



SMART GROWTH AND REGIONAL COLLABORATION

Technical Memo: Housing the Massachusetts Workforce, 2015 – 2030

Metropolitan Area Planning Council

Prepared for the Massachusetts Housing Partnership

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INTRODUCTION

Massachusetts' economic future is inextricably tied to its housing supply. It is well known that the state's housing prices are among the highest in the nation, a situation decades in the making. A variety of physical, political, and regulatory barriers have restricted dense development across much of the state. In some regions, homebuyers and renters have bid up the prices of the limited available housing, while other markets have seen the availability of housing decline as a result of conversion to seasonal or vacation rental properties. As a result, the high price of housing has become burdensome for many working families, which makes recruitment and retention of workers more difficult for employers. There is growing concern among economists and public policy makers that the lack of appropriate and affordable housing for workers may present a significant impediment to long-term economic growth in Massachusetts.

The housing cost crisis will be compounded by a looming demographic transition, as nearly one million Massachusetts Baby Boomers retire over the next 15 years, necessitating similar numbers of new workers just to maintain the current employment base. If many retirees remain in the state, net growth of housing will be essential to accommodate young workers who take their place in the labor force. This concept, that housing production is an economic imperative, has been incorporated into *Opportunities for All*,¹ the Baker-Polito administration's economic development strategy, which adopts increased supply as a strategic goal essential to economic development. That plan cites MAPC's estimate that 500,000 new housing units will be needed in Massachusetts to accommodate population growth and changing housing needs.

It is also true that housing and economic factors vary widely across Massachusetts. In Metro Boston rapid job growth and limited housing supply has driven up both wages and housing prices. Meanwhile, other parts of the state with less robust economies and somewhat more affordable housing have struggled to attract younger workers. These regions face challenges with the adequacy and desirability of housing for new workers moving to the area, and could struggle to meet demand if economic conditions improve.

To help build a better understanding of workforce housing needs across the state, MAPC has expanded an analysis previously completed for Metro Boston² to include six other regions of

¹ *Opportunities for All: The Baker-Polito Strategy and Plan for Making Massachusetts Great Everywhere*; Executive Office of Housing and Economic Development; December 2015
<http://www.mass.gov/hed/docs/eohed/edplan2015.pdf>

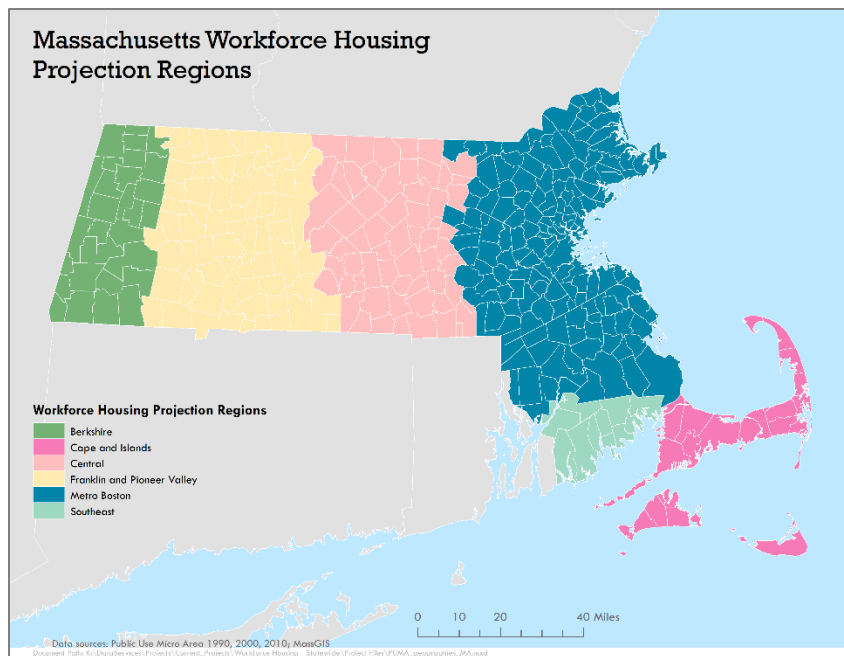
² *Building for the Middle; Housing Greater Boston's Workforce*; Urban Land Institute, Boston; September, 2016
<http://boston.uli.org/building-for-the-middle/>

Massachusetts. MAPC studied the income and housing conditions of working households in each region back to 1990; and has projected the number and income level of new working households likely to form between 2015 and 2030. Using individual worker- and household-level census records, we examined the income distribution and housing cost burden of households with at least one non-student wage earner (termed *working households*). Household income classifications are based on HUD's 2014 Area Median Income (AMI)³ categories for Massachusetts and combined income from all earners and sources for each household. We then combined MAPC and UMass Donahue Institute population and labor force projections with occupational vacancy forecasts produced by the state to estimate the housing needs of new workers in each region. The objective is to build a better understanding of how the characteristics and housing needs of working households have changed over the past 25 years and how many housing units might be needed to serve a growing workforce through 2030.

ANALYSIS REGIONS

The analysis relies on multiple data sources which all utilize different geographic boundaries for tabulating both historical and forecasted data. As a result, MAPC created custom analysis regions that maximize consistency of tabulation areas while also distinguishing different labor and housing markets. Six analysis regions were defined, and are depicted in Figure 1: Metro Boston, Central, Franklin and Pioneer Valley, Berkshire, South Coast, and Cape and Islands.

Figure 1: Workforce Housing Projections Regions



Appendix A of this report includes a map series depicting the boundaries of the various data tabulation areas that had to be reconciled, and helps to illustrate the complexities faced in incorporating data from such a wide range of sources. While further disaggregation may have been desirable (such as distinguishing Cape Cod, Martha's Vineyard, and Nantucket) it was not

³ <https://www.huduser.gov/portal/datasets/il/il16/>

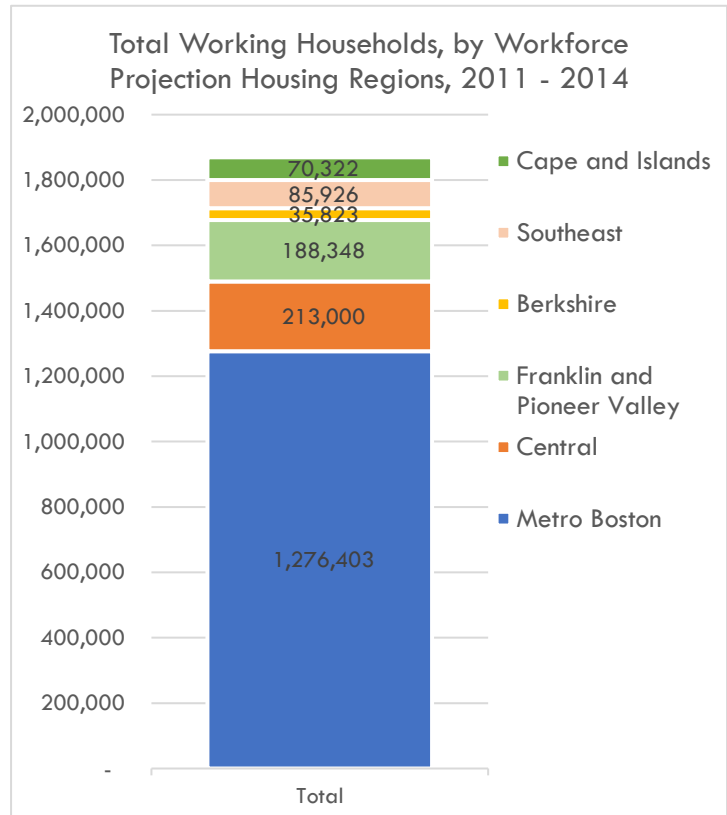
possible due to the limitations of the data. Appendix B describes the boundary issues affecting the Cape and Islands in more detail.

DEFINING WORKING HOUSEHOLDS

This analysis evaluates the housing conditions and needs of “working households,” which are defined as households with at least one wage-earner who is not a student.⁴ Using U.S. Census Bureau Public Use Microdata, MAPC estimates that there were approximately 1,870,000 such households in Massachusetts during the period 2010 – 2014. Figure 2 depicts the number of working households by region. More than two-thirds of the state’s working households reside in the Metro Boston forecasting region. The Central and Franklin & Pioneer Valley regions contain 11% and 10%, respectively, and the remaining regions each contain less than 5% of all working households.

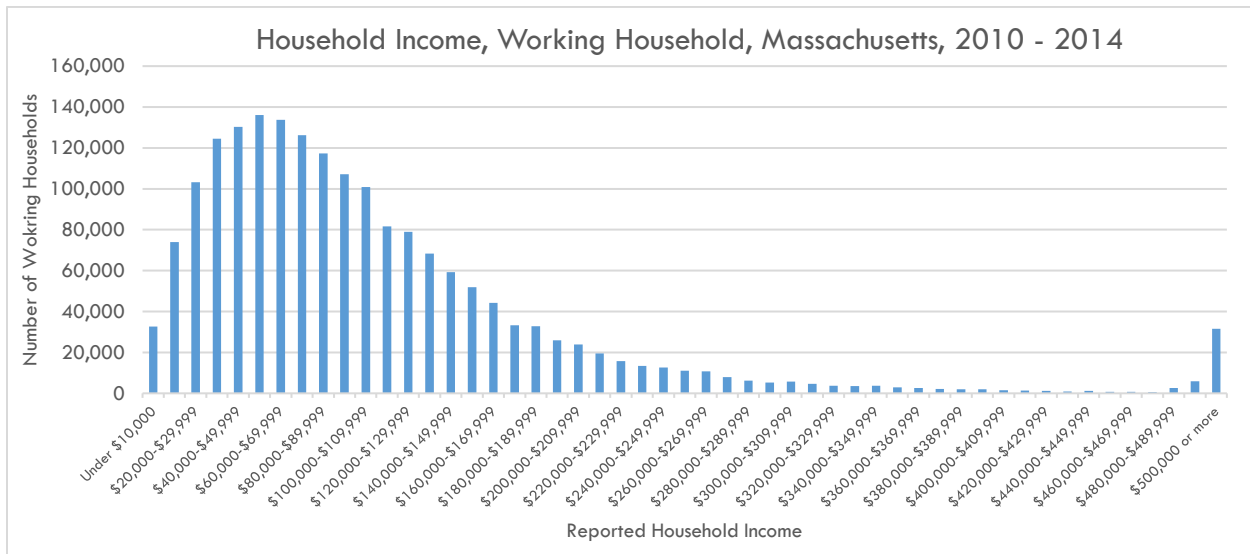
Income from all sources was combined to calculate a total income for each household, and the household was classified according to the occupation of the principal wage earner (the earner with the highest reported earnings for the previous 12 months.) Figure 3 shows the reported household income of working households in Massachusetts during the period 2010 – 2014.

Figure 2: Working Households by Region



⁴ The definition includes households in which the wage earner reported that he or she was currently unemployed but had wage income in the previous 12 months. This was necessitated by changes in census definitions over time.

Figure 3: Working Households by Income



Households were also classified by income category, using US Department of Housing and Urban Development (HUD) Area Median Income (AMI) categories further adapted by MAPC. HUD’s income classification framework accounts for both income and household size, and specifies both median income and income limits for low-income categories (80%, 50%, and 30% of AMI). MAPC also developed thresholds for middle- and high-income households, resulting in a total of eight different income categories. While HUD does produce AMI limits specific to each Fair Market Rent (FMR) area, using these regional limits would have created more geographic complexity in the model and would not produce income classifications comparable across the state. Therefore, MAPC used the HUD income limits for Massachusetts. Figure 4 presents HUD’s 2014 50%, 80%, and 100% AMI limits for a family of four, in the 19 FMR regions across Massachusetts, as well as the statewide number, and the number of households in each FMR area. A map of the FMR areas is included in the Appendix.

Figure 4: Official HUD Income Limits by Fair Market Rent area, 2014

Fair Market Rent Area	50% AMI	80% AMI	100% AMI	Households
New Bedford	\$29,800	\$47,700	\$59,600	63,766
Providence-Fall River	\$36,100	\$57,750	\$72,200	94,776
Taunton-Mansfield-Norton	\$41,450	\$63,900	\$82,900	41,728
Barnstable Town MSA	\$42,950	\$63,900	\$85,900	95,755
Berkshire County (part)	\$42,950	\$63,900	\$85,900	19,813
Fitchburg-Leominster	\$42,950	\$63,900	\$85,900	55,547
Franklin County (part)	\$42,950	\$63,900	\$85,900	28,814
Pittsfield	\$42,950	\$63,900	\$85,900	36,278
Springfield	\$42,950	\$63,900	\$85,900	240,277
Western Worcester County	\$42,950	\$63,900	\$85,900	11,331
Brockton	\$43,800	\$63,900	\$87,600	87,452
Worcester	\$43,850	\$63,900	\$87,700	203,455

Dukes County	\$44,050	\$63,900	\$88,100	7,368
Lawrence-NH	\$44,050	\$63,900	\$88,100	101,123
Massachusetts	\$44,050	\$63,900	\$88,100	2,547,075
Lowell	\$45,350	\$63,900	\$90,700	107,775
Boston-Cambridge-Quincy-NH	\$47,050	\$67,750	\$94,100	1,302,101
Eastern Worcester County	\$48,950	\$63,900	\$97,900	32,747
Easton-Raynham	\$51,100	\$63,900	\$102,200	12,740
Nantucket County	\$52,450	\$83,900	\$104,900	4,229

This table shows that the 100% AMI ranges from \$59,600 in New Bedford to \$104,900 in Nantucket, though the FMR areas at the extreme ends of the range are relatively small. Nearly 92% of households in Massachusetts live in an FMR area where the median income is within \$6,000 of the statewide AMI (\$82,100 - \$94,100.) So while the statewide FMR does not represent the full variability of income levels across the state, it does reflect the conditions faced by the vast majority of the state's households. The use of the statewide AMI will have the following results, when compared to using the area-specific AMIs: it will produce larger estimates of the number of low-income households in areas with a lower AMI, and larger estimates of higher-income households in areas with a higher AMI.

Figure 5 presents the upper limit of each income category, by household size, using the statewide AMI figures. An eighth income category, Extremely High Income, includes all households above 200% of AMI.⁵

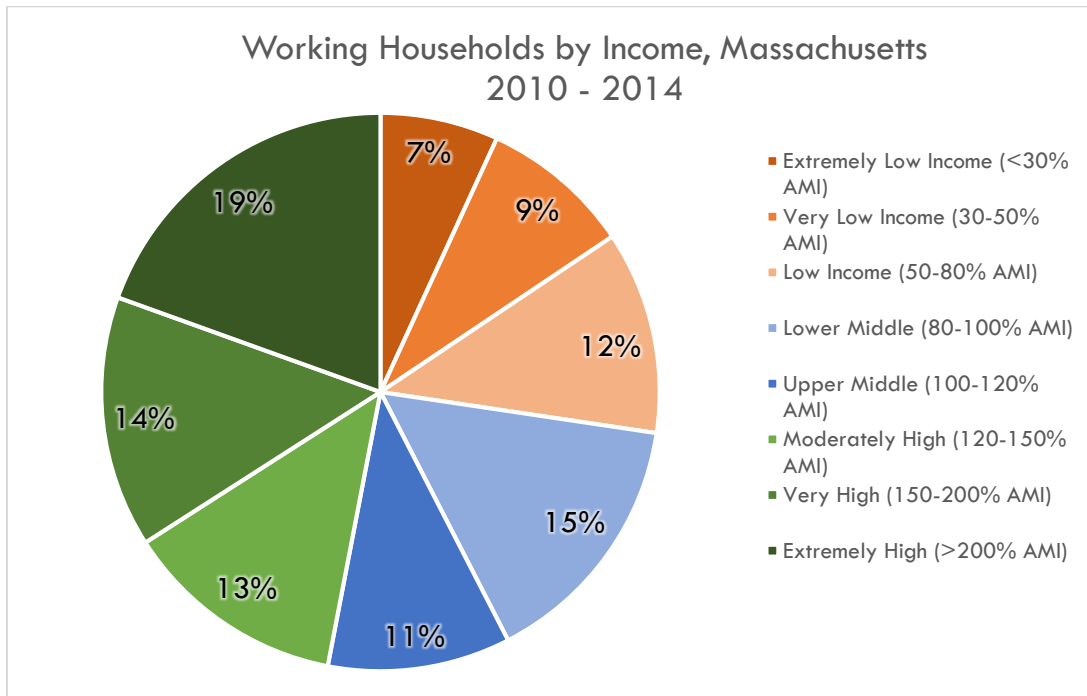
Figure 5: Income limits for working household classification, in 2014 dollars

Household Size	Extremely Low Income (30% AMI)	Very Low Income (50% AMI)	Low Income (80% AMI)	Lower Middle Income (100% AMI)	Upper Middle Income (120% AMI)	Moderately High Income (150% AMI)	Very High Income (200% AMI)
1 Person	\$18,500	\$30,850	\$44,750	\$61,700	\$74,040	\$92,550	\$123,400
2 People	\$21,150	\$35,250	\$51,100	\$70,500	\$84,600	\$105,750	\$141,000
3 People	\$23,800	\$39,650	\$57,500	\$79,300	\$95,160	\$118,950	\$158,600
4 People	\$26,450	\$44,050	\$63,900	\$88,100	\$105,720	\$132,150	\$176,200
5 People	\$28,550	\$47,550	\$69,000	\$95,100	\$114,120	\$142,650	\$190,200

⁵ While the limits for the low-income limit groups are nominally based on a percentage of area median income (AMI), for a given household size, there is an exception for the low-income (80 percent of AMI) group due to HUD methodology. Specifically, the four-person low-income limit cannot be greater than the U.S. median family income (\$63,900.) For more information visit <https://www.huduser.gov/portal/datasets/il.html>.

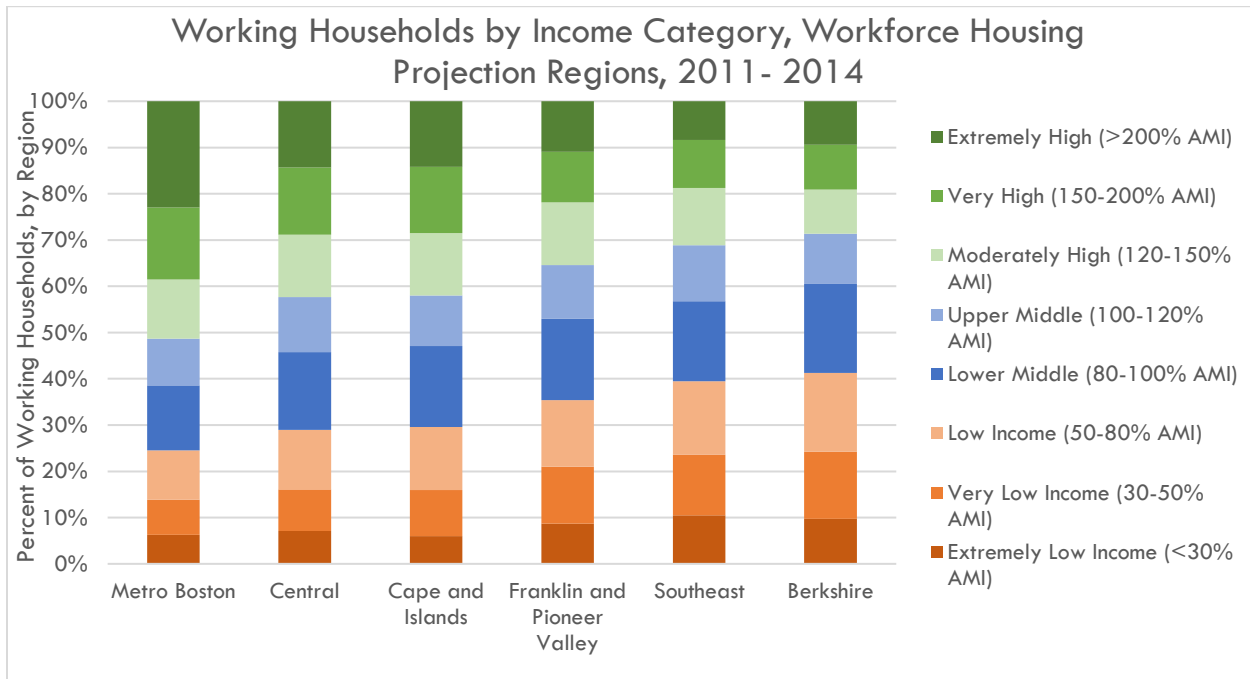
Figure 6 shows the distribution of all Massachusetts working households by AMI category.

Figure 6: Working Households by Income Category



As shown in the chart, 27% of working households have incomes below the 80% AMI threshold, and 26% would be considered middle-income (between 80% and 120% AMI). 47% of working households qualify as high-income (above 120% AMI). Figure 7 shows the distribution of working households by income for each of the projections regions. The Western Massachusetts regions (Berkshire and Franklin & Pioneer Valley) and Southeast regions have a higher proportion of low-income working households (above 30% in all cases) and fewer high income working households. Notably, the share of middle income working households is relatively similar across regions, comprising between 24 and 30% of the total in every region.

Figure 7: Working Households by Income Category and Region

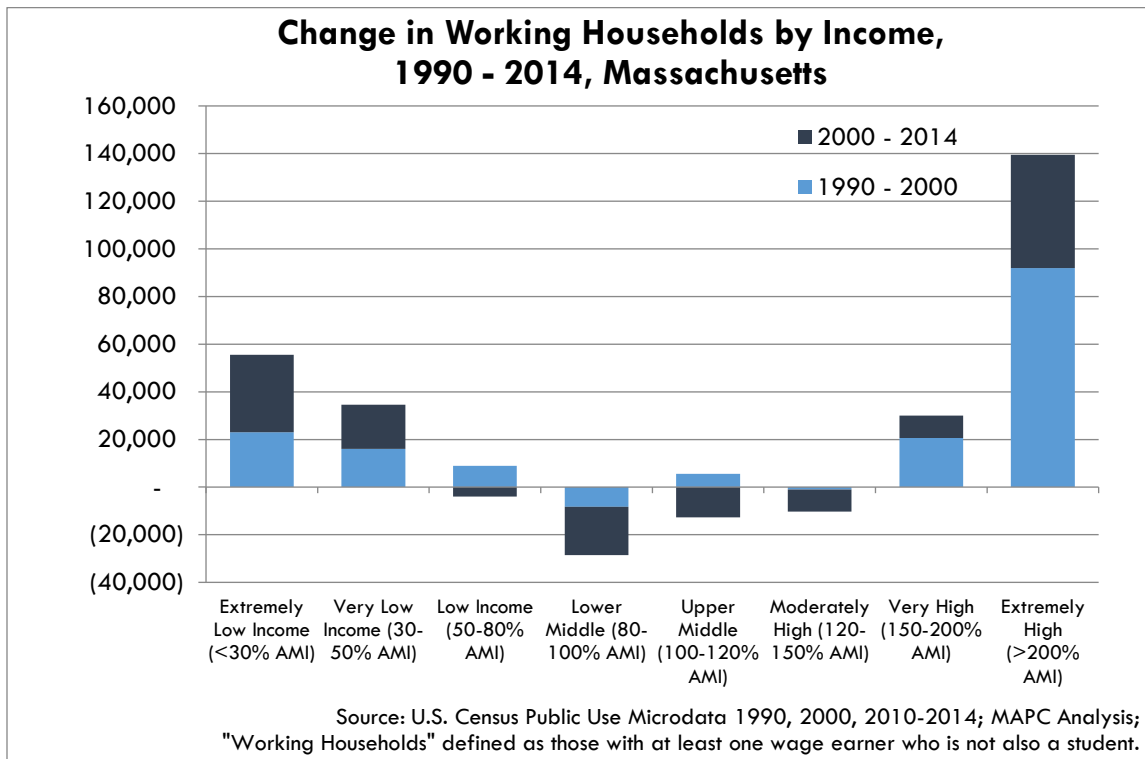


HISTORICAL TRENDS

To inform future projections of working households by income, MAPC analyzed changes in the compositions of working households since 1990, using earlier vintages of the Census Bureau’s Public Use Microdata described previously. The reported wages for 1990 and 2000 working households were adjusted to 2014 dollars using inflation adjustment factor from the U.S. Bureau of Labor Statistics Division of Consumer Prices and Price Index. A national inflation adjustment factor was used for the 1990 incomes, and a New England-specific inflation adjustment factor was used for the 2000 incomes. Households were categorized into income categories using the same size-income thresholds presented above, applied to the inflation-adjusted income. Since occupational categories have changed over time, MAPC created an occupational crosswalk with equivalent categories for the three time periods.

From 1990 to 2010-2014, the number of working households in Massachusetts grew by 218,400, an increase of 13%. Most of this growth took place during the 1990s, when working households grew by 10%. In both decades, growth was unevenly distributed across income levels, as Massachusetts saw growing polarization of working household incomes (Figure 8.) There were net declines in the number of working households between 80% and 150% of AMI, and substantial increases in the number of working households below 80% AMI (increase of 95,000 households) and above 150% AMI (up 169,000 households.) While the growth in households at the extremes occurred during both of the time periods examined, the decline in middle-income households was much more significant in the latter period.

Figure 8: Change in Working Households by Income



Changes in working households varied notably around the state over the two time periods. Figure 9 presents the percent change in working households by income category for each region over the two time periods.

Figure 9: Percentage Change in Working Households by Income and Region, 1990 - 2014

	Extremely Low Income (<30% AMI)	Very Low Income (30-50% AMI)	Low Income (50-80% AMI)	Lower Middle (80-100% AMI)	Upper Middle (100-120% AMI)	Moderately High (120-150% AMI)	Very High (150-200% AMI)	Extremely High (>200% AMI)	All Working Households
1990 -2000									
Metro Boston	34%	15%	8%	1%	4%	1%	8%	43%	13%
Central	15%	11%	-5%	-14%	-6%	-12%	4%	20%	-2%
Franklin and Pioneer Valley	45%	15%	14%	0%	0%	4%	14%	36%	11%
Berkshire	20%	-2%	-6%	-17%	-9%	-23%	-25%	6%	-10%
Southeast	26%	1%	-26%	-23%	-4%	-12%	1%	32%	-9%
Cape and Islands	26%	12%	11%	10%	28%	20%	40%	73%	25%
Massachusetts	32%	12%	4%	-3%	3%	0%	9%	41%	10%

Figure 9 continued on next page

Figure 9 (continued): Percentage Change in Working Households by Income and Region, 1990 - 2014

	Extremely Low Income (<30% AMI)	Very Low Income (30-50% AMI)	Low Income (50-80% AMI)	Lower Middle (80-100% AMI)	Upper Middle (100-120% AMI)	Moderately High (120-150% AMI)	Very High (150-200% AMI)	Extremely High (>200% AMI)	All Working Households
2000-2014									
Metro Boston	40%	13%	1%	-8%	-8%	-6%	2%	13%	3%
Central	55%	16%	4%	7%	6%	10%	19%	41%	16%
Franklin and Pioneer Valley	15%	13%	-14%	-15%	-6%	-3%	-7%	16%	-3%
Berkshire	22%	20%	-4%	5%	-9%	-17%	14%	7%	3%
Southeast	19%	9%	4%	-6%	1%	12%	10%	17%	6%
Cape and Islands	2%	2%	-15%	-6%	-11%	-3%	0%	2%	-5%
Massachusetts	34%	13%	-2%	-7%	-6%	-4%	4%	15%	3%

The patterns of wage polarization can be seen in every region and in both time periods, with positive growth at either end of the income spectrum and negative or below-average growth in middle income working households. Since 2000, the Central region saw the fastest growth in working households (16%), though those with incomes between 50% and 120% of AMI grew by less than 7%, while those with incomes below 30% AMI grew by an astonishing 55%. Two regions saw a net decline in the number of working households since 2000: Franklin & Pioneer Valley and Cape & Islands.

The polarization in household incomes is due in large part to wage changes over the same period. Since 1990, the state added an estimated 284,200 workers, and the reported annual wage increased by \$8,380⁶. However, as shown in Figure 10, many occupations with below average wages in 1990 actually saw real-dollar declines in reported wages, including occupations that saw substantial growth in employment, such as Food Preparation (average wage down 6%), Transportation (-23%), and Construction (-12%). Two occupations with below-average wages in 1990 saw increases in both employment and average wages (Personal Care and Social Services), but the wage growth was minor—less than \$2,000 in both cases. Meanwhile, nearly every occupation with above-average wages in 1990 also saw above-average growth in wages, in some cases increases of over \$10,000 per year.

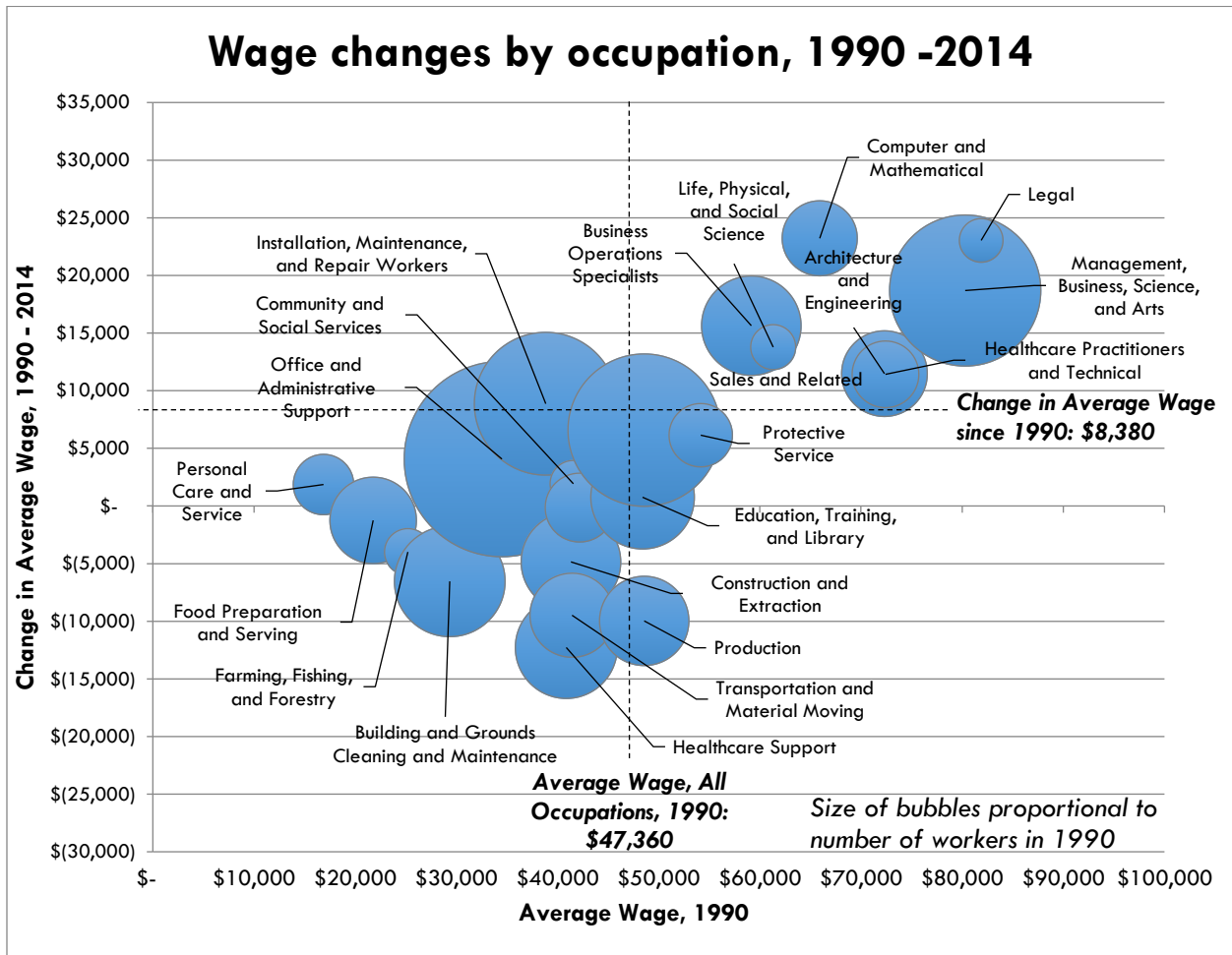
⁶ Estimates are based on self-reported employment status, occupation, and wage from PUMS records.

Figure 10: Change in Employment and average wage by occupation, 1990 – 2014

Occupation	Average Wage 1990	Change in average wage since 1990	Change in average wage since 1990 (%)	Change in workers since 1990	Change in workers since 1990 (%)
Personal Care and Service	\$16,870	\$1,860	11%	61,190	125%
Food Preparation and Serving	\$21,780	\$(1,250)	-6%	48,000	48%
Farming, Fishing, and Forestry	\$25,210	\$(3,990)	-16%	(22,530)	-76%
Building and Grounds Cleaning and Maintenance	\$29,350	\$(6,540)	-22%	(36,830)	-23%
Office and Administrative Support	\$34,510	\$4,070	12%	(100,940)	-20%
Installation, Maintenance, and Repair Workers	\$38,840	\$8,870	23%	(185,120)	-69%
Healthcare Support	\$40,870	\$(12,280)	-30%	(55,880)	-41%
Construction and Extraction	\$41,330	\$(4,850)	-12%	29,860	23%
Transportation and Material Moving	\$41,440	\$(9,480)	-23%	51,700	55%
Community and Social Services	\$41,570	\$1,930	5%	28,980	98%
Arts, Design, Entertainment, Sports, and Media	\$42,190	\$(140)	0%	7,970	13%
Military Specific	\$43,670	\$10,020	23%	(920)	-31%
Average, All Occupations	\$47,360	\$8,380	18%	284,160	10%
Education, Training, and Library	\$48,410	\$760	2%	68,810	49%
Production	\$48,570	\$(9,970)	-21%	46,470	44%
Sales and Related	\$48,570	\$6,580	14%	(4,210)	-1%
Protective Service	\$54,160	\$6,140	11%	11,550	21%
Business Operations Specialists	\$59,160	\$15,640	26%	(29,920)	-23%
Life, Physical, and Social Science	\$61,320	\$13,780	22%	25,300	91%
Computer and Mathematical	\$65,920	\$23,220	35%	41,600	55%
Architecture and Engineering	\$72,320	\$11,480	16%	(25,940)	-27%
Healthcare Practitioners and Technical	\$72,420	\$11,420	16%	142,490	239%
Management, Business, Science, and Arts	\$80,300	\$18,690	23%	67,050	22%
Legal	\$81,880	\$23,040	28%	21,440	82%

Figure 11 presents these changes visually, demonstrating that those occupations with the highest wages in 1990 were those that saw the largest increases in wages in the subsequent 24 years. Conversely, lower-wage occupations saw below-average wage growth or declines in average wages.

Figure 11: Change in average wage by occupation



DEMOGRAPHIC & LABOR FORCE PROJECTIONS

Forecasts of future year labor force were based on existing demographic projections prepared by MAPC and the University of Massachusetts Donahue Institute. Both organizations have prepared municipal-level projections of population by age for future years, including 2030. MAPC projections were used for 164 municipalities covering most of the Metro Boston region, while Donahue’s 2015 projections were used for most other areas. The Berkshire Regional Planning Commission also provided projections that organization developed independently, and these projections were substituted for the Donahue projections in that region.⁷

To forecast patterns of labor force entrances and exits, MAPC applied region- and age-specific labor force participation rates to the projected future year population. Labor force participation rates were drawn from the 2014 1-year American Community Survey, Table S2301, and were held constant for all age groups for future years. The 2015 labor force was estimated based on an interpolated population derived from the 2010 decennial census count and the projected

⁷ The Cape Cod Commission also provided independently provided projections; however, these arrived too late in the process to be included.

2020 population for each region. Figure 12 shows the projected change in the number of labor force participants by age cohort (a group of residents born in a specified range of years) between 2015 and 2030.

Figure 12: Projected change in labor force participants by region, 2015 - 2030

Birth Year	Metro Boston	Central	Franklin and Pioneer Valley	Berkshire	Southeast	Cape and Islands	Grand Total
Before 1945	-59,637	-9,726	-8,135	-2,323	-3,732	-5,819	-89,372
1946-50	-104,542	-19,245	-16,821	-3,783	-7,807	-9,139	-161,337
1951-55	-121,818	-23,523	-19,950	-4,123	-8,707	-8,988	-187,109
1956-60	-150,009	-31,052	-25,752	-4,544	-11,992	-9,386	-232,736
1961-65	-155,816	-32,342	-24,198	-4,171	-11,937	-8,399	-236,863
1966-70	-55,109	-7,561	-4,547	-1,061	-4,132	-587	-72,998
1971-75	-43,459	-4,356	-2,256	-708	-3,001	-190	-53,970
1976-80	-13,959	3,846	3,124	-66	678	1,078	-5,299
1981-85	-9,846	6,535	2,367	-324	1,158	1,259	1,147
1986-90	29,453	9,671	-729	21	1,901	1,400	41,717
1991-95	94,961	15,678	6,107	786	4,429	1,555	123,517
1996-00	168,743	19,831	11,165	2,645	7,587	3,162	213,132
2001-05	213,003	26,919	20,495	4,344	11,385	5,749	281,896
2006-10	199,157	33,378	34,540	5,494	16,010	7,430	296,009
2011-15	91,898	17,737	18,432	3,145	8,275	3,524	143,012
Net Total	83,019	5,791	-6,158	-4,668	115	-17,353	60,747
New Entrants	797,215	133,595	96,230	16,435	51,423	25,157	1,100,431

These estimates indicate that between 2015 and 2030 the state's labor force could see a net loss of 1.04 million workers born before 1980, due to retirement or outmigration. Over the same time period, approximately 1.1 million workers born after 1980 are expected to join the labor force, resulting in a net gain of only 60,700 workers. Troublingly, regions outside of Metro Boston will struggle to grow their labor force or even maintain current levels of workers. The Central region is projected to see a net increase of only 5,800 new workers, while the Berkshires, Franklin/Pioneer, and Cape & Islands are projected to see net declines in the labor force. Of course, it is worth noting that these projections are based on past trends in migration and continued patterns of labor force participation, and changing trends could result in more positive economic outcomes (and vice versa). However, they highlight the severe structural barriers faced by many regions of the state as they seek to maintain and grow their employment base.

In particular, the Berkshire and Cape & Islands regions are characterized by a highly seasonal economy and a large number of seasonal homes. While demographics may be driving declining resident labor supply currently, these regions are likely to see continued demand for seasonal labor, which entails a different set of housing needs than does growth in year-round employment. As such, the results presented here should be considered preliminary and more research is needed

to understand how future labor demand will be satisfied, or how these regions' economies will adjust if the labor force does not materialize.

Once the future labor force was estimated for each region, the number of employed residents was estimated by applying an unemployment rate assumption to the projected labor force. For most regions, the 2014 unemployment rate (as reported by the 2014 1-year American Community Survey Table S2301) was applied to future years. The exception was in the Berkshire and Pioneer/Franklin regions where the 2014 unemployment rate was well-above the long-term statewide average; in these regions, a lower assumption (matching the long-term statewide average) was used for future years. Figure 13 depicts the observed and assumed labor force participation rates and unemployment rates for the population age 16 and over.⁸

Figure 13: Labor Force Participation Rates and Unemployment Rates, by Forecast Region

Region	Labor Force Participation Rate, 2014	Employment Rate, 2014	Unemployment Rate, 2014	Unemployment Rate, 2020	Unemployment Rate, 2030
Berkshire	65.0%	59.3%	8.60%	8.25%	8.25%
Cape and Islands	60.0%	56.4%	5.80%	5.80%	5.80%
Central	67.5%	62.8%	6.90%	6.90%	6.90%
Franklin and Pioneer Valley	64.1%	58.5%	8.60%	8.25%	8.25%
Metro Boston	68.6%	64.1%	6.40%	6.40%	6.40%
Southeast	66.1%	61.6%	6.80%	6.80%	6.80%

OCCUPATIONAL PROJECTIONS

The likely occupation of future labor force entrants was estimated based on projections prepared by the Massachusetts Executive Office of Labor and Workforce Development. EOLWD projects both turnover and new growth in jobs for 21 different occupations across 16 Workforce Investment Areas across Massachusetts, for the period 2015 - 2024. Since the WIAs are not consistent with the projections regions, projected openings (both turnover and growth) in each occupation were allocated to municipalities within the WIA based in the 2014 share of total employment, and then the projected openings were summed for each forecast region. From this was derived a distribution of job openings by occupation for each region. The distribution was applied to the total number of new labor force entrants estimated for the period 2015 – 2030, to yield an estimate of new entrants by occupation (Figure 14.)

⁸ It is important to note that self-reported unemployment rates collected via the ACS are consistently higher than the more well-known estimates based on administrative records and reported by the Bureau of Labor Statistics. However, patterns over time are consistent across the two datasets, and the ACS estimates can be combined with the age-specific labor force participation rates used for the projections.

Figure 14: Projected Job Openings by Occupation, 2015 – 2030

Occupation	Metro Boston	Central	Franklin and Pioneer Valley	Berkshire	Southeast	Cape and Islands	Statewide
Office/Admin	111,500	20,400	12,400	2,300	8,200	3,800	158,700
Architecture/Engineering	9,100	0	300	0	0	0	9,500
Arts	15,000	1,100	900	100	100	100	17,200
Business	59,700	7,200	4,100	400	700	400	72,500
Community Service	20,200	6,500	6,100	500	2,500	700	36,400
Construction	19,800	4,100	2,200	500	2,100	1,700	30,300
Education	55,300	13,000	13,700	2,000	4,300	1,300	89,500
Food Prep	81,600	16,300	11,100	2,900	6,900	4,500	123,300
Health Practitioners	79,400	13,800	12,200	1,500	5,400	2,500	114,800
Health Support	37,200	8,000	7,300	800	3,500	1,000	57,800
Legal	7,600	600	800	0	200	0	9,200
Maintenance	31,500	4,500	3,600	1,300	1,800	2,100	44,900
Management	65,600	7,500	6,800	1,100	1,800	1,300	84,200
Production	5,200	0	0	0	0	200	5,300
Protective Services	7,300	1,500	900	100	300	300	10,500
Repair	14,300	3,600	2,100	400	1,500	700	22,500
Sales	50,000	6,800	4,100	1,200	4,900	1,400	68,400
Service	37,300	5,900	4,800	800	3,200	1,500	53,600
Social Science	15,900	1,600	1,300	200	1,000	100	20,000
Technical	41,200	3,400	1,700	200	200	100	46,900
Transportation	32,600	10,100	4,800	600	5,600	1,600	55,100
All Occupations	797,215	135,871	101,199	16,744	54,331	25,261	1,130,600

Note: Negative values (where total employment is forecasted to decline faster than employee turnover) are not reported.

The largest share of job openings will be in administrative support, with 14% of the total. Food preparation and healthcare practitioners each comprise more than 10% of the total as well. Food preparation makes up the largest share of job openings on the Cape and Islands and in the Berkshires, reflecting the tourism-based economies of those regions.

NEW WORKING HOUSEHOLDS

In order to estimate the number of new workforce households associated with these job openings, MAPC applied existing (2010 – 2014) headship/principal earner rates for each occupation to the projected new employees. The results (Figure 15) show that the 1.13 million workers entering the workforce are likely to form 680,000 new households, with the largest number of households in office and administrative support, healthcare practitioners, and management. Though food service makes up the second largest share of job openings statewide, the headship rate for foodservice workers is relatively low, so they make up a smaller share of principal earners. The

table also shows that even in regions with net decline in the projected labor force, new entrants still form a substantial number of new households that will need a place to live.

Figure 15: Projected new working households by occupation of principal earner and region, 2015-2030

Occupation	Metro Boston	Central	Franklin and Pioneer Valley	Berkshire	Southeast	Cape and Islands	Grand Total
Admin	61,710	11,081	7,203	1,417	4,979	2,150	88,540
Health Practitioners	52,714	9,040	8,647	1,037	3,658	1,853	76,950
Management	49,739	5,829	5,192	897	1,471	1,019	64,148
Food Prep	36,746	6,737	5,282	1,167	3,512	2,329	55,774
Business	40,780	4,861	2,891	243	543	257	49,576
Education	29,108	6,676	7,627	1,254	2,531	805	48,001
Sales	31,036	4,240	2,641	825	2,965	870	42,578
Technical	31,639	2,715	1,355	164	162	101	36,137
Transportation	19,887	6,403	3,124	390	3,673	1,006	34,481
Health Support	20,929	4,181	4,420	457	2,058	609	32,654
Maintenance	17,838	2,597	2,244	763	1,163	1,309	25,914
Service	17,192	2,775	2,337	493	1,775	827	25,398
Community Service	11,812	4,109	3,852	343	1,790	438	22,344
Construction	12,909	2,882	1,605	333	1,556	1,235	20,520
Repair	10,070	2,659	1,546	231	1,105	483	16,094
Social Science	10,484	1,119	911	148	673	92	13,429
Arts	8,468	662	512	42	77	30	9,790
Protective Services	5,227	1,084	700	107	215	194	7,528
Legal	5,471	421	571	26	142	0	6,541
Architecture/Engineering	7,234	0	261	38	0	36	6,497
Production	3,169	0	0	0	0	119	(2,937)
Grand Total	484,162	78,365	59,521	10,170	32,064	15,673	679,955

To cross-check these estimates of working households, MAPC compared the projected number of working households to a separate estimate of new households based directly on headship rates

from the 2010 Census, irrespective of labor force or working household status. That method indicates that residents born after 1966 will form a total of 790,000 households from 2015 – 2020. In other words, the projected new working households make up 86% of total household formation over the same period. The remaining 14% of households are assumed to be headed by students or residents not in the labor force.

The projected new working households were further decomposed into households by income category, based on the distribution of household incomes (AMI categories) for principal earners in each occupation in each region. The occupation specific wages assumed that the trends in wage polarization observed over the past 25 years continue into the next decades. Using the inflation-adjusted income for households by primary occupation, MAPC calculated the shift in the income distribution within occupations from 1990 to 2014. The distribution was held for each occupation and the shifts were applied to future workforce households to account for shifting incomes. This accounts for both future occupations as well as the shifting income distribution within each profession.

Overall, the projections indicate that 29% of new working households will be low-income, 26% will be middle income, and 45% will be high income. Figure 16 shows the statewide projection of new working households by occupation of principal earner and household income. Office and administrative services, the occupation with the largest number of new principal earners, has a relatively balanced income distribution of new households, while the next two occupations (healthcare practitioners and management) will produce disproportionately high-income households (68% and 73%, respectively). Meanwhile, households headed by food service workers will be disproportionately low-income (69%). Overall, 31% of food service workers are projected to be the principal earner of a household below the statewide 80% AMI threshold.

Figure 16: Projected Worker Households by Occupation and Income

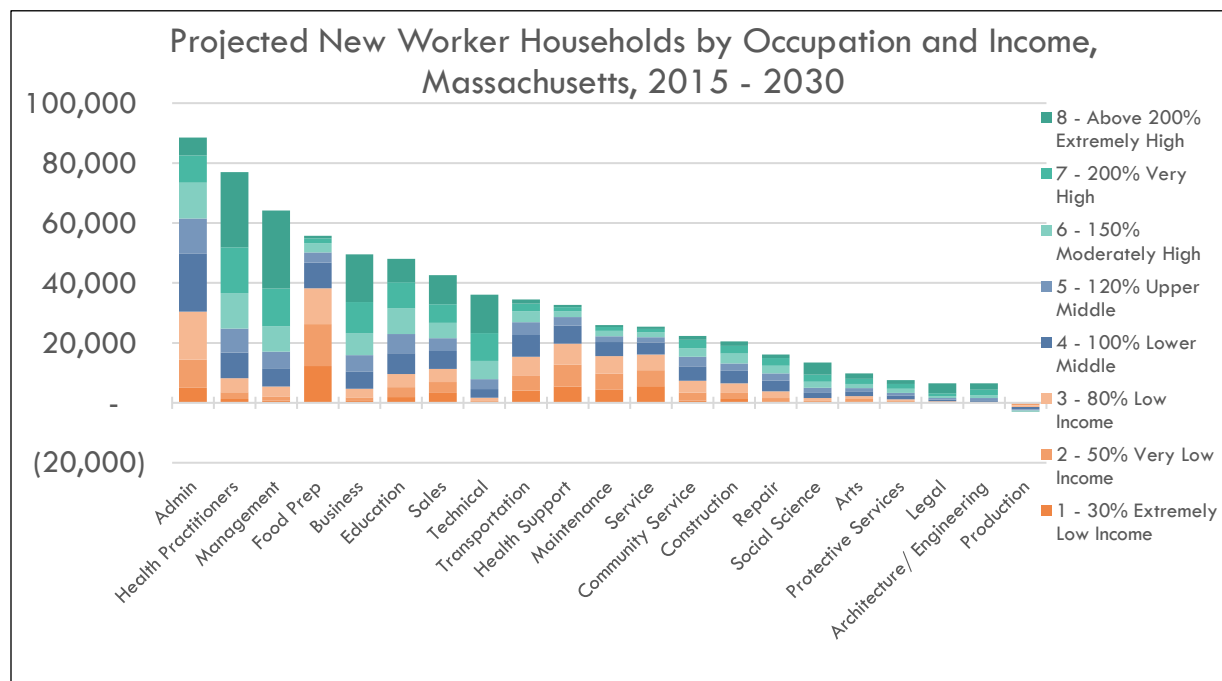


Figure 17 presents the projections of new working households by income and region, for the period 2015 – 2030.

Figure 17: Projected new working households by income and region, 2015 - 2030

Region	Extremely Low Income (<30% AMI)	Very Low Income (30-50% AMI)	Low Income (50-80% AMI)	Lower Middle (80-100% AMI)	Upper Middle (100-120% AMI)	Moderately High (120-150% AMI)	Very High (150-200% AMI)	Extremely High (>200% AMI)	All Working Households
Metro Boston	30,772	41,280	55,436	69,846	49,301	61,322	73,019	103,184	484,162
Central	6,482	8,303	11,166	13,491	9,378	9,910	10,254	9,381	78,365
Southeast	3,823	4,456	5,604	5,266	3,680	3,874	3,187	2,174	32,064
Berkshire	1,097	1,615	1,791	1,807	1,092	903	936	930	10,170
Franklin & Pioneer Valley	5,335	7,623	8,146	9,988	6,620	8,281	6,701	6,828	59,521
Cape and Islands	1,129	1,989	2,359	3,038	1,643	2,033	1,841	1,641	15,673
Statewide	48,637	65,266	84,503	103,435	71,714	86,323	95,938	124,139	679,955

The share of low income workers is highest in the Berkshire and Southeast regions, where more than 40% of new working households are projected to be at or below 80% of statewide AMI. Middle income households are projected to comprise 26% of new working households statewide, and between 25% and 30% in each region. High-income households are projected to make up 49% of new households in Metro Boston, but much less (<38%) in every other region.

NET HOUSING DEMAND

While new working households are projected to form 680,000 new households, not each household will need a new housing unit; some of the demand can be satisfied through existing units freed up by households who move to other states/regions, move to nursing homes or group quarters, or pass away. Age-specific headship rates from the 2010 decennial census were applied to the projected population to estimate the change in total households by age. Statewide, we project a decline of 477,000 households headed by a resident born before 1966.

Figure 18 depicts the projected change in total households by birth cohort for each region between 2015 and 2030. The vast majority of household attenuation will be the result of declines in the number of households headed by someone born in 1945 or prior. While Baby Boomer retirement will have a big effect on labor supply in the coming decades (>1 million vacancies due to retirement or outmigration), current housing occupancy patterns suggest that many retirees will choose to stay in their home or stay in the region. As a result, they are expected to free up only 135,000 housing units for use by new workers.

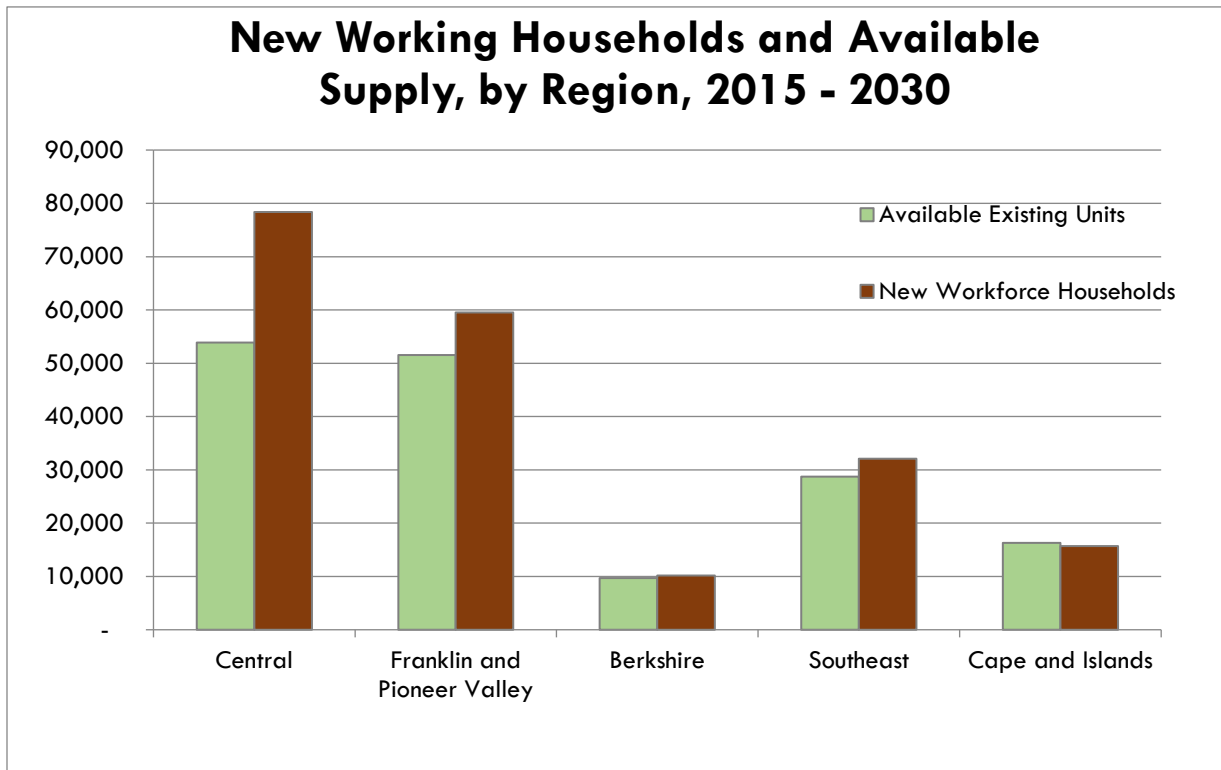
Figure 18: Projected change in households by age cohort and region, 2015 - 2030

Year born	Metro Boston	Central	Franklin and Pioneer Valley	Berkshire	Southeast	Cape and Islands	Grand Total
Pre-1946	(216,654)	(37,203)	(36,953)	(9,219)	(20,252)	(22,610)	(342,892)
1946-50	(43,571)	(6,924)	(6,994)	(939)	(4,429)	(3,500)	(66,356)
1951-55	(23,214)	(4,160)	(4,513)	(480)	(2,407)	(595)	(35,371)
1956-60	(18,239)	(3,941)	(3,100)	(158)	(1,480)	(42)	(26,961)
1961-65	(6,456)	(1,659)	967	357	(187)	839	(6,139)
1966-70	996	903	3,061	587	787	1,589	7,922
1971-75	110	2,019	3,327	519	883	1,334	8,192
1976-80	17,777	6,207	5,294	865	2,353	1,857	34,353
1981-85	23,097	7,852	4,863	741	2,656	2,000	41,208
1986-90	87,687	17,793	11,536	1,874	6,689	3,565	129,144
1991-95	100,761	16,878	10,412	1,823	6,021	2,683	138,579
1996-00	126,906	17,532	14,089	2,742	7,213	3,198	171,680
2001-05	128,982	17,482	15,270	3,115	7,486	3,447	175,782
2006-10	34,820	4,815	5,097	714	2,352	762	48,560
2011-15	21,732	4,601	4,547	591	2,085	736	34,292
All ages	234,733	42,194	26,902	3,130	9,769	(4,737)	311,992

Two regions of the state also face unique conditions in the housing market. The Berkshires and the Cape and Islands have both experienced substantial and persistent conversion of year round housing units to seasonal rentals or other units used only on an occasional basis. Based on the patterns of year-round to seasonal conversion observed from 2000 – 2010 (based on decennial census data), MAPC estimates that approximately 10,400 units on Cape Cod and the Islands and 1,100 units in the Berkshires will be lost from the year round supply between 2015 and 2030. These units were subtracted from the available housing unit supply before estimating net workforce housing demand.

Figure 19 depicts the projected number of newly available units (due to outmigration or mortality) in each region compared to the projected number of new working households. The projected loss to seasonal units in the Berkshires and Cape and Islands are deducted from the available supply. (Metro Boston projections are not depicted in this chart due to the dramatically different scale of supply and demand.)

Figure 19: Projected supply and demand for workforce housing, by region, 2015 - 2030



The net workforce housing demand by region is depicted in the chart below. Overall, non-Metro Boston regions are projected to have a net demand of 35,000 housing units for working households between 2015 and 2030; more than two thirds of this is expected in the Central region (24,500 units), with an additional 8,000 units needed in the Franklin and Pioneer Valley. The Southeast region is projected to need approximately 3,300 units of workforce housing, while the Berkshire and Cape and Islands regions are expected to have effectively zero net demand, even after accounting for the loss of units to seasonal uses.

Figure 20 summarizes the dynamics of workers, households, and supply for each region.

Figure 20: Summary of Labor Force, Working Households, and Housing Supply, 2015 - 2030

Region	New Labor Force Entrants	New Working Households	Newly-available existing units	Year-round units lost to seasonal use	Net supply of existing units	Net workforce housing demand
Metro Boston	797,215	484,208	308,134	0	308,134	176,074
Central	133,595	78,365	53,888	0	53,888	24,477
Southeast	51,423	32,064	28,756	0	28,756	3,308
Berkshire	16,436	10,170	10,796	1,080	9,716	454
Franklin and Pioneer Valley	96,230	59,545	51,561	0	51,561	7,985
Cape and Islands	25,157	15,673	26,747	10,431	16,316	-643
Statewide	137,823	680,026	479,881	11,511	468,370	211,655

CONCLUSIONS

This analysis adds to the already-robust body of evidence documenting the importance of housing production to Massachusetts' long-term economic growth. We estimate that the state needs at least 211,000 new housing units by the year 2030 in order to accommodate younger workers and their households. Troublingly, we also find that persistent wage polarization and declining incomes among workers in many low-skill but rapidly growing occupations will contribute to an unsustainable increase in the number of working households that will be eligible for housing subsidies. This finding suggests that solving the state's affordable housing crisis may need to entail economic policies designed to raise wages at the bottom of the income spectrum.

CAVEATS

While this projection of workforce housing demand provides a unique window into housing needs across Massachusetts in the coming years, it does have its limitations.

- Population trends could diverge from the published projections if migration patterns change substantially. This could occur if certain regions are more successful at attracting and retaining workers through economic or other programs.
- The size of the labor force and corresponding employment growth is based on assumptions about labor force participation rates. If older workers choose to continue working at higher rates than in the past, there will be fewer vacancies for younger workers to fill. Depending on migration and economic factors, this could result in slower population growth, more robust economic growth, or higher unemployment among younger workers.
- The number of existing housing units made available to house new working households depends in large part on the housing choices of older householders. If seniors age in place at higher rates than in the past and/or live substantially longer than their predecessors, then fewer existing units may be available for younger households. Conversely, higher outmigration to other states could free up more units for younger households.
- The analysis assumes that new entrants to the labor force will be distributed across occupations consistent with the overall pattern of job openings projected by EOLWD. However, it could be that certain openings are more likely to be filled by workers already in the labor force, and that new entrants are more likely to be in certain entry-level positions, and may have correspondingly lower wages and household incomes.
- The loss of year-round units to seasonal use is difficult to predict, and depends on economic factors, consumer preference for the Berkshires and Cape and Islands as vacation destinations, as well as the available stock of housing. Seasonal conversion could accelerate as the number of very high income households in the state grows substantially.
- Net demand for new housing units is only one dimension of the housing puzzle, especially in regions far from Metro Boston. In those regions, the suitability of housing, the seasonality of housing availability, and proximity to employment opportunities may represent much more severe challenges than the net demand for new units.

APPENDIX A: Maps

Figure A1: Projections Regions

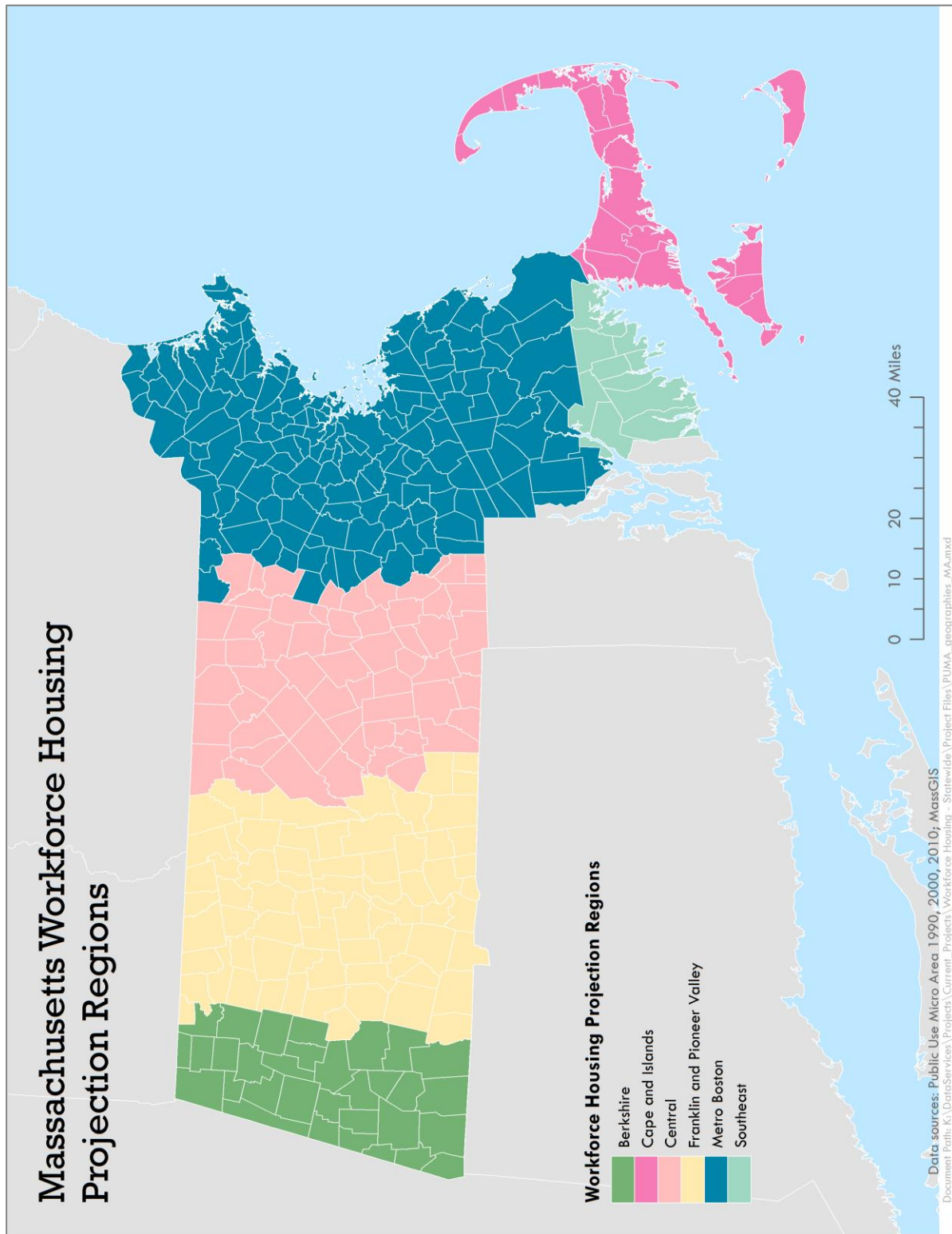


Figure A2: 1990 Public Use Microdata Areas and Regional Assignment

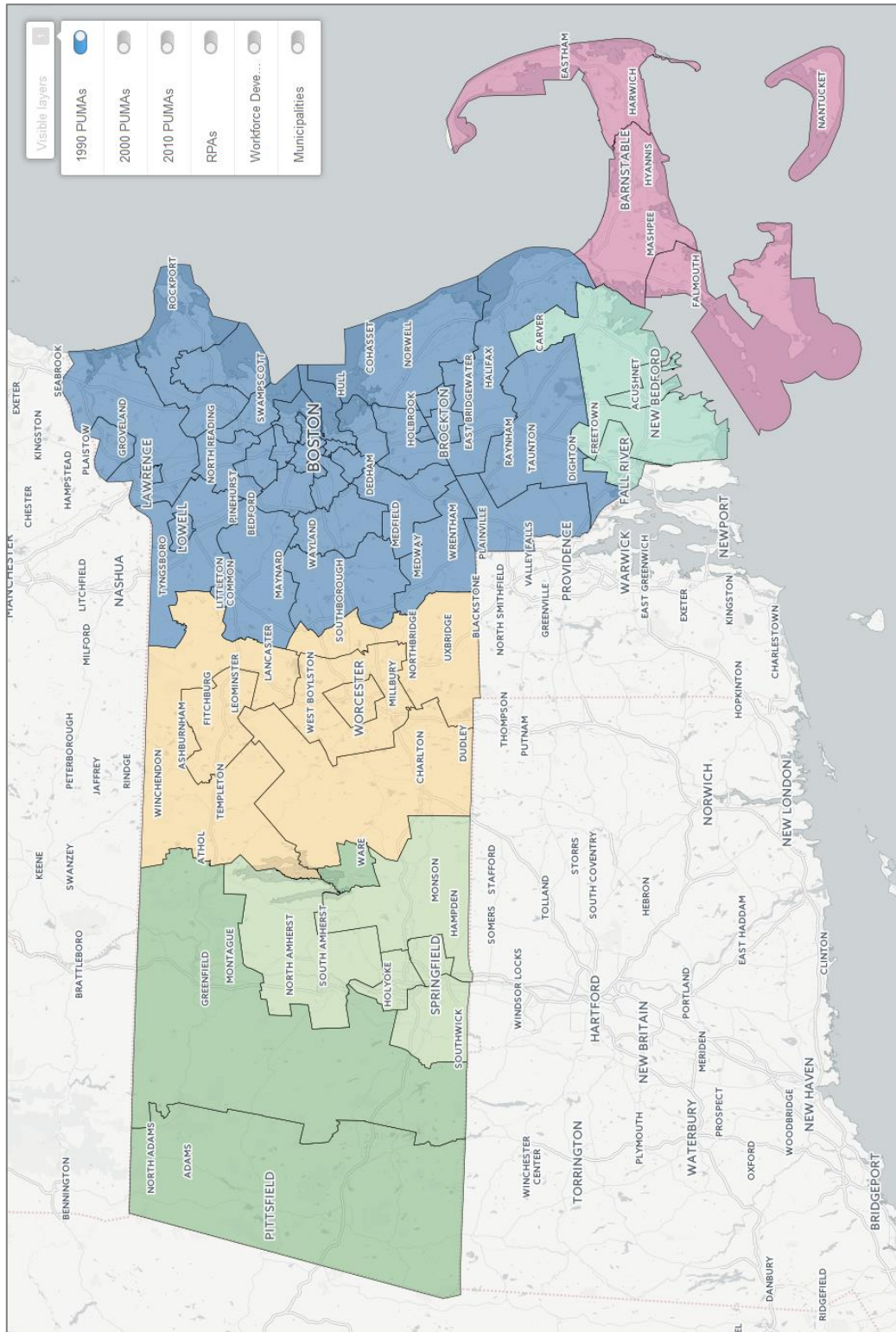


Figure A3: 2010 Public Use Microdata Areas and Regional Assignment

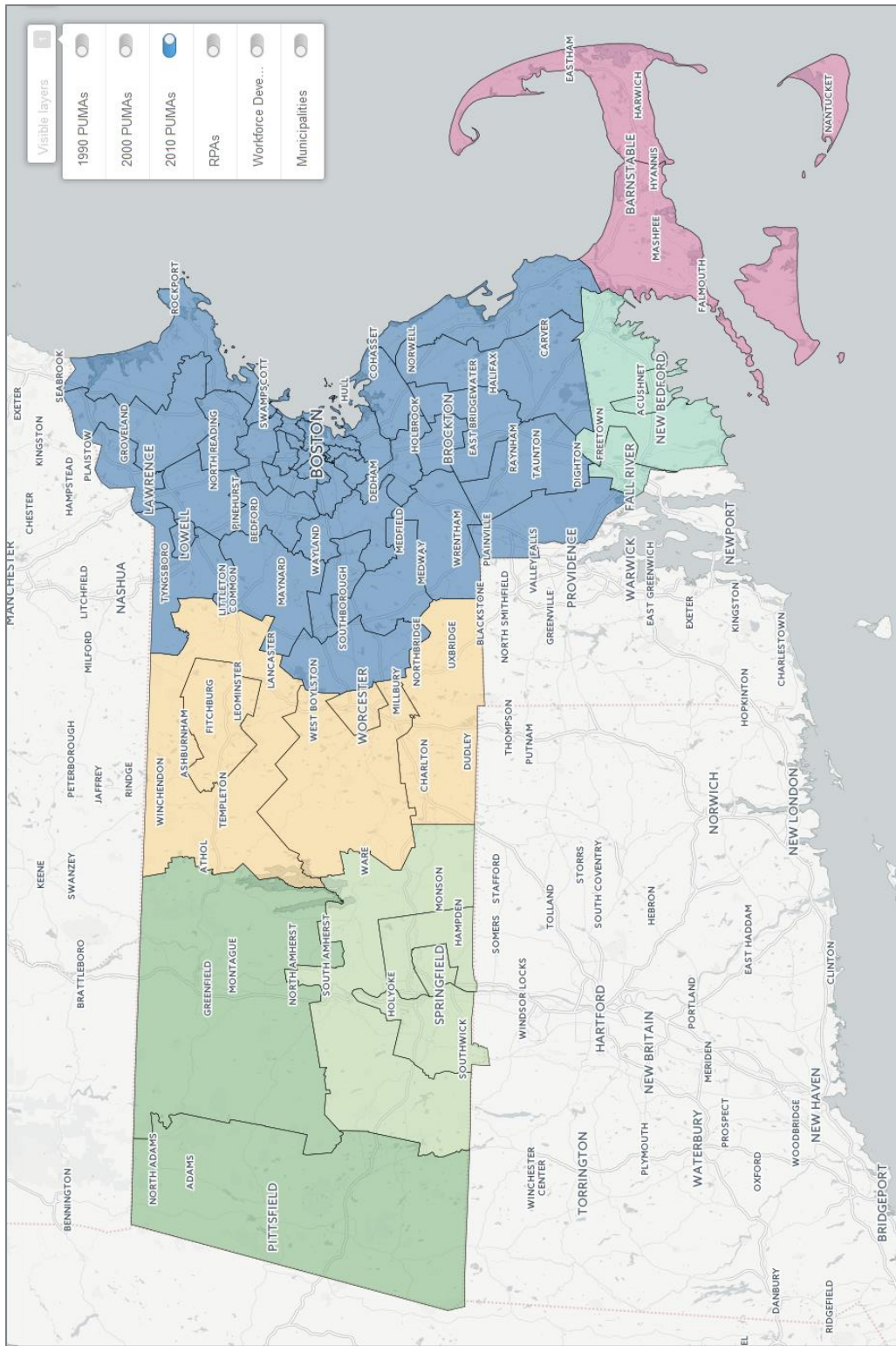


Figure A4: Workforce Development Areas

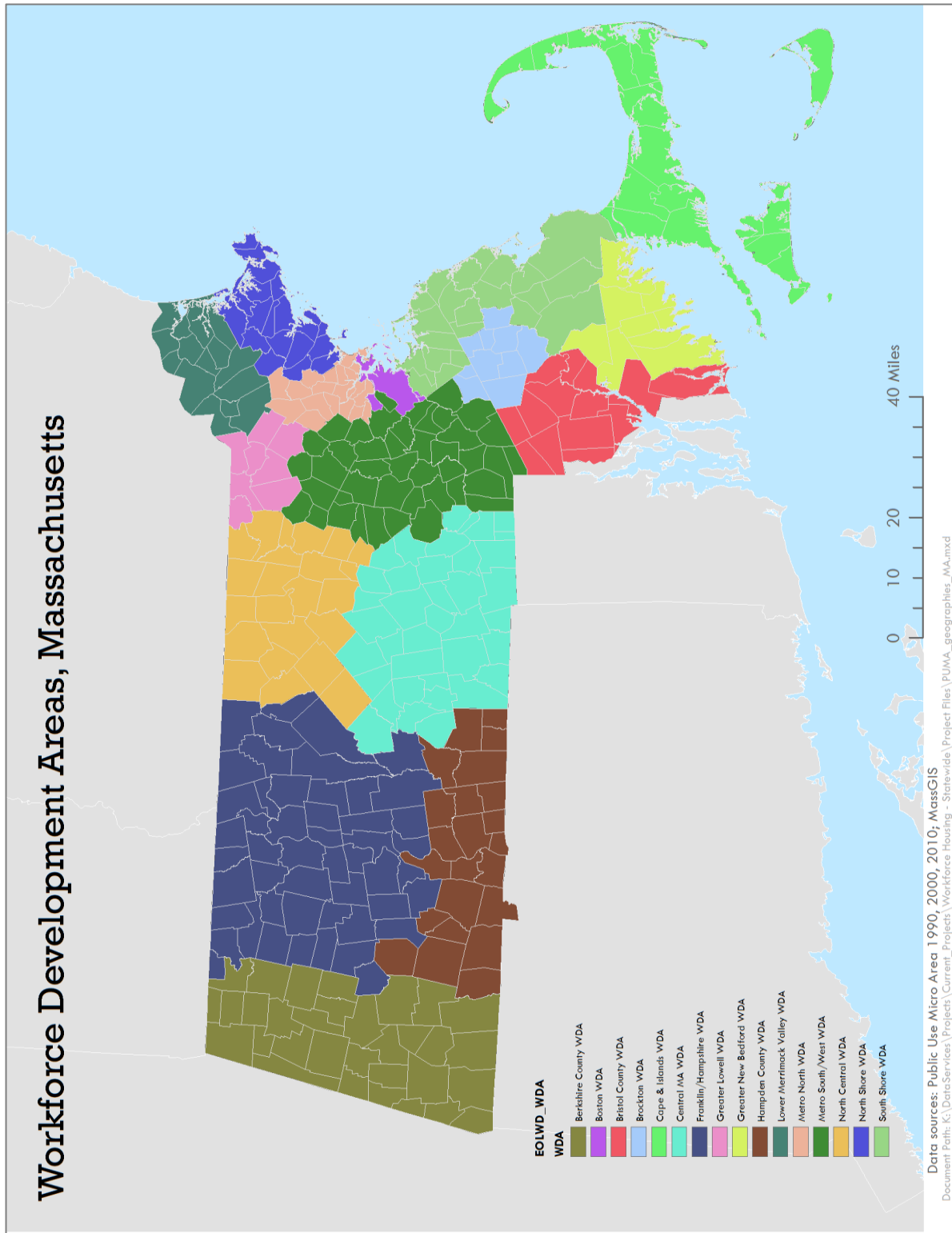


Figure A5: Regional Planning Agency Boundaries

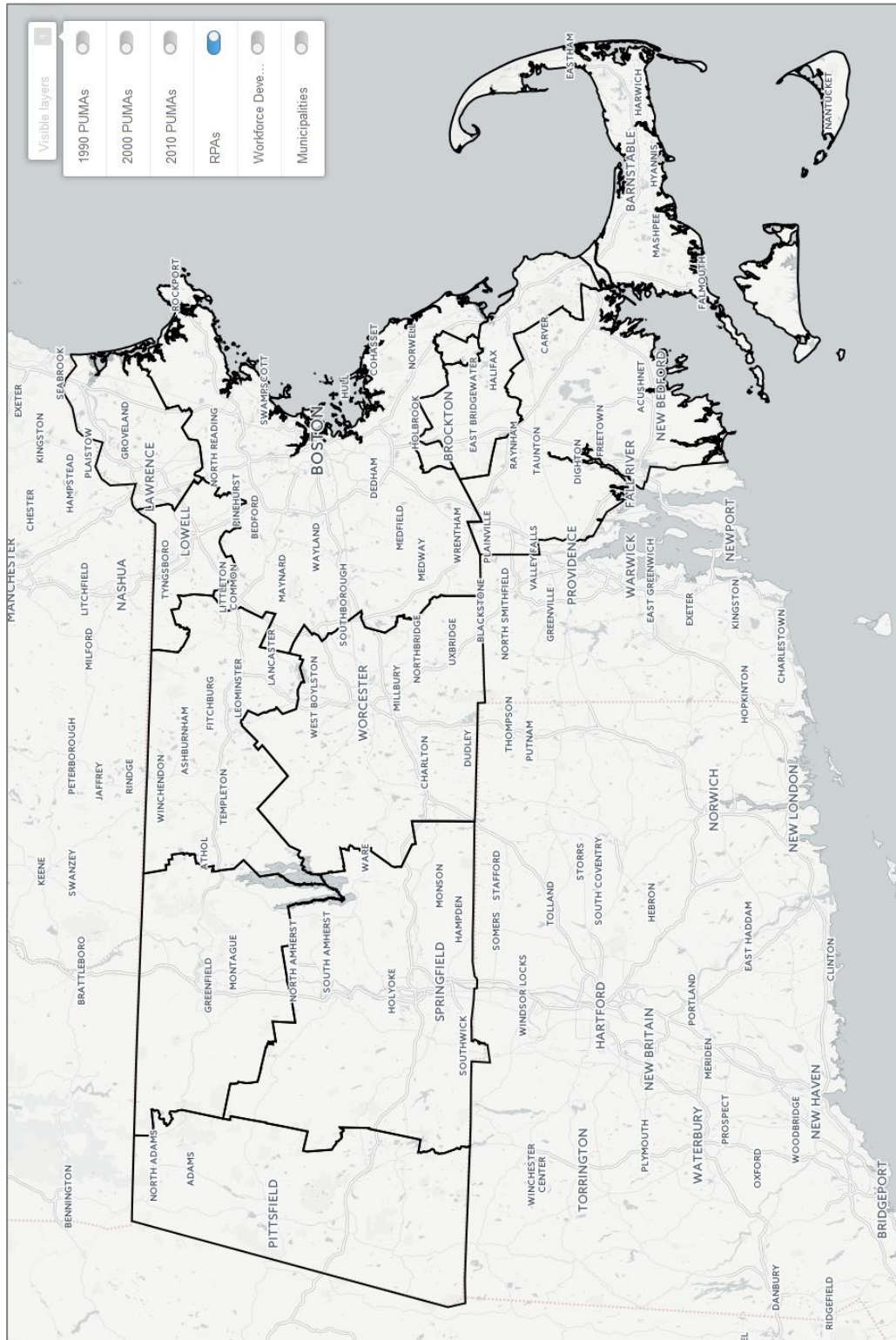
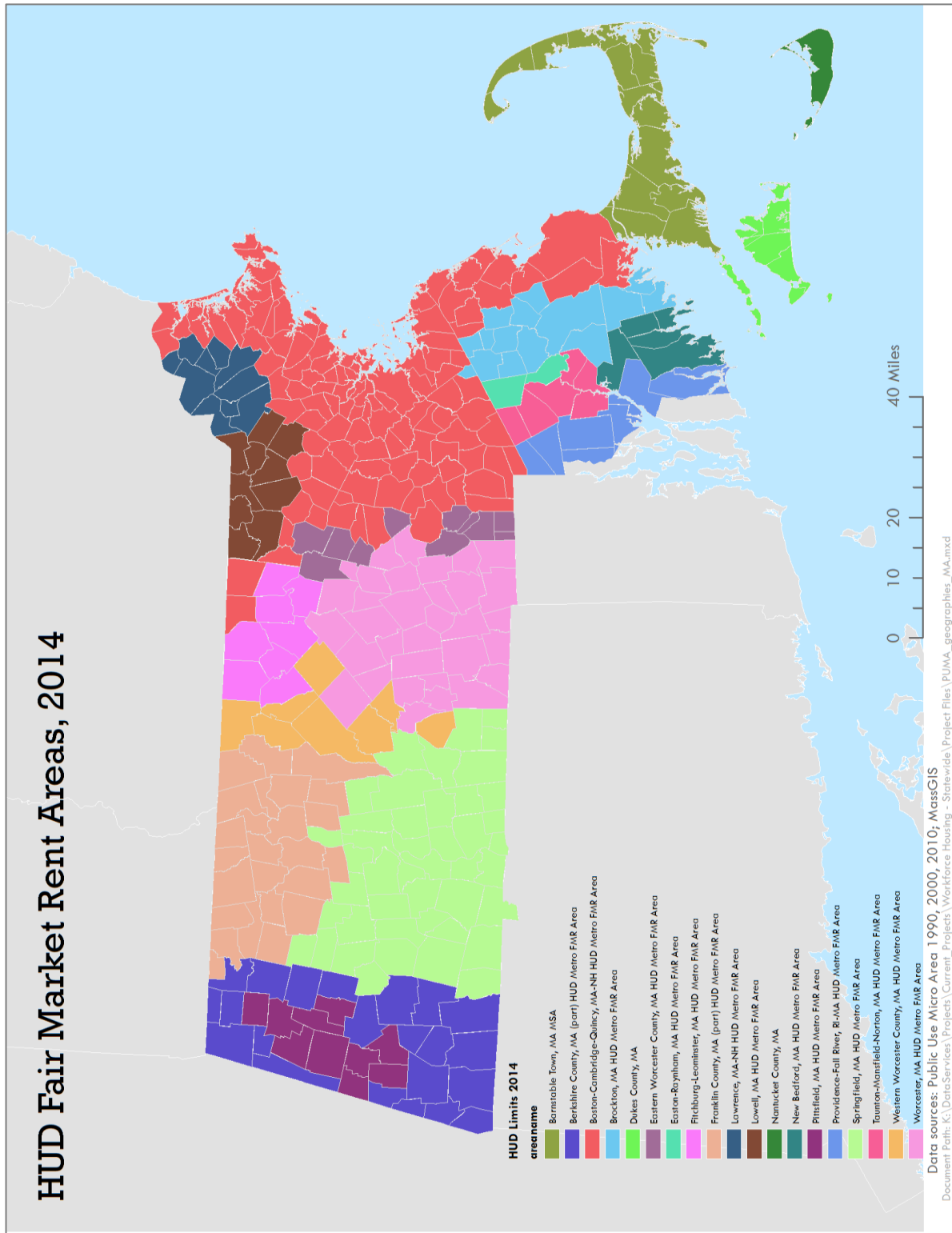


Figure A6: HUD Fair Market Rent Areas



APPENDIX B: Cape and Islands Regional Boundary Research and Methods

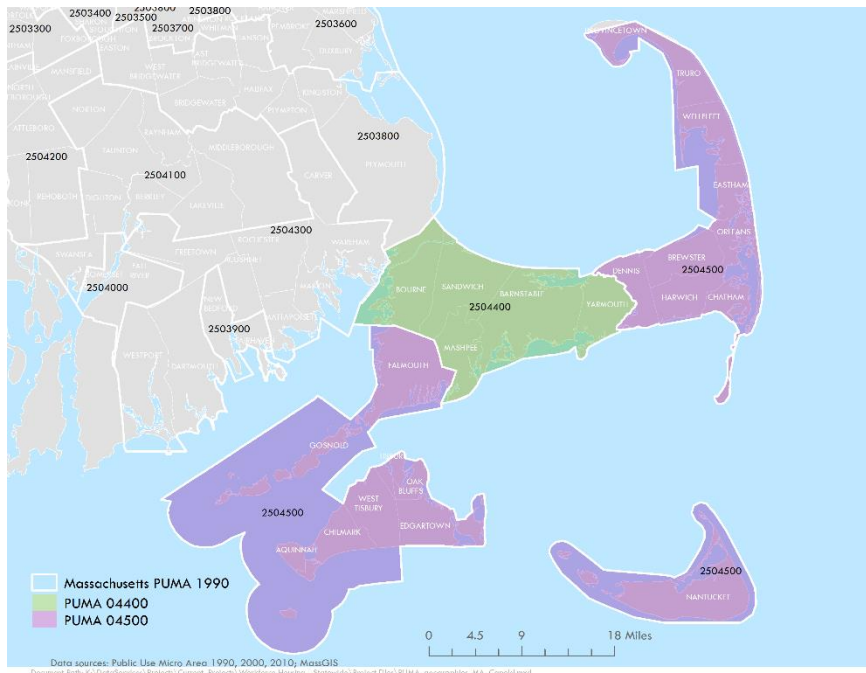
MAPC's workforce housing projections analysis relies on data from the U.S. Census Public Use Microdata Sample (PUMS), which is published at a geography called a Public Use Microdata Area (PUMA) that has a population threshold of 100,000. To quantify the need for future workforce housing, we need a combination of attributes, including age, income, occupation, and labor force status, which can be obtained from PUMS data (see the attached methods document for more details), but not from other sources with smaller geographic extents.

To better understand trends for the Cape, Martha's Vineyard, and Nantucket separately, we are able to reference disaggregated data from the Census and other sources. This disaggregated information is helpful in communicating the differences in the three regions, but not for developing workforce housing projections.

The following maps show the PUMA geographies for the Cape and islands and illustrate the limitations these boundaries present for disaggregating Cape Cod, Nantucket and Martha's Vineyard.

1990 PUMS

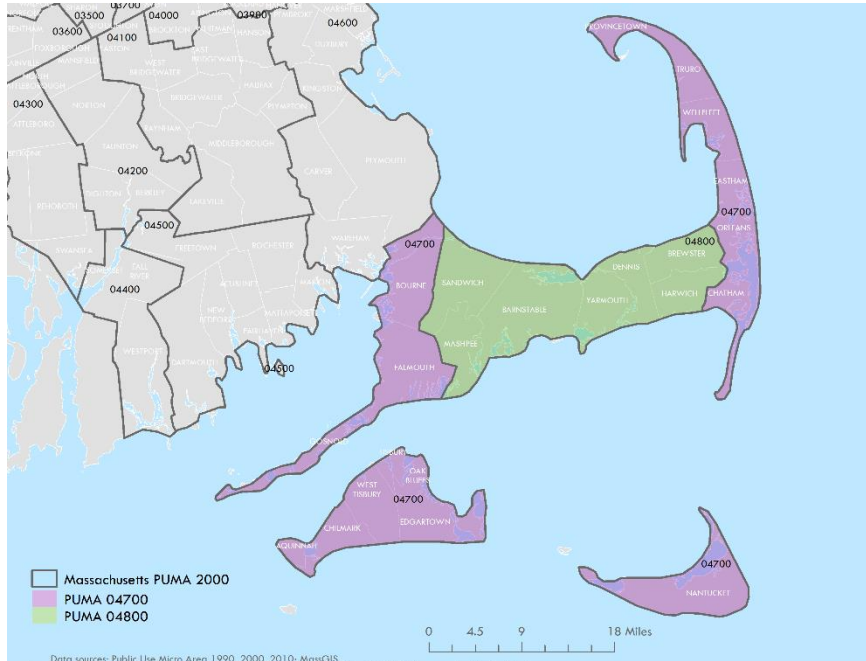
For 1990 PUMS data there are two PUMAs in the region, shown below in purple and green. One PUMA (04500) covers Nantucket, Martha's Vineyard, and parts of Cape Cod, including Falmouth and municipalities east of Yarmouth. The other PUMA (04400) includes the remaining Cape Cod municipalities.



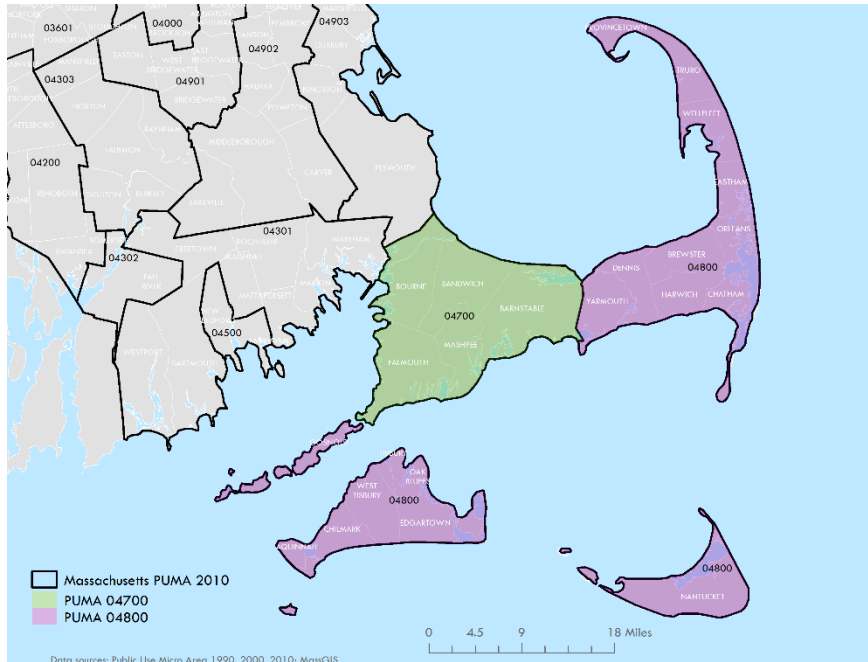
2010-2014 PUMS

The 2010-2014 PUMS data uses two sets of PUMAs, one referencing 2000 PUMA boundaries for data from 2010 to 2011, and one referencing 2010 PUMA boundaries for data from 2012 to 2014. Each of these, again, has two PUMAs in the region.

The map below shows the 2000 PUMAs for the Cape and islands in purple and green. One PUMA (04700) covers Nantucket, Martha's Vineyard, and parts of Cape Cod, including Falmouth, Bourne and municipalities east of Brewster and Harwich. The other PUMA (04800) includes the remaining Cape Cod municipalities.

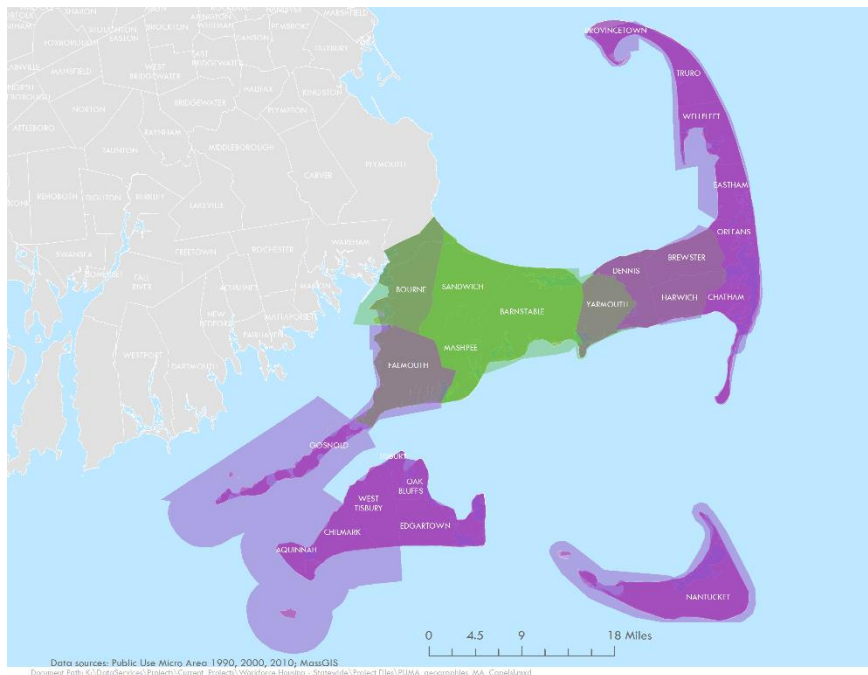


The map below shows the 2010 PUMAs for the Cape and islands in purple and green. One PUMA (04800) covers Nantucket, Martha's Vineyard, and Cape Cod municipalities east of Barnstable. The other PUMA (04700) includes the remaining Cape Cod municipalities.



Overlapping PUMA Boundaries

The map below overlays the three sets of PUMAs on top of each other. It shows that Martha's Vineyard, Nantucket, and the far eastern arm of Cape Cod are consistently grouped together, as are Mashpee, Sandwich, and Barnstable. The remaining Cape Cod municipalities are not consistently in the same PUMA from decade to decade.



Workforce Development Areas

Another data source the analysis relies on is occupational projections, published by the Executive Office of Labor and Workforce Development with Workforce Development Area (WDA) geographies. There is just one WDA for the Cape and Islands region, which means that the long-term occupational projections that we use in our analysis to project future occupational vacancies are for the Cape and islands together.

