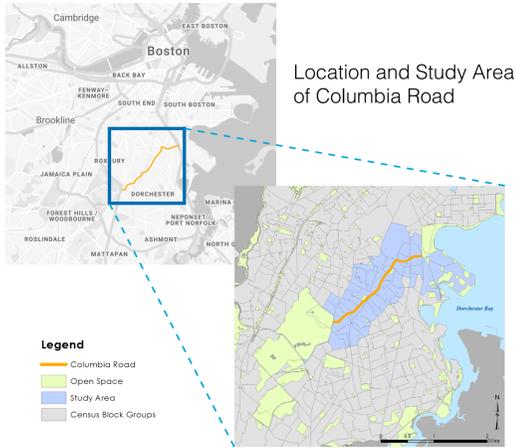


INTRODUCTION

As one of the widest streets in the city of Boston, Columbia Road hosts an immense daily traffic flow, winding through the Roxbury and Dorchester, Massachusetts—the largest neighborhood in Boston.

Today, this 2.4-mile major arterial was seen as a missing link of Emerald Necklace, a park system known as the great vision of Olmsted, by several planning and design organizations and the city of Boston. There is no doubt that a redesign of Columbia Road would provide essential connectivity, placemaking, and environmental benefits to the surrounding neighborhoods, and increase accessibility of open space.

Therefore, a comprehensive review of the status quo of open space access and environmental justice along the Columbia Road is really helpful not only for showcasing the current problem, but for offering background information to inform that potential redesign.



METHODOLOGY

Since a quarter-mile is a common standard used for walkable distance, this analysis defines the study area as the 43 census block groups within 1/4-mile of Columbia Road.

Environmental Justice

According to The Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), Environmental Justice (EJ) refers to “the equal protection and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits.” The enforcement of environmental justice principles is devoted to enabling everyone to live in and enjoy a clean and healthful environment and to be free of environmental pollution.¹

In addition, the criteria of EJ communities that EOEEA defines was used to assess the distribution of EJ populations and the status of EJ in every census block group.

Corresponding census block groups were respectively selected based on income, minority, and English isolation criteria, and were represented in different colors to present EJ communities.

Similarly, census block groups that meet one, two and all EJ communities criteria were respectively selected to present the status of EJ.

Open Space Access

Open space, as defined by the state of Massachusetts, includes conservation land, recreation land, town forests, parkways, agriculture land, aquifer protection land, watershed protection land, cemeteries,

¹ “Smart Growth / Smart Energy Toolkit Modules - Environmental Justice (EJ),” Mass.gov, accessed April 4, 2019, <https://www.mass.gov/service-details/smart-growth-smart-energy-toolkit-modules-environmental-justice-ej>.

and forest land.² In view of the context of Columbia Road, this analysis examines the access to public parks to represent the open space accessibility.

Method 1

This evaluation method is from the research of urban parks in Curitiba, Brazil that Joseli Macedo and Monica A Haddad conducted in 2016.³ A quarter-mile buffer was created around each census block group and then the sum of public park area that fell within each buffer was calculated. Additionally, the public park area in each census block group was normalized by corresponding population. Lastly, the standard of 10.12 square meters (0.0025 acres) of public park area per person that offered by DeChiara and Kopleman was applied to evaluate the status of public park access.⁴

Method 2

This method uses park type and matching park service area that developed by National Recreation and Park Association (NRPA) to measure the access to public parks around Columbia Road.⁵

| Park Type | Park size (acres) | Typical Uses | Service Area |
|--------------------|-----------------------|-----------------------------|--------------------------|
| Pocket Parks | Less than 0.25 acres | Plazas and squares | 0.1 mile |
| Neighborhood Parks | 0.25 acres to 5 acres | Multi-use | .25 miles – 5 min walk |
| Community Parks | Over 5 acres | Multi-use, large facilities | 0.5 miles – 10 min. walk |

Table 1. NRPA Typology for Existing Parks.

² “MassGIS Data: Protected and Recreational OpenSpace,” Massachusetts Document Repository, accessed April 21, 2019, <https://docs.digital.mass.gov/dataset/massgis-data-protected-and-recreational-openspace>.

³ Joseli Macedo and Mónica A Haddad, “Equitable Distribution of Open Space: Using Spatial Analysis to Evaluate Urban Parks in Curitiba, Brazil,” Environment and Planning B: Planning and Design 43, no. 6 (November 1, 2016): 1096–1117, <https://doi.org/10.1177/0265813515603369>.

⁴ DeChiara J and Koppelman L, “Urban Planning and Design Criteria,” 1982, New York, NY: Van Nostrand Reinhold Co., Inc.

⁵ “NRPA Park Metrics | Research | National Recreation and Park Association | NRPA,” accessed April 9, 2019, <https://www.nrpa.org/publications-research/ParkMetrics/>.

RESULTS

Environmental Justice

The maps show that all census block groups in the study area meet at least one of criteria for environmental justice populations, and 65% of census block groups meet two or more criteria.

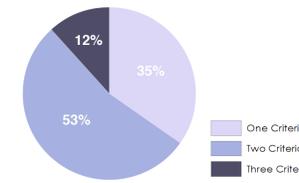


Table 2. Percentage of Census Block Groups meet Criteria of Environmental Justice Populations.

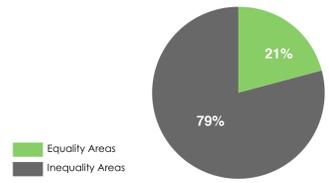


Table 3. Percentage of Status of Public Park Access

Open Space Access

Although the map of park service areas shows that Columbia Road is fairly accessible to open space, and the distribution of public parks within study area displays a diversity of public park types and scales—from closely clustered small pocket parks to the city’s largest park: Franklin Park. But in the map of status of public park access, most of census block groups are not up to the standard of 0.0025 acres of public park area per person, which were represented as inequity areas.

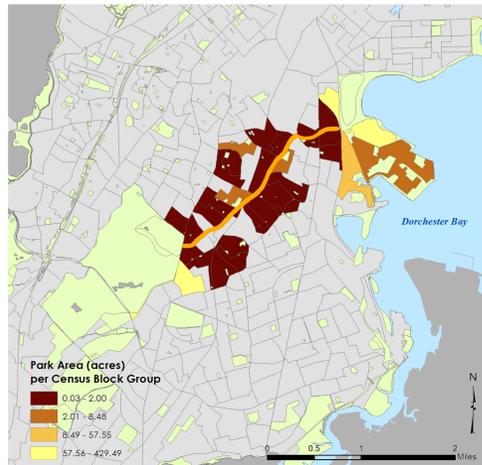
CONCLUSION

It is generally believed that low-income and minority communities are at greater risk of environmental burdens and at the same time lack environmental assets in their neighborhoods. Therefore, this assessment of existing environmental justice populations and public park access along the Columbia Road indicates where the quality of and accessibility to open space need to be enhanced in order to improve local residents’ quality of life.

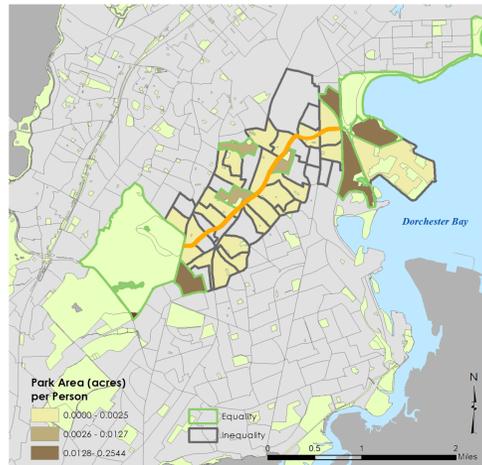
In terms of correlation of status of environmental justice and status of public park access, there is an obvious overlap between inequality areas and census block groups accord with multiple criteria of environmental justice populations. However, since quantitative analysis is lacking in this evaluation, the relationship between these two factors cannot be easily decided.

Open Space Access

Method 1

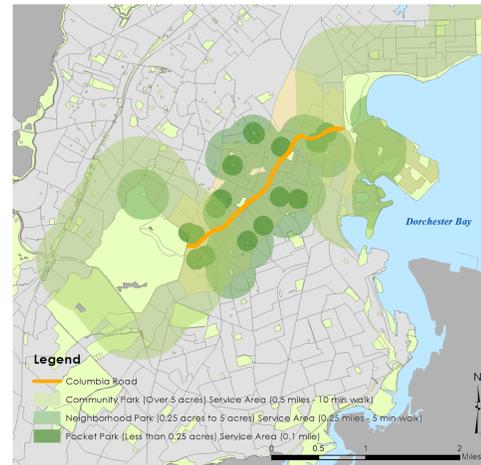


Public Park Access



Status of Public Park Access

Method 2



Park Service Areas

Tufts UNIVERSITY Graduate School of Arts and Sciences

OPEN SPACE ACCESS & ENVIRONMENTAL JUSTICE

A SPATIAL ANALYSIS WITHIN 1/4-MILE PROXIMITY TO COLUMBIA ROAD

Environmental Justice

2017 Median Household Income

Percentage of White Population

Percentage of Limited English Speaking Household



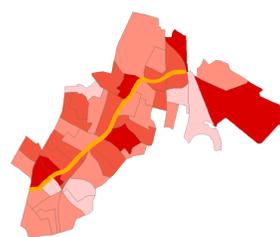
Median Household Income

- \$11,762 - \$25,000
- \$25,001 - \$37,000
- \$37,001 - \$45,000
- \$45,001 - \$43,000
- \$43,001 - \$114,375



Percentage of White

- 0% - 10%
- 10.1% - 25%
- 25.1% - 40%
- 40.1% - 55%
- 55.1% - 80.2%



Percentage of Limited English Speaking Household

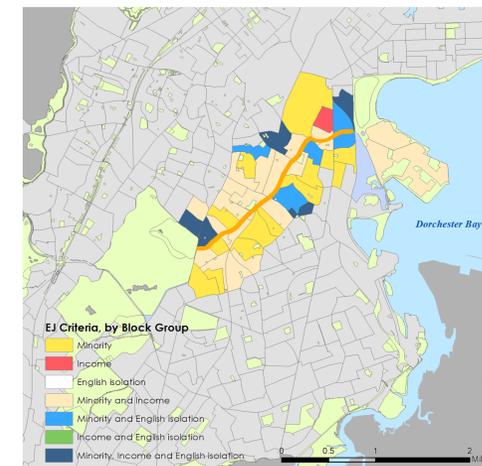
- 0% - 6%
- 7% - 15%
- 16% - 25%
- 26% - 32%

EOEEA defines environmental justice populations as communities that meet one of more of the following criteria:¹

- Block group whose annual median household income is equal to or less than 65 percent of the statewide median (\$62,072 in 2010) - **Income**
- 25% or more of the residents identify as a race other than white - **Minority**
- 25% or more of households have no one over the age of 14 who speaks English only or very well - **English Isolation**

¹ “Environmental Justice Communities in Massachusetts,” Mass.gov, accessed April 5, 2019, <https://www.mass.gov/info-details/environmental-justice-communities-in-massachusetts>.

Xianzheng Fang | UEP 232: Introduction to GIS | May 7, 2019
 Data Sources: ACS 2017 (5-year), MassEOEEA, MassGIS, U.S. Census Bureau.
 Coordinate System: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001
 Projection: Lambert_Conformal_Conic



Environmental Justice Communities



Status of Environmental Justice