

Using Exposure to Environmental Harms to Measure Environmental Justice

An Evaluation of MassGIS Environmental Justice Communities in Greater Boston

Introduction

The purpose of this analysis is to incorporate an environmental component to MassGIS's current demographic assessment of environmental justice (EJ) communities in greater Boston. MassGIS determines a block group to be an EJ community if it meets one or more of the following criteria:

- Race: 25% or more of the block group population is a minority
- Income: the median income of the block group is less than or equal to \$40,673 (or 65.49% of the state median income: \$62,133)
- English language: 25% or more of the population is English-isolated

While this method helps provide a better understanding of where EJ communities are in greater Boston, including exposure to environmental harms can help further identify which communities are environmentally overburdened. Six criteria were utilized to analyze which block groups face greater exposure to environmental harms:

- Density of highways
- Distance from major polluting facilities
- Distance from 303(d) impaired waters
- Access to public transportation—both the MBTA T and bus systems
- Average tree cover

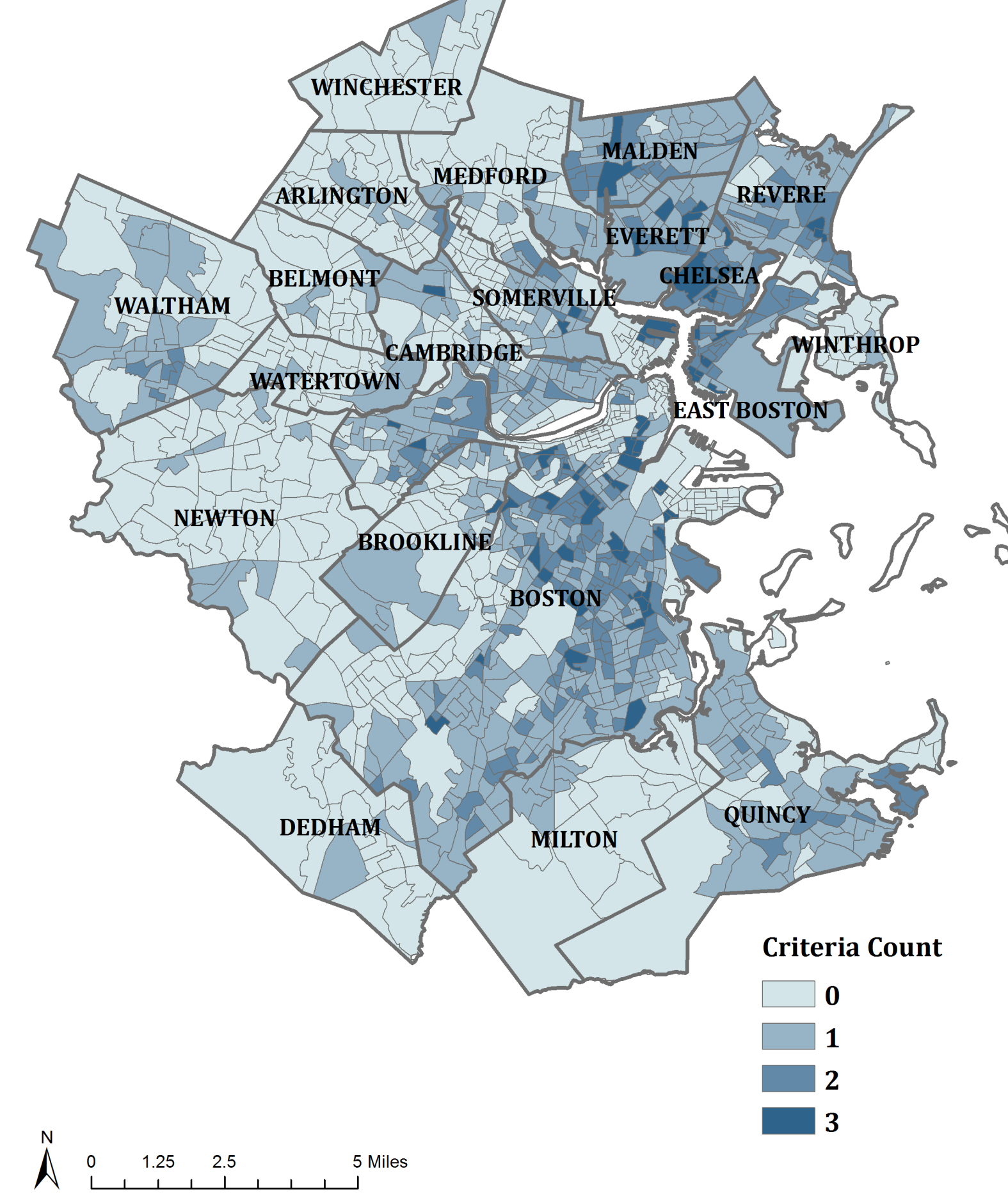
Including some environmental factors in a comprehensive EJ assessment can help paint a more detailed picture of what correlations lie between demographics and exposure to environmental burdens. This analysis intends to introduce some of the environmental harms that could be included in a larger evaluation of the relationship between demographic factors and environmental justice in greater Boston.

Methodology

Map 1 depicts the range of EJ communities as defined by MassGIS demographic criteria. Block groups that meet no criteria are not EJ communities, but all municipalities included as a part of this analysis contain at least a few block groups that meet at least one or more criteria. Table 1 demonstrates what municipalities are most subject to environmental injustice based on the proportion of the town population that lives in an EJ block group.

Map 2 demonstrates how this same range of towns look when EJ is measured by exposure to environmental burdens. The first part of the analysis took place at the block group level. To determine which greater Boston communities are most exposed to environmental burdens, the six criteria described above were all ranked equally with the exception

Map 1: MassGIS EJ Criteria Distribution (based on block group)



Map 2: Environmental Harm Exposure Rankings

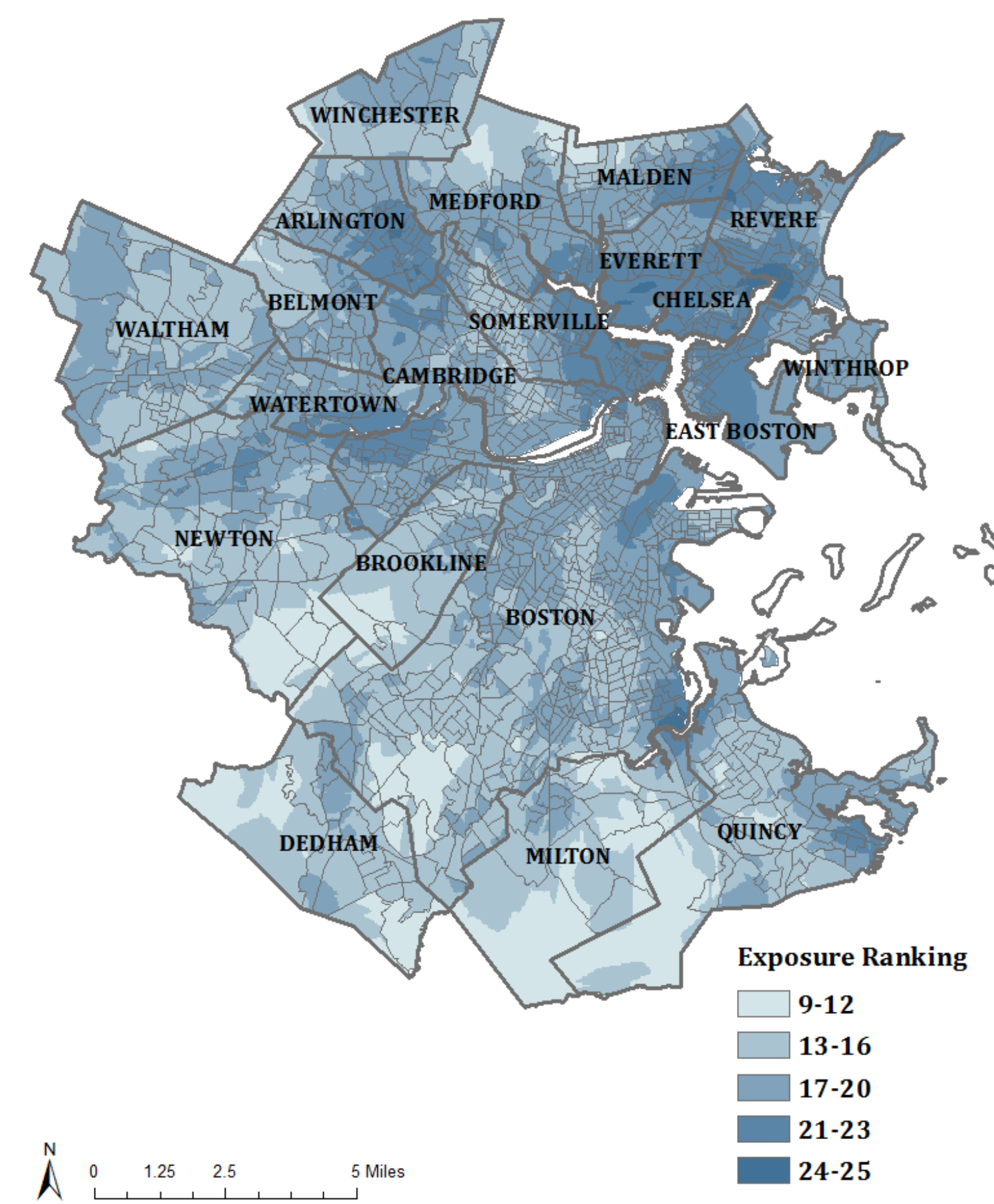


Table 1: MassGIS Environmental Justice Communities

Town	% town pop. in EJ block groups
Chelsea	100
Everett	100
Malden	97
Revere	87
Quincy	74.6
Boston	73.9
Cambridge	67.5
Waltham	59.5
Somerville	53.8
Brookline	49.8
Medford	39
Milton	27.4
Belmont	21.7
Watertown	19.6
Arlington	17.1
Newton	14.9
Winchester	13.7
Dedham	11.4
Winthrop	5

Table 2: Environmental Harm Exposure Ranking

Town	Mean Ranking
Arlington	22.6
Everett	22.1
Chelsea	21.5
Quincy	21.1
Malden	21.1
Somerville	20.2
Cambridge	20.1
Medford	20.1
Winchester	19.4
Milton	18.9
East Boston	18.8
Belmont	18.5
Winthrop	17.9
Watertown	17.7
Revere	17.5
Newton	16.7
Boston	16.6
Brookline	16.6
Waltham	16.5
Dedham	12.4

Source: MassGIS 2010 Environmental Justice Populations table.

According to MassGIS, Chelsea, Everett, Malden, and Quincy have nearly three quarters or more of their populations living in EJ communities. Additionally, these four towns also received some of the highest environmental harm exposure rankings. These correlations can help identify which communities are more likely to be environmentally overburdened based on demographic and environmental factors.

Conclusion & Limitations

Though there are several similarities between the results of the assessments of greater Boston EJ communities based on socioeconomic and environmental factors, this analysis indicates that there may be some environmentally burdened communities that are not reflected in a demographic assessment alone. Arlington received the highest environmental harm exposure ranking of the towns included in this analysis; by contrast, a fairly low proportion of Arlington residents live in an EJ community as defined by MassGIS. Additionally, Revere received a relatively low environmental harm exposure ranking of 17.5, while MassGIS indicates that 87% of Revere residents live in an EJ community.

Despite these discrepancies, it is important to note any commonalities between this analysis and the MassGIS assessment of EJ communities.

These relationships should be considered in light of the inherent limitations of this kind of study. This analysis only looked a small range of environmental burdens, did not identify correlations between specific demographic factors, nor did it calculate actual exposure rates. These limitations could be sites of future research on measuring environmental justice. While the definition of what constitutes an EJ community is open to interpretation, this analysis demonstrates that demographic factors are one of many components of a thorough assessment of the distribution of environmental burdens in greater Boston.

Cartographer: Kasia Hart, Dept. of Urban and Environmental Policy and Planning
Date: May 5, 2014
Sources: Massachusetts Office of Geographic Information (MassGIS), 2010-2013
U.S. Census Bureau, Geography Division- TIGER/Line Shapefiles, 2013
Projection: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001

Criteria

