MAPPING SUITABILITY AND VULNERABILITY:
DETERMINING PRIORITIES FOR URBAN FARMING INSTITUTE PROGRAMMATIC EXPANSION

INTRODUCTION

This research was designed to meet the needs of the Urban Farming Institute (UFI), a local non-profit organization dedicated to furthering opportunities for urban agriculture in the City of Boston. Currently, UFI manages three properties and is in the process of acquiring three additional parcels. To give context to this research, it is necessary to briefly describe the somewhat complex land acquisition process currently employed by UFI. This process is contingent on partnerships with the City of Boston's Department of Neighborhood Development (DND), the Trust for Public Land (TPL), and the Dudley Street Neighborhood Initiative's subsidiary Community Land Trust entity, Dudley Neighbors, Inc. (DNI). DND turns over vacant, city-owned parcels to TPL, which prepares the land for use. DNI then takes title of the land, holding it in trust for UFI. UFI uses the acquired land in one of three ways: (1) uses it directly for agricultural production; (2) utilizes parcels as sites for farmer training; or (3) leases it to individual farmers for use. This model has been effective for UFI until recently. DNI, as a neighborhood organization, is very much tied to the community of Roxbury. It is not within DNI's interest to hold land outside of the Roxbury neighborhood. UFI, however, is not committed to any geographical area; in fact, the organization has three properties in the pipeline for acquisition in the neighborhoods of Mattapan and Roxbury. At this juncture, UFI is considering establishing either a subsidiary or independent Community Land Trust entity as a means by which to better manage its properties.

RESEARCH FOCUS

At this stage in its organizational development, UFI is considering opportunities for expansion throughout the City of Boston. In considering priority areas for land acquisition, this research seeks to identify:
1. Where is the available farmable land in Boston?

VACANT, CITY-OWNED PROPERTIES CONDUCIVE TO AGRICULTURE

2. In what neighborhoods should UFI prioritize land acquisition?

NEIGHBORHOODS AT RISK OR IN THE PROCESS OF BEING GENTRIFIED
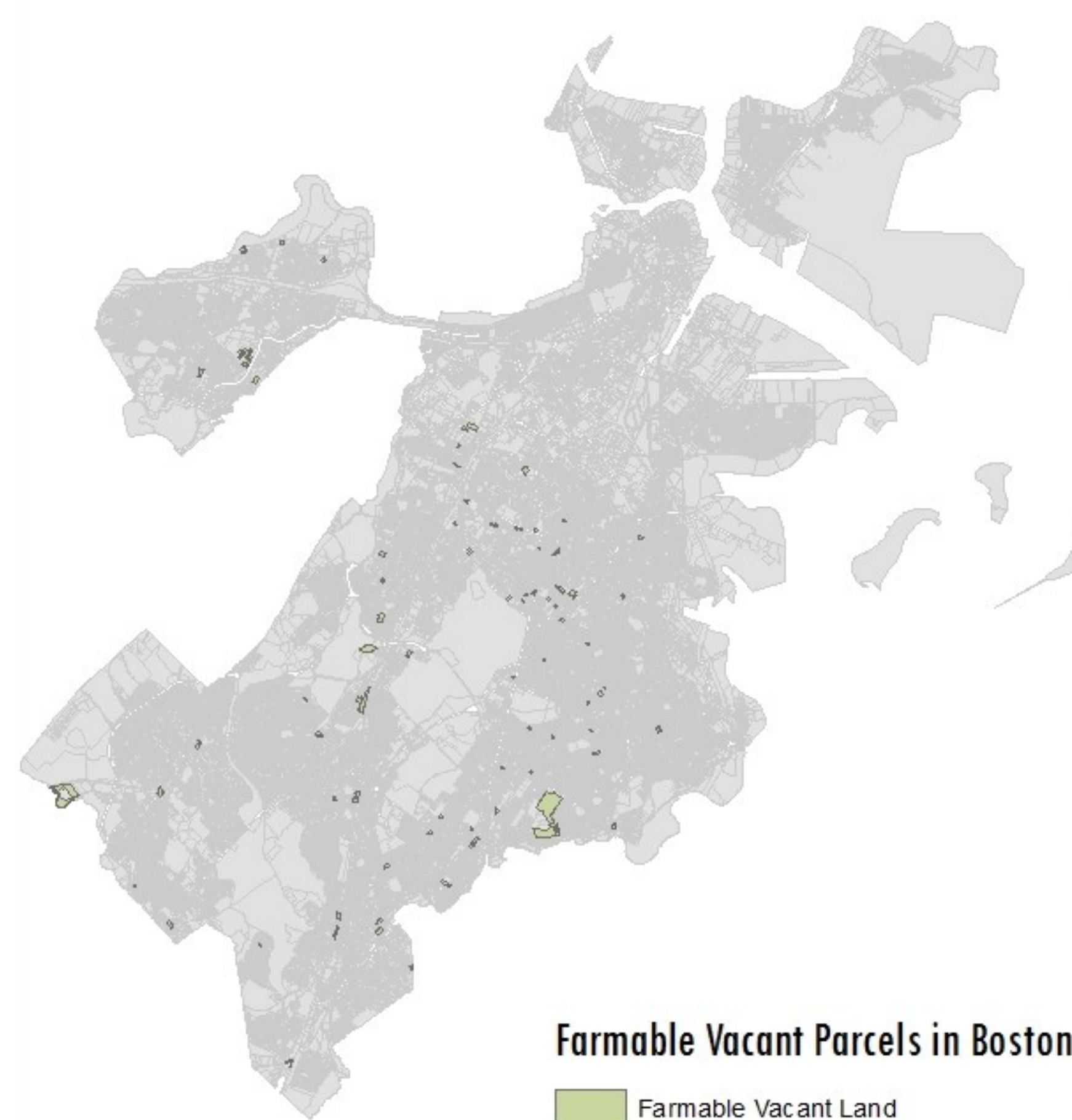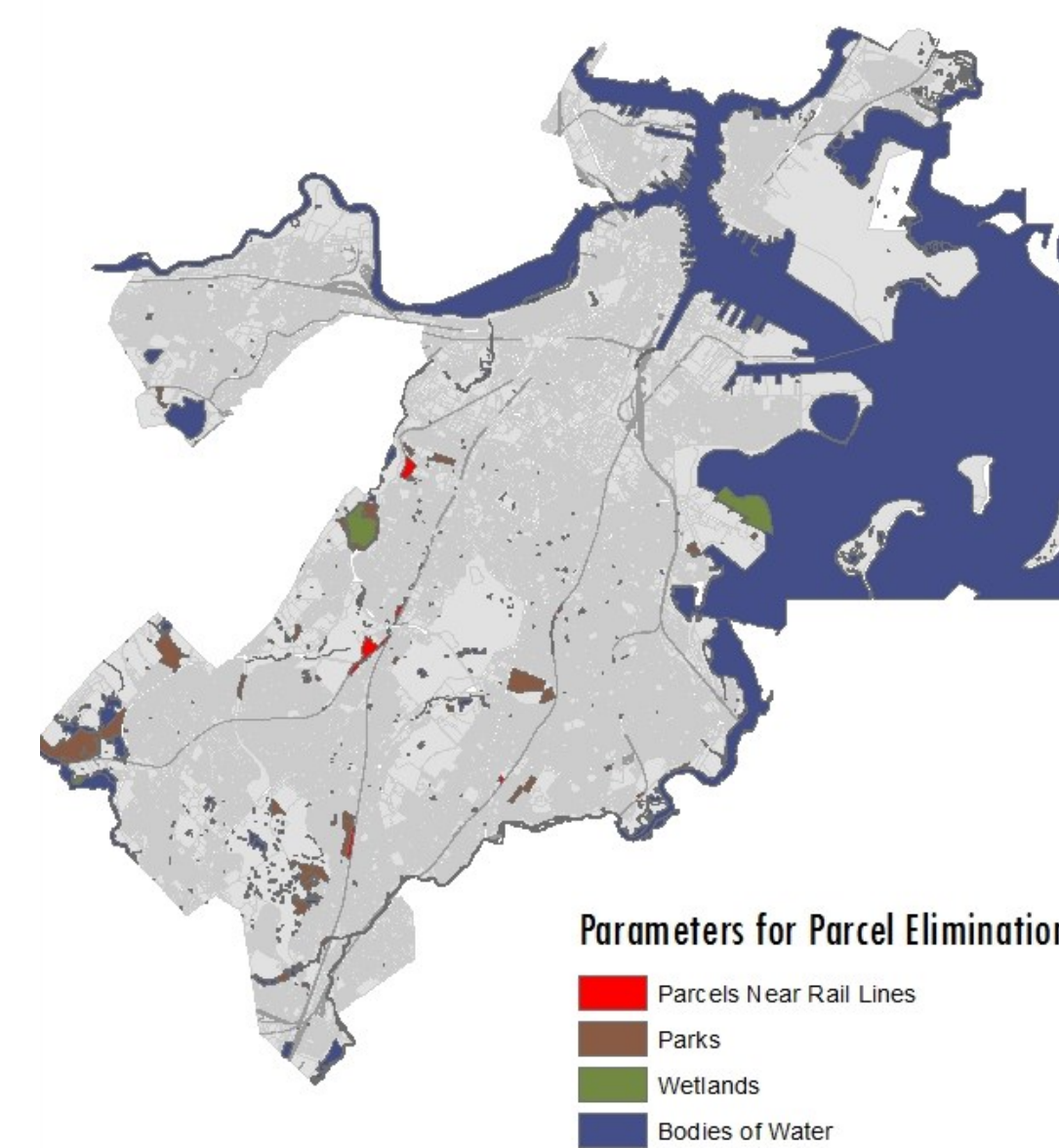
DATA SOURCES

This analysis utilized the most recent data from a number of sources. Data used in the Farmability Index was drawn from the City of Boston's 2014 Assessor's Data, as well as data from MassGIS, the Department of Innovation and Technology, the Boston Water and Sewer Commission, and the Department of Neighborhood Development. All of the data used in the Susceptibility Index was taken from the US Census Bureau's American Community Survey (ACS). The Susceptibility Index compared 5-Year Estimates from the 2009 ACS and 2014 ACS for a five-year perspective on changing neighborhoods. All of the data used in this analysis was vector data.

METHODS

A suitability analysis is the selected methodology for answering the stated research questions. First, it is necessary to evaluate the vacant, city-owned land in Boston based on its suitability for agriculture. To guide this analysis, the Farmability Index (see Figure 2a) was developed. These indicators are based on a 2013 Tufts Field Project that was conducted in partnership with TPL. The authors (Chin, et.al.) assessed available vacant land based on its suitability for agriculture and developed parameters based on interviews with urban farmers and other experts. The derived methodology provides the foundation for this analysis.

FARMABILITY INDEX	
FACTOR	QUALIFIER
SIZE	AREA ≥ 10,000 ft²
PREVENTATIVE ENVIRONMENT	NO WETLANDS NO PARKS NO RAIL LINES
IMPERVIOUSNESS	SURFACE ≤ 20% IMPERVIOUS
LIGHT EXPOSURE	NO TALL BUILDINGS (≥ 5 STORIES) WITHIN 80 ft OF PARCEL BORDER
	CHIN, ET.AL. 2013

Parameters for Parcel Elimination
- Parcels Near Rail Lines
- Parks
- Wetlands
- Bodies of Water

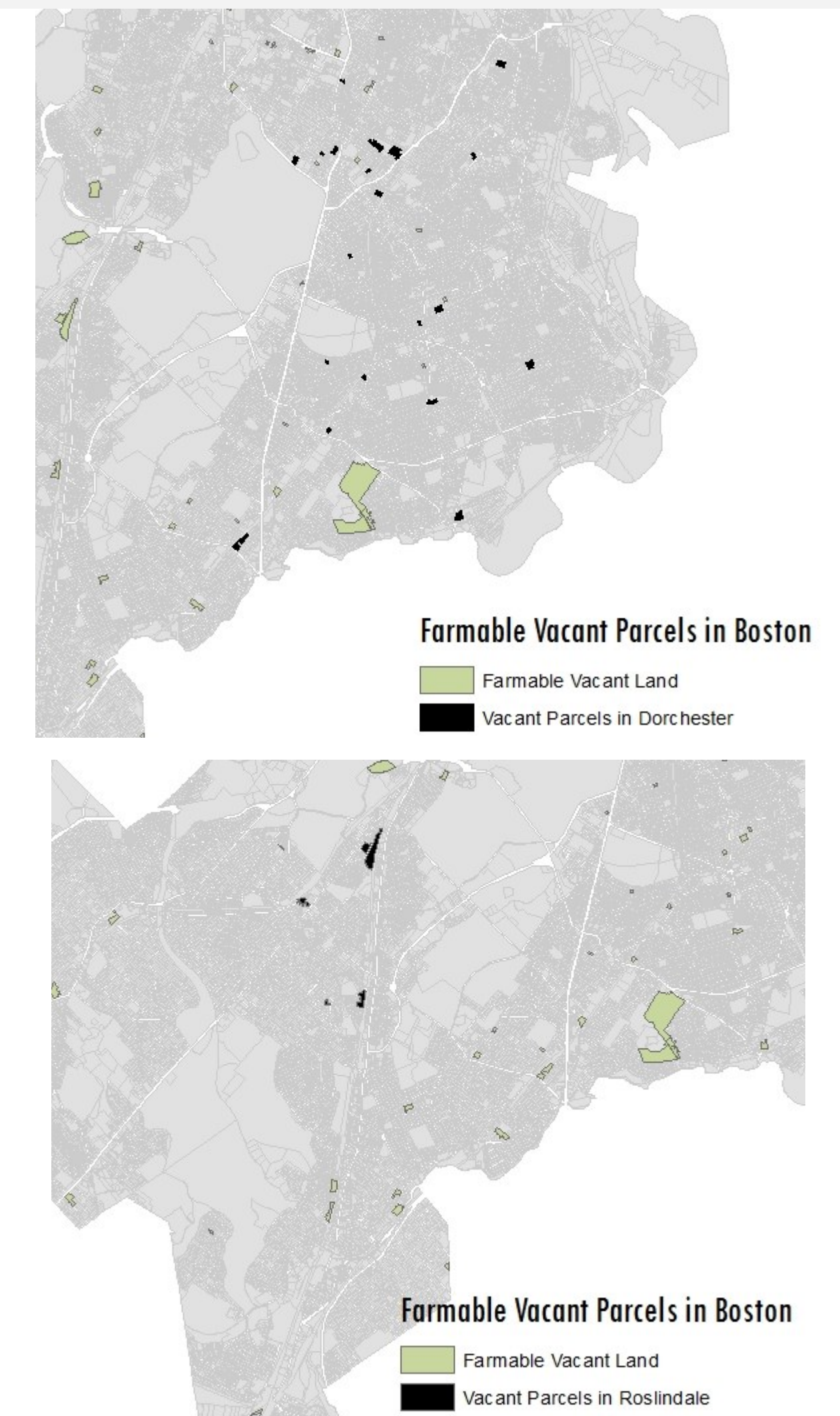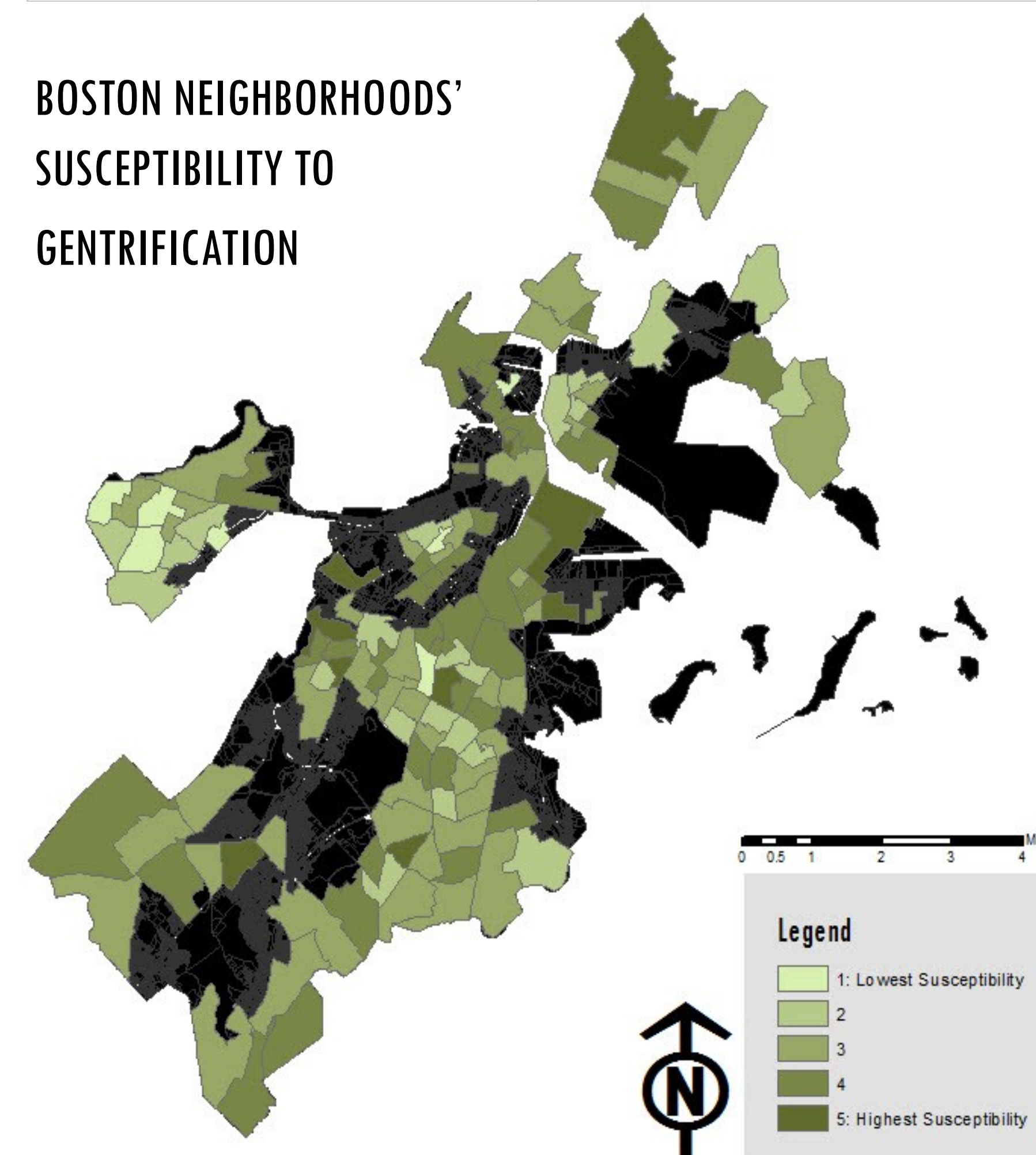**Farmable Vacant Parcels in Boston**
- Farmable Vacant Land

While a parcel's ability to support agriculture (based on the previously defined factors) is of practical importance, it is also essential to consider socioeconomic indicators while prioritizing parcels for acquisition. Many neighborhoods throughout Boston are currently experiencing rapid development, which is often accompanied by rising rents and gentrification.

In developing the criteria for a neighborhood's susceptibility to gentrification, a thorough review of academic literature was necessary. While there exist a wealth of examples of geospatial analyses of gentrification, the literature reveals little consensus regarding what constitute the best indicators. The following methodology for determining a neighborhood's susceptibility to gentrification was derived from a Master's thesis by Nick Welch. This research sought to measure temporal changes observed in a variety of physical, demographic and economic variables in gentrifying neighborhoods. This methodology was selected for application in this context because the derived criteria had basis in reality: these changes had been *observed* in Seattle neighborhoods currently undergoing gentrification, rather than arbitrarily selected. .

SUSCEPTIBILITY INDEX	
	% CHANGE, 2009-2014
FACTOR	QUALIFIER
MEDIAN HOUSEHOLD INCOME	+
% OF POPULATION WITH A BACHELOR'S DEGREE	+
NUMBER OF HOUSING UNITS	+
RENTAL SHARE	-
MEDIAN GROSS RENT	+
MEDIAN HOME VALUE	+
SHARE OF 25-34 COHORT	+
SHARE OF 55-64 COHORT	+
SHARE OF BLACK RESIDENTS	-
SHARE OF FAMILY HOUSEHOLDS WITH CHILDREN	-
	WELCH, 2012

BOSTON NEIGHBORHOODS' SUSCEPTIBILITY TO GENTRIFICATION

Legend
- 1: Lowest Susceptibility
- 2
- 3
- 4
- 5: Highest Susceptibility

Farmable Vacant Parcels in Boston
- Farmable Vacant Land
- Vacant Parcels in Dorchester

Farmable Vacant Parcels in Boston
- Farmable Vacant Land
- Vacant Parcels in Roslindale

RESULTS & IMPLICATIONS

The results of the Farmability Analysis yielded a total of 95 parcels that met the criteria for suitability, approximately 6% of the 1,665 vacant, city-owned parcels with which this analysis began. These parcels can be further prioritized for acquisition based on the results of the Susceptibility Analysis.

The City of Boston was evaluated on ten factors from 2009-2014, mapped by census tract. For each indicator, census tracts were ranked on a scale of 1-5, '1' meaning that the observed change was not one typically associated with gentrification, and '5' meaning that the observed change correlated with those observed in gentrification processes. The highest possible score, meaning most susceptible to gentrification, was a 50. The highest scores observed in this analysis were 37 (Dorchester) and 36 (Roslindale).

These results can inform UFI's land acquisition priorities. In the neighborhood of Dorchester, there are 22 vacant parcels of land that meet the stated criteria for agriculture. In Roslindale, there are 7 available parcels of land that meet the criteria for agriculture. While this analysis is not comprehensive and should certainly not be perceived as either a predictor of gentrification or a foolproof tool to guide UFI's service area expansion, it is useful in that it provides a perspective of changing neighborhoods in Boston. It is recommended that a more in-depth needs assessment of Boston's neighborhoods be conducted with the purpose of identifying the highest-need and thus highest priority areas for expansion. It is also recommended that the parcels identified through this analysis be further examined in person for physical and soil quality concerns prior to acquisition.

Chin, D., Infahsaeng, T., Jakus, I., and Oorthuys, V. (2013). Urban farming in Boston: A survey of opportunities. Tufts University Department of Urban and Environmental Policy and Planning.

Welch, N. (2013). City for all? A geospatial approach to equity, sustainability, and gentrification in Seattle, Washington. Masters thesis, Tufts Uni-