/quincy.ma/description.htm (accessed March 29, 2005).

ii) Brownfields

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>26</td>
<td>12</td>
<td>No Data</td>
</tr>
</tbody>
</table>

The City Planner of Quincy was unable to be contacted to provide data regarding Brownfield sites within the municipality.

iii) Chemical Release

There are 6 facilities reporting under the TURA and/or TRI databases. Of the facilities that report under the TRI database; two report releases of PAC, one of these facilities also reports releases of benzoperylene (Twin Rivers Techs.). The other facility (Axel Johnson Quincy) also reports releases of lead and mercury. There were no reported releases of arsenic, dioxin, or TCE.

iv) Air Emissions

19 air polluting facilities in the NEI were found in Quincy. Eight of these facilities are found within EJ communities. The following table shows these facilities by census tract and their pollution levels:

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWRA FORE RIVER STAGING AREA</td>
<td>QUINCY</td>
<td>316</td>
<td>4179.01</td>
<td>Y</td>
</tr>
<tr>
<td>TWIN RIVERS TECHNOLOGY</td>
<td>QUINCY</td>
<td>147</td>
<td>4179.01</td>
<td>Y</td>
</tr>
<tr>
<td>QUINCY MEDICAL CENTER</td>
<td>QUINCY</td>
<td>76</td>
<td>4181</td>
<td>N</td>
</tr>
<tr>
<td>MWRA BRAINTREE WEYMOUTH</td>
<td>QUINCY</td>
<td>35</td>
<td>4178.01</td>
<td>N</td>
</tr>
<tr>
<td>MWRA QUINCY PS</td>
<td>QUINCY</td>
<td>14</td>
<td>4176.02</td>
<td>Y</td>
</tr>
<tr>
<td>MWRA NUT IS HDWRKS</td>
<td>QUINCY</td>
<td>13</td>
<td>4178.01</td>
<td>N</td>
</tr>
<tr>
<td>FEELEYS ENAMELING COMPANY</td>
<td>QUINCY</td>
<td>12</td>
<td>4180.01</td>
<td>N</td>
</tr>
<tr>
<td>PATRIOT LEDGER THE</td>
<td>QUINCY</td>
<td>9</td>
<td>4180.01</td>
<td>N</td>
</tr>
<tr>
<td>STATE STREET BANK SQUARE</td>
<td>QUINCY</td>
<td>7</td>
<td>4172</td>
<td>Y</td>
</tr>
<tr>
<td>BOSTON SCIENTIFIC CO</td>
<td>QUINCY</td>
<td>6</td>
<td>4173</td>
<td>N</td>
</tr>
</tbody>
</table>

82 For more information on specific facilities reporting under the databases see Appendix C (I & II)
SPRAGUE ENERGY  QUINCY  3  4177  N
MBTA QUINCY BUS GARAGE  QUINCY  2  4177  N
SPRAGUE ENERGY TWIN  QUINCY  2  4179.01  Y
1025 HANCOCK STREET INC  QUINCY  1  4177  N
BFI INCORPORATED OF MASS  QUINCY  1  4180.01  N
SOUTH SHORE PLATING COMPANY INCORPORATED  QUINCY  1  4182  N
INDUSTRIAL HEAT TREAT  QUINCY  1  4172  Y
DEVON REALTY TRUST  QUINCY  1  4175.02  Y
QUINCY POINT CHURCH  QUINCY  1  4179.01  Y

<table>
<thead>
<tr>
<th>Facility</th>
<th>Area</th>
<th>Count</th>
<th>Area Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>68</td>
<td></td>
<td>62.6</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>304</td>
<td></td>
<td>259.5</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility</th>
<th>Area</th>
<th>Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>105</td>
<td></td>
<td>122.7</td>
<td>128.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility</th>
<th>Area</th>
<th>Count</th>
<th>Adjusted Rate</th>
<th>State Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Poisoning</td>
<td>17</td>
<td></td>
<td>1.3</td>
<td>1.3</td>
</tr>
</tbody>
</table>


v) Health Indicator

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>68</td>
<td>62.6</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>304</td>
<td>259.5</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Discharges for Primary Care Manageable Conditions</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>105</td>
<td>122.7</td>
<td>128.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High Risk Communities for Childhood Lead Poisoning</th>
<th>Area Count</th>
<th>Adjusted Rate</th>
<th>State Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Poisoning</td>
<td>17</td>
<td>1.3</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Table 19: Quincy Health Data

H. Revere

Revere is a highly developed residential suburb, approximately 5 miles from downtown Boston. Sixty percent of Revere's total of 4,054 acres (about 6 sq. miles) is developed for industrial, commercial, residential and transportation uses and of this total 70% is used for housing. Almost 900 acres are open water or wetlands. For its size,
Revere is a more complex community than most, owing to its multi-cultural and diverse population, its older residential neighborhoods and housing stock and the numerous specialized regional facilities within its borders. Revere was established as a town in 1846 and as a City in 1914. Approximately 47,283 live in Revere, home to the first public beach in the U.S.83

i) Census Data

The median household income is $37,067. This is 79 percent of the statewide median household income. Minorities account for 21 percent of the population. Foreign born individuals account for 21 percent of the population. 8 percent of the population is linguistically isolated.

ii) Brownfields

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>14</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

The Town Planner, Mr. Frank Stringi, was able to identify eight Brownfield sites within the city of Revere. Four of these sites were listed by DEP with a compliance status of Tier 2. These sites are currently underutilized and contain suspected contaminates that will require removal prior to any redevelopment of the sites. The goal of redeveloping these sites is to increase the economic viability of the sites and the surrounding area. Mr. Stringi prioritized three of the eight sites because there is a developer lined up to redevelop the site and the remediation process has begun.

Mr. Stringi also stated that the city of Revere recently passed new zoning regulations on March 26, 2005 limiting the amount of industry that is permitted within the city. The area previously zoned as general industry, is now known as Technology Enterprise District (TED). This is an interesting move because it restricts the type of businesses that are permitted in this zone. By altering the type of business within the zone the environment within and adjacent to the sites changes as well. The city hopes that the change will attract more technically focused companies as opposed to industry that tends to have a larger impact on the nearby environment.

iii) Chemical Release

There were no facilities in the City of Revere reporting releases in the TURA database. For the 2002 reporting year there were 4 facilities reporting chemical releases in the Federal TRI database. Of these, one facility reported releases of lead, and one reported releases of PAC. There were no facilities reporting releases of arsenic, dioxin, mercury, TCE, or benzoperylenes.

iv) Air Emissions

The table below shows the five sites that were reported in the NEI in 1999 located in Revere. As can be seen two of these facilities are found in EJ Populations.

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLOBAL PETROLEUM CORP</td>
<td>REVERE</td>
<td>57</td>
<td>1707</td>
<td>Y</td>
</tr>
<tr>
<td>IRVING OIL TERMINALS</td>
<td>REVERE</td>
<td>39</td>
<td>1707</td>
<td>Y</td>
</tr>
<tr>
<td>NORTHGATE RECYCLING</td>
<td>REVERE</td>
<td>7</td>
<td>1703</td>
<td>N</td>
</tr>
<tr>
<td>GF REVERE INC</td>
<td>REVERE</td>
<td>1</td>
<td>1702</td>
<td>N</td>
</tr>
<tr>
<td>SPECIALTY ALUMINUM INC</td>
<td>REVERE</td>
<td>1</td>
<td>1702</td>
<td>N</td>
</tr>
</tbody>
</table>

v) Health Indicators

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate**</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>33</td>
<td>57.3</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>149</td>
<td>242.6</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Discharges for Primary Care Manageable Conditions</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>60</td>
<td>124.1</td>
<td>128.3</td>
</tr>
</tbody>
</table>

Table 21: Revere Health Data

Revere was not identified as a High Risk Community for Childhood Lead Poisoning.

I. Somerville

The city of Somerville is located in Middlesex County, Massachusetts, just north of Boston. As of the 2000 census, the city had a total population of 77,478. With 4.1 square miles of land, this makes it the most densely populated community in New England. Somerville was established as a town in 1842 and in 1872 it became a city. Today, Somerville is an eclectic mix of blue-collar families, young professionals, college students and recent immigrants. It is known for its large number of squares, which help mark neighborhood boundaries while also featuring bustling business and entertainment
centers. Among the most active today are Davis Square, Union Square, Ball Square, Teele Square and Magoun Square.\(^{84}\)

\(i\) Census Data

The median household income is $46,315. This is 99 percent of the statewide median household income. Minorities account for 27 percent of the population. Foreign born individuals account for 29 percent of the population. 9 percent of the population is linguistically isolated.

\(ii\) Brownfields

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>10</td>
<td>23</td>
</tr>
</tbody>
</table>

The City Planner, Elaine Middleton, developed a list of Brownfield sites of which seven were included on the list of classified releases. Of those six sites have a compliance status of Tier 2 and one was Tier 1D. Ms. Middleton also commented on the list of classified site/reportable releases, noting that of the 53 classified sites, 23 had the potential for redevelopment or had already been developed. The remaining sites were either homes or pre-existing structures that would most likely remain in their current condition for a while.

\(iii\) Chemical Release

There are 7 facilities reporting under the TURA and/or TRI databases\(^{85}\). Of those 2 (29\%) are using at least one of the seven chemicals identified as Persistent, Bioaccumulative and Toxic (PBT), the remaining 71\% use other chemicals (others).

\(^{84}\) City of Somerville. “About Somerville”
Figure 10 Percentage of PBT Chemical Usage- Somerville

Of the facilities that report under the databases; one reports releases of TCE, and one reports releases of lead. There were no reported releases of arsenic, dioxin, mercury, PAC, or benzoperylene.

\textit{iv) Air Emissions}

Ten of the eleven facilities reported in the NEI were located within EJ communities. The following table shows the air polluting facilities found in Somerville:

<table>
<thead>
<tr>
<th>FACILITY NAME</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
<th>EJ COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROGERS FOAM COMPANY</td>
<td>SOMERVILLE</td>
<td>36</td>
<td>3503</td>
<td>Y</td>
</tr>
<tr>
<td>AMES SAFETY ENVELOPE</td>
<td>SOMERVILLE</td>
<td>28</td>
<td>3512</td>
<td>Y</td>
</tr>
<tr>
<td>UNITED LITHOGRAPH</td>
<td>SOMERVILLE</td>
<td>22</td>
<td>3515</td>
<td>Y</td>
</tr>
<tr>
<td>CLARENDON HILL TOWER</td>
<td>SOMERVILLE</td>
<td>14</td>
<td>3507</td>
<td>Y</td>
</tr>
<tr>
<td>SWEETHEART CUP COMPANY</td>
<td>SOMERVILLE</td>
<td>9</td>
<td>3515</td>
<td>Y</td>
</tr>
<tr>
<td>MAACO AUTO PAINTING</td>
<td>SOMERVILLE</td>
<td>6</td>
<td>3512</td>
<td>Y</td>
</tr>
<tr>
<td>UNIVERSAL LAUNDRY</td>
<td>SOMERVILLE</td>
<td>4</td>
<td>3501</td>
<td>Y</td>
</tr>
<tr>
<td>MDC AMELIA EARHART D</td>
<td>SOMERVILLE</td>
<td>2</td>
<td>3501</td>
<td>Y</td>
</tr>
</tbody>
</table>

\footnotetext{78} For more information on specific facilities reporting under the databases see Appendix C (I &II)

v) Health Data

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>45</td>
<td>72.9</td>
<td>56</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>200</td>
<td>303.1</td>
<td>276.9</td>
</tr>
</tbody>
</table>

Hospital Discharges for Primary Care Manageable Conditions

<table>
<thead>
<tr>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>76</td>
<td>124.8</td>
</tr>
</tbody>
</table>

High Risk Communities for Childhood Lead Poisoning

<table>
<thead>
<tr>
<th>Area Count</th>
<th>Adjusted Rate</th>
<th>State Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Poisoning</td>
<td>25</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 23: Somerville Health Data

J. Winthrop

The Town of Winthrop is situated on a peninsula extending into Boston Harbor. It is located within five miles of downtown Boston, and has a reputation for being a safe and pleasant place to live. Winthrop is a close-knit, family-oriented community where everything is within walking distance. Winthrop was established in 1852 as a town, and named after John Winthrop, the first governor of the state of Massachusetts. It is the only town in Suffolk County (the other communities are governed as cities). In 1920 they
became the second town in the Commonwealth to receive a Charter for a Representative Town Meeting. Approximately, 18,300 people live in Winthrop’s 1.56 square miles.  

i) Census Data

The median household income is $53,122. This is 113 percent of the statewide median household income. Minorities account for 7 percent of the population. Foreign born individuals account for 9 percent of the population. 2 percent of the population is linguistically isolated.

ii) Brownfields

<table>
<thead>
<tr>
<th>Tier 1A</th>
<th>Tier 1B</th>
<th>Tier 1C</th>
<th>Tier 2</th>
<th>Tier 1D</th>
<th>Brownfields</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>No Data</td>
</tr>
</tbody>
</table>

The City of Winthrop contains fewer Tier classified sites than the majority of the 10 study communities. The town planner was unable to identify any Brownfield sites within Winthrop.

iii) Chemical Release

There were no facilities in the Town of Winthrop reporting releases in the TURA or TRI databases.

iv) Air Emissions

Winthrop’s only air pollution point source according to the EPA’s AirData website is the Deer Island Water Treatment Plant. No census tract information was found

---


for this plant. The following table shows the Deer Island Plant and other plants with incomplete information:

<table>
<thead>
<tr>
<th>PLANT NAME</th>
<th>PLANT ADDRESS</th>
<th>CITY</th>
<th>TOTAL EMISSIONS (tons)</th>
<th>CENSUS TRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWRA DEER ISLAND</td>
<td>DEER ISLAND, WINTHROP, MA 02152</td>
<td>WINTHROP</td>
<td>120</td>
<td>unknown</td>
</tr>
<tr>
<td>LONG ISLAND HEALTH CARE</td>
<td>BOSTON HARBOR, BOSTON, MA 02169</td>
<td>BOSTON</td>
<td>43</td>
<td>unknown</td>
</tr>
<tr>
<td>BOSTON SAND &amp; GRAVEL</td>
<td>500 FRONT ST, BOSTON, MA 02114</td>
<td>BOSTON</td>
<td>8</td>
<td>unknown</td>
</tr>
<tr>
<td>BUNKER HILL COMMUNIT</td>
<td>250 NEW RUTHERFORD, BOSTON, MA 02129-2925</td>
<td>BOSTON</td>
<td>7</td>
<td>unknown</td>
</tr>
<tr>
<td>MWRA COLUMBUS PARK</td>
<td>COLUMBIA RD &amp; DAY BL, BOSTON, MA 02127</td>
<td>BOSTON</td>
<td>3</td>
<td>unknown</td>
</tr>
<tr>
<td>MWRA WARD STREET</td>
<td>WARD STREET, BOSTON, MA 02120</td>
<td>BOSTON</td>
<td>1</td>
<td>unknown</td>
</tr>
</tbody>
</table>

Table 24: EPA-regulated air-polluting facilities with missing census tract info in Winthrop, NEI data, 1999.

v) Health Data

<table>
<thead>
<tr>
<th>Chronic Disease Indicators</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer deaths</td>
<td>9</td>
<td>40.0</td>
<td>56.0</td>
</tr>
<tr>
<td>Cardiovascular disease deaths</td>
<td>59</td>
<td>230.5</td>
<td>276.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Discharges for Primary Care Manageable Conditions</th>
<th>Area Count</th>
<th>Area Age-adjusted Rate</th>
<th>State Age-adjusted Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>20</td>
<td>117.1</td>
<td>128.3</td>
</tr>
</tbody>
</table>

Table 25: Winthrop Health Data

Winthrop was not identified as a High Risk Community for Childhood Lead Poisoning.
VI. Potential “Hot Spots”

<table>
<thead>
<tr>
<th>CITY</th>
<th>CENSUS TRACT</th>
<th>Percentage MINORITY</th>
<th>Percentage LINGUISTICALLY ISOLATED</th>
<th>Percentage FOREIGN BORN</th>
<th>Percentage MEDIAN INCOME</th>
<th># of EPA Regulated Air Emission Sites</th>
<th># of TRI Sites</th>
<th># of TURA Sites</th>
<th># of Brownfields</th>
<th># of Potential Insults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everett</td>
<td>3424</td>
<td>31.8%</td>
<td>8.7%</td>
<td>27.0%</td>
<td>75.5%</td>
<td>16</td>
<td>6</td>
<td>9</td>
<td>16</td>
<td>47</td>
</tr>
<tr>
<td>Somerville</td>
<td>3515</td>
<td>35.2%</td>
<td>11.9%</td>
<td>42.6%</td>
<td>77.8%</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Boston</td>
<td>1</td>
<td>29.0%</td>
<td>10.0%</td>
<td>26.0%</td>
<td>95.1%</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Cambridge</td>
<td>3546</td>
<td>46.2%</td>
<td>5.9%</td>
<td>31.2%</td>
<td>103.5%</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Boston</td>
<td>801</td>
<td>85.4%</td>
<td>15.9%</td>
<td>15.5%</td>
<td>59.5%</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>Boston</td>
<td>701</td>
<td>51.7%</td>
<td>30.8%</td>
<td>41.0%</td>
<td>37.6%</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Cambridge</td>
<td>3531</td>
<td>55.5%</td>
<td>9.1%</td>
<td>36.4%</td>
<td>77.7%</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Cambridge</td>
<td>3523</td>
<td>28.4%</td>
<td>7.6%</td>
<td>27.4%</td>
<td>106.2%</td>
<td>3</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Chelsea</td>
<td>1605</td>
<td>64.2%</td>
<td>21.5%</td>
<td>36.7%</td>
<td>58.0%</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 26: Potential Hot Spots

The table above represents the findings for environmental and census data for ten census tracts. These census tracts are the tracts with the highest number of potential environmental insults. This number is based on summing the total number of sites that contain either an air polluting facility, TRI or TURA site, or Brownfield. The tracts above could also potentially affect the adjacent communities. These sites each meet one or more of the four criteria defining an EJ community. Thus, it is important that EOE, its subsidiary agencies, community groups and institutions analyze and focus their attention on these areas.

It is important to recognize that census tract 3424 in Everett comprises nearly twice as many potential insults as any other tract. Moreover, the site contains the largest polluting facility in our study area, the Boston Generating Mystic plant LLC, formerly Exelon Mystic LLC. We urge that the effects of this pollution on the surrounding EJ communities be studied to a greater extent.
VII. **General Recommendations**

The following are general recommendations for EOEA and others to take into consideration. First and foremost, this report is meant to provide an inventory of current environmental justice information and identify concentrations of environmental insults. Subsequent steps must be undertaken to address these potential injustices.

Our first recommendation calls for a better assessment of environmental risks to EJ populations within the study communities. Specific efforts at the local level may include such tasks as scientific analyses of pollution within a certain census tract or block group, increased monitoring of pollution within EJ Communities, and encouraged involvement of community groups who undertake local environmental justice projects.

Another recommendation is the further identification of environmental threats. Our study focused exclusively on point sources of pollution. Threats that were not included in the scope of this project include, but are not limited to, non-point sources of pollution such as transit related emissions and stormwater runoff. Locating where these incidents happen would enhance the EJ Policy because it creates a method of tracking pollution and its effects on communities from cradle to grave. These recommendations will require extensive GIS modeling. This is an important tool that can be used for environmental justice purposes.

A third recommendation is the continuation and enhancement of community involvement in environmental decision-making. This report will be of direct use to community, advocacy, and other groups to provide a clearer understanding of environmental issues within their neighborhood. These groups are currently involved at
some level with the EOEA, but we encourage the right to participate at every level of
decision-making. According to the People of Color Environmental Leadership Summit’s
*Principles of Environmental Justice*, the levels of decision-making include needs
assessment, planning, implementation, enforcement, and evaluation.\(^88\) A great list of
groups related to environmental justice is the *People of Color Environmental Groups: 2000 Directory* created by Robert D. Bullard of the Environmental Justice Resource Center in Atlanta, Georgia.\(^89\)

The Commonwealth’s commitment to environmental justice and its ability to
uphold the environmental rights of its citizens will benefit from strengthening the
environmental justice policy. As it currently stands, the EJ policy “is not intended to
supersede existing law or regulation. EOEA agencies shall implement this consistent
with, and to the extent permitted by, existing law.”\(^90\) Ideally, this policy would be
codified into law. To that end, an environmental justice bill is slated to go before the
state legislature in August 2005. In the months leading up to this event, EOEA must be
proactive in drumming up support for this proposed legislation.

Recognizing the lack of enforceable the policy currently has, a more pragmatic
approach to addressing environment injustice is highly recommended. One strategy
would be to approach Brownfields from an economic redevelopment perspective as a
means to create jobs, expand the municipality’s tax base, and address issues of urban
blight. Also, environmental justice communities should be given preference in the


\(^{89}\) See [http://www.ejrc.caue/poc2000.htm](http://www.ejrc.caue/poc2000.htm) for information on how to obtain a copy.

\(^{90}\) Environment Justice Policy of the Massachusetts Executive Office of Environmental Affairs
allocation of resources such as urban self-help grants, to create environmental amenities that partially mitigate surrounding environmental risks.

Finally, the EJ policy should be integrated into all governmental actions and policies. For example, the Office of Commonwealth Development’s Sustainable Development Principles should be applied in conjunction with the EJ policy, to further strengthen the states commitment to meeting the needs of less empowered communities. An example of a state-level policy that ignores environmental justice in the actual written policy is the Massachusetts Climate Protection Plan. Local climate initiatives would also improve by including environmental justice as a goal.

The following recommendations are specific to different types of information collected for this project.

Recommendations - Census
- Review current EJ criteria; in particular, consider updating the median household income baseline to reflect most recent statewide estimates.

Recommendations - Brownfields
- Adopt a universal definition of Brownfields to prevent ambiguity between stakeholders and government agencies.
- Educate local planning departments, community development corporations, and other development groups of the definition and inform them of potential funding opportunities.
- Provide outreach to teach communities about the hazards of contaminated sites and their role to improve their neighborhood.
- Further examination of sites classified as Tier 1D and implementation of a fee for noncompliance.
- Promote a planners round table to share ideas and techniques and foster community partnerships in the redevelopment of underutilized parcels.
Recommendations - Chemical Release

- Create a MassGIS data layer showing the total TURA and TRI chemical release for the 10 study communities. (The information needed to create such a data layer is available in the tables in Appendix C).

- Complete a basic level of analysis at the community level of the facilities reporting under the databases. This could be done by researching the toxicity of chemicals by using websites such as the Federal Agency for Toxic Substances and Disease Registry (ATSDR): [http://www.atsdr.cdc.gov/toxfaq.html](http://www.atsdr.cdc.gov/toxfaq.html) (This can be performed by EOEA or community groups themselves)

Recommendations - Air Pollution

- Create an updated air pollution GIS data layer of DEP-regulated facilities.

- Analyze mobile sources of air pollution. Two useful sources for EOEA and other groups in the Boston area to evaluate are Boston Transportation Fact Book and Neighborhood Profiles\(^91\) and Logan International Airport’s 2003 Environmental Data Report: Chapter 7 Air Quality/Emissions Reduction\(^92\).

- Update EPA-regulated air polluting facilities inventory after new NEI is released in December 2005.

- Evaluate dispersion levels of air pollution and the effect on EJ populations.

Recommendations – Water Pollution/Fish Consumption

- Further examination of bacteria levels and lead levels found in drinking water in EJ communities, using information from this report.

- Utilize community group and institutional efforts such as the MyRWA/Tufts Collaboration\(^93\).

- Develop methodology for identifying and serving environmental justice communities who may be at risk to toxics in fish consumption.

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\(^93\) The Mystic River Watershed Association has collaborated with Tufts to improve the quality of water in the Mystic. Information is available at [http://www.tufts.edu/tie/mwc/](http://www.tufts.edu/tie/mwc/). Several reports contain information that might be useful to EOEA and others. [http://www.tufts.edu/tie/mwc/resources/maps.html](http://www.tufts.edu/tie/mwc/resources/maps.html) provides GIS layers.
• Provide multi-lingual advisories to EJ communities along the Mystic.
• Evaluate other water bodies in the area for fish consumption problems.

Recommendations - Health Indicators
• Create a state-wide asthma registry to help tract rates of the disease.
• Increase resources to encourage local health departments to complete environmental public health tracking.
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Appendix A 1

GIS Map of EJ Populations by Criteria
Located within Study Communities
The following letters represent the four EJ criteria as established by the state of Massachusetts. Please note that several communities meet one or more of the criteria.

F- Foreign Born
M- Minority
I- Income
E- English Proficiency
Appendix A II

Spreadsheet of Census and Environmental Data at the Tract Level
Appendix A III

Environmental Justice Policy of the Massachusetts Executive Office Of Environmental Affairs
Appendix B I

GIS Map of Tier Classified Sites
Tier Classified Sites Located within Study Communities

Please note pink dot 21E Tier 1C should be Tier 1D
Data obtained from MassGIS
Appendix B II

Summary Table of Brownfields within Study Communities
Appendix B III

Spreadsheets of Tier Classified and Brownfield Sites within 10 Study Communities
Appendix B IV

Brownfields Located within Chelsea, Massachusetts
Appendix C I

Table of Facilities Reporting under TRI
Appendix C II

Table of Facilities Reporting under TURA
Appendix D I

Spreadsheet of EPA Regulated Air Polluting Facilities (NEI, 1999)
Appendix D II

Spreadsheet of DEP Regulated Air Polluting Facilities (BWP, 2005)
Appendix D III

GIS Map of Facility CO Emissions in tons
GIS Map of Facility CO Emissions in tons

Source: from NEI data, 1999
Appendix D IV

GIS Map of Facility pm Emissions in tons
GIS Map of Facility pm Emissions in tons

Source: NEI data, 1999
Appendix D V

Spreadsheets for EPA-Regulated Air Polluting Dry Cleaners, Printers, and Photo Processors
Appendix E I

Asthma Hospitalization Rates Boston
Appendix E II

High Risk Communities for Childhood Lead Poisoning
Appendix F I

Memorandum of Understanding
Appendix F II

IRB Exemption Form
Appendix F III

Informed Consent Documents
Appendix F IV

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