Accessing Energy Efficiency in Massachusetts

An Initial Review of Data

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Overview

In 2017, Massachusetts' "Mass Save" energy efficiency programs ranked number one in the annual efficiency scorecard produced by American Council for an Energy-Efficient Economy (ACEEE) for the seventh consecutive year. Mass Save's high ranking is not, however, a good indicator of whether low-income households are getting the services they need. Only 2 percent of a state's overall energy efficiency score is based on how well a state's program serves low-income families, and these scores do not consider any other differences in how well various communities are served.

According to the Mass Save program administrators, in 2016, the electric efficiency program had a benefit-cost ratio of 2.66 (that is, for every $1 of cost to the administrators there were $2.66 of benefits to customers) and the gas efficiency program of 1.95 ($1 of cost to every $1.95 of benefits). These numbers indicate strong performance on a broad scale, but, like the ACEEE ranking, average performance of the program as a whole may obscure uneven outcomes for distinct demographic groups.

Ten years after the passage of the law that established the Mass Save programs, a fundamental question remains: How well are Massachusetts' efficiency programs reaching under-served communities and harder-to-reach families?

Limits to available data

At present, it is not possible to answer that question completely. A rigorous examination of access to energy efficiency programs in Massachusetts would require data from the companies that administer Mass Save. These companies have not yet made these data publicly available.[1]

When approving and funding efficiency services and incentives, Mass Save program administrators have the capacity to track both energy savings from each measure used and basic characteristics about the family being served. Currently, efficiency program administrators have access to—but do not include in publicly available statistics—information regarding families that:

- have incomes that fall below 60 percent of the state median income,
- have incomes that fall below 80 percent of the state median income,
- have incomes that fall between 80 and 120 percent of the state median income,
- rent in one-to-four-unit buildings,
- rent in larger apartment buildings, and/or
- need language assistance to communicate with efficiency providers.

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[1] The DPU ordered the Mass Save program administrators in 2014 to develop a comprehensive Mass Save database. Order, D.P.U. 14-141, http://170.63.40.34/DPU/FileRoomAPI/api/Attachments/Get/?path=14-141%2fOrder_120114.pdf. Certain obligations under this order have been stayed, but the Order as a whole has not been stayed or withdrawn.

Though not publicly available, these data both exist and are necessary to properly evaluate who benefits from the successes of Mass Save and determine where improvement is needed. Additional data would be helpful to more fully evaluate how Mass Save is reaching underserved households. This includes information on household member's age, race, and ethnicity. While not currently tracked, such data can be produced via anonymous surveys of program participants and reported frequently along with other evaluation, measurement and verification (EM&V) studies.

Findings of initial data review

Though working with limited available data, Applied Economics Clinic has produced this initial review of data through maps and other graphics. Table 1 (below) summarizes some of the differences in energy savings from town to town. A spreadsheet showing all the data used in this review is available at www.aeclinic.org/publicationpages/2018/2/26/accessing-energy-efficiency-in-massachusetts.

- *There are substantial differences in energy savings among Massachusetts towns.* On average, across the whole of Massachusetts, families used 2.8 percent less energy between 2013 and 2015 than they would have without these programs. Energy savings ranged from 0.3 percent of total energy usage in Taunton to 6.7 percent in Tisbury.

- *On average, Boston has achieved more efficiency savings than the rest of the Commonwealth.* While the average savings for Boston reached 3.2 percent, towns outside of Boston only achieved 2.7 percent savings.

- *Boston neighborhoods, however, show wide disparities in efficiency savings.* Average savings among Boston's neighborhoods ranged from 1.7 percent in Allston (02134) to 6.6 percent in Fenway (02115).

- *Lower-income communities are receiving lower efficiency savings.* Families in towns and Boston neighborhoods with median household incomes of $45,000 or less averaged 1.9 percent in savings, while the remaining towns and neighborhoods averaged 2.7 percent. The median household income for Massachusetts as a whole is $71,000.

- *Savings differ by efficiency program administrator.* Across the different gas distributors, total average savings by town or neighborhood for both gas and electric efficiency programs ranged from 2.0 to 4.3 percent. Across the electric distributors, total average savings by town or neighborhood for both gas and electric efficiency programs ranged from 1.6 to 2.7 percent.

Data and methodology

This initial review of geographic data available on www.masssavedate.com—maintained by the Mass Save program administrators—provides information about efficiency savings and the composition of the population for each town in Massachusetts as well as 29 Boston neighborhoods by zip code. Mass Save's geographic data suffer from numerous limitations[2] and, when aggregated to the state level, do not match state total data presented elsewhere on the same website and submitted by the efficiency program administrators to the Massachusetts Department of Public Utilities. In addition, the information presented regarding these geographic data do not make clear whether or not the data include electric savings from gas programs, gas savings from electric programs, and/or oil and propane savings from any programs. To derive a value for energy savings for this review, we combined gas and electric savings on the basis of their greenhouse gas emission reductions.

All demographic data are taken from the U.S. Census Bureau's annual American Community Survey's average 2011 to 2015 tables (www.factfinder.census.gov), which present data at the zip code level. It should be emphasized that the demographic information considered here—median income, renters, nativity, English language skill, and race/ethnicity—refers to each town in its entirety, and is not limited to the group of families that have received efficiency services. It is not possible, therefore, to make conclusions regarding uneven provision of efficiency services to different Massachusetts groups. The findings of this review point towards unequal access to energy efficiency in Massachusetts, but do not provide conclusive proof. Further data and analysis are needed to provide insight into how Massachusetts' distribution of energy efficiency access can be improved.

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[2] *Including the limitations described on the www.masssavedata.com website:*

This data is sourced from residential and C&I customer profile studies…,which use gross savings and incentives data collected from a combination of PA customer tracking and other vendor data (such as upstream lighting sales by store location) to geographically represent savings and spending across the Commonwealth. The study data does not always tie directly to the PA customer tracking systems and DPU reported savings, which take into account other factors, such as evaluation impact factors and attribution…Since actual purchasers of bulbs through the residential upstream lighting core initiative are not known a model was used to allocate savings and incentives to the census block group level. Behavioral savings were modeled at the block group level by assuming average monthly savings were attributed to participating households in each block group. The C&I data includes all upstream lighting installs and savings that could be geocoded.

Table 1. Overview of Average Total Energy Efficiency Savings (2013-2015)

	2013-2015 Average Total Savings (%)		
	Town/Neighborhood Count	Residential & Low-Income	Commercial & Industrial
By Electric Utility			
Eversource	153	2.7%	2.5%
National Grid	162	2.6%	2.2%
Unitil	3	1.6%	2.0%
Municipal	40	1.6%	1.0%
By Gas Utility			
Eversource	42	2.7%	3.4%
National Grid	138	2.8%	2.1%
Columbia	51	2.1%	2.1%
Berkshire	20	2.3%	2.5%
Liberty Utilities	6	2.0%	2.6%
Municipal	3	4.3%	N/A
None	90	3.5%	2.8%
Same Electric/Gas (1=Yes, 2=No)			
1	78	2.7%	2.9%
2	300	2.5%	2.4%
Median Income (MA: $70,954)			
<$45000	17	1.9%	2.1%
$45,000-71,000	132	2.6%	2.2%
$71,000-110,000	180	2.7%	2.8%
>$110,000	49	2.6%	2.4%
Renters			
40%+	68	2.5%	2.5%
20-40%	128	2.7%	2.2%
0-20%	181	2.6%	2.2%
Percent White			
95%+	86	2.5%	2.3%
85-95%	175	2.7%	2.2%
75-85%	59	2.7%	2.2%
0-75%	58	2.4%	2.5%
Foreign Born			
0-5%	140	2.7%	2.2%
5-20%	191	2.6%	2.2%
20%+	47	2.6%	2.5%
Speaks English "Less Than Very Well"			
0-5%	280	2.7%	2.2%
5-20%	83	2.5%	2.5%
20%+	15	2.5%	1.9%
Boston			
Boston	28	3.2%	2.4%
Not Boston	350	2.7%	2.6%

Figure 1. Residential & Low-Income Savings in Massachusetts (2013-2015)
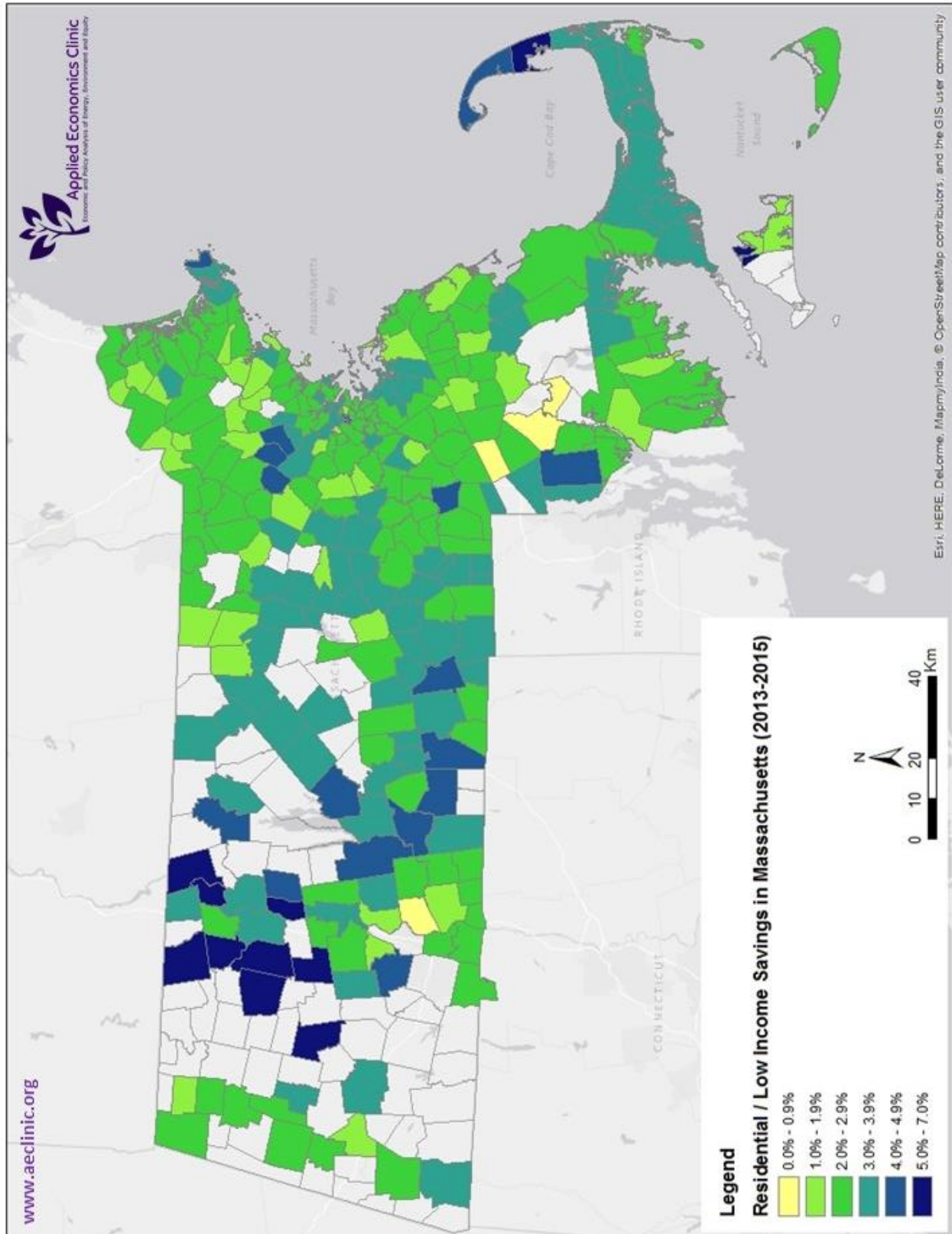
Figure 2. Residential & Low-Income Savings in Boston (2013-2015)
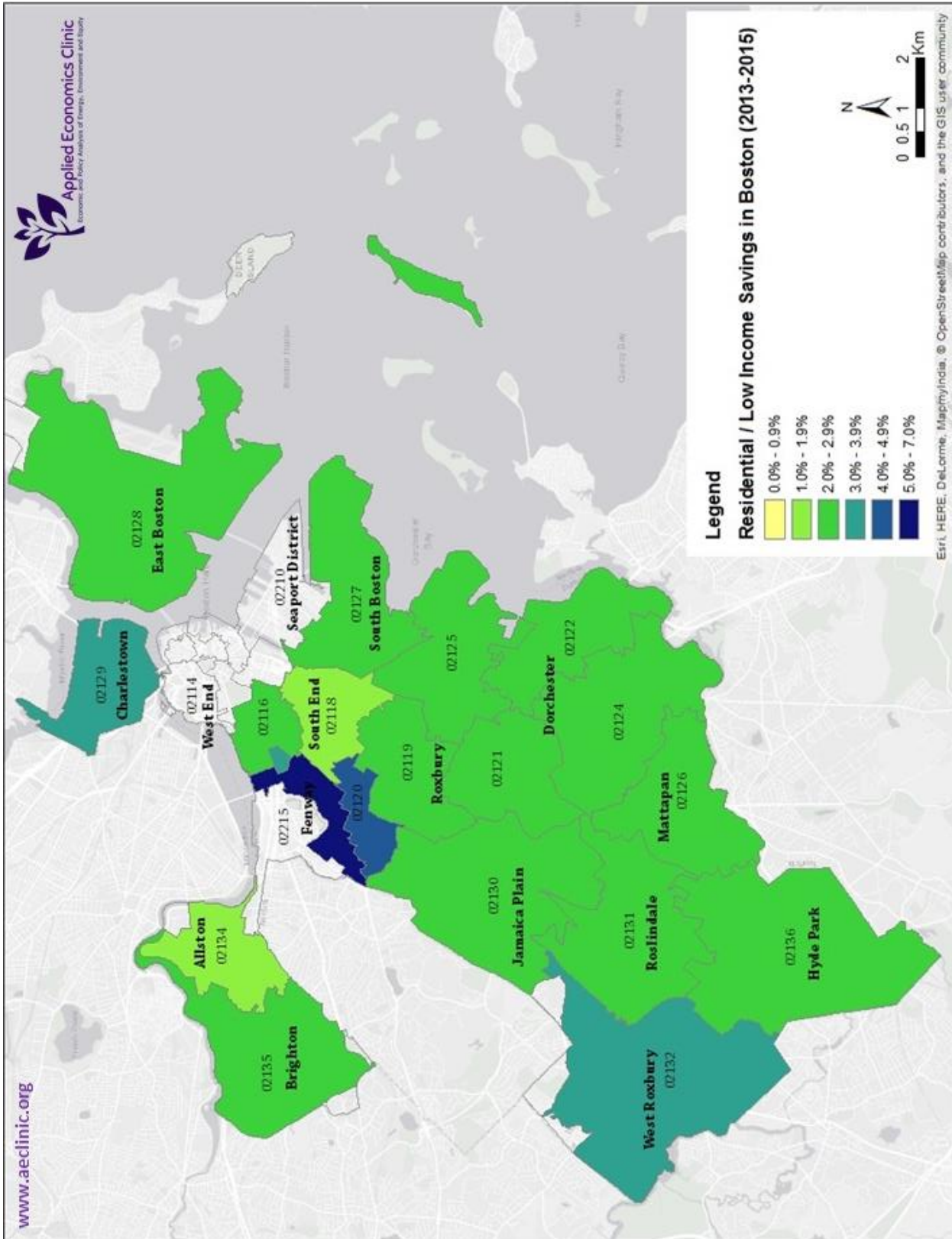
Figure 3. Commercial & Industrial Savings in Massachusetts (2013-2015)

Legend

Commercial / Industrial Savings in Massachusetts (2013-2015)

- 0.0% - 0.9%
- 1.0% - 1.9%
- 1.9% - 2.9%
- 3.0% - 3.9%
- 4.0% - 4.9%
- 5.0% - 40.0%

Figure 4. Commercial & Industrial Savings in Boston (2013-2015)
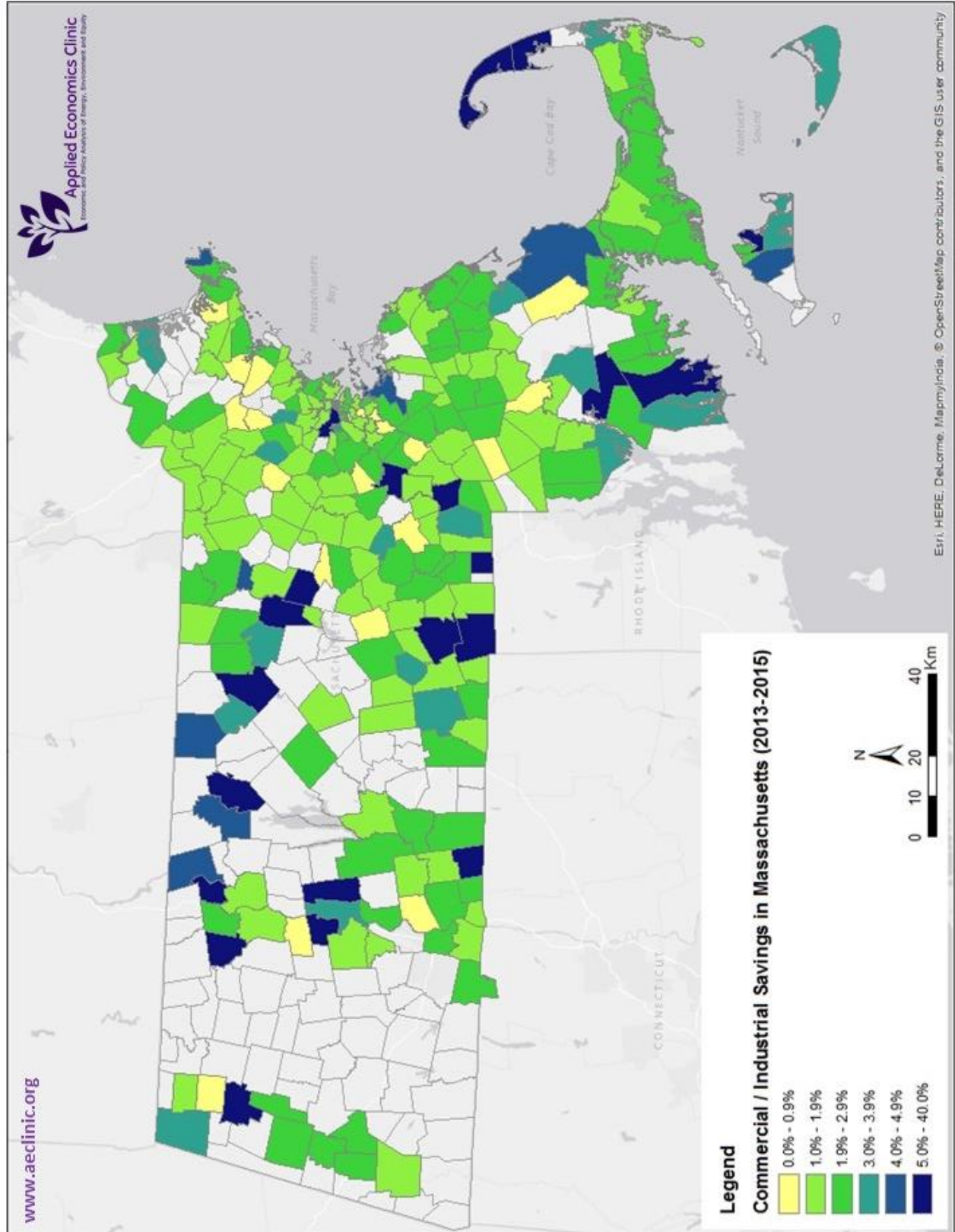
Figure 4. Commercial & Industrial Savings in Boston (2013-2015)
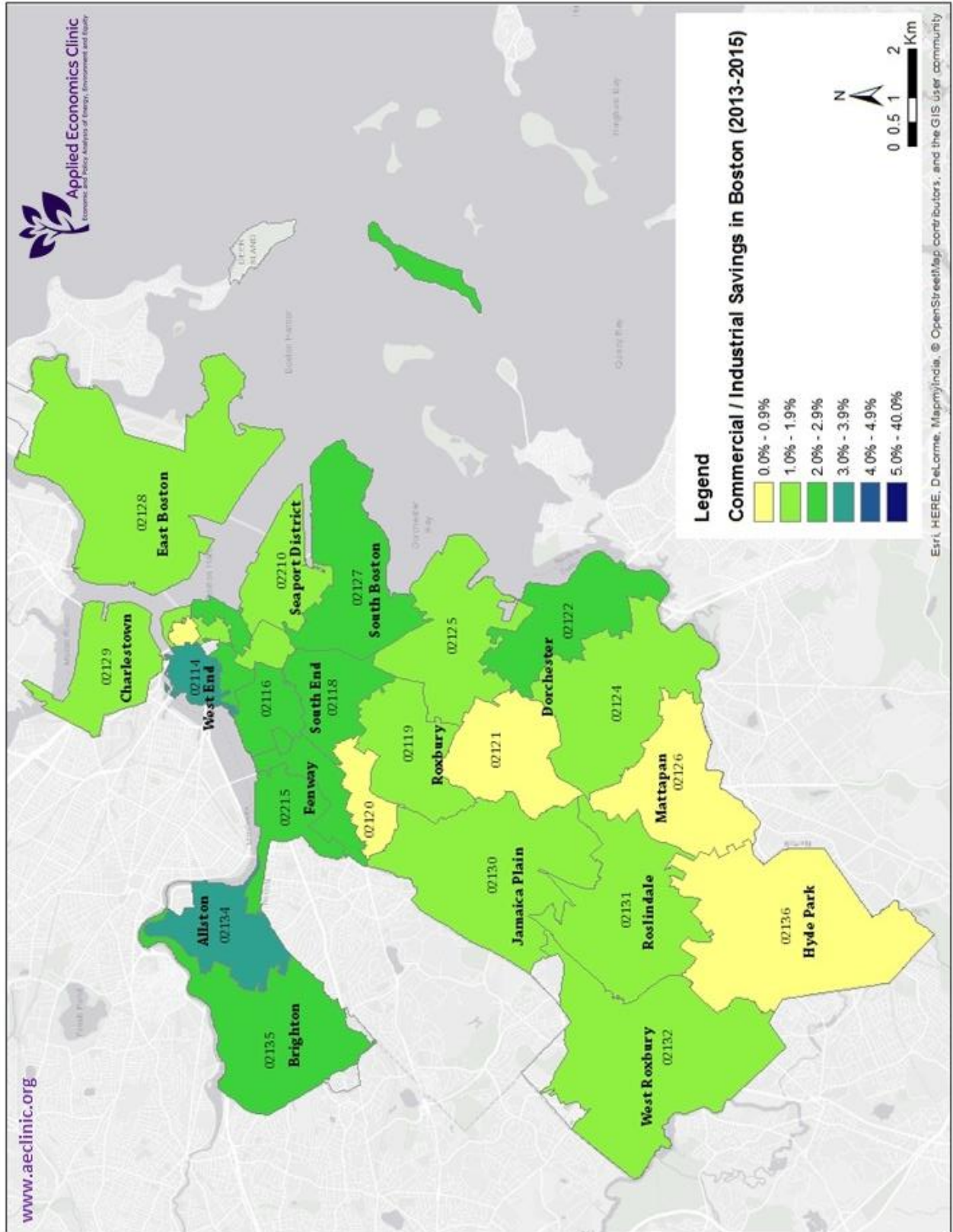
Figure 5. Median Income in Massachusetts (2016)

Figure 6. Median Income in Boston (2016)
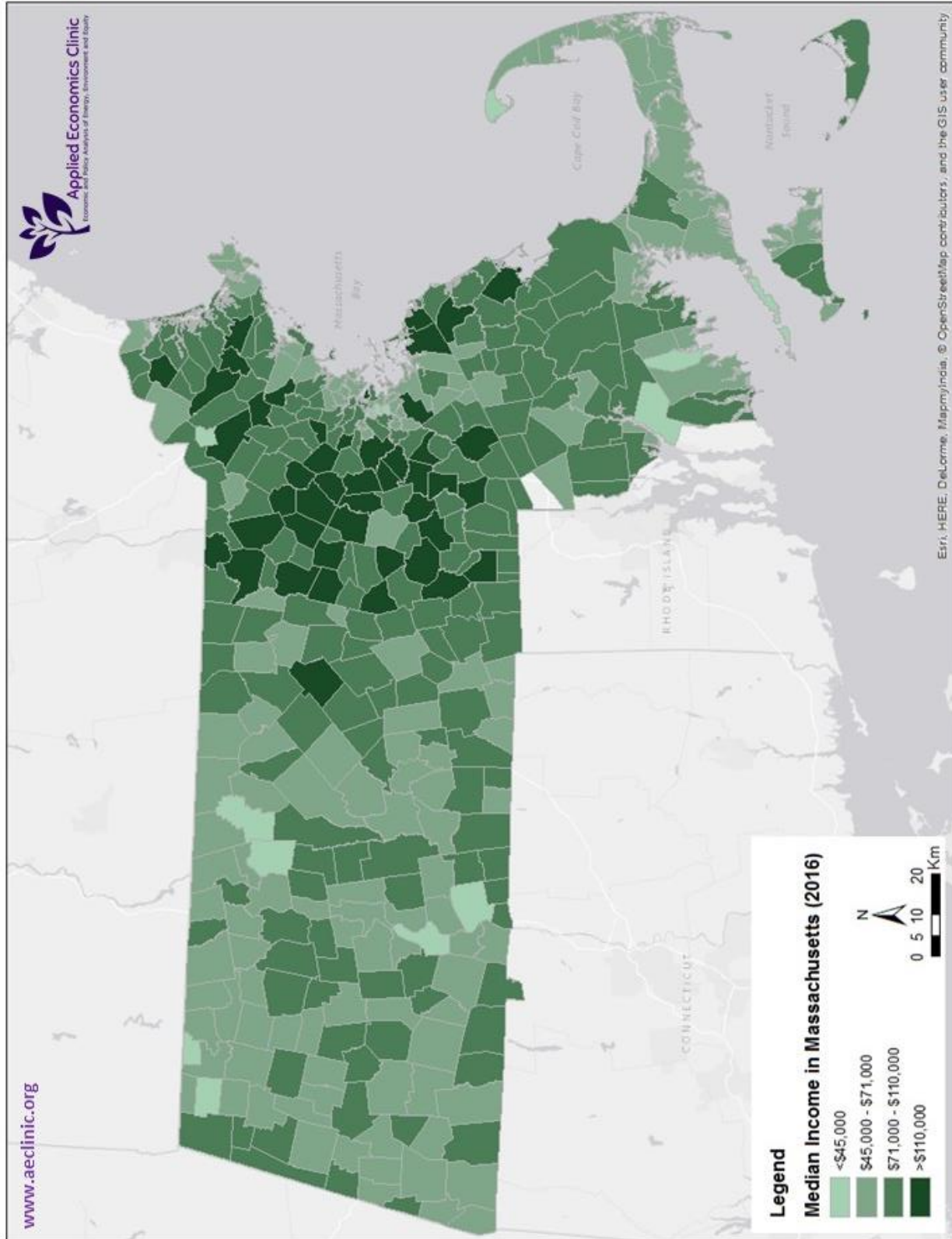
Figure 7. Percentage of Renters in Massachusetts (2016)
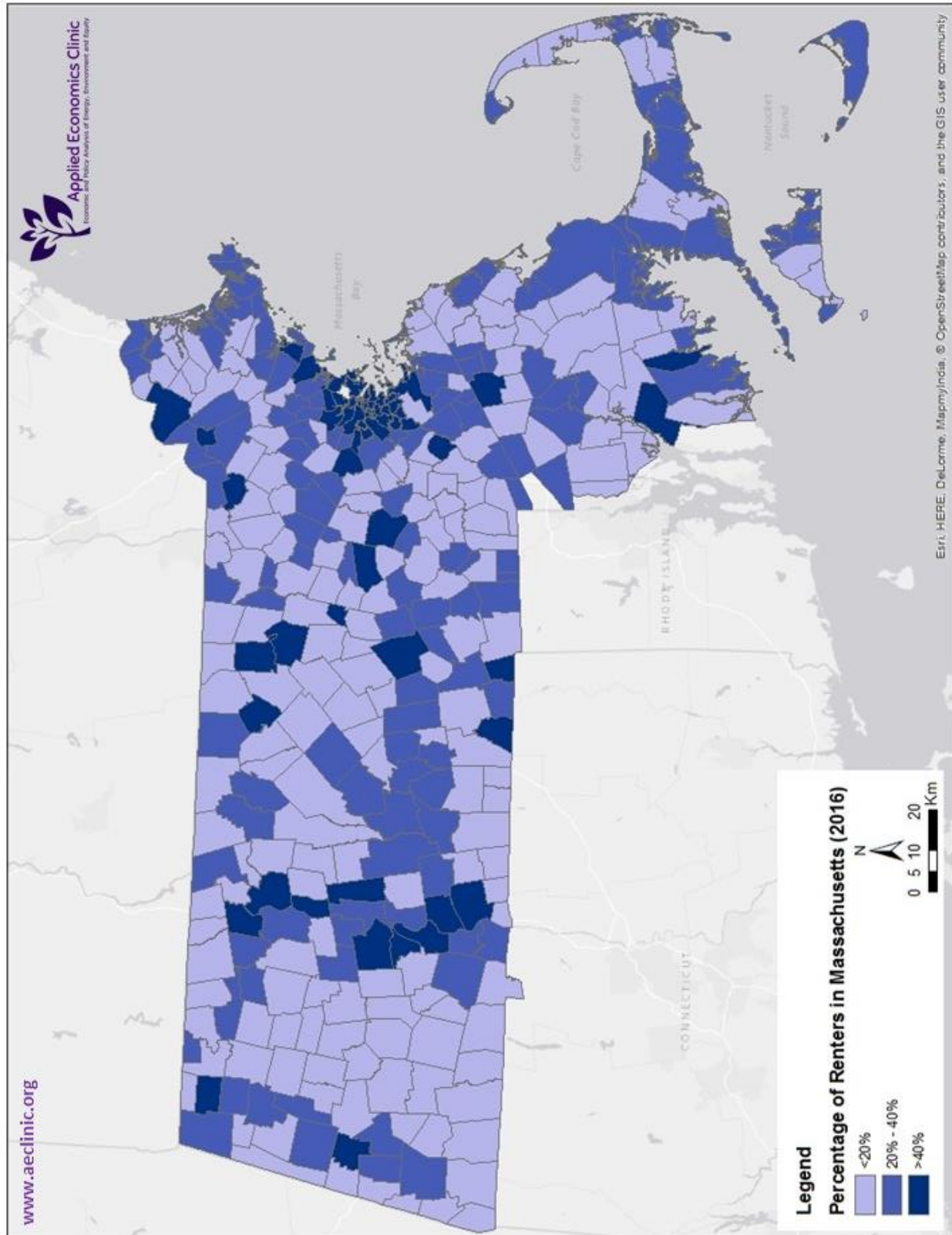
Figure 8. Percentage of Renters in Boston (2016)
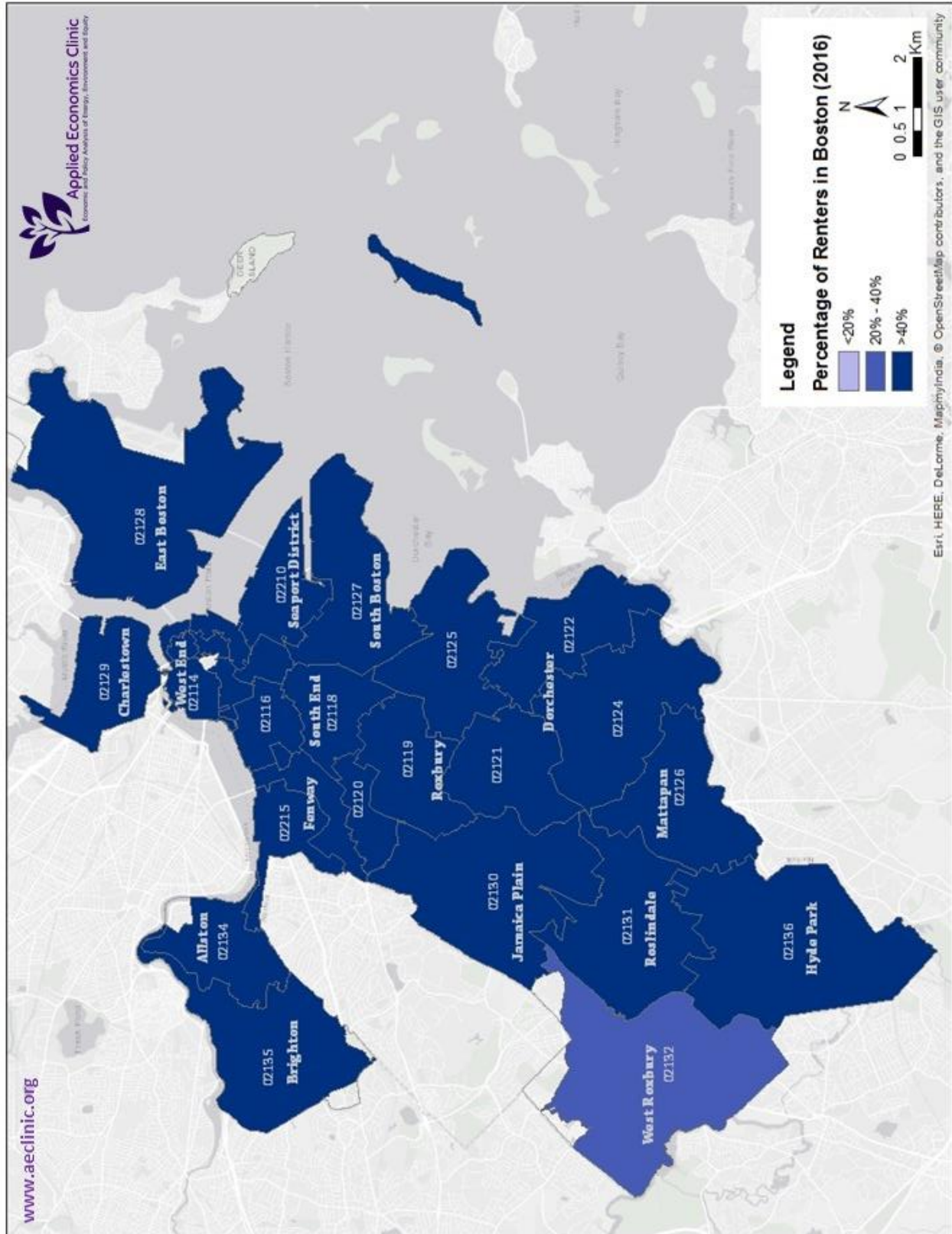
Figure 9. Percentage of Foreign Born Population in Massachusetts (2016)
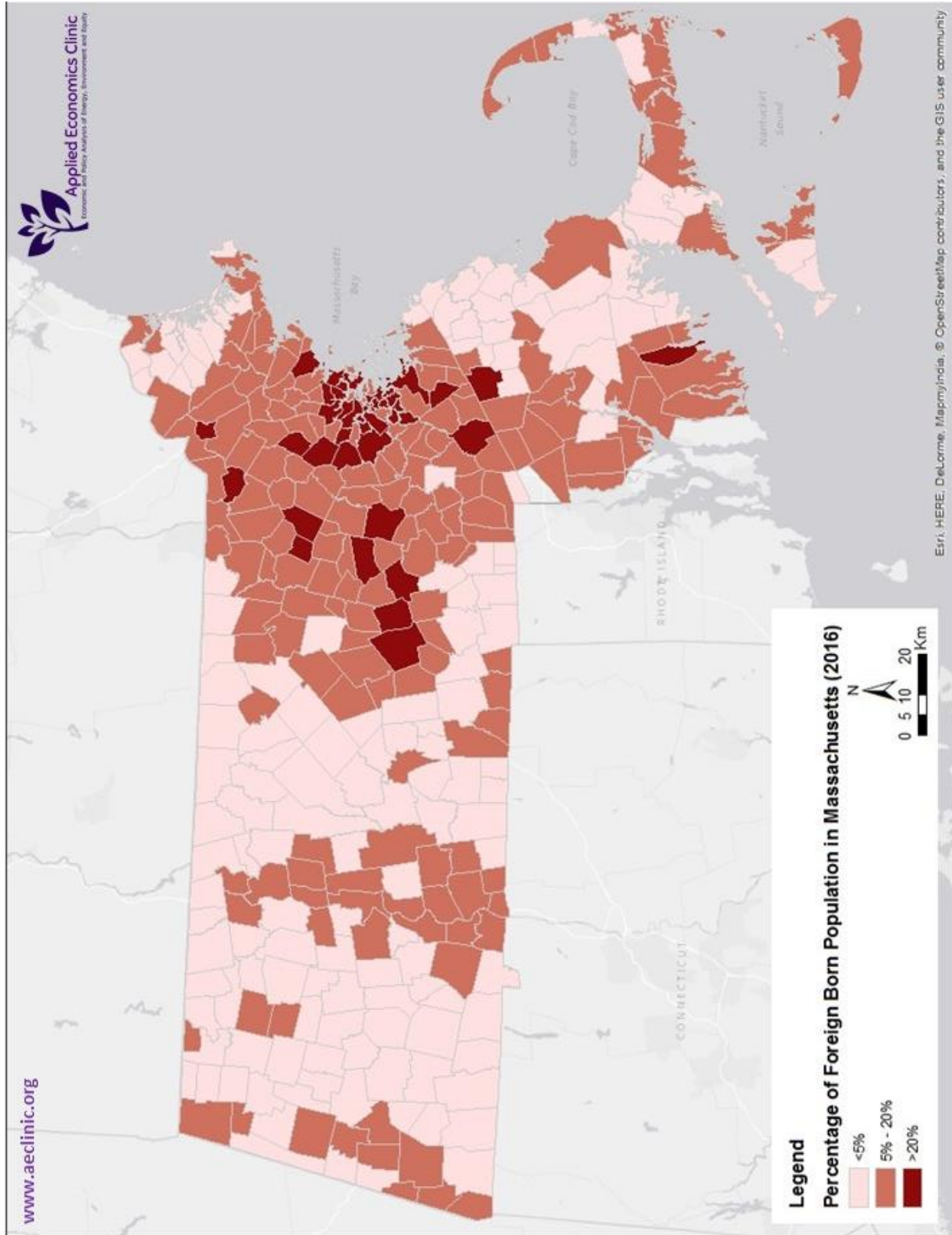
Figure 10. Percentage of Foreign Born Population in Boston (2016)
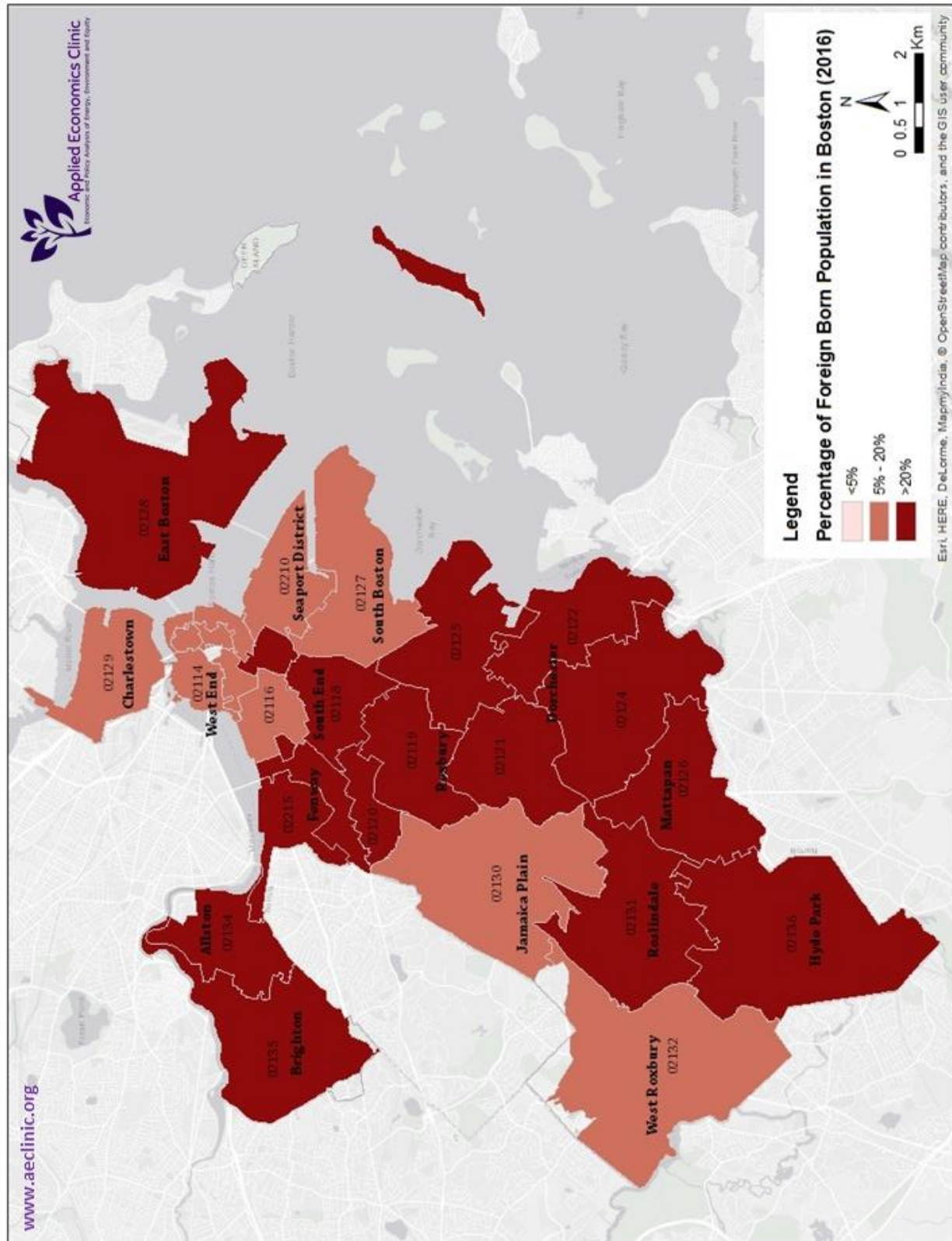
Figure 11. Percentage speaking English "less than very well" in Massachusetts (2016)
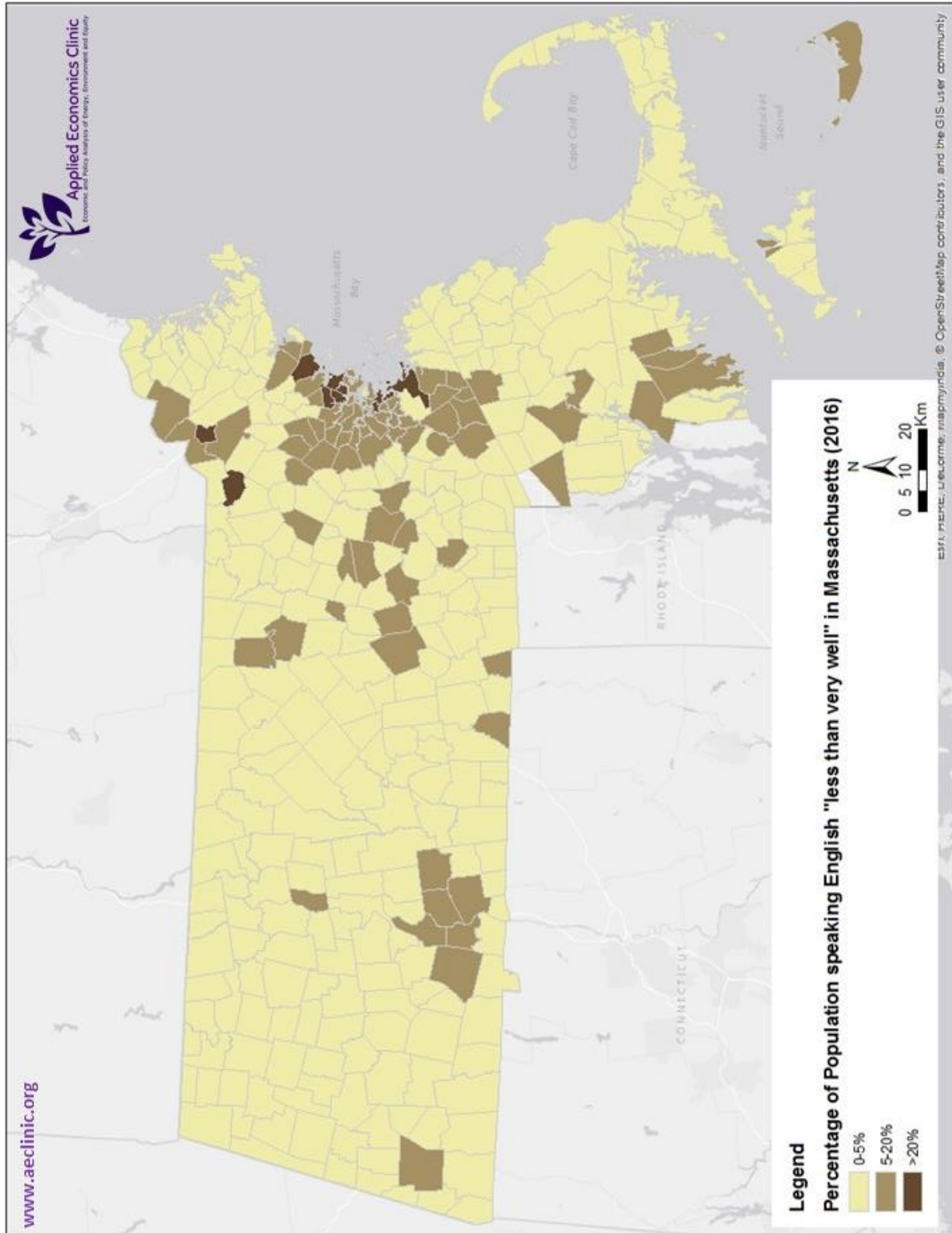
Figure 12. Percentage speaking English "less than very well" in Boston (2016)
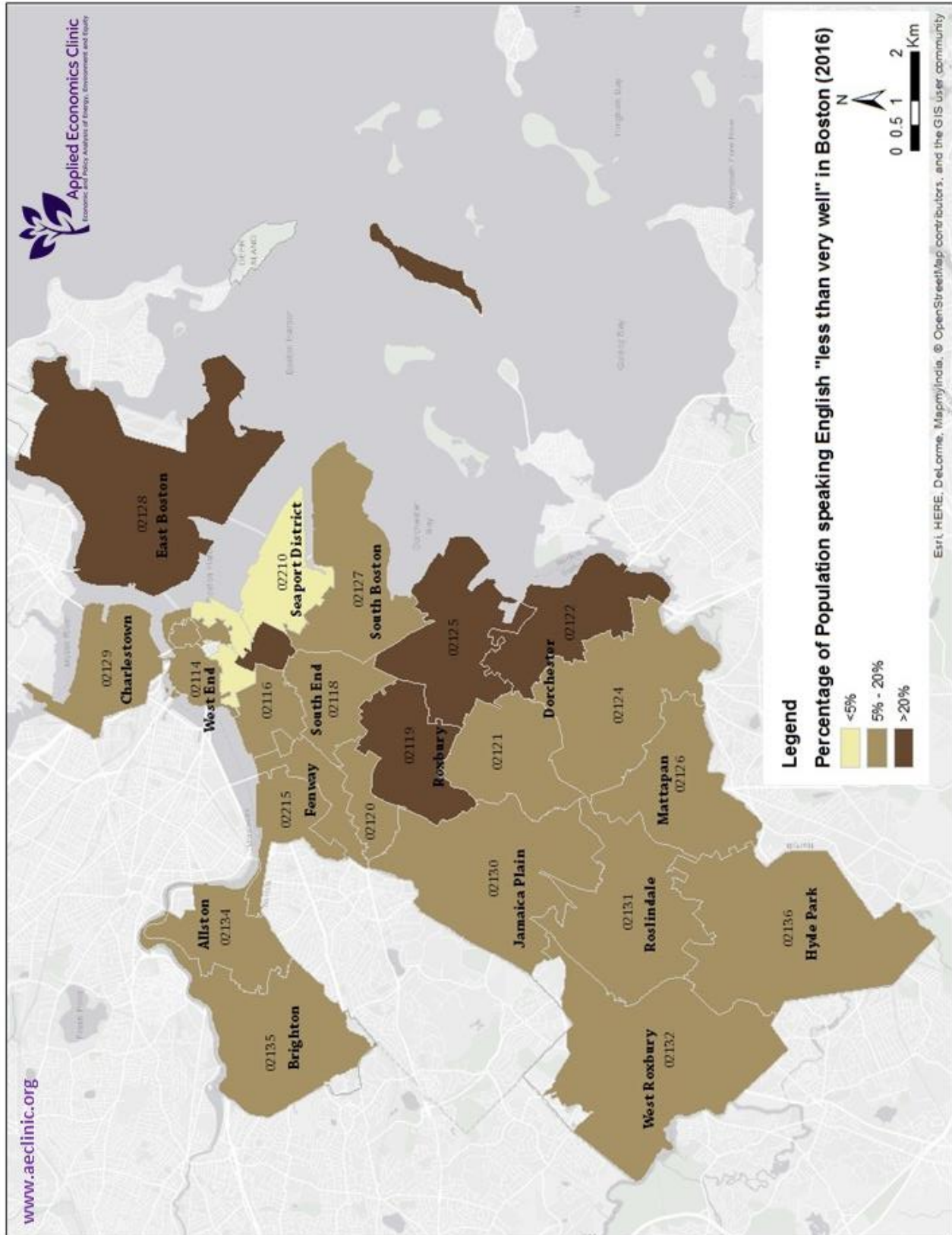
Figure 13. White, non-Hispanic as a share of population in Massachusetts (2016)
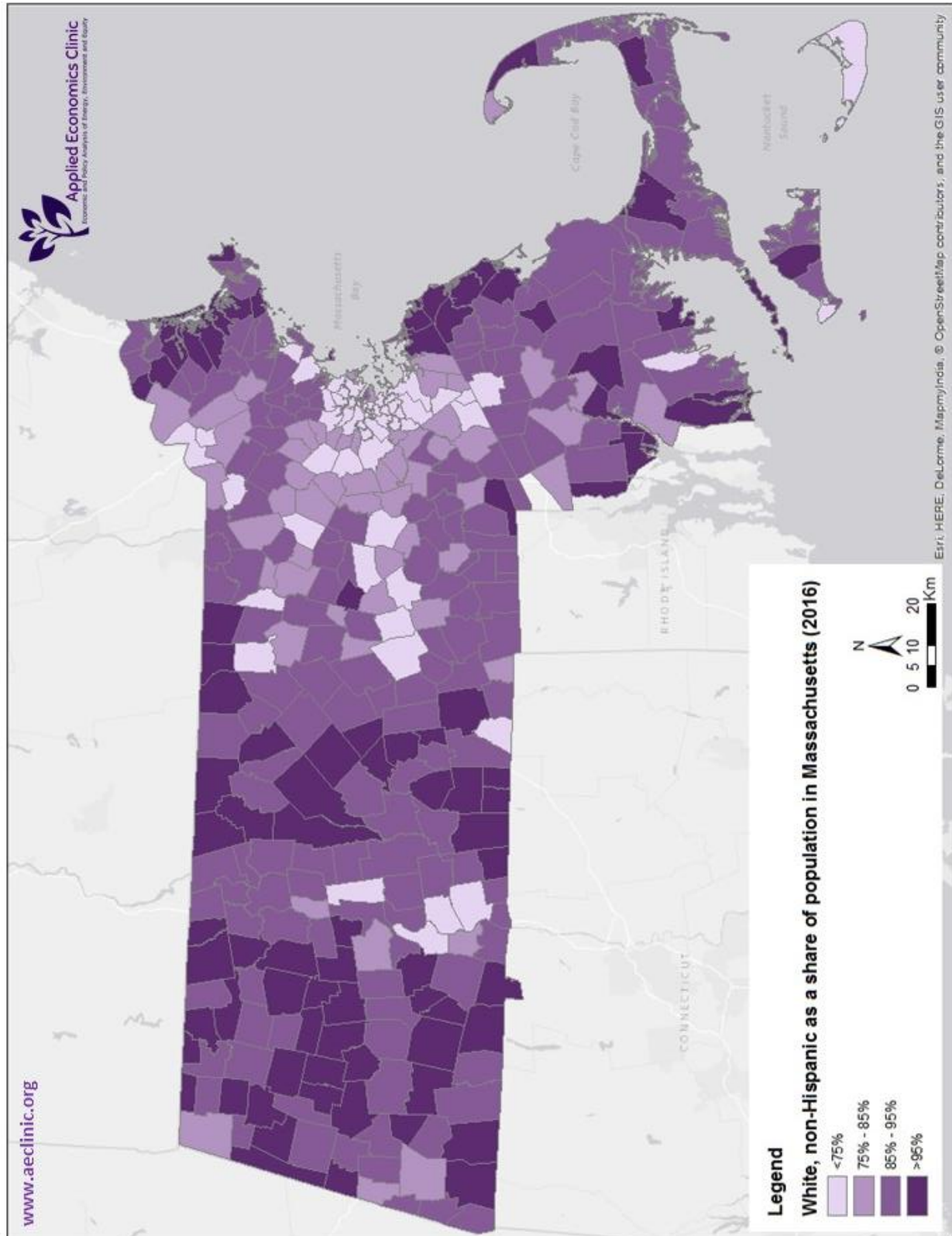
Figure 14. White, non-Hispanic as a share of population in Boston (2016)
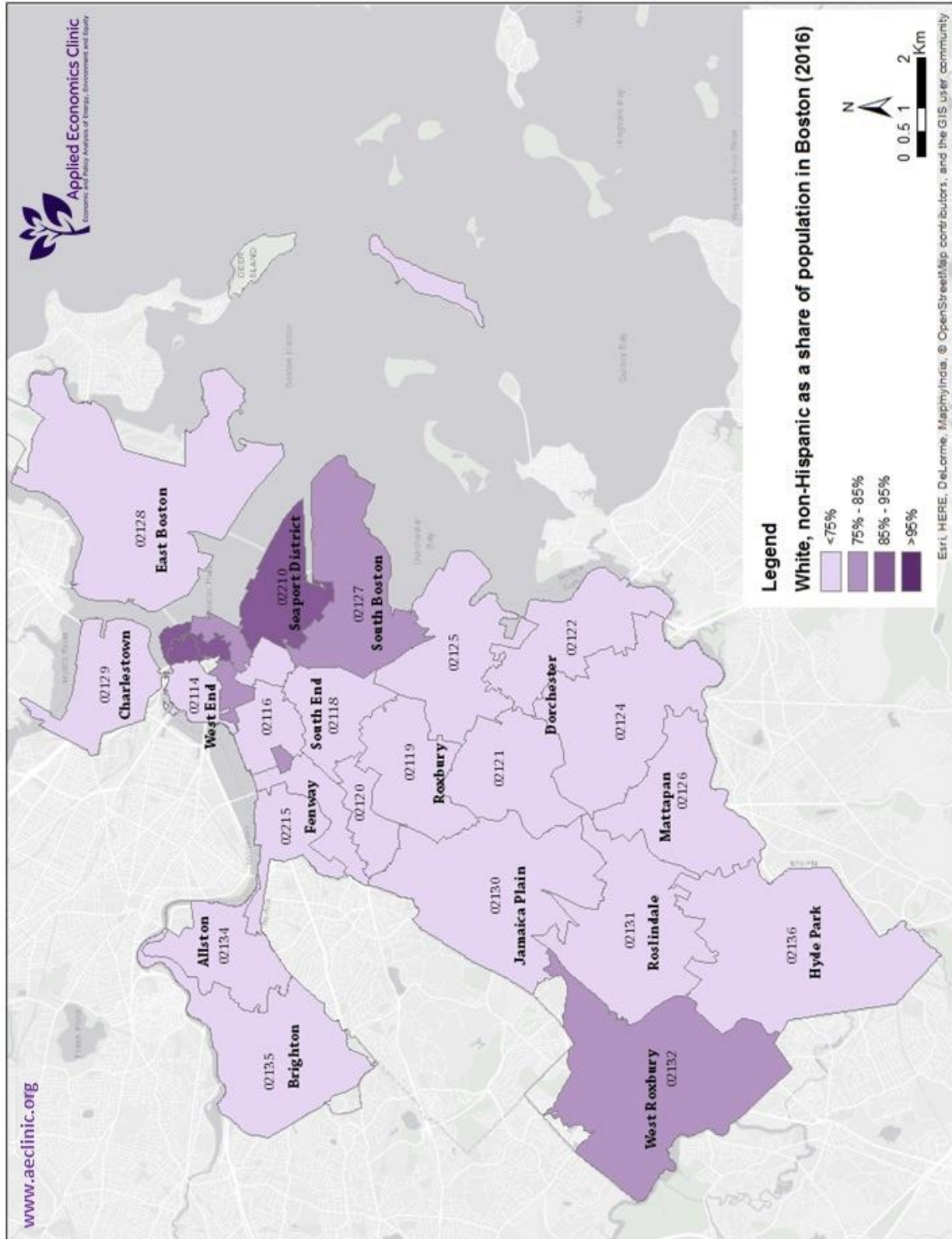
Figure 15. Race in Massachusetts by Town/Neighborhood (2016)

Municipality	White	Black	Latino	Asian	Native American	Other
Abington	92%					
Acton	71%			23%		
Acushnet	93%		5%			
Adams	96%					
Agawam	88%		7%			
Alford	94%					
Allston (02134)	57%	5%	13%	21%		
Amesbury	94%					
Amherst	73%	5%	6%	13%		
Andover	79%			13%		
Aquinnah	40%		40%	19%		
Arlington	80%			11%		
Ashburnham	96%					
Ashby	97%					
Ashfield	97%					
Ashland	81%		5%	9%		
Athol	92%		6%			
Attleboro	84%		6%			
Auburn	91%		5%			
Avon	74%	11%	7%			
Ayer	83%		5%	5%		
Back Bay (02116)	71%	5%	7%	14%		
Back Bay (02199)	85%			12%		
Barnstable	88%					
Barre	96%					
Beacon Hill (02108)	83%		5%			
Becket	94%					
Bedford	75%	5%		14%		
Belchertown	91%					
Bellingham	93%					
Belmont	77%	5%		14%		
Berkley	97%					
Berlin	96%					
Bernardston	94%					
Beverly	91%					
Billerica	87%			5%		
Blackstone	94%					
Blandford	99%					
Bolton	91%			5%		
Bourne	91%					
Boxborough	75%			20%		
Boxford	93%					
Boylston	90%					
Braintree	82%		5%	9%		
Brewster	96%					
Bridgewater	84%		7%			
Brighton (02135)	66%		10%	16%		
Brimfield	98%					
Brockton	40%	39%	10%			9%
Brookfield	91%			7%		
Brookline	72%		6%	16%		
Buckland	94%					
Burlington	76%		5%	15%		
Cambridge	62%	10%	9%	15%		
Canton	81%		6%	7%		
Carlisle	85%			10%		
Carver	94%					
Charlemont	95%					
Charlestown (02129)	71%	8%		11%	8%	
Charlton	97%					
Chatham	91%					
Chelmsford	85%			9%		
Chelsea	23%	5%	66%			

0%   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

■ White ■ Black ■ Latino ■ Asian ■ Native American ■ Other

Location	White	Black	Latino	Asian	Native American	Other
Cheshire	98%					
Chester	94%					
Chesterfield	98%					
Chicopee	74%		19%			
Chilmark	90%					
Chinatown (02111)	38%	5%		52%		
Clarksburg	99%					
Clinton	79%		16%			
Cohasset	98%					
Colrain	95%					
Concord	83%		6%	6%		
Conway	97%					
Cummington	96%					
Dalton	94%					
Danvers	91%					
Dartmouth	89%					
Dedham	80%		8%	7%		
Deerfield	91%					
Dennis	91%					
Dighton	94%					
Dorchester (02121)	3%	65%	29%			
Dorchester (02122)	34%	28%	12%	18%		7%
Dorchester (02124)	16%	58%	16%	6%		
Dorchester (02125)	30%	27%	20%	13%		9%
Douglas	89%					8%
Dover	84%			8%		
Downtown (02110)	85%			10%		
Dracut	84%	5%				
Dudley	93%					
Dunstable	93%					
Duxbury	97%					
East Boston (02128)	32%		58%			
East Bridgewater	94%					
East Brookfield	98%					
East Longmeadow	88%		6%			
Eastham	94%					
Easthampton	88%		7%			
Easton	89%					
Edgartown	88%					7%
Egremont	92%					
Erving	94%					
Essex	97%					
Everett	48%	19%	22%	7%		
Fairhaven	90%			6%		
Fall River	79%		10%	5%		
Falmouth	88%					
Fenway (02115)	61%	8%	13%	15%		
Fitchburg	64%		26%			
Florida	93%					5%
Foxborough	90%					
Framingham	67%	5%	15%	8%		5%
Franklin	91%			5%		
Freetown	94%					
Gardner	88%		7%			
Georgetown	93%					
Gill	91%					
Gloucester	95%					
Goshen	97%					
Gosnold	100%					
Grafton	79%		6%	7%		
Granby	91%		7%			
Granville	97%					
Great Barrington	82%		11%			

Legend: White, Black, Latino, Asian, Native American, Other

Stacked bar chart of racial/ethnic composition by municipality (White, Black, Latino, Asian, Native American, Other):

Municipality	White	Black	Latino	Asian	Other
Greenfield	88%		7%		
Groton	92%		5%		
Groveland	95%				
Hadley	90%				
Halifax	95%				
Hamilton	89%		7%		
Hampden	97%				
Hancock	97%				
Hanover	95%				
Hanson	93%				
Hardwick	95%				
Harvard	83%	7%	5%		
Harwich	94%				
Hatfield	97%				
Haverhill	76%		19%		
Hawley	94%				
Heath	94%				
Hingham	96%				
Hinsdale	98%				
Holbrook	75%	13%	8%		
Holden	91%				
Holland	95%				
Holliston	90%				
Holyoke	43%		50%		
Hopedale	94%				
Hopkinton	88%		7%		
Hubbardston	94%				
Hudson	88%		5%		
Hull	94%				
Huntington	92%		5%		
Hyde Park (02136)	27%	42%	26%		
Ipswich	95%				
Jamaica Plain (02130)	58%	10%	23%	6%	
Kenmore (02215)	62%	11%	21%		
Kingston	94%				
Lakeville	95%				
Lancaster	85%		5%	6%	
Lanesborough	95%				
Lawrence	17%		77%		
Lee	93%				
Leicester	92%				
Lenox	94%				
Leominster	75%		16%		
Leverett	95%				
Lexington	69%		25%		
Leyden	100%				
Lincoln	78%	7%	9%		
Littleton	89%		6%		
Longmeadow	87%		6%		
Lowell	49%	7%	19%	21%	
Ludlow	90%		7%		
Lunenburg	89%		5%		
Lynn	39%	11%	38%	8%	
Lynnfield	91%		5%		
Malden	49%	15%	10%	23%	
Manchester	97%				
Mansfield	88%		5%		
Marblehead	93%				
Marion	90%			6%	
Marlborough	70%		17%	5%	5%
Marshfield	95%				
Mashpee	87%				
Mattapan (02126)	5%	77%	15%		

Legend: White, Black, Latino, Asian, Native American, Other

A horizontal stacked bar chart showing racial/ethnic demographic breakdown by Massachusetts municipality. Categories: White, Black, Latino, Asian, Native American, Other.

Municipality	White	Black	Latino	Asian	Other
Mattapoisett	96%				
Maynard	91%				
Medfield	91%				
Medford	74%	9%	6%	8%	
Medway	89%				
Melrose	87%				
Mendon	95%				
Merrimac	98%				
Methuen	68%		25%		
Middleborough	94%				
Middlefield	96%				
Middleton	84%		10%		
Milford	81%		9%		5%
Millbury	92%				
Millis	94%			5%	
Millville	93%				
Milton	73%	13%		7%	
Monroe	99%				
Monson	96%				
Montague	89%				
Monterey	95%				
Montgomery	97%				
Mount Washington	92%				
Nahant	95%				
Nantucket	75%	7%	12%		5%
Natick	81%			11%	
Needham	85%			8%	
New Ashford	92%				5%
New Bedford	65%	6%	19%		8%
New Braintree	98%				
New Marlborough	96%				
New Salem	97%				
Newbury	97%				
Newburyport	92%				
Newton	74%	6%		14%	
Norfolk	85%	6%	7%		
North Adams	90%				
North Andover	84%		6%	6%	
North Attleboro	87%				
North Brookfield	97%				
North End (02109)	85%			6%	
North End (02113)	90%			5%	
North Reading	90%			6%	
Northampton	81%		8%	6%	
Northborough	84%			10%	
Northbridge	91%				
Northfield	95%				
Norton	93%				
Norwell	96%				
Norwood	81%		6%	7%	
Oak Bluffs	86%				8%
Oakham	96%				
Orange	96%				
Orleans	95%				
Otis	98%				
Oxford	89%		7%		
Palmer	94%				
Paxton	88%		9%		
Peabody	85%		9%		
Pelham	87%		7%		
Pembroke	93%				
Pepperell	93%				
Peru	95%				

Legend: White, Black, Latino, Asian, Native American, Other

Location	White	Black	Latino	Asian	Native American	Other
Petersham	96%					
Phillipston	93%					
Pittsfield	85%	5%	5%			
Plainfield	90%					
Plainville	93%					
Plymouth	92%					
Plympton	95%					
Princeton	91%			6%		
Provincetown	85%		6%			
Quincy	61%	5%		28%		
Randolph	38%	38%	8%	12%		5%
Raynham	87%					
Reading	91%			5%		
Rehoboth	94%					
Revere	58%	5%	28%	6%		
Richmond	95%					
Rochester	92%					
Rockland	92%					
Rockport	96%					
Roslindale (02131)	49%	22%	24%			
Rowe	98%					
Rowley	98%					
Roxbury (02119)	10%	54%	28%			
Roxbury (02120)	38%	23%	21%	16%		
Royalston	98%					
Russell	95%					
Rutland	95%					
Salem	74%	5%	16%			
Salisbury	93%					
Sandisfield	94%					
Sandwich	95%					
Saugus	87%	5%				
Savoy	86%	7%		5%		
Scituate	96%					
Seaport District (02210)	88%	6%				
Seekonk	95%					
Sharon	76%		16%			
Sheffield	99%					
Shelburne	97%					
Sherborn	90%		5%			
Shirley	68%	8%	14%			6%
Shrewsbury	74%		17%			
Shutesbury	89%		5%			
Somerset	97%					
Somerville	70%	6%	9%	10%		
South Boston (02127)	77%	6%	11%	5%		
South End (02118)	46%	16%	20%	15%		
South Hadley	86%		5%			
Southampton	98%					
Southborough	84%		11%			
Southbridge	62%	33%				
Southwick	96%					
Spencer	92%					
Springfield	33%	19%	43%			
Sterling	91%		6%			
Stockbridge	90%					
Stoneham	91%					
Stoughton	75%	14%				
Stow	92%					
Sturbridge	95%					
Sudbury	86%		9%			
Sunderland	78%	6%	8%			
Sutton	95%					

Legend: White | Black | Latino | Asian | Native American | Other

Horizontal stacked bar chart showing racial/ethnic composition (White, Black, Latino, Asian, Native American, Other) by Massachusetts municipality:

Municipality	White	Black	Latino	Asian	Other
Swampscott	93%				
Swansea	98%				
Taunton	84%	6%	6%		
Templeton	98%				
Tewksbury	91%				
Tisbury	87%		7%		5%
Tolland	95%				
Topsfield	94%				
Townsend	95%				
Truro	96%				
Tyngsborough	88%			8%	
Tyringham	99%				
Upton	90%				
Uxbridge	93%				
Wakefield	92%				
Wales	97%				
Walpole	87%				
Waltham	66%	6%	13%	12%	
Ware	92%				
Wareham	85%				10%
Warren	96%				
Warwick	95%				
Washington	96%				
Watertown	77%		10%	8%	
Wayland	82%			12%	
Webster	80%			11%	
Wellesley	79%		5%	11%	
Wellfleet	93%				
Wendell	94%				
Wenham	91%				
West Boylston	79%		6%	12%	
West Bridgewater	88%			6%	
West Brookfield	93%				
West End (02114)	74%		9%	11%	
West Newbury	98%				
West Roxbury (02132)	79%	5%	7%	6%	
West Springfield	79%		10%	5%	
West Stockbridge	85%		2%		7%
West Tisbury	96%				
Westborough	69%			24%	
Westfield	87%		8%		
Westford	80%			17%	
Westhampton	95%				
Westminster	95%				
Weston	80%			11%	
Westport	98%				
Westwood	88%			7%	
Weymouth	85%			5%	
Whately	94%				
Whitman	94%				
Wilbraham	90%				
Williamsburg	98%				
Williamstown	78%	5%	7%	5%	
Wilmington	91%			5%	
Winchendon	95%				
Winchester	83%			12%	
Windsor	96%				
Winthrop	85%			12%	
Woburn	82%		5%	6%	
Worcester	57%	12%	21%	7%	
Worthington	96%				
Wrentham	96%				
Yarmouth	91%				

Legend: ■ White ■ Black ■ Latino ■ Asian ■ Native American ■ Other