# Demographic and Economic Projections for Transportation Planning in Massachusetts

## *Methods, results, and implications*

*A presentation to the*
MassDOT Board of Directors
MBTA Fiscal Management Control Board

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*Metropolitan Area Planning Council*

MAPC

# Introduction

- Population & employment projections are essential inputs for transport models & plans
  - Long Range Transportation Plans & Transportation Improvement Program
  - MassDOT/MBTA project/service planning and design
  - MEPA-related transportation modeling
- Current (2018) process created new projections for all regions, municipalities, and transportation analysis zones in Massachusetts
  - Population (by age and labor force status)
  - Households (by size, workers, and income)
  - Employment (by sector)
- Coordinated by MassDOT with:
  - MAPC
  - University of Massachusetts Donahue Institute (UMDI)
  - Interagency Projections Committee
- Today's presentation:
  - Overview of statewide and regional projections
  - Allocation to municipalities and zones
  - MAPC region highlights

# Statewide and Regional Projections
*Methods and Findings*

Metropolitan Planning Organizations (MPOs)
13 Regions in Massachusetts
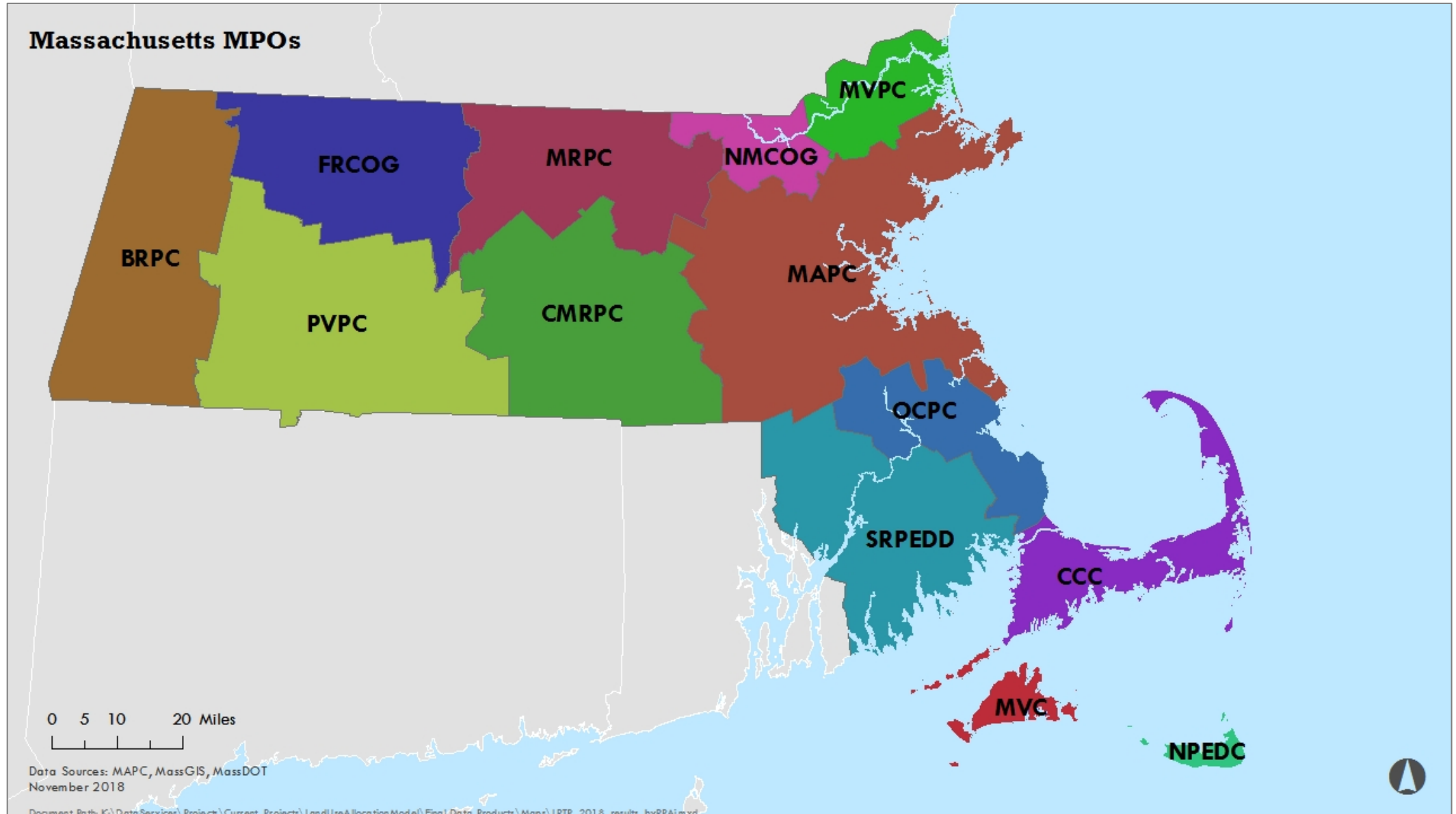
# Process & Approach

Principles:
- Maintain internal consistency of population, households, labor force, and employment
- Rely on current/recent rates of births, deaths, migration, headship, etc.
- Allocation informed by detailed info about development pipeline
- Output format must match transport model specifications

Methods:
- Traditional Cohort Component: Births – Deaths + Migration
- Migration rates based on 2005 – 2011 period
- Calibrated to match 2015 municipal & regional population estimates
- "Benchmark" regions → municipalities –> Metropolitan Planning Organization regions
- Households & Labor Force derived from population by age
- MA employment constrained by resident labor force and estimated incommuters
- Regional Planning Agencies responsible for allocation to municipalities and transportation analysis zones

# Projections Workflow
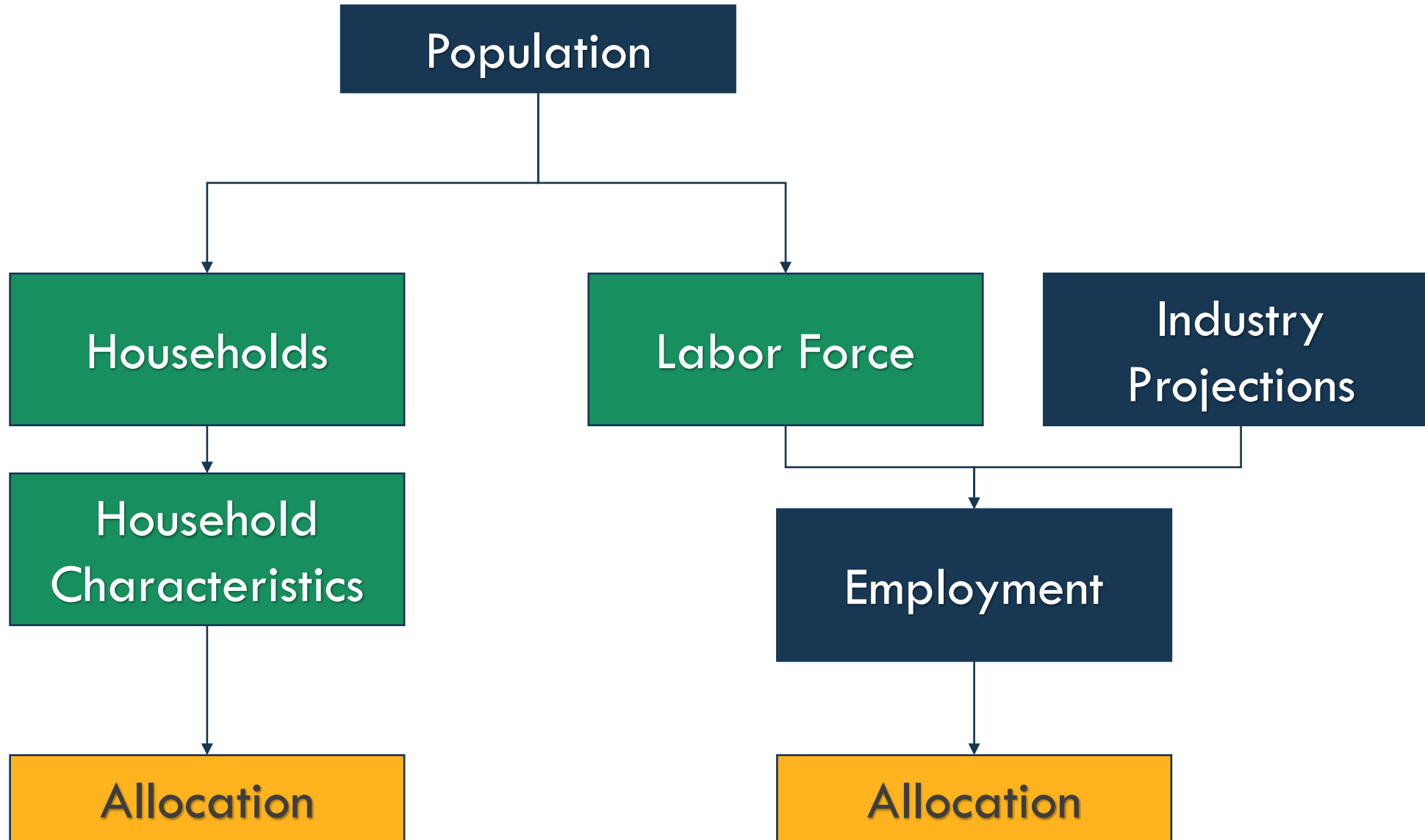
# 2040 Projections: Massachusetts
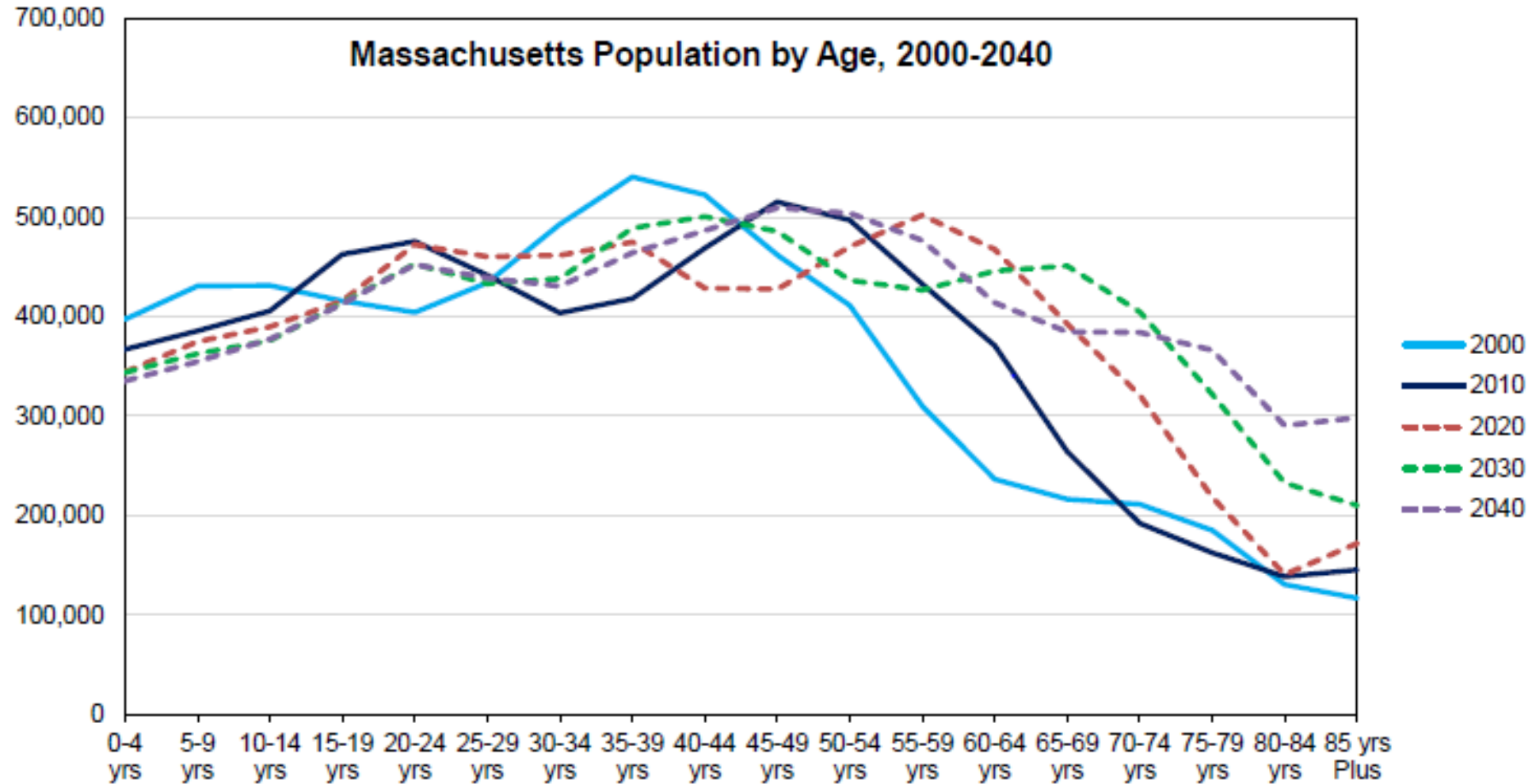
|  | 2010 | 2040 | Net change | Percent change |
|---|---|---|---|---|
| Population | 6,548,000 | 7,380,000 | 833,000 | 13% |
| Households | 2,547,000 | 3,152,000 | 605,000 | 24% |
| Employment | 3,199,000 | 3,524,000 | 324,000 | 10% |

# Massachusetts Population by Age



Massachusetts Population by Age, 2000-2040

# Population change by region, 2010 - 2040



**Population Change (%)**
- Decline up to 18%
- 0% - 8% increase
- 8% - 16% increase
- Increase over 16%

MVPC
FRCOG
MRPC
NMCOG
BRPC
MAPC (97)
PVPC
CMRPC
OCPC
SRPEDD
CCC
MVC
NPEDC

0  5  10    20 Miles

Data Sources: MAPC, MassGIS, MassDOT
November 2018

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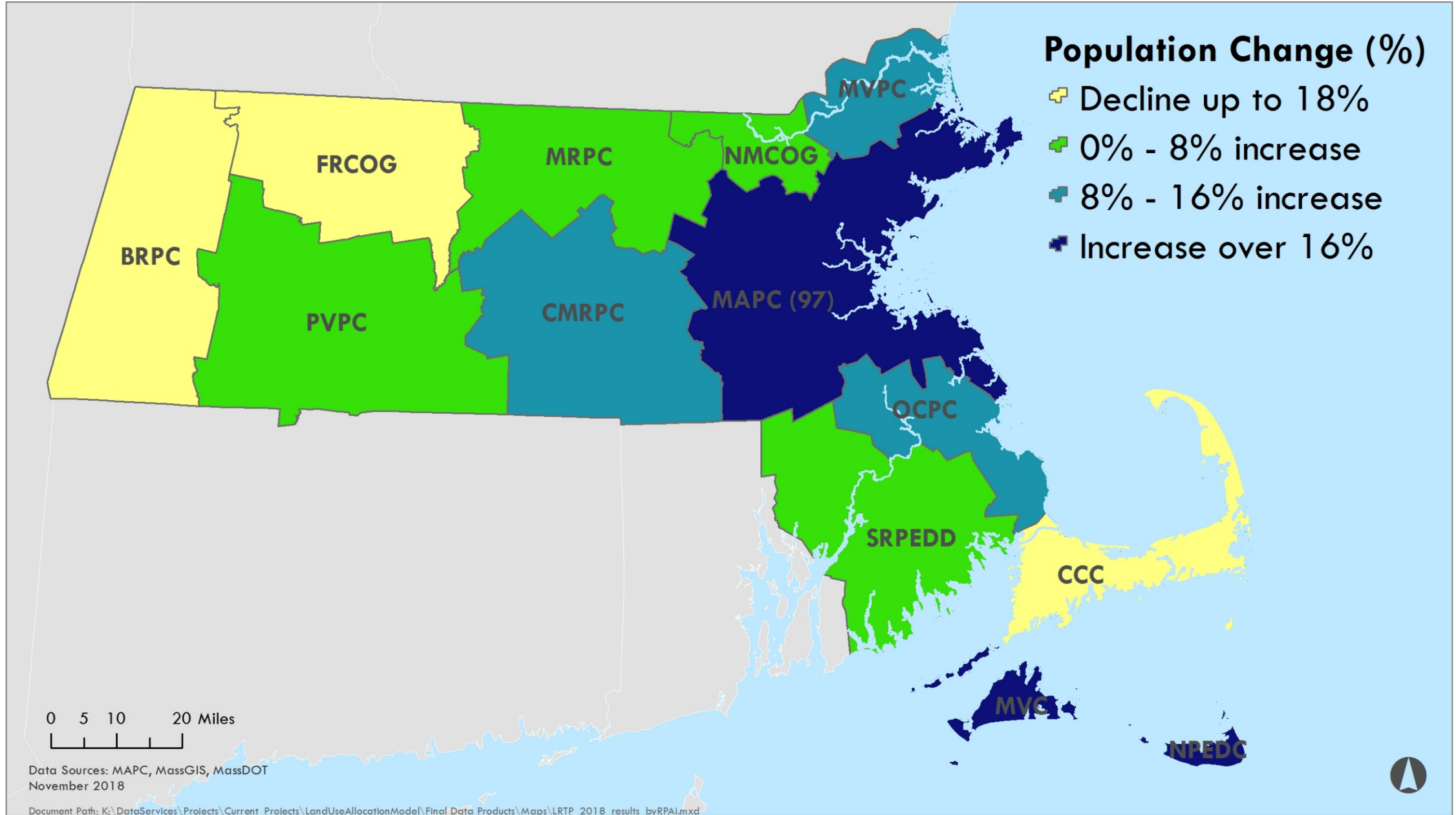
# By 2040, most households will be headed by someone born after 1980

Householders by Generation,
Massachusetts, 2010 - 2040
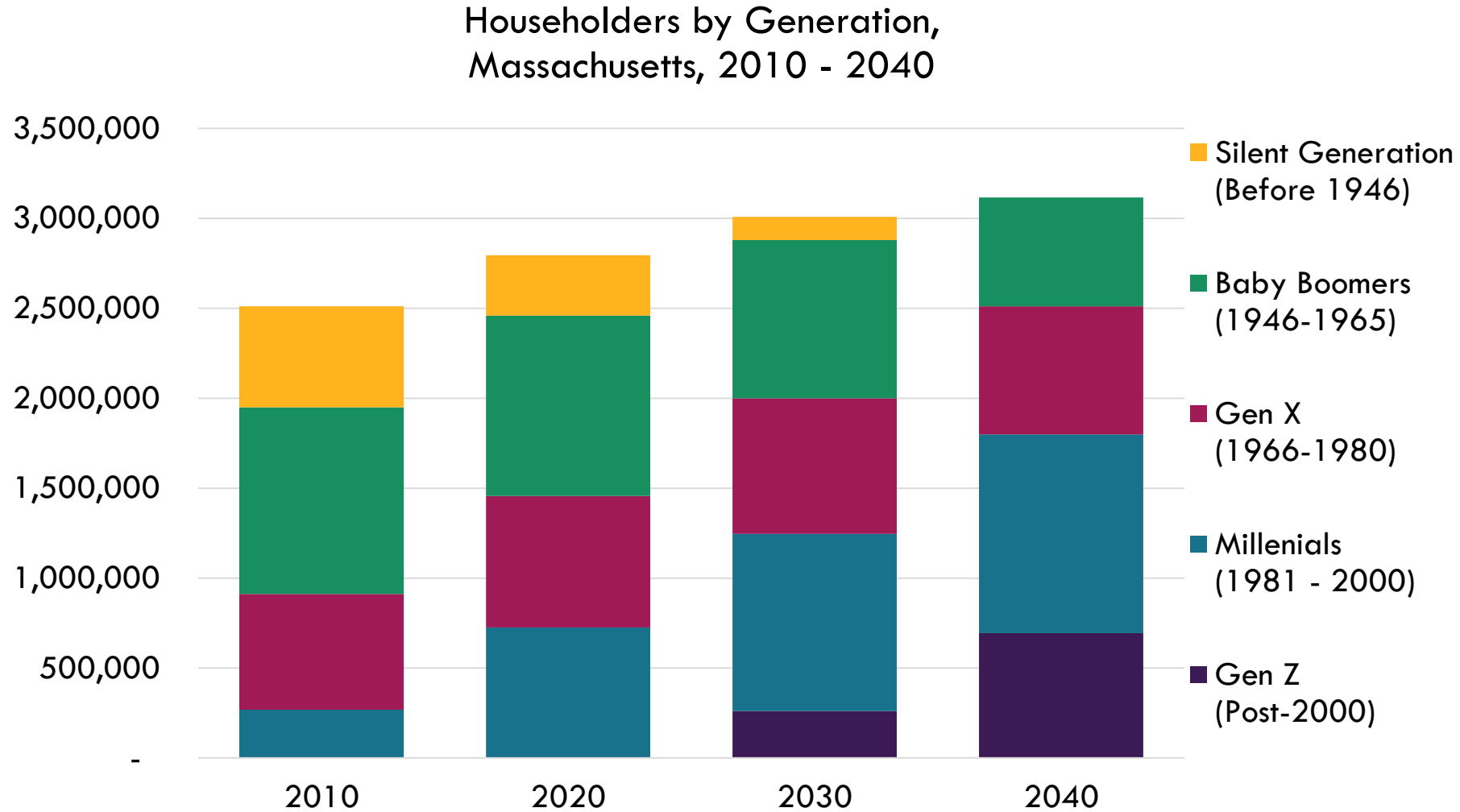


Source: MAPC Household Projections &
UMDI/MassDOT Population Projections (2018)

# Families with children will comprise a declining share of total households

## Households by Household Type, Massachusetts, 2010 - 2040
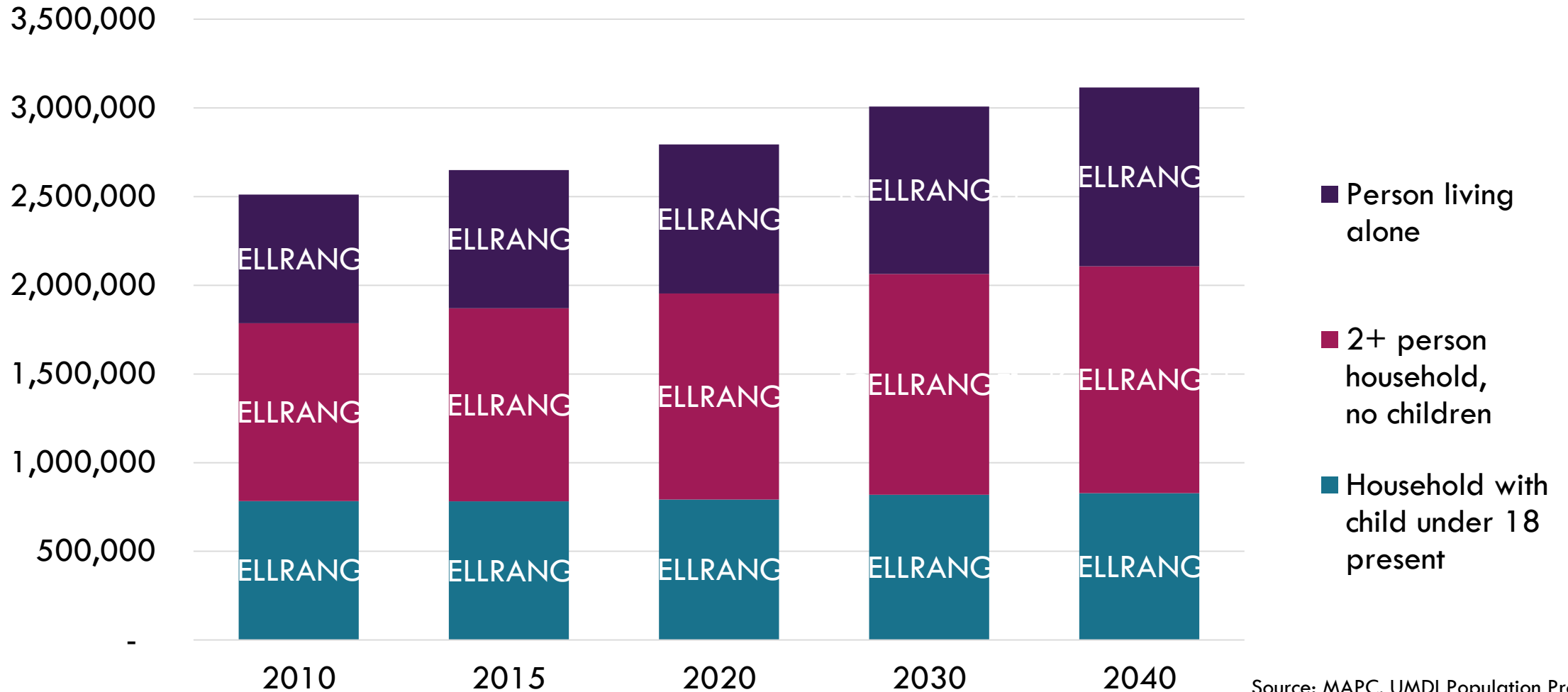


Source: MAPC, UMDI Population Projections

# Household change by region, 2010 - 2040



**Household Change (%)**
- Decline of 14%
- 0% - 15% increase
- 15% - 25% increase
- 25% - 31% increase

Regions shown on map: MVPC, MRPC, NMCOG, FRCOG, BRPC, PVPC, CMRPC, MAPC (97), QCPC, SRPEDD, CCC, MVC, NPEDC
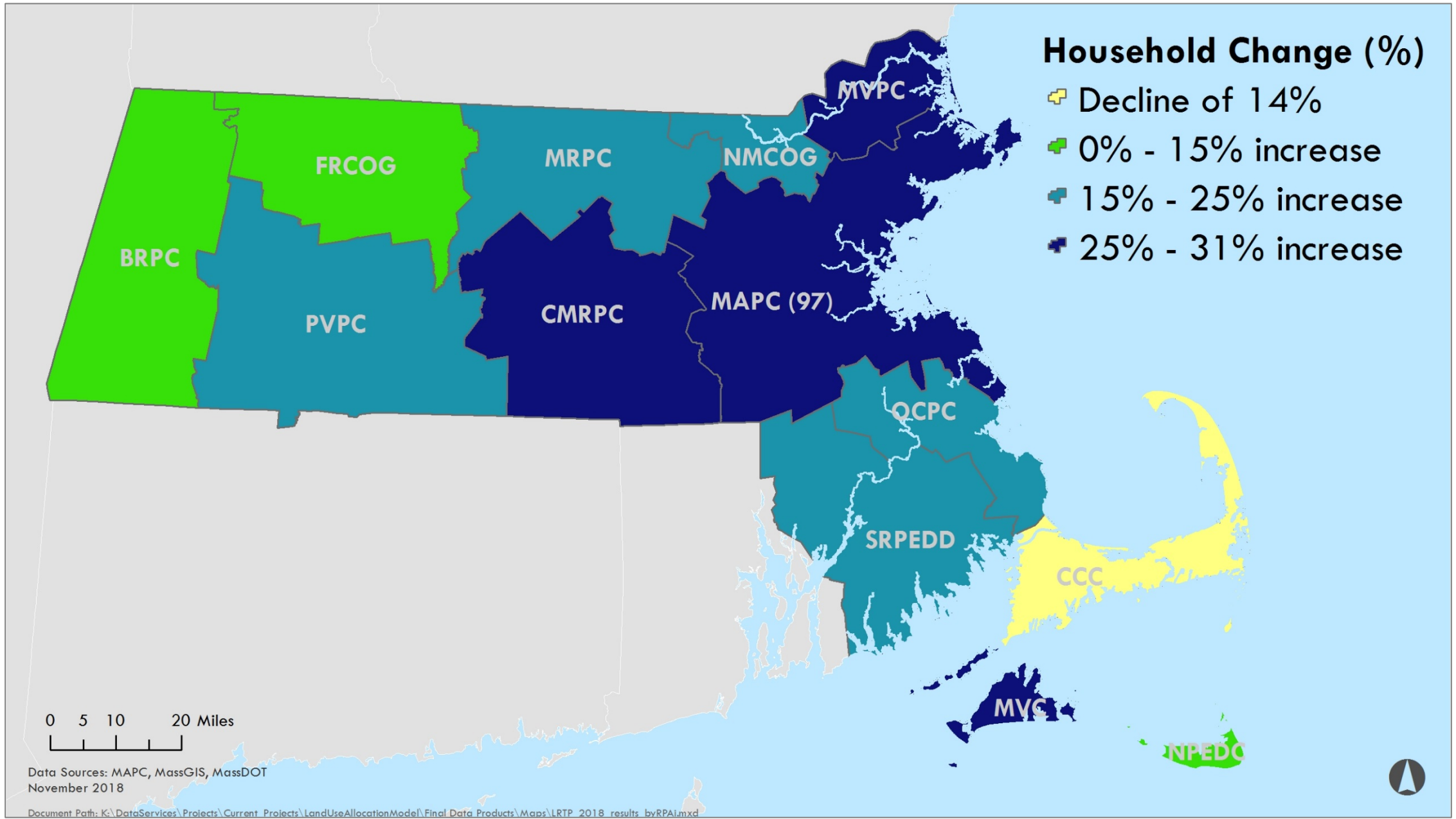
# A wave of Baby Boomer retirement compensated by entrance of younger workers into the labor force

Net Labor Force Change by Year of Birth, 2010-2040



**Roughly 2,116,100 workers may retire or leave the labor force between 2010-2040**

**Roughly 2,343,800 workers are projected to join the labor force**

Net Labor Force Change, 2010-2040

Year of Birth

Source: MAPC, UMDI Population Projections
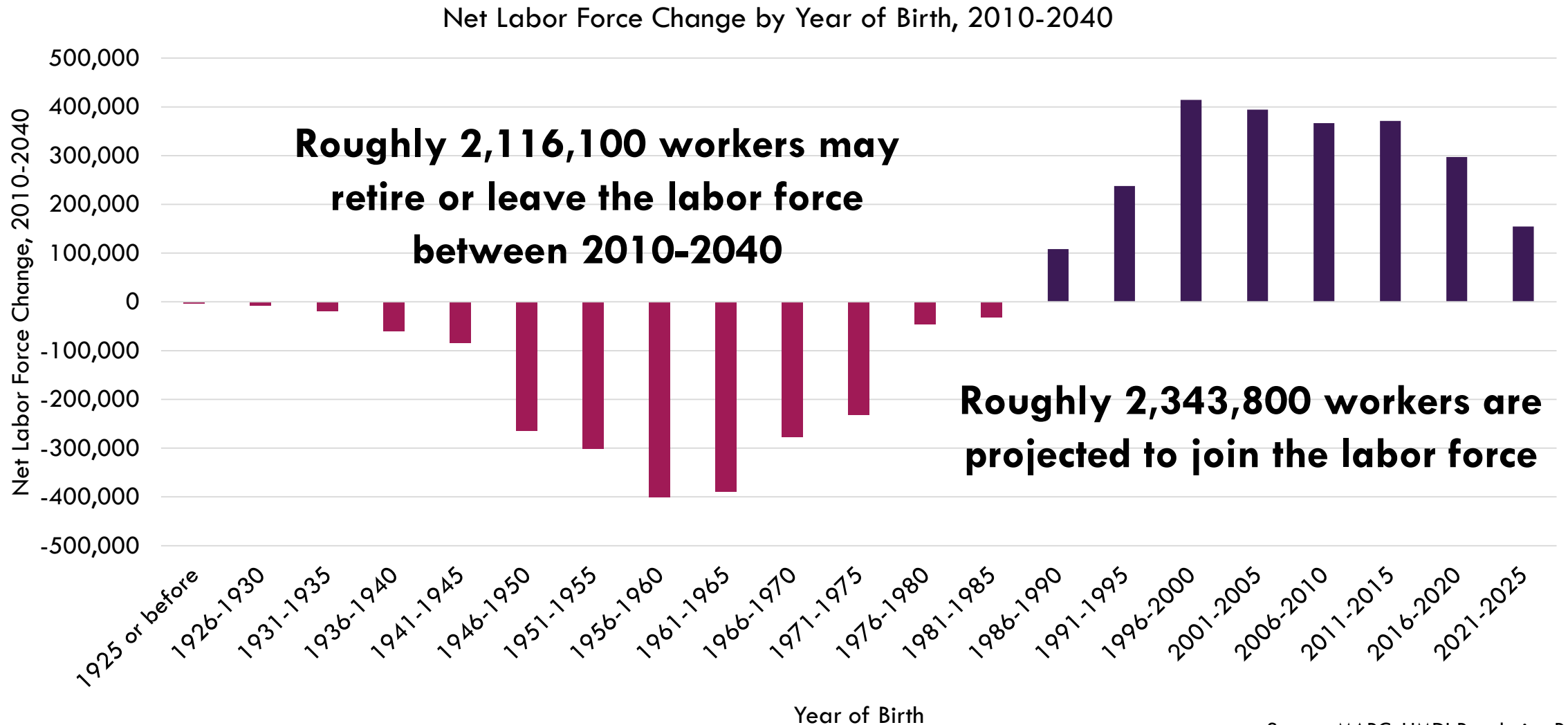
# Employment change by region, 2010 - 2040

**Employment Change (%)**
- Decline up to 15%
- 1% - 5% increase
- 6% - 10% increase
- 11% - 15% increase

MVPC

NMCOG

MRPC

FRCOG

BRPC

PVPC

CMRPC

MAPC (97)

OCPC

SRPEDD

CCC

MVC

NPEDD

0  5  10      20 Miles

Data Sources: MAPC, MassGIS, MassDOT
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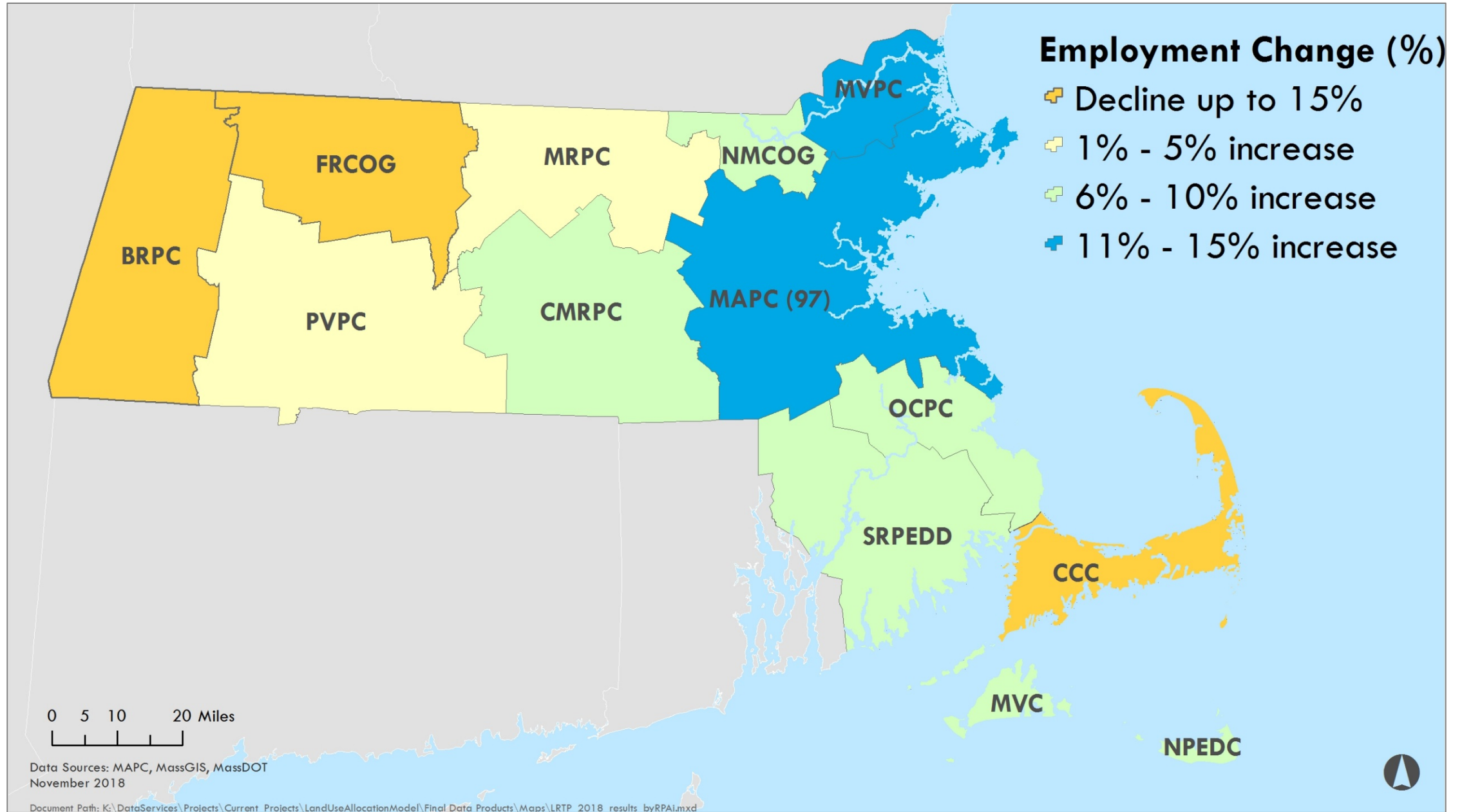
# Allocation to Municipalities and Analysis Zones

*Methods and Results*

# Methods: Household and Employment Allocation

**Non-MAPC Regions**

- Municipal household projections based on municipal population projection

- MassBuilds inventory of planned and proposed housing units

- Other Regional Planning Agency adjustments

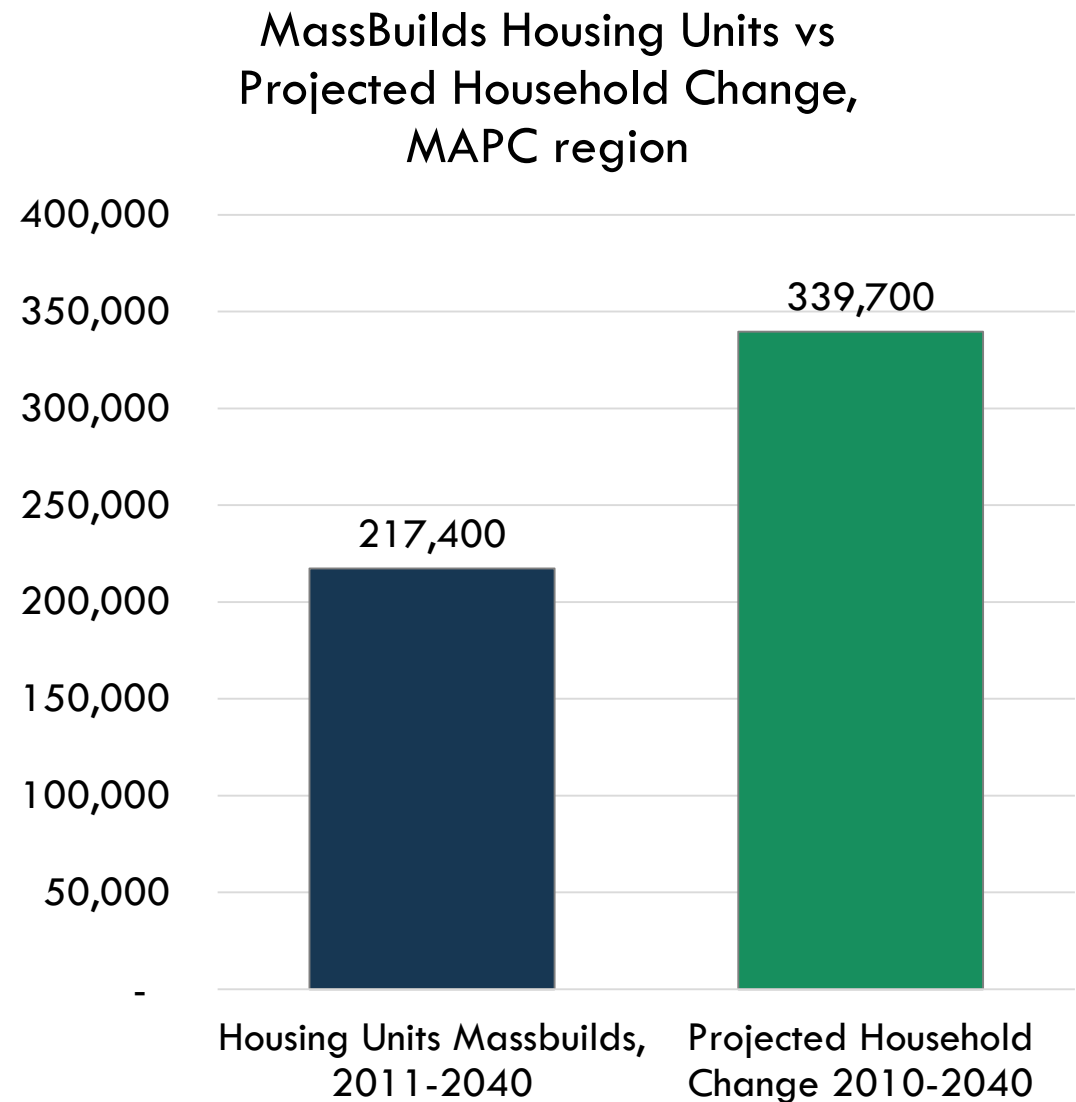- Additional household detail added by MAPC

**MAPC**

- Region's households are grouped into "agents" based on demographic characteristics (age, income, etc)

- Households and employment are allocated directly to zones by land use allocation model:
  - Existing distribution of agents & jobs
  - MassBuilds inventory of planned and proposed housing units & commercial space
  - Estimated development capacity
  - Accessibility to employment, retail, services

# Massbuilds: >4,000 developments statewide
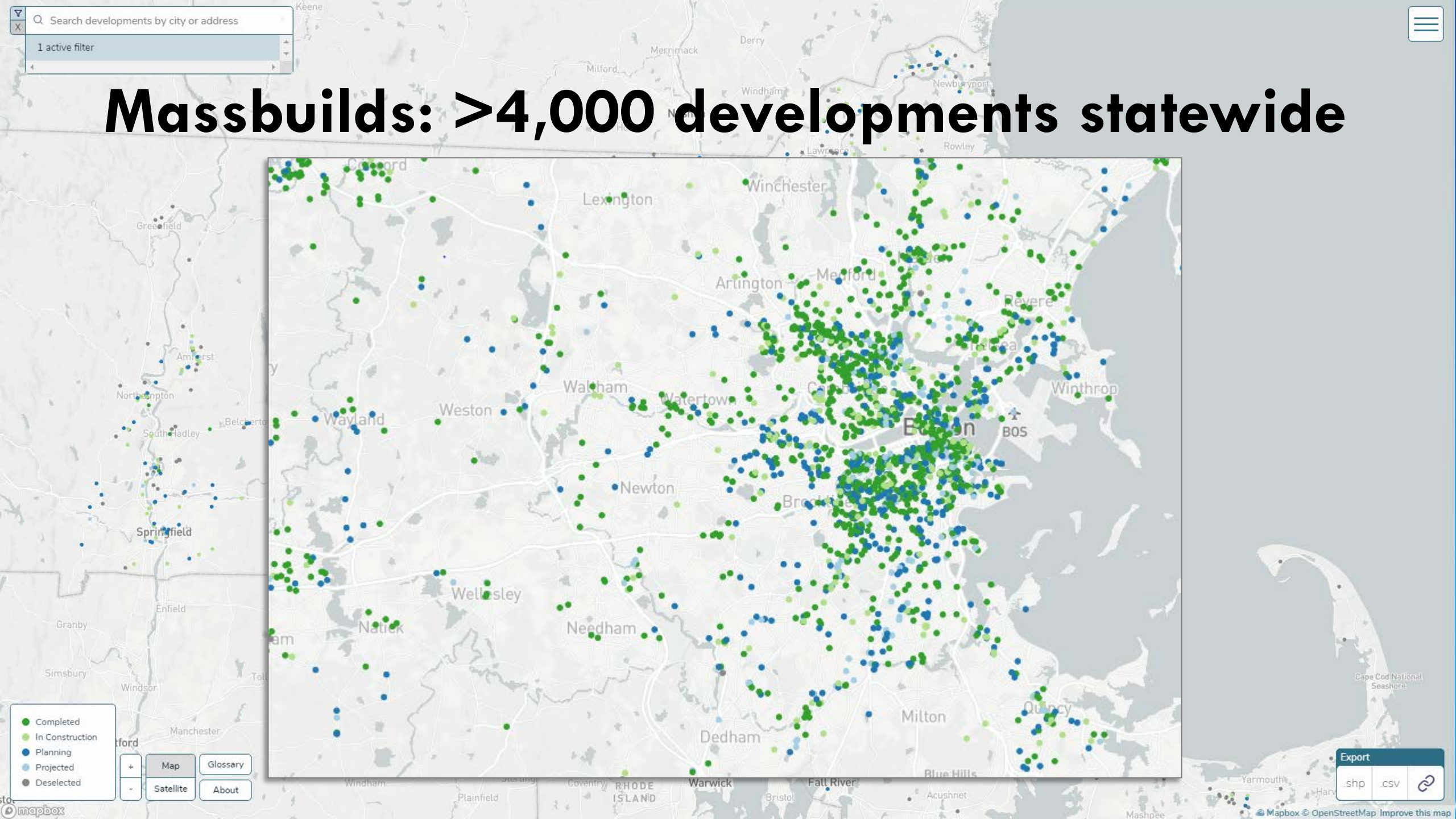
# Housing units completed since 2010 or in the pipeline: 65% of projected new households



MassBuilds Housing Units vs Projected Household Change, MAPC region

- 400,000
- 350,000 — 339,700
- 300,000
- 250,000
- 217,400
- 200,000
- 150,000
- 100,000
- 50,000
- -

Housing Units Massbuilds, 2011-2040

Projected Household Change 2010-2040

# >200 million square feet of commercial space completed since 2010 or envisioned before 2040; more than 2.5 X amount needed for projected job growth

MassBuilds Job Capacity vs
Projected Employment Change,
MAPC region
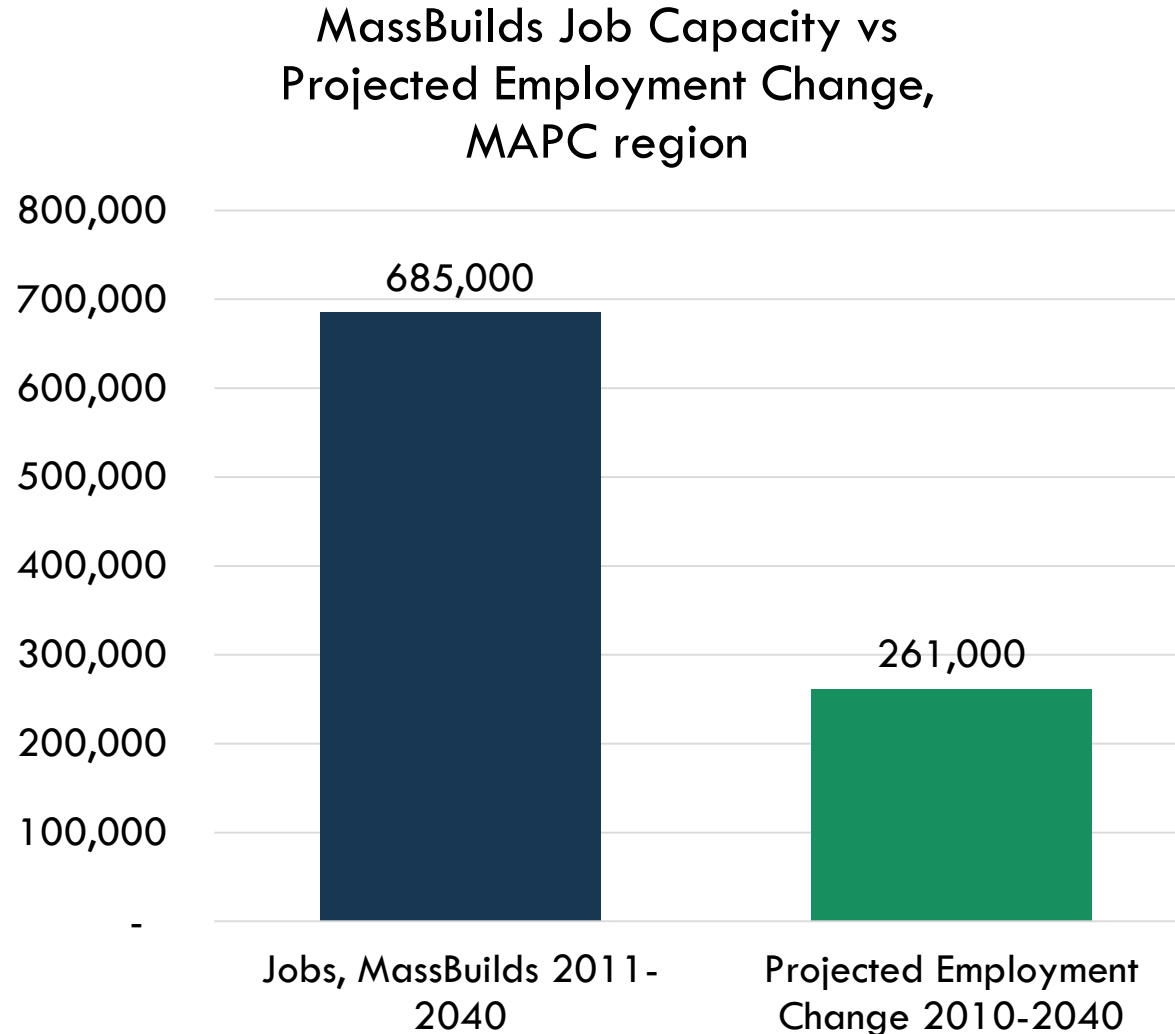
# MAPC Region
## *Highlights*

# Significant household shifts within MAPC region

Household Types with Large Growth ↑

Household Types with Large Decline ↓

No child households over 45 making under 35k (>90%)

Two person households over 65 making 35k-150k (+88%)

Parents under 35 with children making under 75k (+72%)

No child 3-4 person households making over 35k, householder under 45 (-76%)
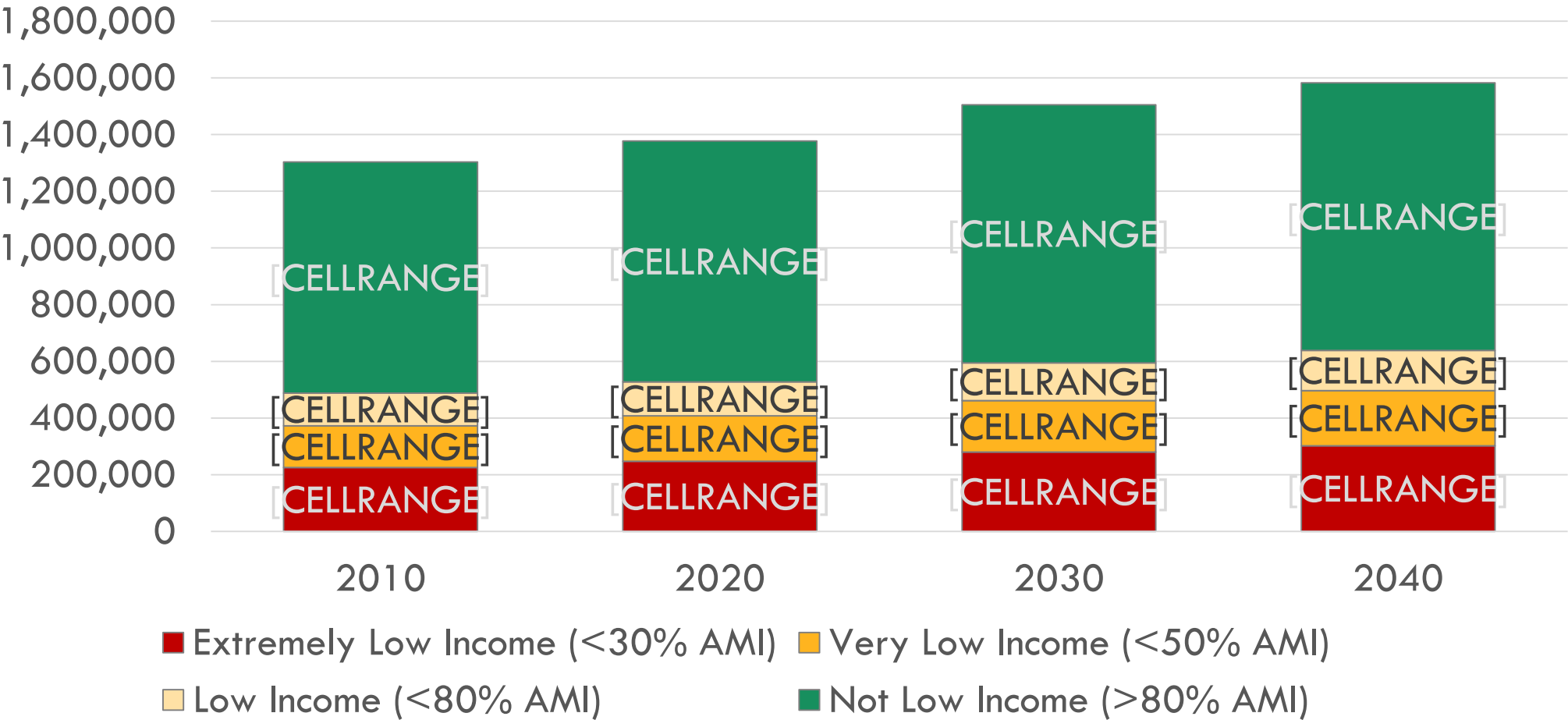
Single parents with one child (-41%)
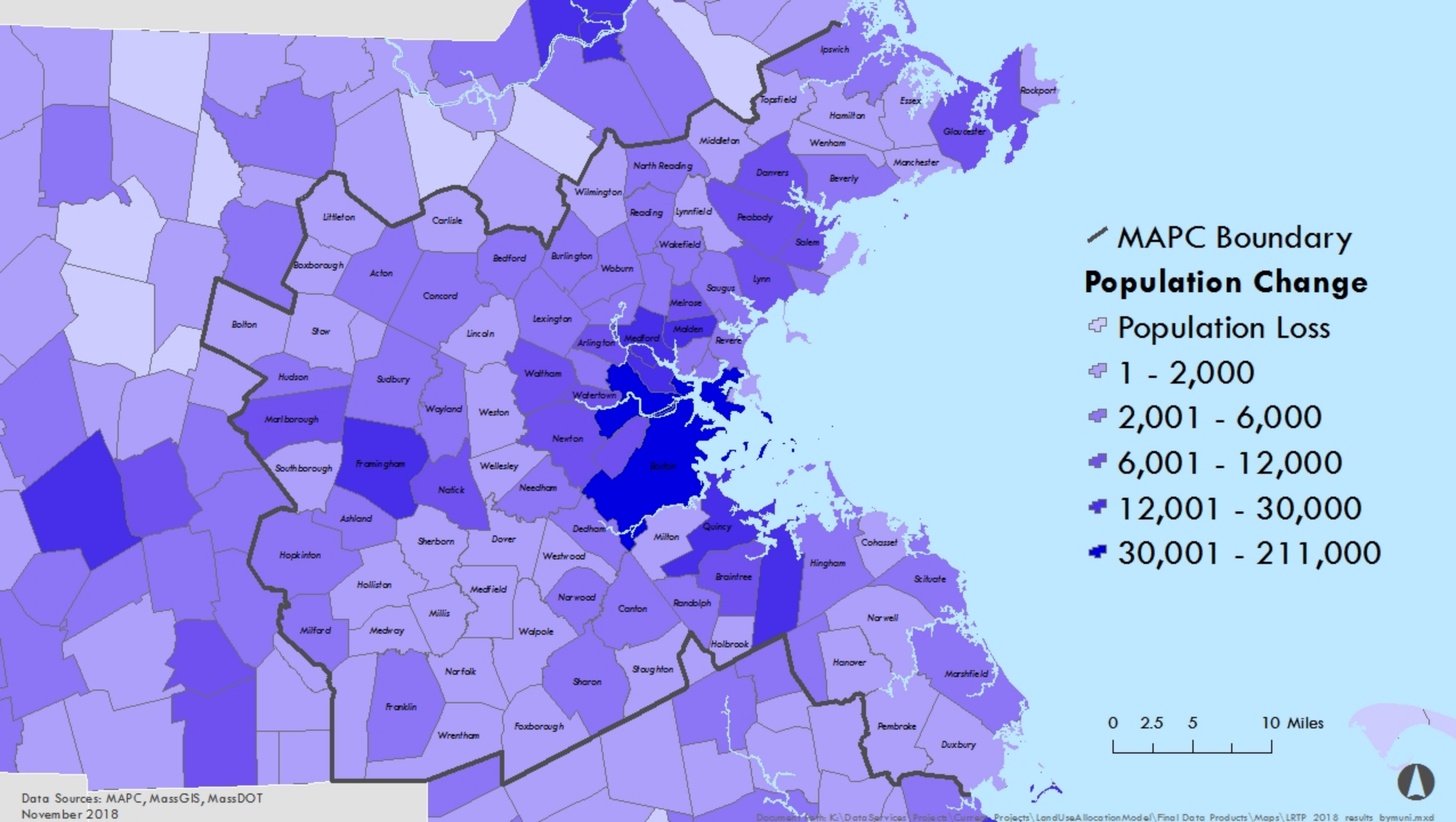
Single householder under 45 making under 35k (-12%)
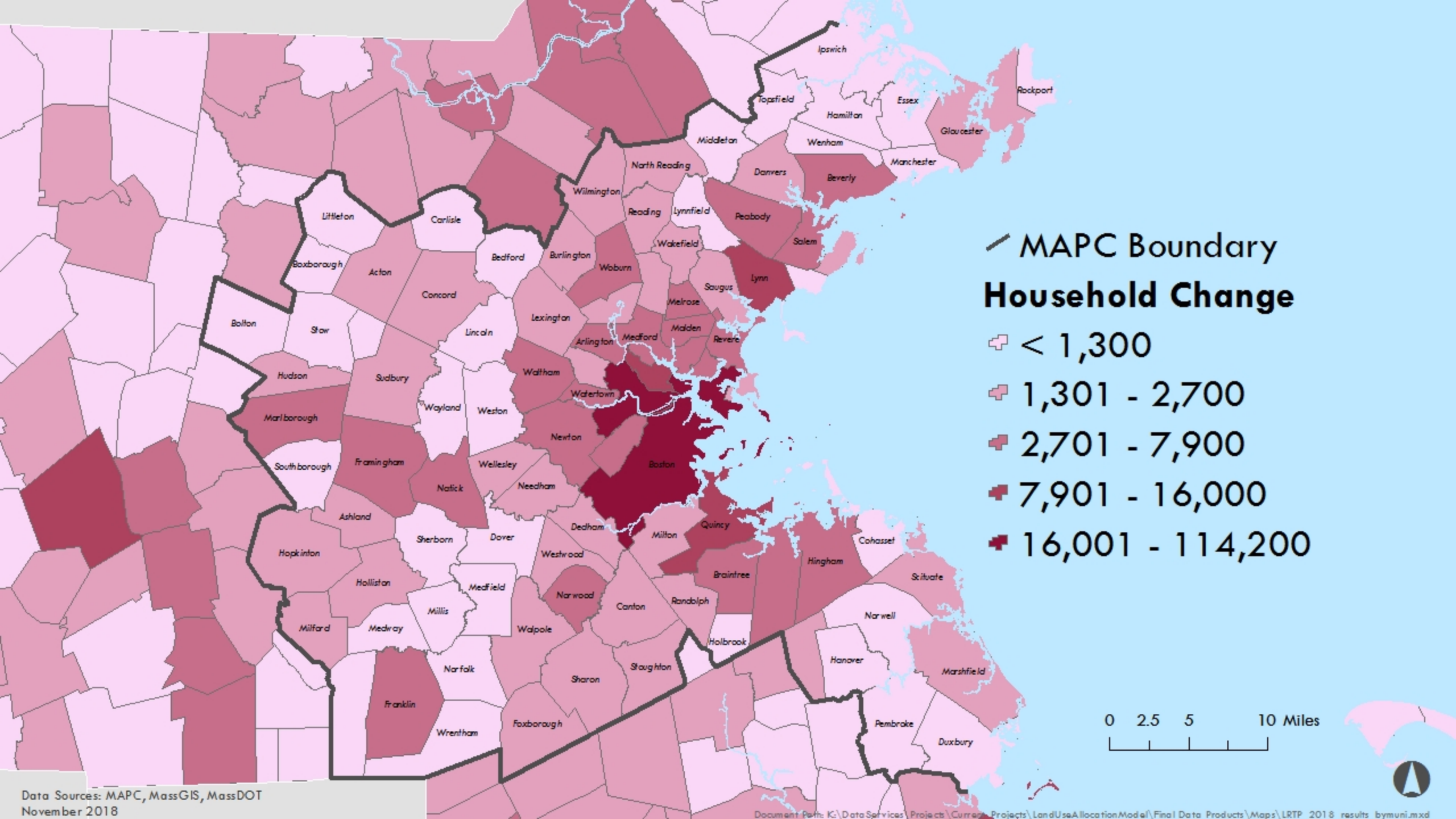
# Lowest income households projected to comprise a larger share of total households

Projected Households by Income
(as percent of Area Median Income), Boston MPO



- Extremely Low Income (<30% AMI)
- Very Low Income (<50% AMI)
- Low Income (<80% AMI)
- Not Low Income (>80% AMI)

**Legend:**

— MAPC Boundary

**Population Change**

▱ Population Loss

▱ 1 - 2,000

▱ 2,001 - 6,000

▱ 6,001 - 12,000

▰ 12,001 - 30,000

▰ 30,001 - 211,000

0  2.5  5    10 Miles

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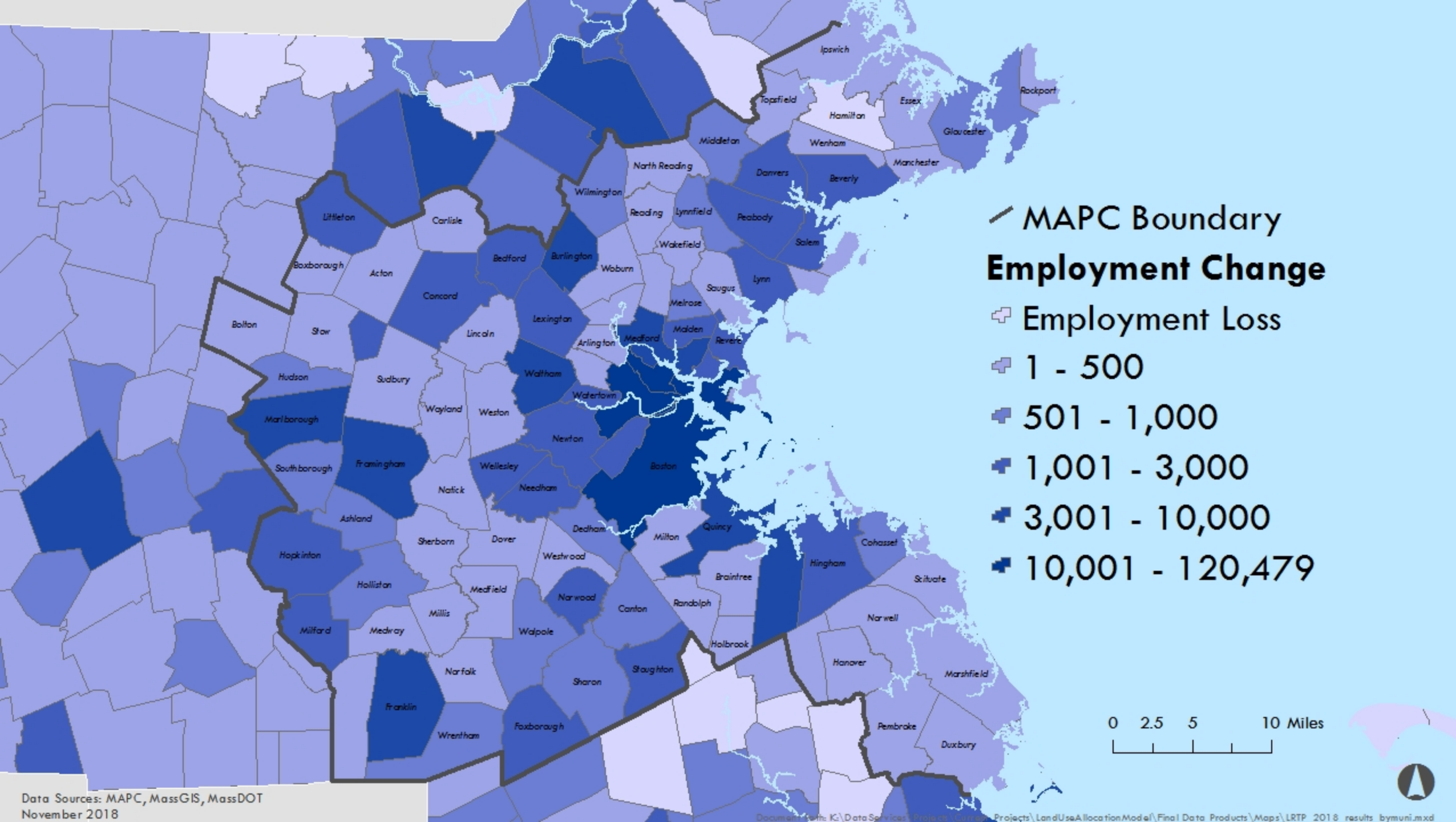
**MAPC Boundary** (legend line)

## Household Change

- < 1,300
- 1,301 - 2,700
- 2,701 - 7,900
- 7,901 - 16,000
- 16,001 - 114,200

0   2.5   5      10 Miles

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**MAPC Boundary**

**Employment Change**

Employment Loss

1 - 500

501 - 1,000

1,001 - 3,000

3,001 - 10,000

10,001 - 120,479

0   2.5   5        10 Miles

Data Sources: MAPC, MassGIS, MassDOT
November 2018

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# Additional Considerations

- Fully integrated land use—transportation model still in development. For the time being, land use inputs generally held constant for different transportation scenarios (e.g., Build vs. No-Build). Can be altered on a project-by-project basis, within reason.

- Status quo approach does not assume any major changes in migration patterns, headship rates, labor force participation, income distribution, etc.

- Additional demographic & land use scenarios to be developed through MAPC's MetroCommon regional planning process now underway (www.metrocommon.mapc.org)

# Thank You

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