



4 Regional Profile



DEMOGRAPHICS IN THE MONTACHUSETT REGION

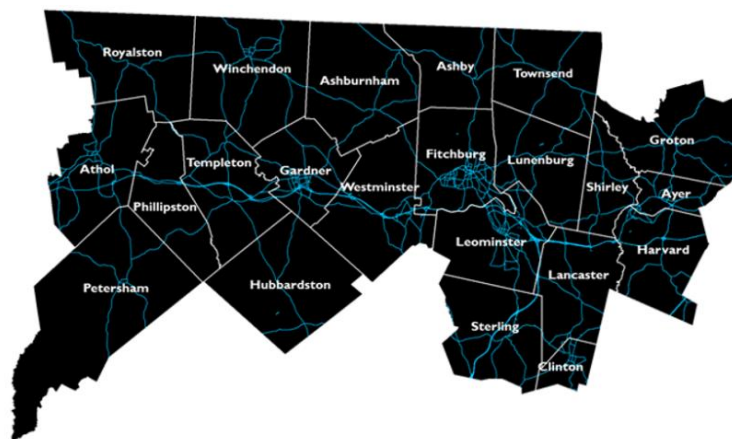
This following provides a profile of the Montachusett region through various sets of data, i.e. the U.S. Census and the American Community Surveys (ACS), as well as various MRPC reports developed in accordance with local studies and contracts.

Through the tables, charts and analyses presented, an understanding of the population that comprises the Montachusett region and its unique features and characteristics will be gained. The various data sets presented highlight the continued changing face of the region and help provide some background to the relationship that exists between the communities and their needs.

Background & History

The Region was settled as early as the 17th Century and began as small settlements that evolved from an era of agrarianism into the age of industrialization and now into the era of information and communications. The physical landscape is a mixture of compact urban centers and small rural communities containing “town commons”. Comprised of 22 communities located in north central Massachusetts, the region measures approximately 685 square miles in size. Of this area, approximately 654 square miles (or approximately 95%) is land.

The Montachusett Region’s earliest settlements were founded as trading outposts for the Massachusetts Bay



Colony. Lancaster and Groton were settled in the mid-1600's to ensure the flow of animal pelts from the interior to Boston. By the second half of the eighteenth century, most communities in the region were settled. Originally, local economies focused on agriculture but, since farming



provided a poor return, manufacturing quickly became the dominant economic force in the region.

Montachusett communities harnessed swift-flowing streams and rivers for water-powered manufacturing. The first mills were allied with agricultural production, but the nineteenth century saw the establishment of other industries, including paper, textile and woodworking industries. By the mid-nineteenth century, the production of lumber and wood products became the region's largest industry, and the City of Gardner was known internationally as a major center of chair manufacturing.

The growth of the region was accelerated by railroad connections enabling the easy transport of materials, goods and people. Communities with an industrial base prospered and expanded with the influx of migrants both foreign and US born. Smaller towns did not see widespread growth. However, their industrialized neighbors enjoyed a heyday during the end of the 19th Century.

The 20th Century saw a period of economic decline that was caused by the migration of industries to southern states and the Great Depression. The smaller industrialized communities suffered severely and recovered slowly. Today, the region's more urbanized communities are dominated by "mature" manufacturing industries, such as Gardner's surviving furniture mills and Leominster's surviving plastics companies. Other local economies, recognizing the instability of the region's industrial base, are undergoing a transition away from specialization in manufacturing industries. One foray into tourism has proven successful with the creation of Johnny Appleseed theme marketing and the Johnny Appleseed Trail Association, Inc. (JATA). The JATA offers a higher visibility to agritourism businesses in Phillipston and Leominster.

Regional Analysis

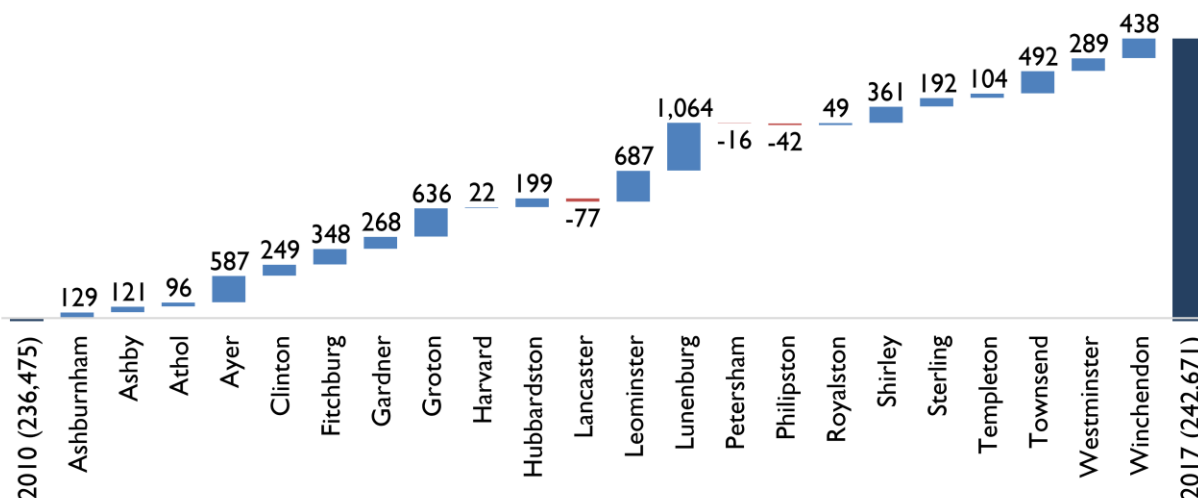
The following section identifies and highlights several key demographics that help to paint the picture that is the Montachusett Region. From a review of this information, a series of regional trends and developments are identified. These trends, combined with input from the general public and local officials, will help to establish the future growth of the Montachusett Region.



Population

The Montachusett Region witnessed a 2.6% increase in its population from 2010 to 2017, welcoming an estimated 6,196 new residents during this time (see Figure 4 -1). As of 2017, the Region boasts a population of 242,671 residents across its 22 communities.

Figure 4 - 1. Population Change in the Montachusett Region (2010 to 2017)

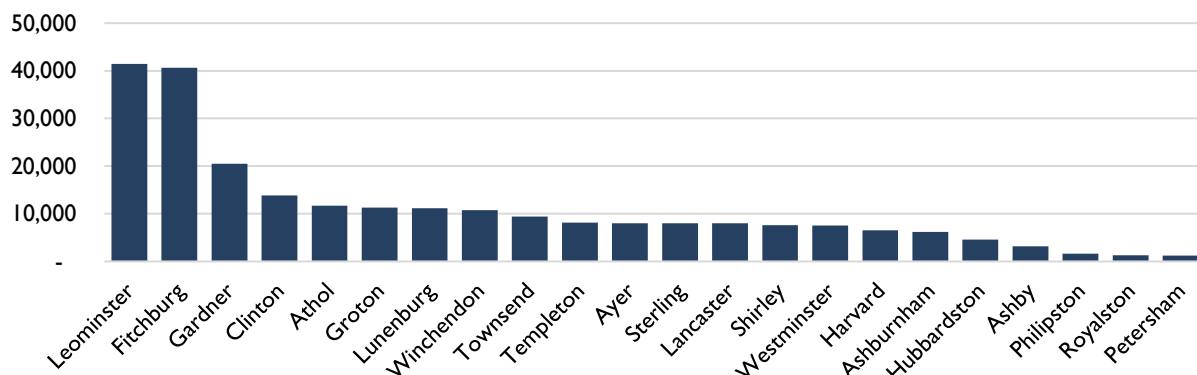


Source: US Census, American Community Survey (2013-2017) 5-Year Estimates

Lunenburg saw the largest population increase in recent years with approximately 1,064 new residents (a 10.6% increase from 2010). The majority of communities saw more modest population increases, while three communities – Lancaster, Petersham, and Phillipston – experienced a slight decline in population (-1%, -1.3%, and -2.5% respectively).



Figure 4 - 2. Population by Community



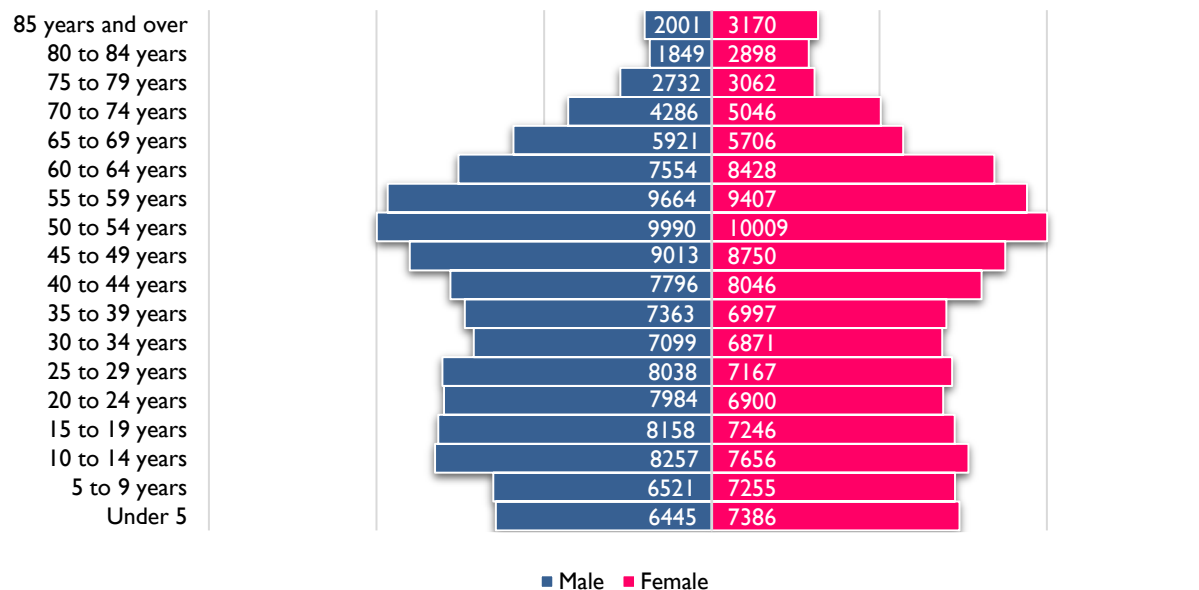
Source: American Community Survey (2013-2017) 5-Year Estimates

Age

The Montachusett Region is considerably older than the state or nation as a whole (see Figure 4 - 3), a trend that has been steadily rising in recent decades. In 2017, 19 of the Region's 22 communities had a higher median age than Massachusetts, up from just eight in 1990. According to the most recent data from the American Community Survey (ACS), nearly one-quarter (23.4%) of Montachusett residents are between the ages of 45 and 59 years old.



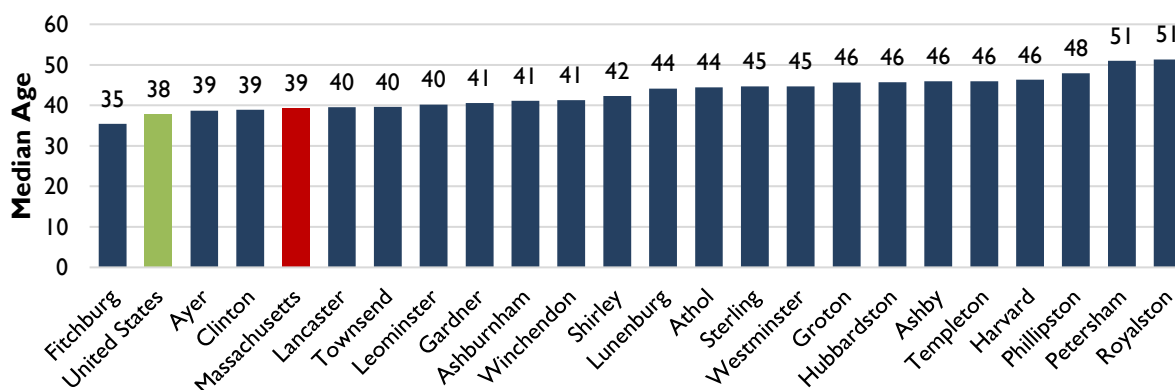
Figure 4 - 3. Age Distribution by Gender, Montachusett Region



Source: American Community Survey (2013-2017) 5-Year Estimates

The large proportion of residents nearing retirement age poses a number of planning challenges for the Region, including ensuring accessibility to health care services, public transportation, senior housing, as well as generational shifts in employment and succession in the workforce.

Figure 4 - 4. Median Age in Montachusett Communities Compared to Massachusetts and the US



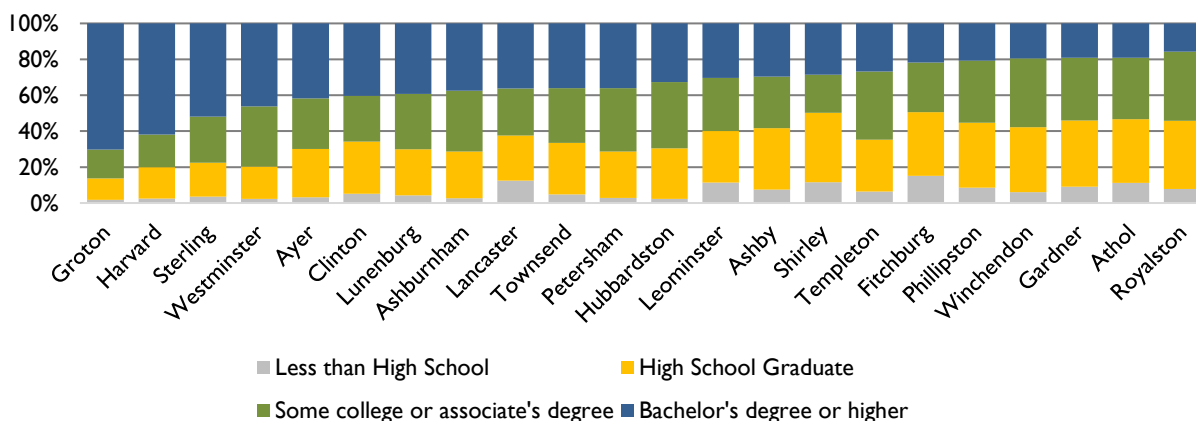
Source: American Community Survey (2013-2017) 5-Year Estimates



Educational Attainment

Montachusett communities range considerably in terms of highest level of educational attainment (see Figure 4 - 5).

Figure 4 - 5. Highest Level of Educational Attainment, Montachusett Region



Source: American Community Survey (2013-2017) 5-Year Estimates

Groton boasts the highest percentage of residents with a Bachelor's degree or higher with 70.3% of residents holding a Bachelor's or post-graduate degree (nearly 4.5 times that of Royalston).

In Table 4 - 1, we see increasing levels of educational attainment across the board for those aged 25 to 34 years old. Graduation rates between 2000 and 2017 grew for both males and females for both high school and bachelor's degrees and higher. Most significantly, we witnessed a 45% increase in the proportion of women aged 25 to 34 years old with a Bachelor's degree or higher.



Table 4 - 1. Highest Level of Educational Attainment (Aged 25 to 34 years)

Highest Level of Educational Attainment	Male		Female	
	2000	2017	2000	2017
High school degree or higher	85.3%	88.1%	90.7%	92.7%
Bachelor's degree or higher	21.2%	26.3%	27.3%	39.6%

Source: US Census, American Community Survey (2013-2017) 5-Year Estimates

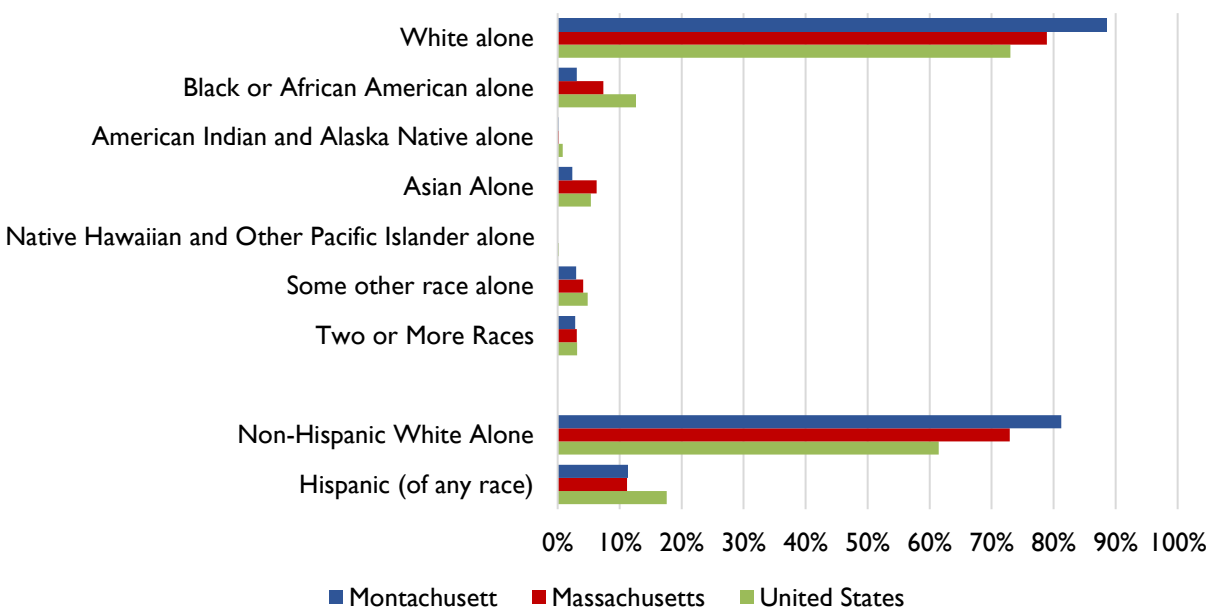
Still, educational attainment in the region remains lower than the state as a whole. In 2017, it was estimated that 92.1% of men and 94.4% of women aged 25 to 34 in Massachusetts received a high school degree or higher, while 46% and 55.8% received a bachelor's degree or higher. The trend toward having a more educated population is valuable as the economic sustainability of the region depends on ensuring a robust workforce that includes young professionals and careers to support their success.

Race

The Montachusett Region remains a predominantly white region but is trending toward increased diversity. The Region currently has a higher proportion of residents who identify as "white alone" when compared respectively to the state and nation as whole (see Figure 4 - 6).



Figure 4 - 6. Race in the Montachusett Region Compared to Massachusetts and the United States



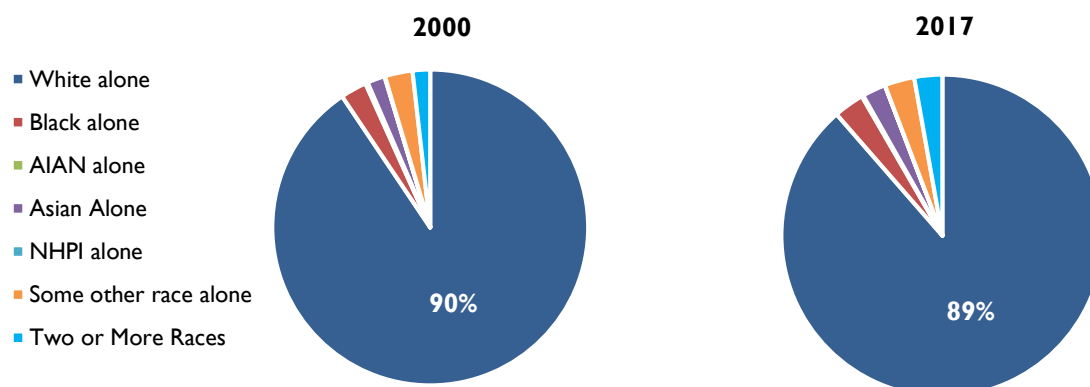
Source: American Community Survey (2013-2017) 5-Year Estimates

However, in the period between 2000 and 2017, we observed the following demographic changes as they pertain to race:

1. The number of Hispanic residents grew from 15,672 to 27,511 (+75.5%)
2. The number of residents who self-identified as Black or African American alone grew from 6,127 to 7,451 (+21.6%)
3. The number of Asian residents grew from 4,098 to 5,743 (+40.1%)
4. The number of residents who identified as two or more races increased from 4,127 to 6,828 (+65.4%)



Figure 4 - 7. Race in the Montachusett Region (2000 to 2017)



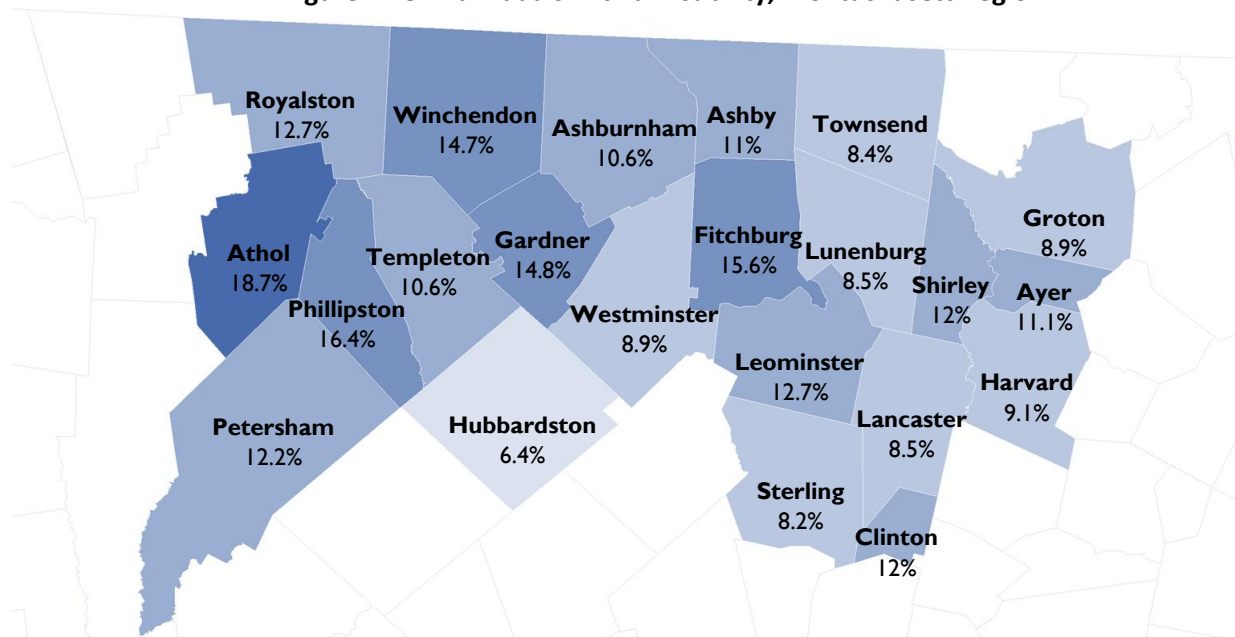
Source: US Census, American Community Survey (2013-2017) 5-Year Estimates

Disability

In Massachusetts, 11.6% of total individuals report having a disability (ACS 2017). A disability refers to difficulty hearing, vision, cognitive, ambulatory, self-care, and/or living independently. Ten Montachusett communities have a higher proportion of residents managing a disability than the state as a whole (Figure 4 - 8), with Athol, Phillipston, and Fitchburg topping the list. Among other important planning considerations, the comparatively high percentages of residents with disabilities, and a steadily aging population, emphasizes the importance of multimodal transportation access. Access to transportation services through the Montachusett Regional Transit Authority (MART) offers a vital lifeline for many to ensure equitable access to employment, education, as well as social and healthcare services.



Figure 4 - 8. Individuals with a Disability, Montachusett Region



Source: American Community Survey (2013-2017) 5-Year Estimates

MART currently offers ADA Eligible Paratransit Service to transportation-disabled individuals. Service is provided by lift-equipped vans and is available in the areas that MART provides fixed route bus service. Under the ADA regulations, there are three categories of persons who are eligible for ADA Paratransit Service:

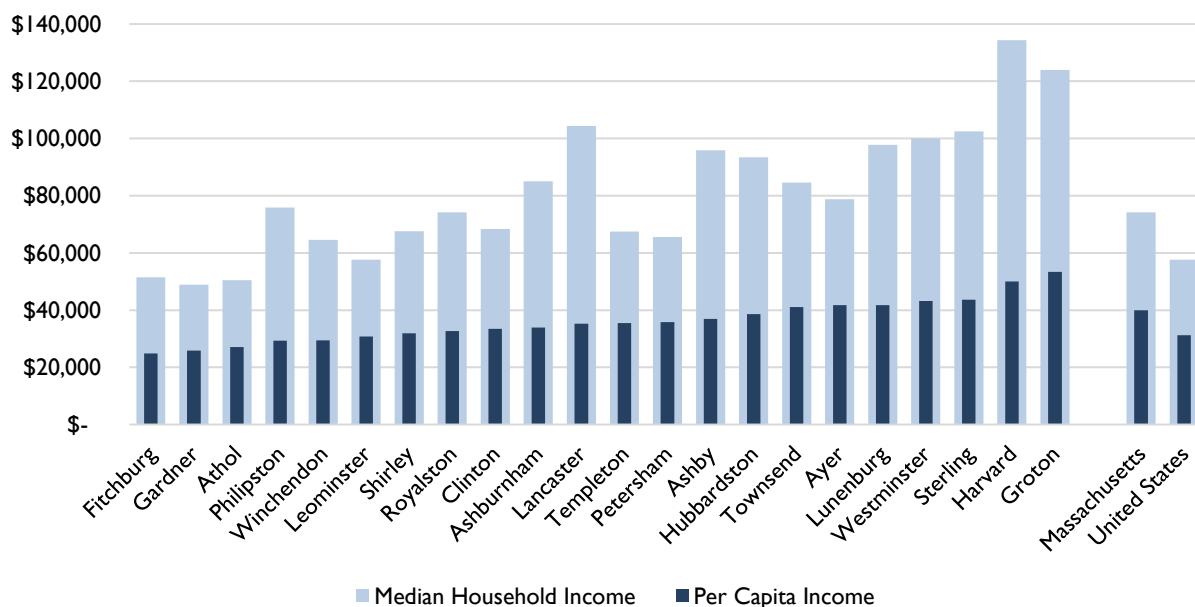
1. Is unable as a result of physical or mental impairment, to get on, ride, or get off an accessible vehicle on the public transit system: or
2. Needs the assistance of a wheelchair lift or other boarding assistance device and is able, with such assistance to get on, ride and get off an accessible vehicle, but such vehicle is not available on the route when the individual wants to travel; or
3. Has specific impairment-related condition including vision, hearing or impairments causing disorientation which prevents travel to or from a station or stop on the system.



Income

The ACS collects income and poverty data, and presents both across a range of different categories, including age, gender, race, family structure, occupation, etc. The ACS defines per capita income as the mean money income received in the past 12 months computed for every man, woman, and child in a geographic area. It is derived by dividing the total income of all people 15 years old and over in a geographic area by the total population in that area. (Note: income is not collected for people under 15 years old, even though those people are included in the denominator of per capita income. This measure is rounded to the nearest whole dollar.). In addition to per capita income, median household income is presented here in Figure 4 - 9 for each Montachusett community, as well as the state and nation.

Figure 4 - 9. Per Capita Income and Median Household Income



Source: American Community Survey (2013-2017) 5-Year Estimates

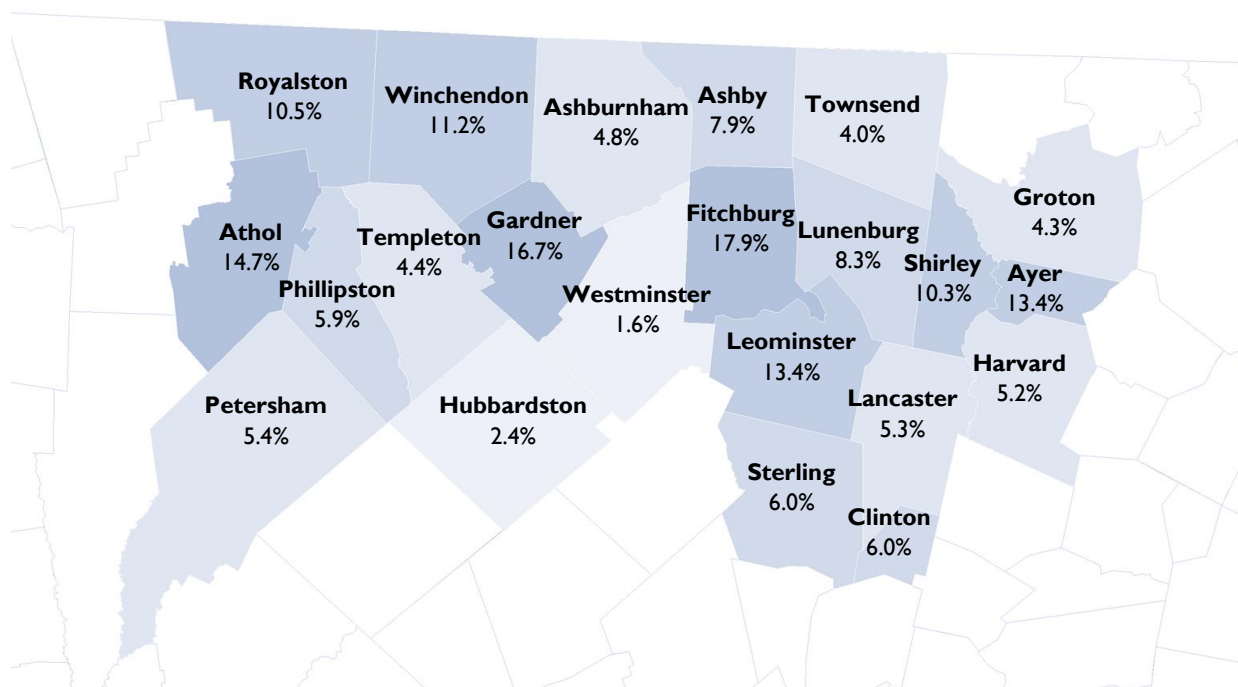
Fifteen (15) of the region's 22 communities have a lower per capita income than the state (\$39,913), while nine rank below the state when examining median household income (Figure 4 - 9).



Poverty

Poverty is calculated as a percentage of the population below the poverty threshold. The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, that family and every individual in it is considered to be in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps).

Figure 4 - 10. Individuals Living in Poverty, Montachusett Region



Source: American Community Survey (2013-2017) 5-Year Estimates

An estimated 11.1% of individuals are living in poverty within the Commonwealth of Massachusetts. Six Montachusett communities have a higher concentration of poverty than the state as a whole, with Fitchburg (17.9%), Gardner (16.7%), and Athol (14.7%) also exceeding the



national poverty rate of 14.6% (Figure 4 - 10). Between 2016 and 2017, poverty rates declined in the region at a quicker pace than both the state and nation (Table 4 - 2).

Table 4 - 2. Poverty Rates

Area	2016	2017	1-Year Change
Montachusett Region	11.9%	10.8%	-1.1%
Massachusetts	11.4%	11.1%	-0.3%
United States	15.1%	14.6%	-0.5%

Source: American Community Survey 5-Year Estimates

Title VI and Environmental Justice (EJ)

Transportation and social equity through Title VI and Environmental Justice (EJ) all play a key role in the quality of life in the region by shaping access to jobs, housing, services and recreational opportunities and is essential to addressing poverty, unemployment and other equal opportunity goals. It is based on the principle that all people have a right to be protected from harmful or burdensome investments/projects, to live in and enjoy a clean and healthful environment and ensure that these identified communities do not bear a disproportionate burden of obtrusive projects and also share in positive and beneficial investments.

Transportation and social equity are a civil and human rights priority and major goal for the Montachusett Region. It requires making investments that provide all residents - regardless of age, race, color, national origin, income or physical agility - with opportunities to work, shop, be healthy, and play.

Title VI was enacted as part of the landmark Civil Rights Act of 1964 and prohibits discrimination on the basis of race, color, sex and national origin in programs and activities receiving federal financial assistance. In 1994, Executive Order 12898 was issued by President Clinton. Its purpose



is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities. The order is also intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities' access to public information and public participation. The order also directs each agency to develop a strategy for implementing environmental justice.

Massachusetts Executive Order 552 was issued on November 25th, 2014 requiring state Secretariats to take action in promoting environmental justice (EJ). "Environmental Justice is based on the principle that all people have a right to be protected from environmental pollution, and to live in and enjoy a clean and healthful environment. Environmental justice is 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" (www.mass.gov) .

Annually, during the development of the Transportation Improvement Program (TIP) and the Unified Planning Work Program (UPWP), an analysis is conducted on projects and work tasks to assess burdens and benefits on identified Title VI and EJ communities. For these analyses, the 2013-2017 American Community Survey 5-year estimates were utilized. For some of the data, census estimates were only available at the Census Tract level. This data dealt with Foreign Born, Disabilities and Non-English Spoken at Home. The remaining census data estimates were available at the Block Group level. The tables below list the ACS data sources as well as whether they were broken down to the Census Tract or Block Group level. These tables, therefore, were used to determine Environmental Justice (EJ) and Title VI designated areas.



Table 4 - 3. ACS Table Sources

Source: 2013-2017 ACS 5-Year Estimates

By Block Group

Variable	2013-2017 ACS Table No.
Total Population	B03002
Majority Population	B03002
Poverty Determined Population	B17021
Below Poverty Population	B17021
Population 65 Years or Older Population	B09020
Median Household Income	B19013
Limited English Proficiency (LEP)	C16002
Households	

Source: 2013-2017 ACS 5-Year Estimates

By Census Tract

Variable	2013-2017 ACS Table No.
Total Population	B05002
Foreign Born	B05002
Individuals with Disabilities	S1810
Percent Household Limited English Proficiency (LEP)	S1602
Percent Language Spoken at Home – Non-English	DP02

Environmental Justice (EJ) and Title VI populations are defined differently by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA). In addition, EJ analysis is based on different criteria, ex. poverty based on the statewide median income rather than the regional median income. The tables below define the Title VI and EJ criteria utilized in the regional analysis.

Table 4 - 4. Environmental Justice and Title VI Definitions for Analysis

Environmental Justice Block Groups	Analysis Criteria
1. Block group whose annual median household income is equal to or less than 65 percent (%) of the statewide median (\$74,167 in 2017);	Statewide Median Income: \$74,167 65% of Median Household Income: \$48,209 Geography: Block Group
2. Twenty-five percent (25%) or more of the residents identifying as minority;	Minority Population Equal or Greater Than 25% Geography: Block Group
3. Twenty-five percent (25%) or more of the households having no one over the age of 14 who speaks English as their primary language or have a limited ability to read, speak, write, or understand English - Limited English Proficiency (LEP).	Limited English Proficiency Equal or Greater Than 25% Geography: Block Group

FTA Title VI Communities	Analysis Criteria
1. Minority – Percent of population including Hispanic or Latino of any race that is considered non-white and is higher than the regional average	Regional Average: 12.24% Geography: Block Group
2. Low Income - Percent estimated below poverty level that is higher than the regional average	Regional Average: 10.85% Geography: Block Group



FHWA Title VI Communities	Analysis Criteria
1. Elderly – Percent of Total Population > 65 that is higher than the regional average	Regional Average: 15.11% Geography: Block Group
2. Individuals with Disabilities – Percent of population with a disability that is higher than the regional average	Regional Average: 12.03% Geography: Census Tract
3. Minority – Percent of population including Hispanic or Latino of any race that is considered non-white and is higher than the regional average	Regional Average: 12.24% Geography: Block Group
4. Foreign Born – Percent of population that is Foreign Born and is higher than the regional average	Regional Average: 8.12% Geography: Census Tract
5. Language – Percent of Population Spoken Language Other than English that is higher than the regional average	Regional Average: 14.42% Geography: Census Tract

Table 4 - 5 summarizes the populations for the Montachusett Region as a whole for the defined Title VI and EJ communities.

Table 4 - 5. Title VI and EJ Populations – Montachusett Region

		EJ Block Groups			FTA Title VI Block Groups		FHWA Title VI Block Groups		FHWA Title VI Census Tracts		
		Income	Minority	LEP HH	Minority	Low Income	Elderly	Minority	Disabilities	Foreign Born	Language
1	Total Regional Population	242,671	242,671	91,041 (HH)	242,671	233,995	242,671	242,671	242,671	242,671	242,671
2	Total Regional EJ/Title VI Population	N/A	29,695	2,322 (HH)	29,695	25,377	36,671	29,695	29,194	19,710	34,985
3	Percent of Total Regional EJ/Title VI Population vs. Total Regional Population	N/A	12.24%	2.55%	12.24%	10.85%	15.11%	12.24%	12.03%	8.12%	14.42%

NOTE: Figures listed as N/A due to the different criteria used by FTA and FHWA to define Low Income populations. Thus, a specific count cannot be calculated. The FTA definition is based on a regional average while FHWA is based on the statewide median income.

Housing Characteristics

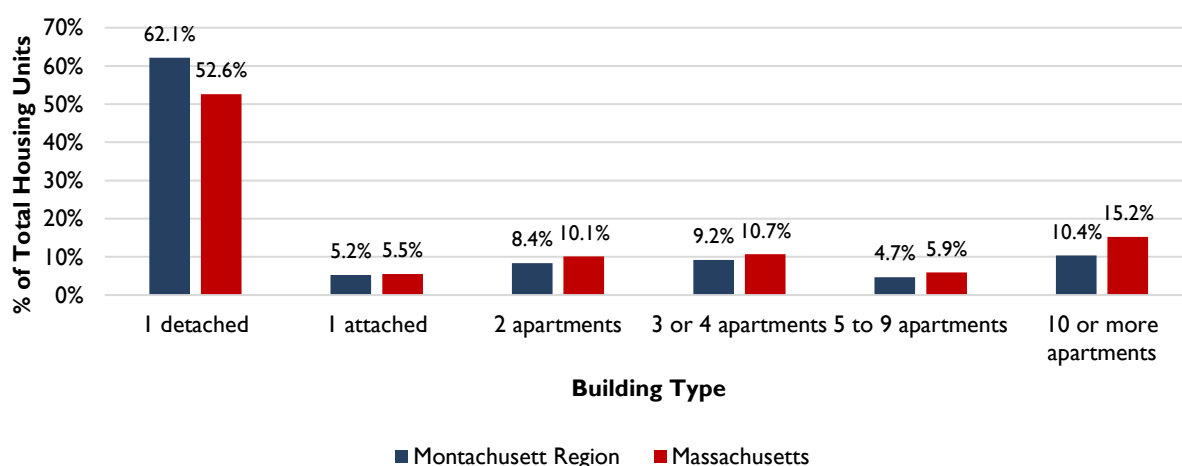
To serve their aging populations as well as attract young professionals and working families, Montachusett communities will need to offer a variety of housing options. For many individuals, housing needs changes over a lifetime as household size and income decreases. Ensuring



available housing near importance services (e.g. healthcare facilities, public transit, grocery stores) becomes more important as the ability and willingness to drive may decrease as well. Balancing the housing needs of seniors, students, and working families and individuals of all ages represents an ongoing challenge for each of our 22 communities.

Like the state as a whole – but to an even further degree – the majority of housing units in the Montachusett Region are single detached units (Figure 4 - 11).

Figure 4 - 11. Housing Units by Building Type

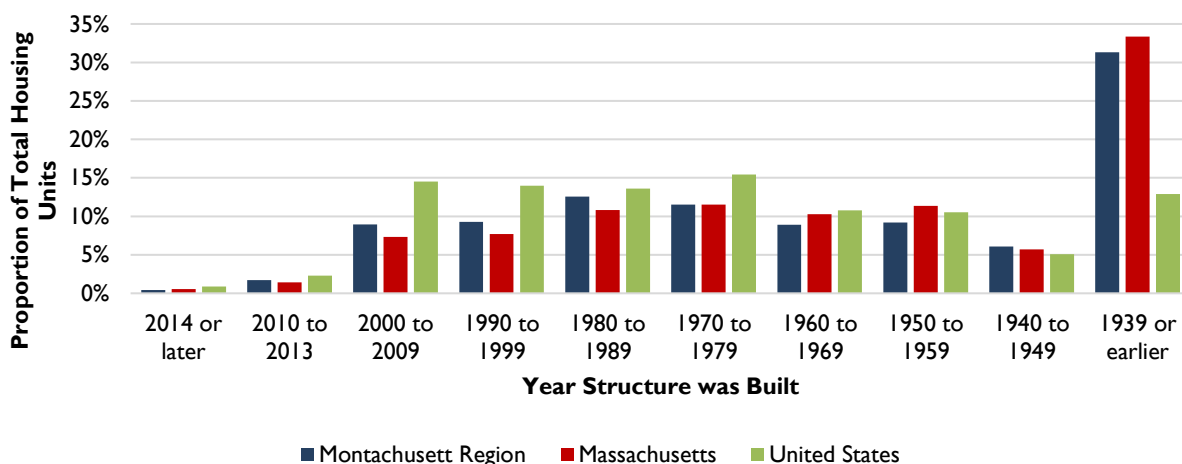


Source: American Community Survey (2013-2017) 5-Year Estimates

The ages of homes in the Montachusett Region are akin to much of New England, with nearly a third of all homes having been built prior to the second World War (Figure 4 - 12). All homes built prior to 1978 (when lead-based house paint was discontinued in the United States) are likely to contain some levels of lead. Today, the Massachusetts Lead Law requires the removal or covering of lead paint hazards in homes built before 1978 where any children under six live, regardless of their blood lead level.



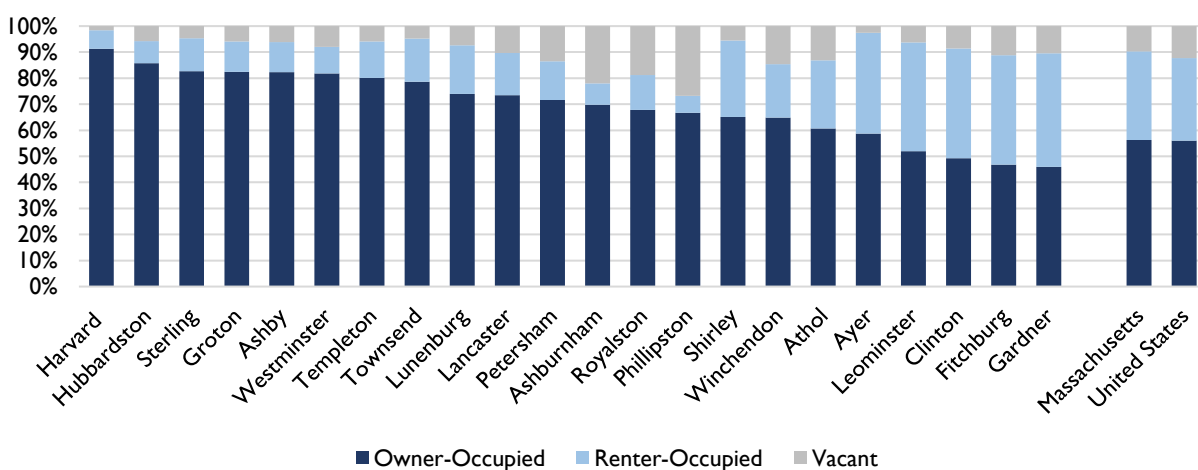
Figure 4 - 12. Proportion of Total Housing Units by Year Structure Was Built



Source: American Community Survey (2013-2017) 5-Year Estimates

Housing occupancy is highly variable between communities in the region (Figure 4 - 13), with homeowner occupancy ranging from as high as 91% in Harvard to as low as 46% in Gardner (compared to 56% in both the state and the nation).

Figure 4 - 13. Housing Occupancy Status

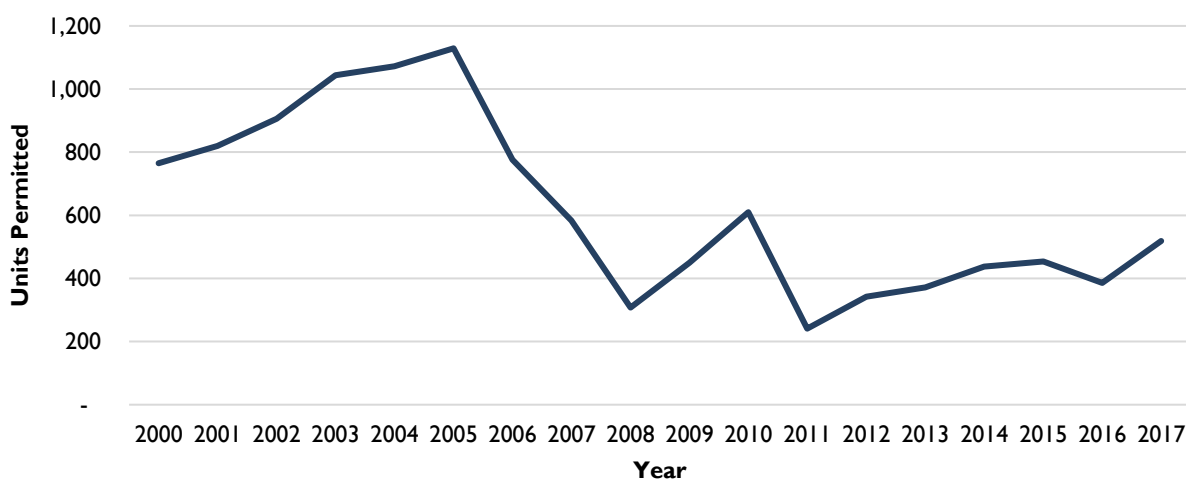


Source: American Community Survey (2013-2017) 5-Year Estimates



In 2010, the region witnessed a spike in housing production which helped break the trend of declining construction which began in 2005 (Figure 4 - 14).

Figure 4 - 14. Number of Housing Units Permitted in the Montachusett Region (2000 to 2017)



Source: US Census Bureau – Annual Building Permit Survey

More than half of the building units permitted in 2010 were concentrated in the community of Lunenburg who supported the production of 308 units that year (of the total 610 in the entire region), including seven housing complexes with an estimated 186 total housing units.

It is generally accepted that a household can afford a home valued up to 30% of the household's annual income before becoming "cost burdened". Those households who pay a higher percentage of their income on housing may – according to the US Department of Housing and Urban Development – "have difficulty affording necessities such as food, clothing, transportation, and medical care". An estimated 19,464 owner-occupied households and 12,866 renter-occupied households are cost burdened throughout the Montachusett Region (Table 4 - 6).



Table 4 - 6. Cost Burden Severity by Community and Housing Occupancy

Community	Number of owner-occupied households that are cost burdened	% of owner-occupied households that are cost burdened	Number of renter-occupied households that are cost burdened	% of renter-occupied households that are cost burdened
Ashburnham	762	38.3	32	26.2
Ashby	352	35.1	23	42.6
Athol	927	27.8	634	52.5
Ayer	621	33.6	689	51.2
Clinton	1,132	32.2	911	42.3
Fitchburg	3,016	35.8	3,433	56.4
Gardner	1,480	34.1	1,464	43.8
Groton	908	27.1	121	26.8
Harvard	499	28.5	65	55.6
Hubbardston	314	23.1	135	93.1
Lancaster	578	29.6	168	47.6
Leominster	2,945	31.8	3,466	48.9
Lunenburg	1,144	32.5	280	46.7
Petersham	121	30	25	54.4
Phillipston	151	25.9	5	100
Royalston	107	26.8	15	32.6
Shirley	636	42.2	275	41.9
Sterling	709	28.9	205	71.9
Templeton	602	25.6	173	41.1
Townsend	792	29.4	238	41.4
Westminster	775	31.9	114	33.8
Winchendon	893	30.2	395	42.1

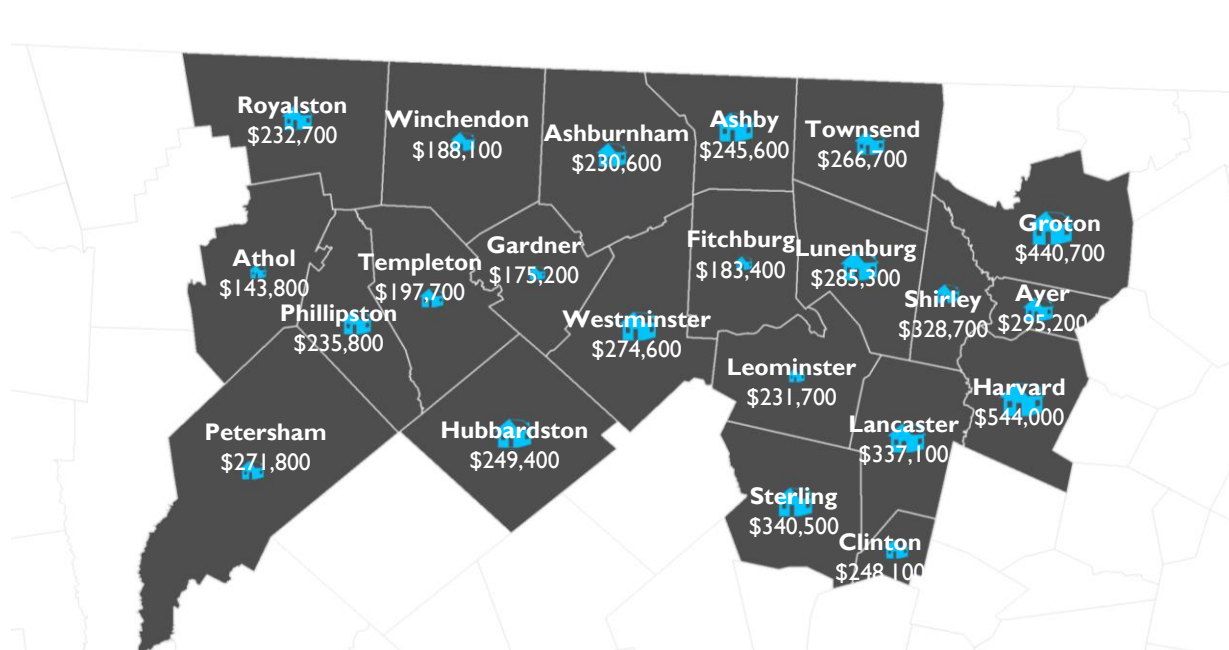
Source: Housing.MA

Almost twenty-eight percent (27.9%) of owner-occupied households are considered cost-burdened throughout Massachusetts; all but six communities in the Montachusett region exceed this figure. Although fewer total renters experience being cost burdened when compared to homeowners, their rate of burden is significantly higher. Specifically, 47.4% of renter-occupied households spend more than 30% of their income on living expenses across the state, while 10 of 22 Montachusett communities exceed this rate.

Another indicator of housing affordability is the median home value of the region. As a general trend, housing values are highest along the eastern edge of the Montachusett Region in those communities with greatest accessibility to Boston and major employment centers (Figure 4 - 15).



Figure 4 - 15. Median Household Value for Owner-Occupied Households

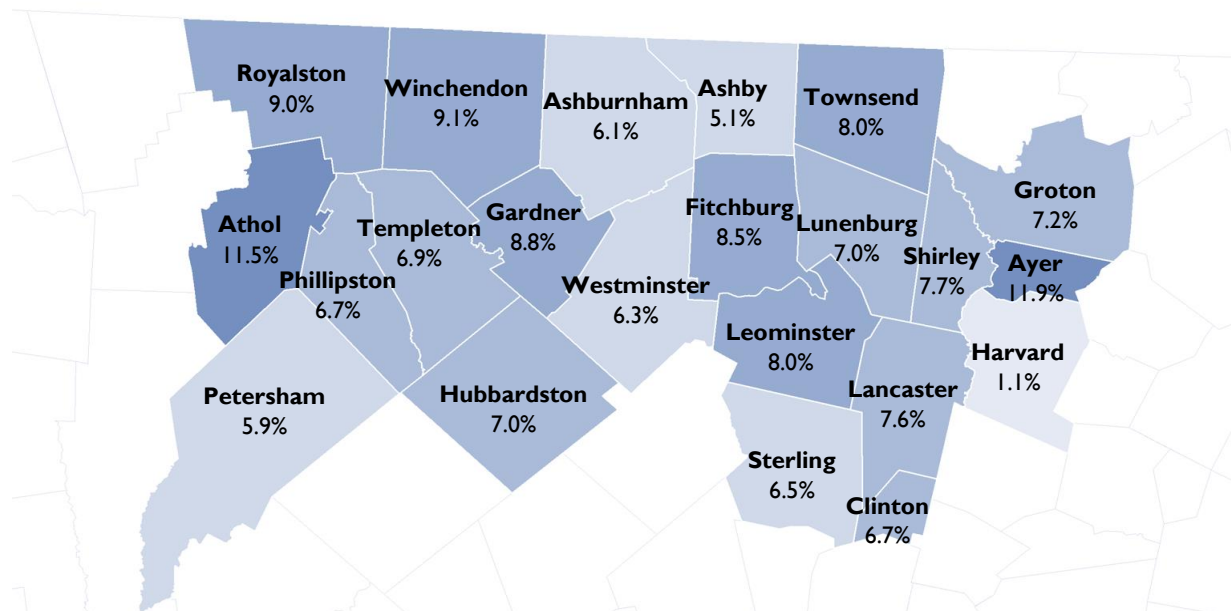


Source: American Community Survey (2013-2017) 5-Year Estimates

To project future household values, Zillow.com compiles the past six years of home sales data and forecasts ahead a single year (Figure 4 - 16). Housing values are projected to increase in every Montachusett community over the next year; in particular, Ayer (11.9%) and Athol (11.5%) are expected to see dramatic changes in their housing markets in the near future.



Figure 4 - 16. One-Year Household Value Projections



Source: Zillow Research 2019

Labor Force and Employment

Labor force and employment data were collected and compared across multiple sources, including American Community Survey estimates, ESRI's Business Analyst Online (BAO), and Massachusetts Office of Labor and Workforce Development. Overall, despite significant disruptions since before 2000, manufacturing remains the largest (NAICS 2-digit) employment sector in the region (17% of total employees) and integral to the economic health of many communities.



Table 4 - 7. Businesses and Employment by Industry (ESRI BAO 2019)

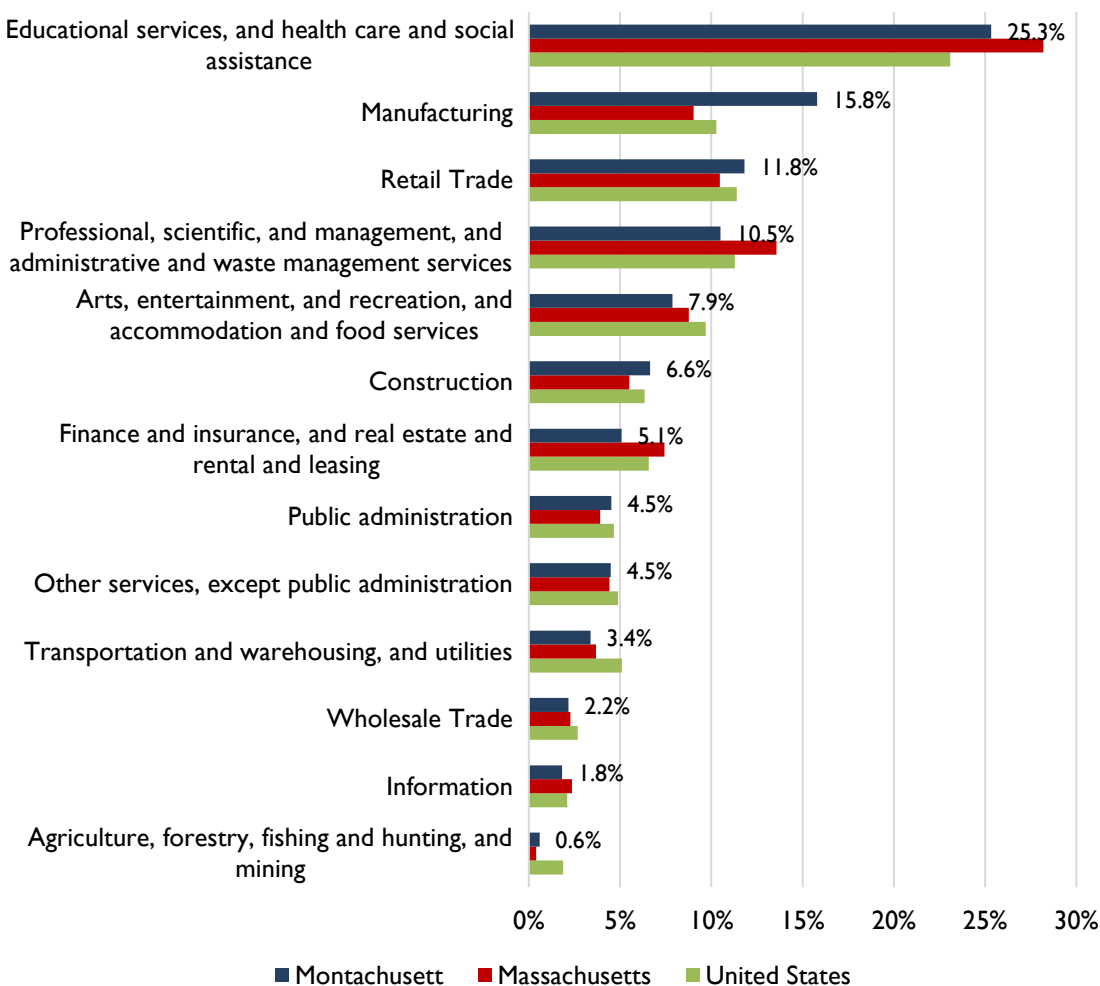
Industry By NAICS Codes	Businesses		Employees	
	Number	Percent	Number	Percent
Manufacturing	450	5.3%	16,175	17.0%
Health Care & Social Assistance	635	7.4%	13,826	14.5%
Retail Trade	1,155	13.5%	12,577	13.2%
Educational Services	273	3.2%	9,688	10.2%
Accommodation & Food Services	510	6.0%	8,192	8.6%
Public Administration	533	6.2%	5,808	6.1%
Other Services (except Public Administration)	1,316	15.4%	5,240	5.5%
Wholesale Trade	342	4.0%	4,924	5.2%
Construction	797	9.3%	3,910	4.1%
Professional, Scientific & Tech Services	611	7.1%	3,167	3.3%
Finance & Insurance	274	3.2%	2,228	2.3%
Transportation & Warehousing	155	1.8%	1,931	2.0%
Administrative & Support & Waste Management & Remediation Services	309	3.6%	1,850	1.9%
Real Estate, Rental & Leasing	389	4.5%	1,806	1.9%
Information	181	2.1%	1,514	1.6%
Arts, Entertainment & Recreation	149	1.7%	1,237	1.3%
Agriculture, Forestry, Fishing & Hunting	60	0.7%	297	0.3%
Utilities	25	0.3%	287	0.3%
Management of Companies & Enterprises	9	0.1%	227	0.2%
Unclassified Establishments	369	4.3%	154	0.2%
Mining	9	0.1%	104	0.1%
Total	8,551	100.0%	95,142	100.0%

Source: ESRI Business Analyst Online (BAO) 2019

When aggregated (as is done for the American Community Survey estimates), educational services, and health care and social assistance together represent the largest employing industry in the Montachusett Region, as we see in the state and nation as a whole.



Figure 4 - 17. Employment by Industry

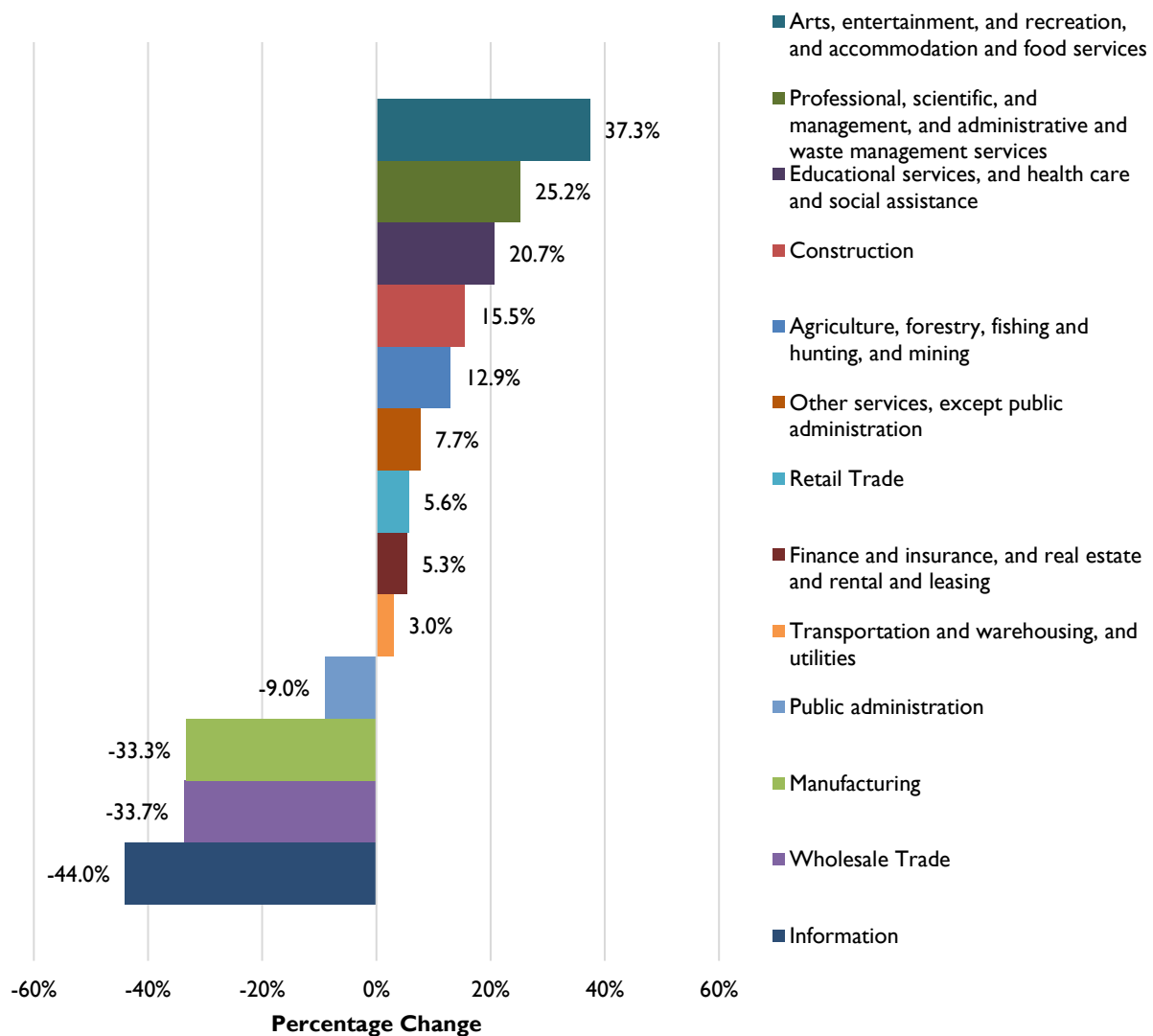


Source: American Community Survey (2013-2017) 5-Year Estimates

The level of manufacturing-based employment – despite declines in recent decades – continues to dwarf that of both the state and country. While efforts continue toward diversifying the regional economy into other growing sectors of the economy, including service sectors, the region’s comparative advantage of an experienced manufacturing workforce and legacy industrial space will ensure manufacturing is maintained as a cornerstone in the region’s economy.



Figure 4 - 18. Shift in Employment by Industry as a Share of the Regional Economy, Montachusett Region (2000 to 2017)



Source: US Census, American Community Survey (2013-2017) 5-Year Estimates

Between 2000 and 2017, the region witnessed some notable shifts in the total employment share by each industry. Arts, entertainment, and recreation, and accommodation and food services – although still modest in its total employment, with 9,544 jobs in 2017 – has increased its share of total employment in the region by 37.3% since 2000. Other industries which witness such a boost included professional, scientific, and management, and administrative and waste management services (25.2%); educational services, and health care and social assistance (20.7%); and construction (15.5%).



While the greatest declines in total employment share occurred in the information (-44%) and wholesale trade (-33.7%) sectors, together these sectors are responsible for less than 4% of jobs in the region in 2017. Manufacturing, on the other hand, accounts for an estimated 15.8% of the region's employment and is down from 23.7% in 2000 (and a net loss of 7,063 jobs during that time).

According to the Massachusetts Executive Office of Labor and Workforce Development, the fastest growing occupation in the Montachusett Region is heating, air conditioning, and refrigeration mechanics and installers (see Table 4 - 8). Home health aides and personal care aides are also going to be needed in higher supply to help continue to meet the care needs of the region's growing senior population.

Table 4 - 8. Fifteen (15) Fastest Growing Occupations in the Montachusett Region

Title	Employees 2016	Projected Employees 2026	Numeric Change	Percent Change	2017 Mean Annual OES Wage
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	122	156	34	27.9%	\$50,272
Home Health Aides	232	292	60	25.9%	\$30,609
Personal Care Aides	1,924	2,404	480	24.9%	\$28,198
Software Developers, Applications	210	252	42	20.0%	\$95,582
Nonfarm Animal Caretakers	210	252	42	20.0%	\$27,317
Market Research Analysts and Marketing Specialists	179	213	34	19.0%	\$62,777
Mental Health and Substance Abuse Social Workers	180	214	34	18.9%	\$36,639
Combined Food Preparation and Serving Workers, Including Fast Food	1,020	1,205	185	18.1%	\$25,361
Financial Managers	296	345	49	16.6%	\$93,419
Farmers, Ranchers, and Other Agricultural Managers	244	284	40	16.4%	—
Plumbers, Pipefitters, and Steamfitters	300	346	46	15.3%	\$63,347
Self-Enrichment Education Teachers	128	147	19	14.8%	\$39,451
Nurse Practitioners	161	184	23	14.3%	\$128,176
Residential Advisors	352	399	47	13.4%	\$31,980
Loan Officers	750	842	92	12.3%	\$84,574

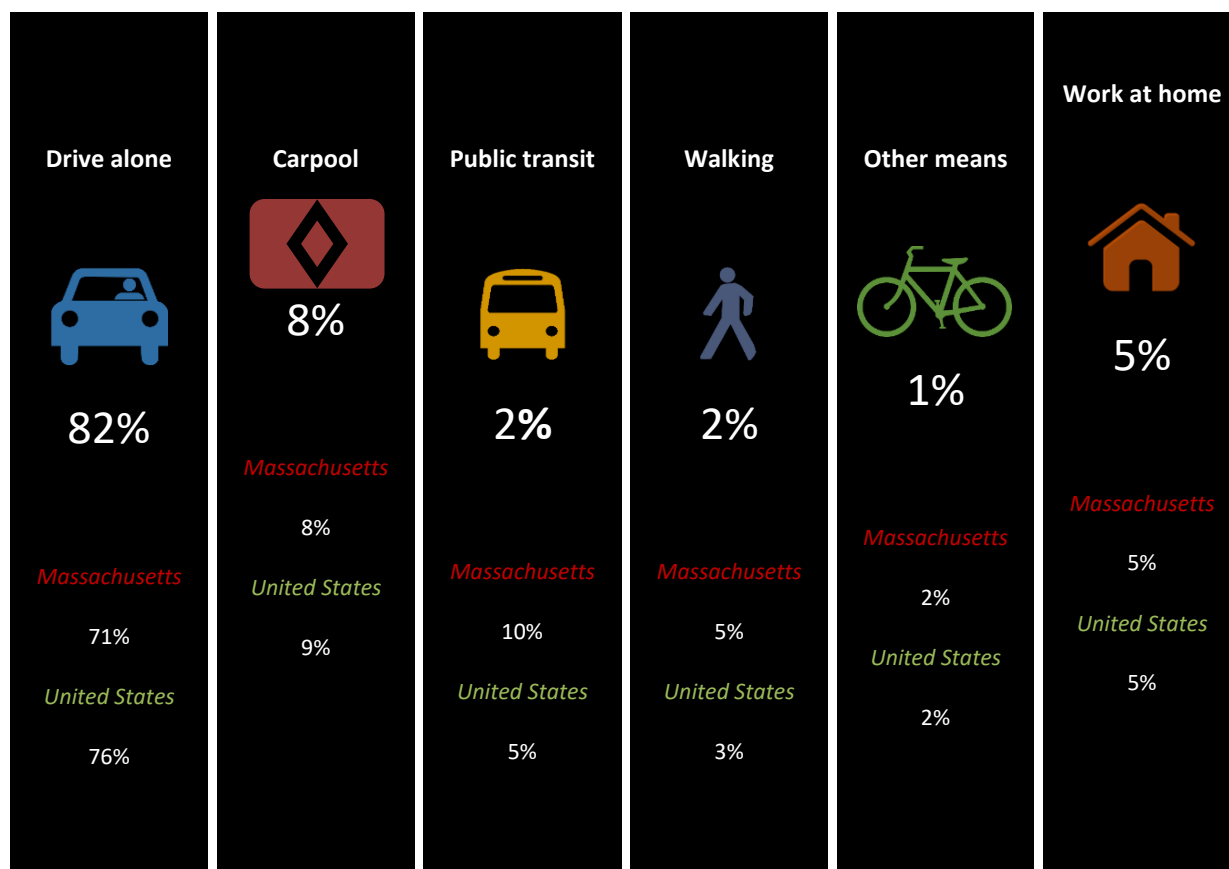
Source: Massachusetts Executive Office of Labor and Workforce Development 2018



Travel Means & Times

This section provides commuting information for workers aged 16 or over. This data comes from the American Community Survey (ACS) from the US Census Bureau.

Figure 4 - 19. Means of Travel to Work, Montachusett Region

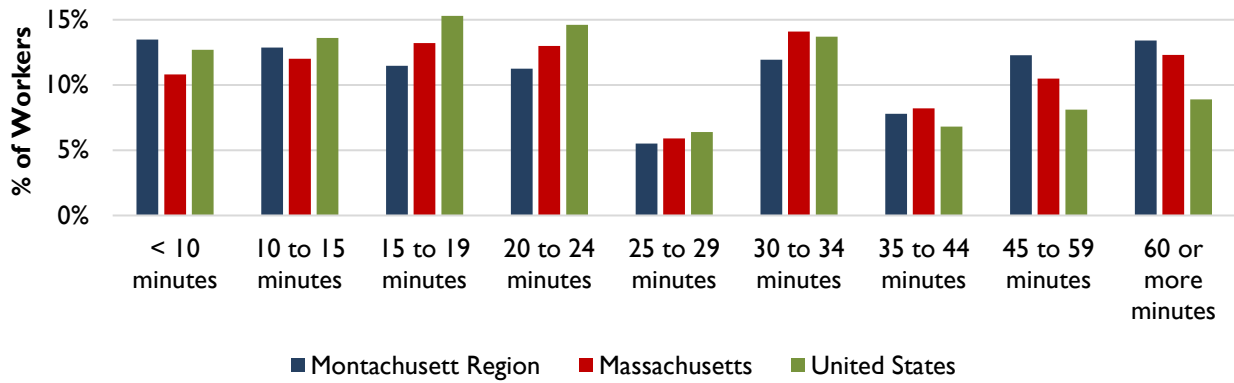


Source: American Community Survey (2013-2017) 5-Year Estimates

Montachusett Region commuters are more auto-reliant for than the state or nation, with 90% of workers either driving alone or carpooling to work (compared to 78% of workers in Massachusetts, and 85% of workers in the country). We also recognize Montachusett residents are significantly less reliant upon public transit and a few residents are able to walk to their place of employment.



Figure 4 - 20. Travel Time to Work

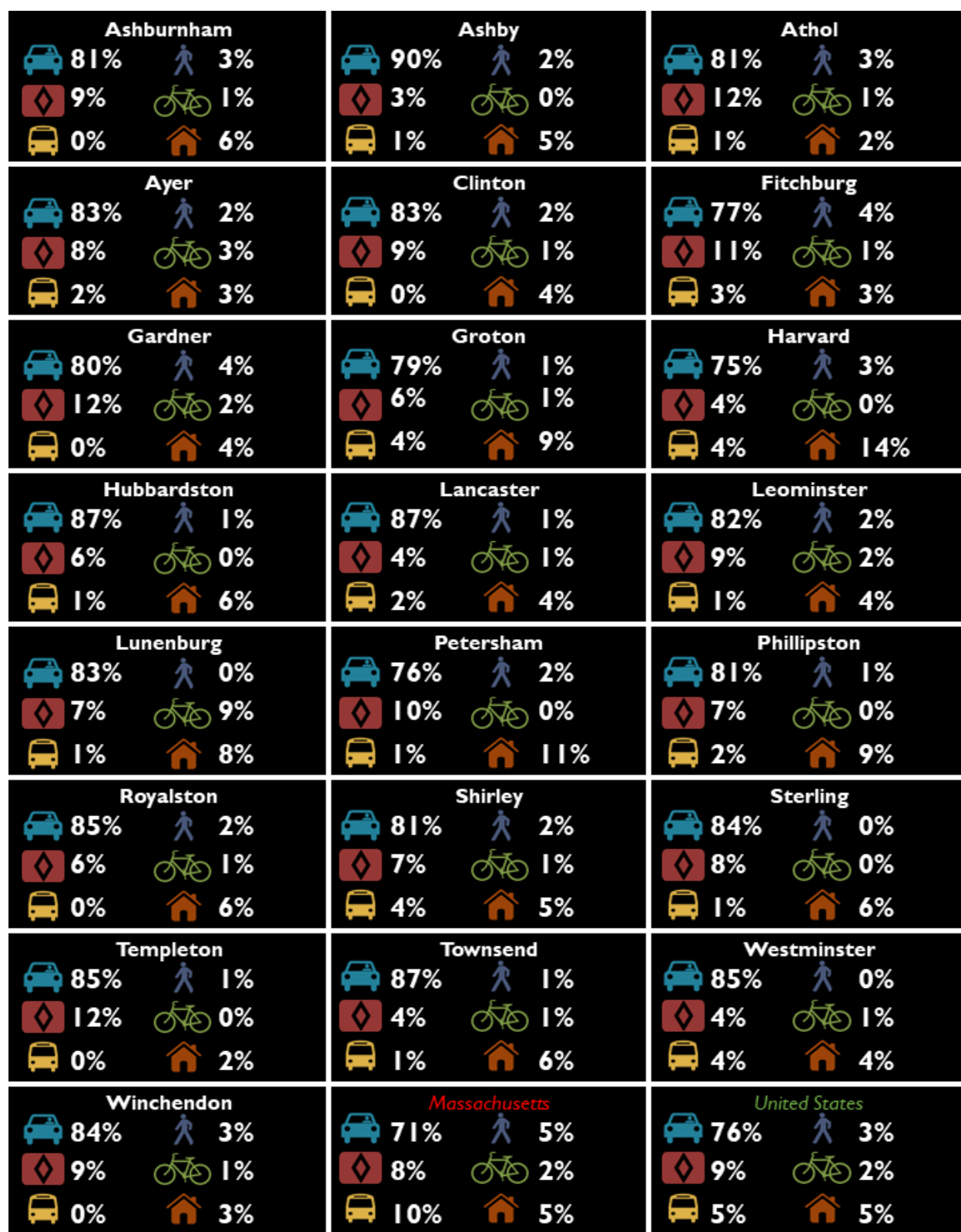


Source: American Community Survey (2013-2017) 5-Year Estimates

Interestingly, a higher proportion of Montachusett residents have *both* less than a 10-minute and more than a 45-minute commute to their place of employment when compared to Massachusetts and the US.



Figure 4 - 21. Means of Travel to Work by Community



Source: American Community Survey (2013-2017) 5-Year Estimates



PROJECTIONS FOR THE MONTACHUSETT REGION

MassDOT worked with the UMass Donahue Institute (UMDI) to update and revised population, households and employment projections for the Commonwealth's MPOs for use in their 2020 RTP and the Statewide Transportation Planning Model developed and run by Central Transportation Planning Staff (CTPS) of the Boston Region MPO. Working with a Projection Advisory Committee that included UMDI, MassDOT, CTPS and the state's Regional Planning Agencies (RPAs), these projections were developed over a series of months.

As stated by UMDI in their report, *Massachusetts Population Projections by Regional Planning Area, Projections Methodology*:

"It is important to note that modeled projections cannot and do not purport to predict the future, but rather may serve as points of reference for planners and researchers. Like all forecasts, the UMDI projections rely upon assumptions about future trends based on past and present trends which may or may not actually persist into the future. It is also a demographically-based model, assuming that population change is driven by births, deaths, and the persistence of historic migration rates into the future."

For a more detailed discussion regarding the development and methodology employed by UMDI to develop these demographic projections, please contact the MRPC.

Methodology

The following summarizes the methodology employed by UMDI and reviewed by the Projections Advisory Committee. It is derived from a presentation conducted by UMDI entitled "Long-Term Population Projections for Massachusetts Regions - Method Overview, Recent Updates, and the Components of Change in Massachusetts, September 2018."

The following steps were conducted:

1. Massachusetts Population Growth
2. Population Projections Method Overview

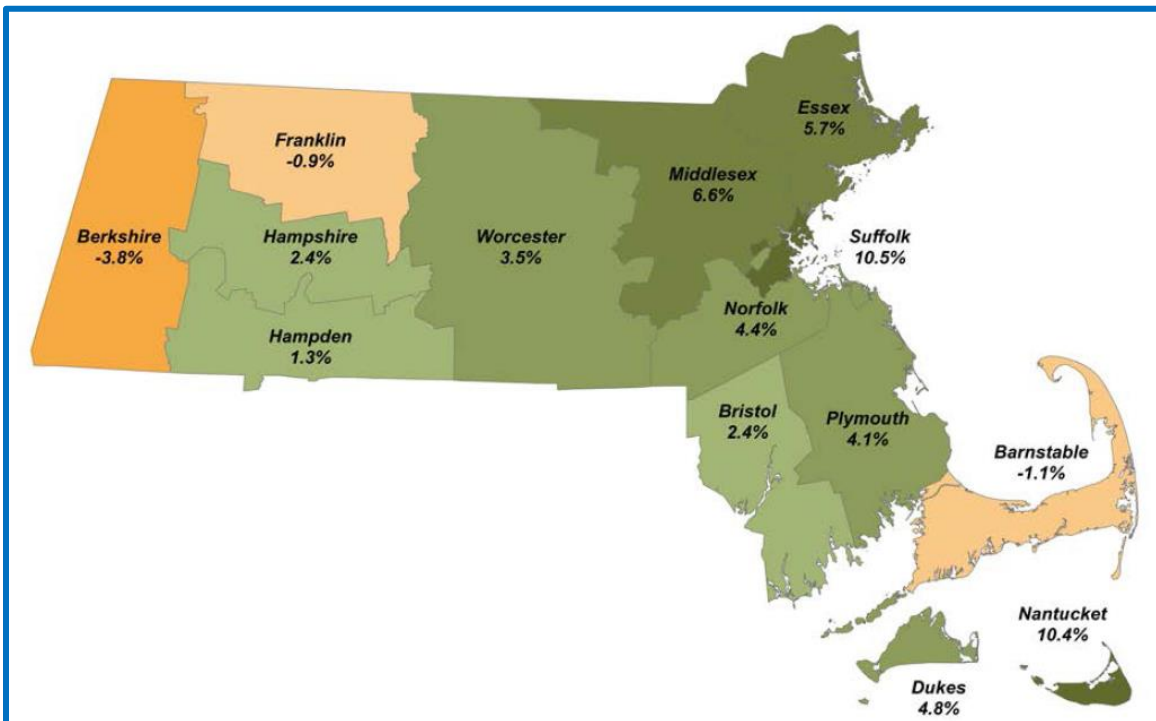


3. Updating the Model
4. Results by MPO Region
5. Regional Variation
6. Statewide Results Summary

Massachusetts Population Growth Snapshot

- Massachusetts has been growing twice as fast this decade compared to last.
 - 0.3% average annual growth between 2000 and 2010
 - 0.7% average annual growth between 2010 and today
- From 2000 to 2010, Massachusetts population increased by 198,516 –or 3.1% total.
- Since Census 2010, Massachusetts population has already increased by 312,011, or 4.8% cumulatively.

Figure 4 - 22. Estimated Percent Change in Population by Massachusetts County April 1, 2010 to July 1, 2017



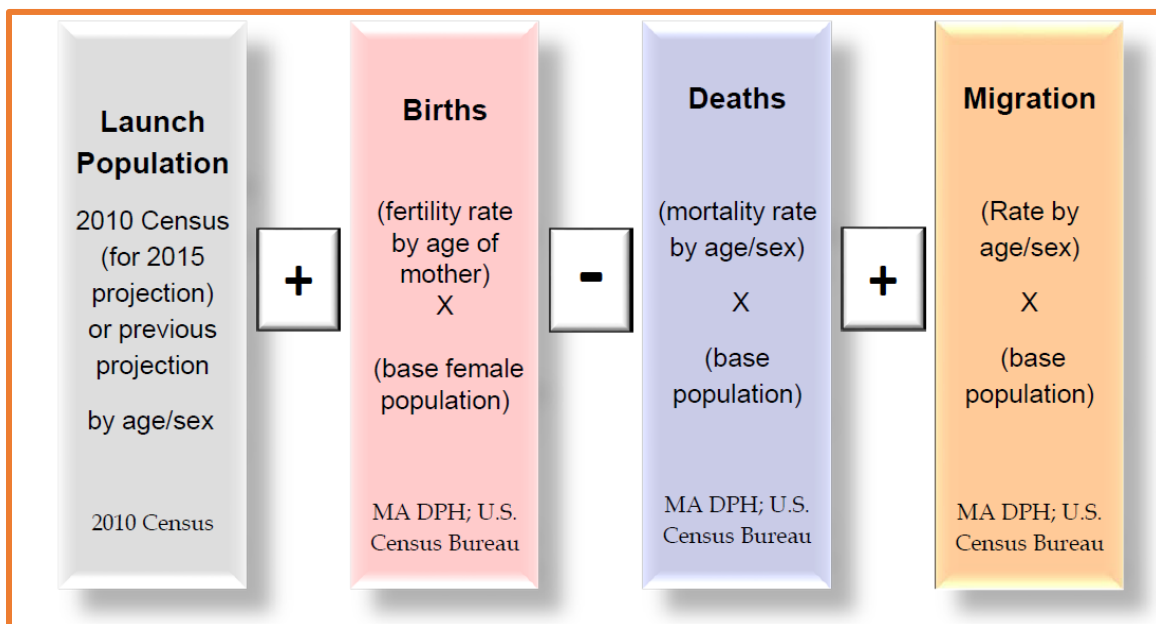
Source: Long-Term Population Projections for Massachusetts Regions, UMDI



Population Projections Method Overview

- Cohort-Component Method
 - A demographic accounting framework for modelling population change
 - For each age/sex/geography cohort:

Figure 4 - 23. Cohort Projection Methodology

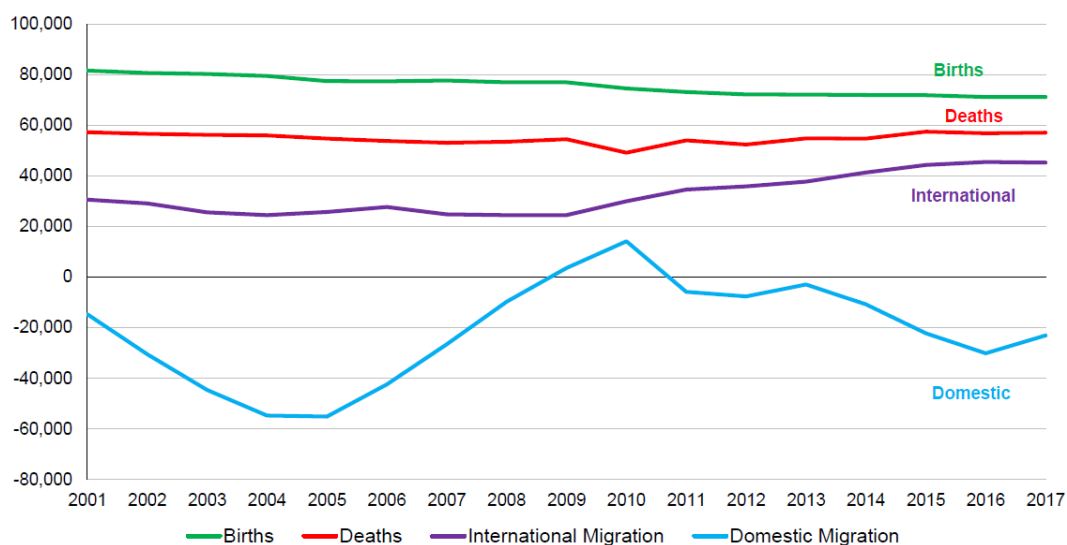


“Cohort” refers to age/sex group for a particular geography, for example, the number of 5-9 year old females in Cambridge.

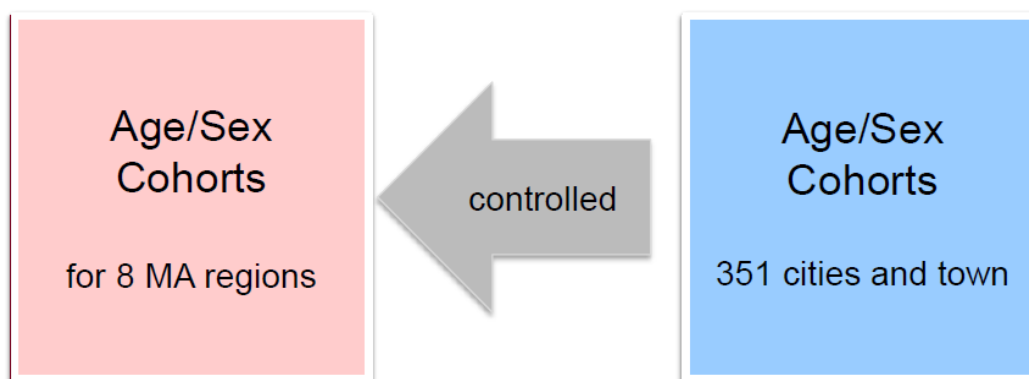
- Components of Change



Figure 4 - 24. Massachusetts Components of Change 2000-2017



- Method Overview
 - Population projections developed at 2 levels



- Both levels are estimated using a *cohort component* approach.
- Difference is in how migration is modelled.

Population Projections Method Overview

- Updates to UMDI V2015 Population Projections
 - **Reset the 2015 launch populations** to align with Census Bureau's 2017 released population estimates by age/sex/county for 2015



- **Fertility rates:** Updated regional rates-by-age according to percentage change observed in state rates-by-age from old period (2005-2009) to latest period (2011-2015)
- **Death rates:** Updated regional rates-by-age according to percentage change observed in state rates-by-age from old period (2005-2009) to latest period (2011-2015)
- **Migration:** In and out migration rates by UMDI region maintained from 2005-2011 ACS data, with 2015 launch refreshed. (Because of issues with new MIGPUMA boundaries).

Results by MPO Region

Figure 4 - 25. Population Change by RPA Region 2010-2020

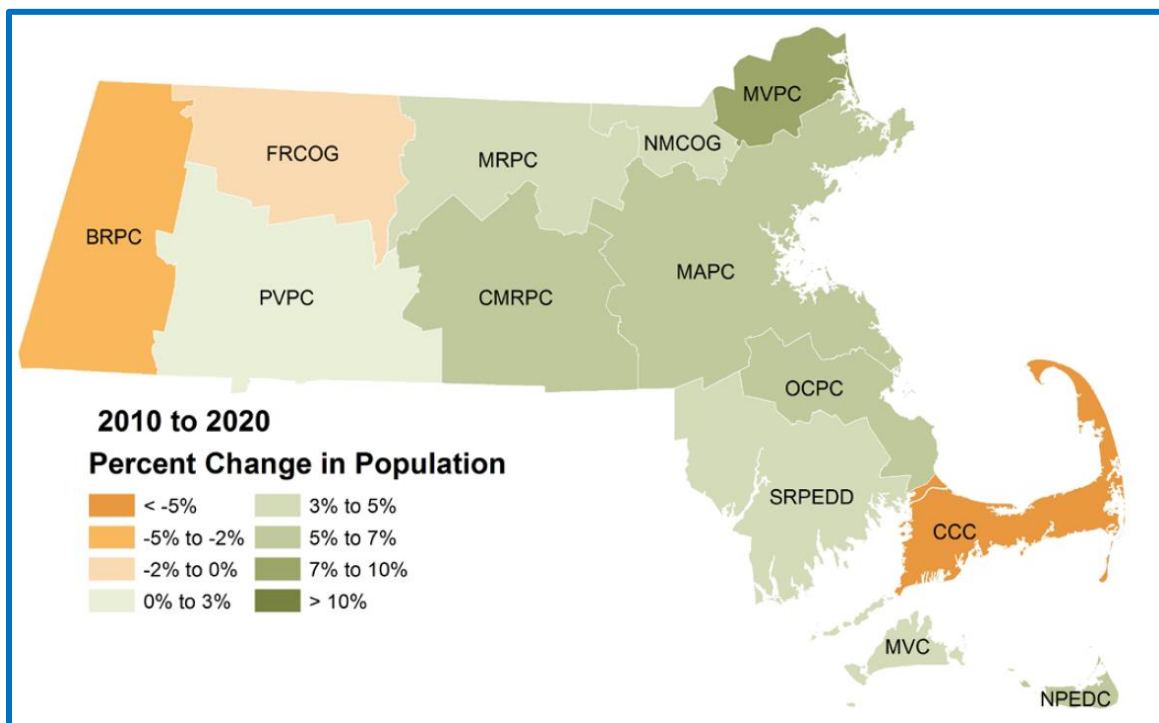




Figure 4 - 26. Population Change by RPA Region 2020-2030

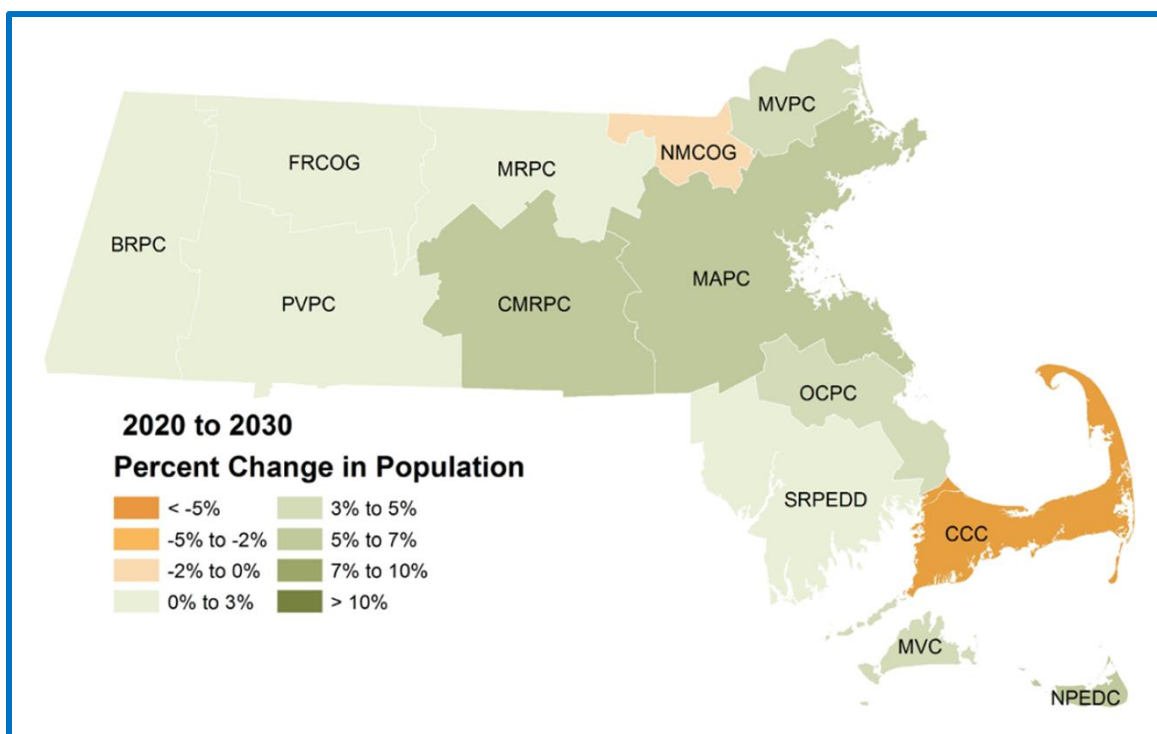
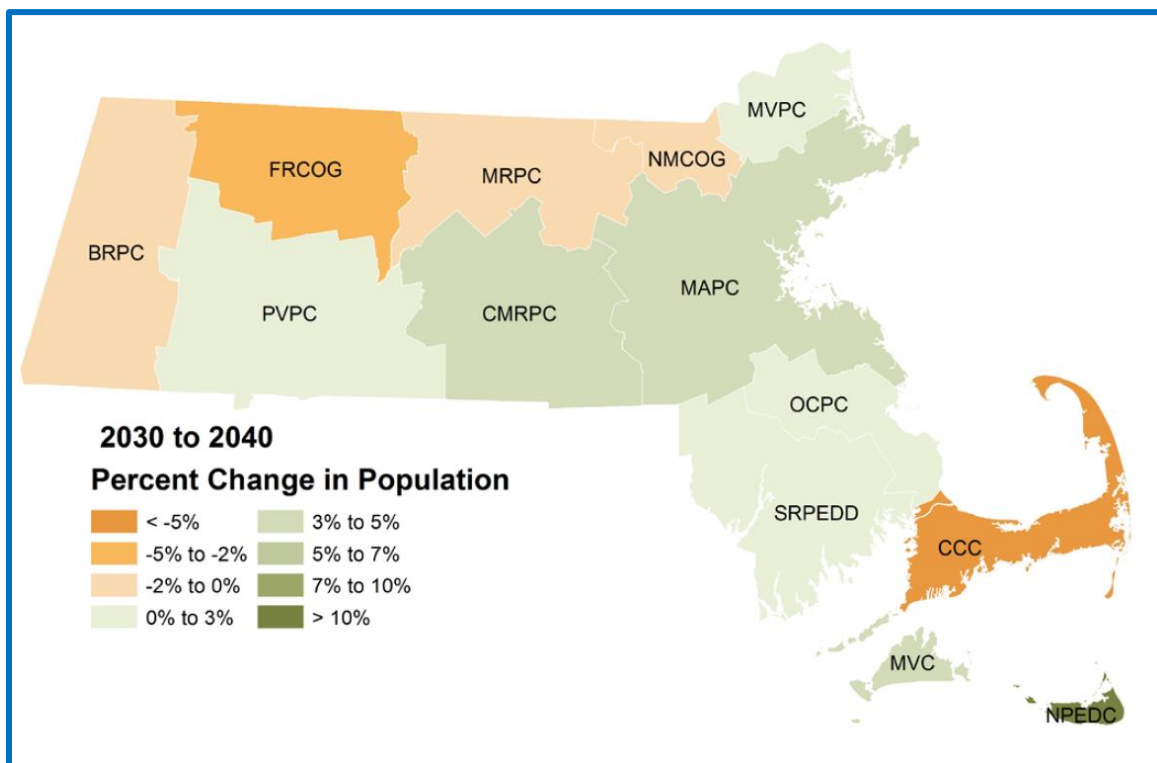


Figure 4 - 27. Population Change by RPA Region 2030-2040





Regional Variation

- Major Factors Influencing Regional Variation
 - Recent trends in migration by region are picked up in the model.
 - Age profile of each region varies considerably
 - Diversity varies around the state and relates to age profile, thus natural increase
 - In seasonal areas, most of the recent housing unit growth is confined to seasonal use, not adding resident population.
- Diversity and Age
 - A higher percentage of Hispanic population generally relates to a lower median age. •In Massachusetts the median age of the Hispanic population is 27.9 compared to 41.5 for the Non-Hispanic population.
 - At the county level, we see that Barnstable and Dukes County are the two oldest in Massachusetts in terms of median age and are also the two counties with the lowest percentage of Hispanic population.
 - The “youngest” county, Suffolk, has the second highest percentage of Hispanic population in Massachusetts.
 - Half (50.4%) of the nation’s children younger than five belonged to a minority population in 2016, with 25.8% identifying as Hispanic.
 - In Massachusetts, 41.0% of children younger than five belonged to a minority population and 20.4% were Hispanic.



Figure 4 - 28. Estimated Minority Population

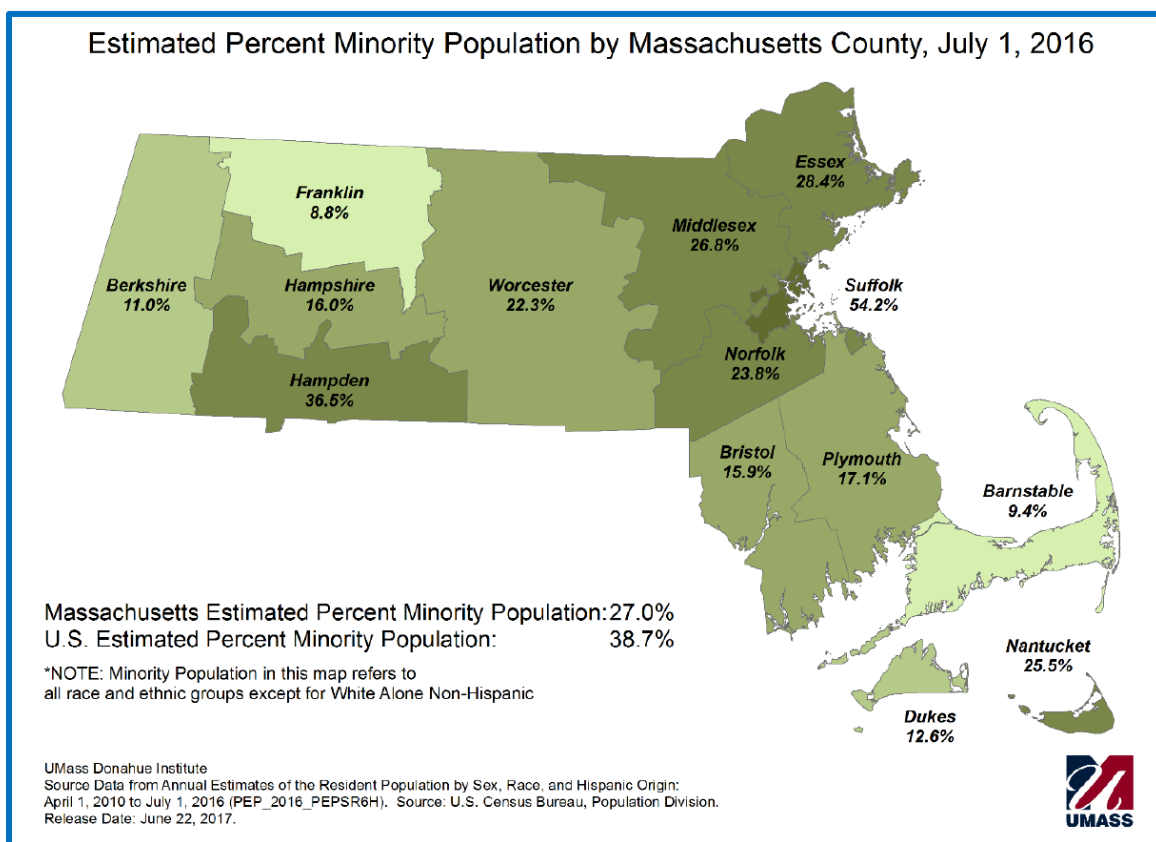
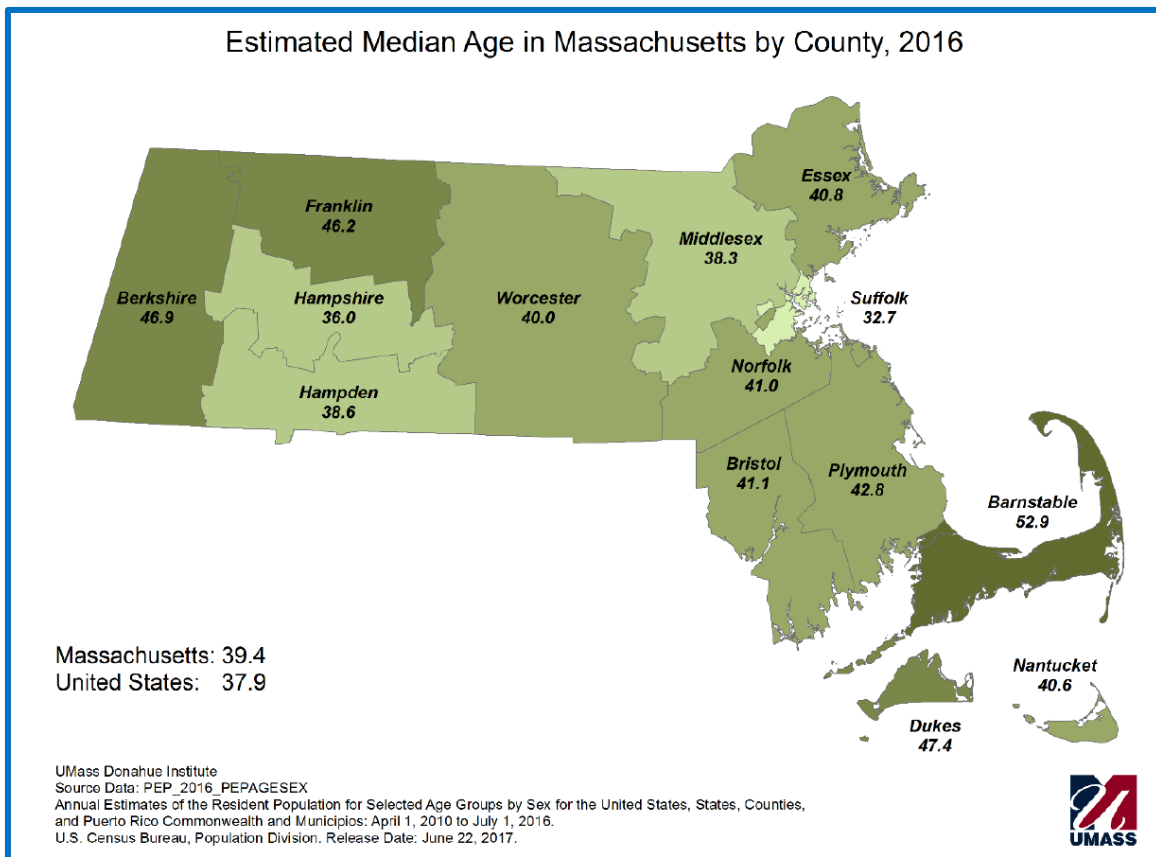




Figure 4 - 29. Estimated Median Age

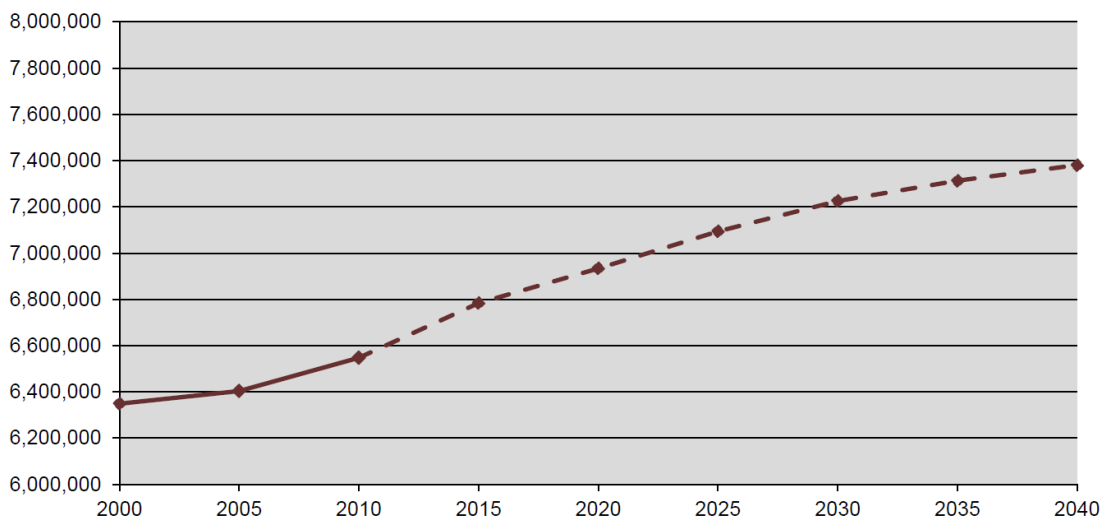


Statewide Summary

- Total State Population

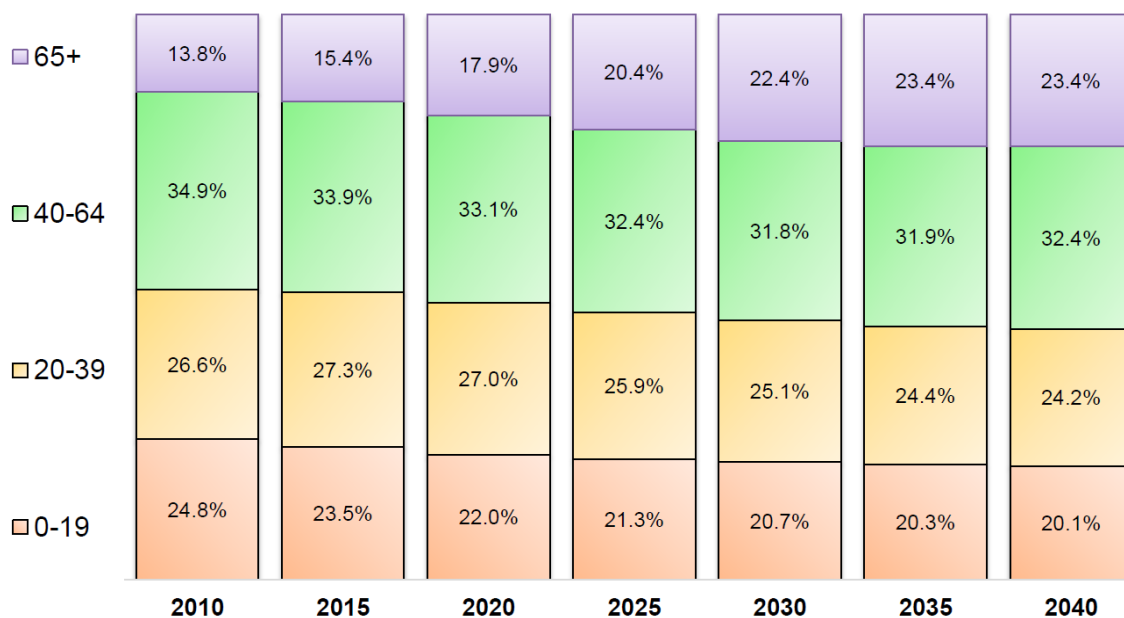


Figure 4 - 30. Massachusetts Actual and Projected Population, 2000-2040



- Population by Age Group: Shifting Ratios

Figure 4 - 31. Massachusetts Projected Population Distribution by Age Group 2010-2040



Source Data: U.S. Census Bureau, 2010 Census Summary File 1; UMass Donahue Institute Population Projections 2018

Montachusett Region Projections

Based upon the work conducted by UMDI and MassDOT as outlined above, a series of projections were calculated for the Montachusett Region. These projections were provided as regional totals



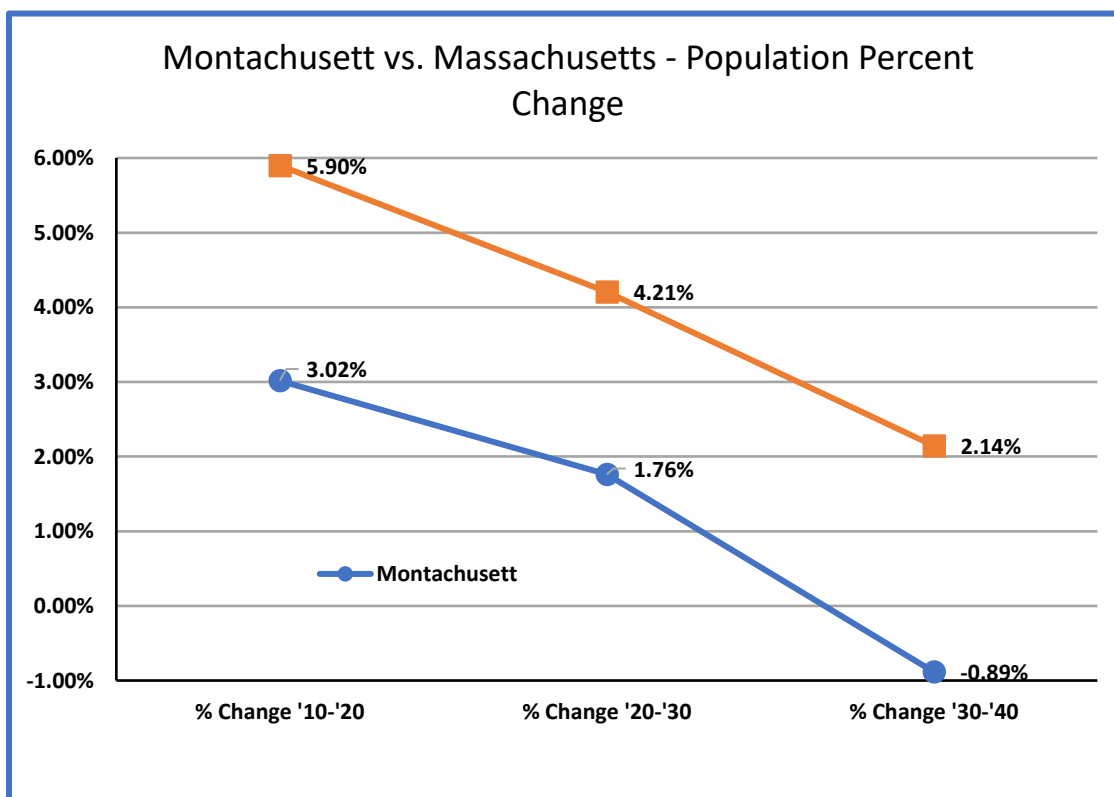
and then disaggregated to the 22 communities that comprise the region. This process was based upon past census data for the communities as well as local review and feedback.

Population

When compared with the Commonwealth as a whole, the population of the Montachusett region is expected to grow at a lower rate until 2040 (Refer to the following Figure 4 - 32). The change in the Montachusett population is expected to lag from approximately 2.5 to 3.0 percentage points behind the state. By 2040, the expected population growth rate for the region from 2010 is projected at 3.90% while Massachusetts is projected at 12.72%.

When compared to the other 12 RPA's in Massachusetts, Montachusett is 1 of 11 regions anticipated to see positive growth in population over the 2010 to 2040 time period. (See Table 4 - 9). Two of the regions that are expected to see a decline in population over this same period are located west of Montachusett, i.e. Franklin Regional Council of Government (FRCOG) and the Berkshire Regional Planning Commission (BRPC).

Figure 4 - 32. Montachusett vs Massachusetts Population Percent Change





The following tables provide a breakdown of Population, Employment and Household projections by the 13 Regional Planning Areas in the state of Massachusetts. These regional totals were provided to the RPA's by MassDOT and UMDI and represent the control totals for the region in question and the state as a whole. RPA staff then distributed these regional control totals to their member municipalities based on local input, data and knowledge.



Table 4 - 9. RPA Projection Totals for Population, Employment and Households – 2010, 2020, 2030 and 2040

RPA	Census 2010	Population 2020	Population 2030	Population 2040	% Change '10-'20	% Change '10-'40	Jobs 2010	Jobs 2020	Jobs 2030	Jobs 2040	% Change '10-'20	% Change '10-'40
BRPC	131,219	127,986	128,548	128,063	-2.5%	-2.4%	60,150	59,772	57,864	57,639	-0.6%	-4.2%
CCC	215,888	210,930	199,466	176,007	-2.3%	-18.5%	88,596	88,953	81,880	75,299	0.4%	-15.0%
CMRPC	556,698	588,141	619,815	641,260	5.6%	15.2%	224,059	238,486	240,984	244,265	6.4%	9.0%
FRCOG	71,372	70,804	70,925	69,477	-0.8%	-2.7%	25,684	26,055	25,163	24,622	1.4%	-4.1%
MAPC (97)	3,087,975	3,356,151	3,568,967	3,704,533	8.7%	20.0%	1,823,515	1,993,310	2,041,465	2,084,667	9.3%	14.3%
MRPC	236,475	243,607	247,899	245,705	3.0%	3.9%	77,199	80,996	79,726	79,098	4.9%	2.5%
MVC	16,535	18,156	19,584	19,793	9.8%	19.7%	7,731	8,256	8,349	8,362	6.8%	8.2%
MVPC	333,748	357,622	370,611	380,912	7.2%	14.1%	145,374	158,793	159,763	161,742	9.2%	11.3%
NMCOG	286,901	299,617	298,889	295,061	4.4%	2.8%	119,332	128,420	127,398	127,359	7.6%	6.7%
NPEDC	10,172	11,206	11,804	12,212	10.2%	20.1%	5,699	6,227	6,256	6,212	9.3%	9.0%
OCPC	362,406	379,936	391,583	396,418	4.8%	9.4%	140,572	149,986	149,870	150,406	6.7%	7.0%
PVPC	621,570	632,012	647,277	656,992	1.7%	5.7%	252,156	261,527	260,253	260,838	3.7%	3.4%
SRPEDD	616,670	637,719	650,104	653,966	3.4%	6.0%	229,400	242,461	242,848	243,002	5.7%	5.9%
MA	6,547,629	6,933,887	7,225,472	7,380,399	5.9%	12.7%	3,199,467	3,443,242	3,481,819	3,523,509	7.6%	10.1%

RPA	Census 2010	Households 2020	Households 2030	Households 2040	% Change '10-'20	% Change '10-'40
BRPC	56,091	58,453	60,341	60,055	4.2%	7.1%
CCC	95,755	97,410	93,355	82,313	1.7%	-14.0%
CMRPC	210,870	234,781	256,845	270,061	11.3%	28.1%
FRCOG	30,462	32,675	34,478	34,427	7.3%	13.0%
MAPC (97)	1,216,543	1,377,472	1,505,119	1,582,644	13.2%	30.1%
MRPC	89,816	98,864	105,522	107,413	10.1%	19.6%
MVC	7,368	8,368	9,180	9,359	13.6%	27.0%
MVPC	123,577	140,546	152,363	159,348	13.7%	28.9%
NMCOG	104,022	116,271	121,559	122,740	11.8%	18.0%
NPEDC	4,229	4,644	4,787	4,780	9.8%	13.0%
OCPC	129,490	143,521	152,908	156,069	10.8%	20.5%
PVPC	238,629	255,326	270,293	278,094	7.0%	16.5%
SRPEDD	240,223	261,815	277,728	284,421	9.0%	18.4%
MA	2,547,075	2,830,145	3,044,477	3,151,722	11.1%	23.7%



Population growth in the region is expected to peak in 2030 to 247,899 persons but slightly decrease by -0.89% (or -2,194 persons) by 2040.

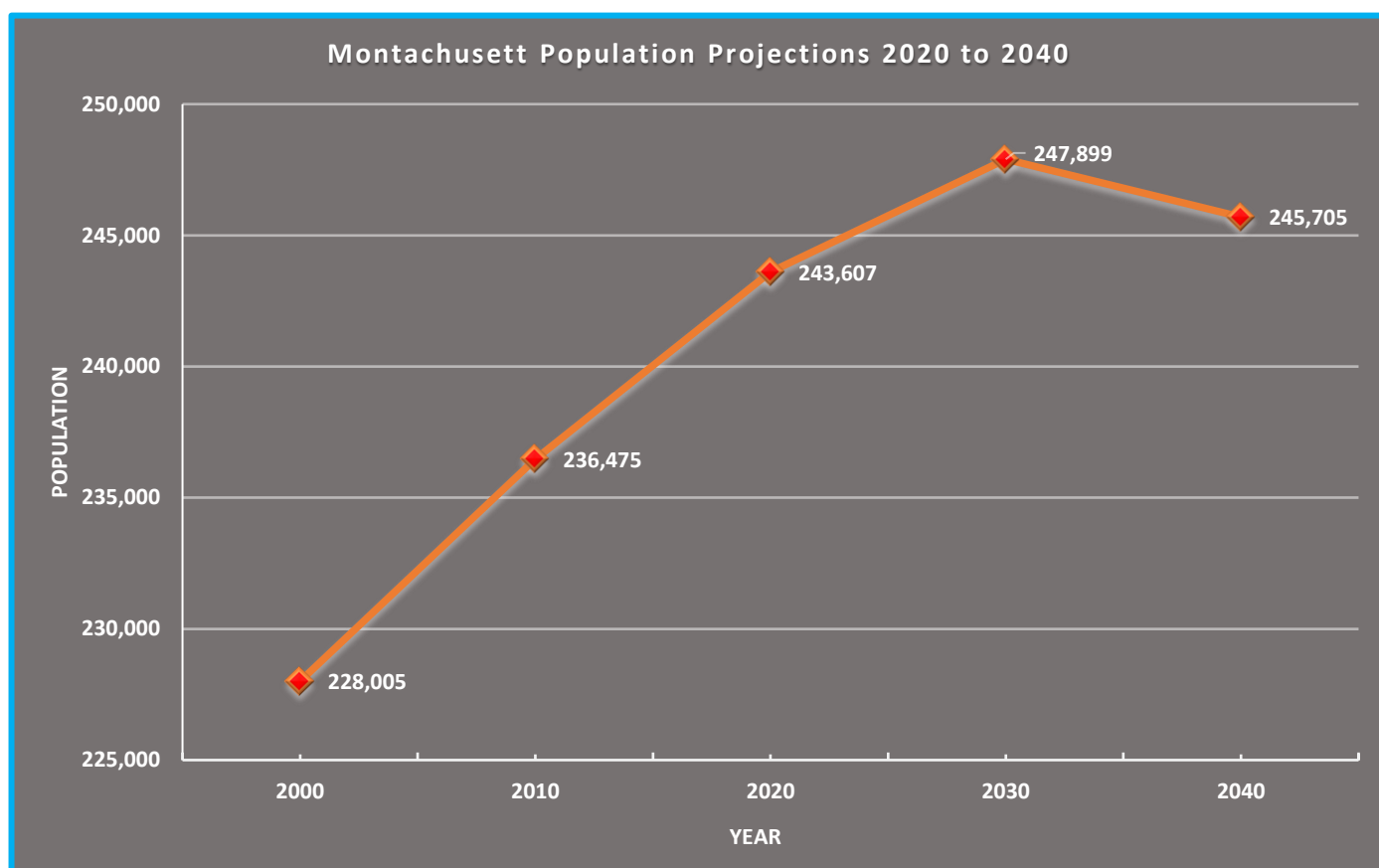
Within the communities of the Montachusett region, population changes from 2010 to 2040 will vary from an increase of 42% (3,269 persons) in Harvard to a decrease of -11% (-129 persons) in Royalston. Of the three cities of Fitchburg, Gardner, and Leominster, Fitchburg and Gardner are projected to gain population at a 6.67% and 4.81%, respectively. Leominster it is projected to decrease by -1.13% (or 1,003 persons). See Table 4 - 10 for population projections for each Montachusett region community.

Table 4 - 10. Population Projections – Montachusett Region

TOWN	COUNTY	Census 2000	Census 2010	2020	2030	2040	% Change '10-'20	% Change '20-'30	% Change '30-'40	% Change '10-'40
Ashburnham	Worcester	5,546	6,081	6,142	6,250	6,195	1.00%	1.76%	-0.88%	1.87%
Ashby	Middlesex	2,845	3,074	3,111	3,166	3,138	1.20%	1.77%	-0.88%	2.08%
Athol	Worcester	11,299	11,584	12,185	12,399	12,290	5.19%	1.76%	-0.88%	6.09%
Ayer	Middlesex	7,287	7,427	7,578	7,712	7,644	2.03%	1.77%	-0.88%	2.92%
Clinton	Worcester	13,435	13,606	13,848	13,732	13,351	1.78%	-0.84%	-2.77%	-1.87%
Fitchburg	Worcester	39,102	40,318	42,640	43,391	43,007	5.76%	1.76%	-0.88%	6.67%
Gardner	Worcester	20,770	20,228	21,639	22,021	21,200	6.98%	1.77%	-3.73%	4.81%
Groton	Middlesex	9,547	10,646	11,340	12,090	12,773	6.52%	6.61%	5.65%	19.98%
Harvard	Worcester	5,981	6,520	7,439	8,869	9,250	14.10%	19.22%	4.30%	41.87%
Hubbardston	Worcester	3,909	4,382	4,777	5,232	5,497	9.01%	9.52%	5.06%	25.45%
Lancaster	Worcester	7,380	8,055	8,025	8,166	8,094	-0.37%	1.76%	-0.88%	0.48%
Leominster	Worcester	41,303	40,759	40,577	40,046	40,300	-0.45%	-1.31%	0.63%	-1.13%
Lunenburg	Worcester	9,401	10,086	10,275	10,456	10,364	1.87%	1.76%	-0.88%	2.76%
Petersham	Worcester	1,180	1,234	1,270	1,293	1,281	2.92%	1.81%	-0.93%	3.81%
Phillipston	Worcester	1,621	1,682	1,723	1,697	1,628	2.44%	-1.51%	-4.07%	-3.21%
Royalston	Worcester	1,254	1,258	1,223	1,210	1,125	-2.78%	-1.06%	-7.02%	-10.57%
Shirley	Middlesex	6,373	7,211	6,989	7,112	7,049	-3.08%	1.76%	-0.89%	-2.25%
Sterling	Worcester	7,257	7,808	7,817	7,746	7,108	0.12%	-0.91%	-8.24%	-8.97%
Templeton	Worcester	6,799	8,013	7,766	7,903	7,833	-3.08%	1.76%	-0.89%	-2.25%
Townsend	Middlesex	9,198	8,926	8,970	8,606	8,350	0.49%	-4.06%	-2.97%	-6.45%
Westminster	Worcester	6,907	7,277	7,457	7,607	7,420	2.47%	2.01%	-2.46%	1.97%
Winchendon	Worcester	9,611	10,300	10,816	11,195	10,808	5.01%	3.50%	-3.46%	4.93%
REGION		228,005	236,475	243,607	247,899	245,705	3.02%	1.76%	-0.89%	3.90%
Massachusetts		6,349,097	6,547,629	6,933,887	7,225,472	7,380,399	5.90%	4.21%	2.14%	12.72%



Figure 4 - 33. Montachusett Population Projections 2020 to 2040



Households

The number of households in the region is expected to generally follow the same projected growth pattern as projected population growth. However, the number of households does not peak in 2030 as population is expected to do but rather continues to increase slightly by 1.79% (1,891 households) by 2040 (Figure 4 - 34).

Within the communities of the Montachusett region, household changes from 2010 to 2040 will vary greatly. As with population projected growth, households in Harvard will have the greatest growth at 74.56%, a total increase of 1,411 households. Sterling is projected to see an increase of 5.47% over the 2010-2040 time frame, the smallest in the region. Overall, all 22 communities are expected to see growth in households over the 30-year period. This is a trend seen in the decade numbers from 2010 to 2020 and 2020 to 2030. It is not until 2040 that any community is expected to see a decline in households and then in only six municipalities (Athol (-0.54%),



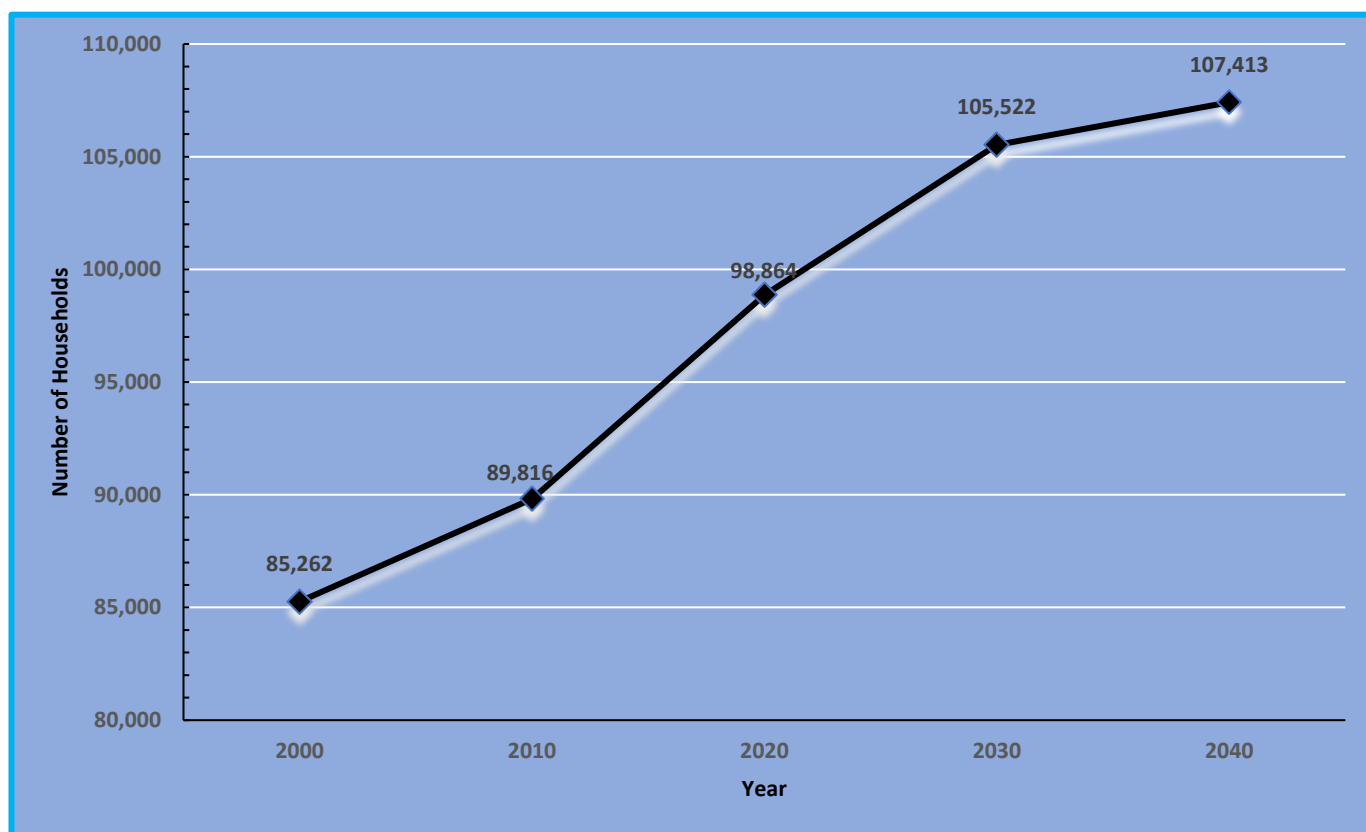
Clinton (-1.10%), Gardner (-0.92%), Sterling (-6.56%), Templeton (-0.14%) and Westminster (-1.02%). See Table 4-11 for household projections for each Montachusett region community.

Table 4 - 11. Household Projections – Montachusett Region

TOWN	COUNTY	Census 2000	Census 2010	2020	2030	2040	% Change '10-'20	% Change '20-'30	% Change '30-'40	% Change '10-'40
Ashburnham	Worcester	1,929	2,148	2,316	2,432	2,443	7.82%	5.02%	0.45%	13.73%
Ashby	Middlesex	978	1,105	1,184	1,247	1,265	7.14%	5.32%	1.46%	14.48%
Athol	Worcester	4,487	4,656	5,156	5,428	5,399	10.73%	5.28%	-0.54%	15.95%
Ayer	Middlesex	2,982	3,118	3,405	3,715	3,897	9.20%	9.11%	4.91%	24.99%
Clinton	Worcester	5,597	5,831	6,134	6,290	6,221	5.19%	2.55%	-1.10%	6.69%
Fitchburg	Worcester	14,943	15,165	16,850	17,648	17,859	11.11%	4.74%	1.19%	17.76%
Gardner	Worcester	8,282	8,224	9,311	9,933	9,842	13.22%	6.68%	-0.92%	19.67%
Groton	Middlesex	3,268	3,753	4,597	5,333	5,881	22.49%	16.01%	10.27%	56.70%
Harvard	Worcester	1,809	1,893	2,341	2,998	3,304	23.65%	28.09%	10.21%	74.56%
Hubbardston	Worcester	1,308	1,566	1,900	2,252	2,448	21.36%	18.51%	8.71%	56.35%
Lancaster	Worcester	2,049	2,409	2,616	2,821	2,854	8.60%	7.84%	1.16%	18.47%
Leominster	Worcester	16,491	16,767	17,666	18,261	18,843	5.36%	3.37%	3.19%	12.38%
Lunenburg	Worcester	3,535	3,835	4,180	4,480	4,521	8.99%	7.19%	0.90%	17.88%
Petersham	Worcester	438	493	554	602	606	12.33%	8.76%	0.57%	22.86%
Phillipston	Worcester	580	633	725	785	808	14.55%	8.32%	2.85%	27.62%
Royalston	Worcester	449	498	554	601	604	11.26%	8.55%	0.38%	21.23%
Shirley	Middlesex	2,067	2,264	2,433	2,727	2,857	7.47%	12.07%	4.76%	26.17%
Sterling	Worcester	2,573	2,810	3,038	3,172	2,964	8.13%	4.39%	-6.56%	5.47%
Templeton	Worcester	2,411	2,882	2,939	3,087	3,082	1.96%	5.04%	-0.14%	6.95%
Townsend	Middlesex	3,110	3,240	3,659	3,773	3,788	12.92%	3.13%	0.39%	16.92%
Westminster	Worcester	2,529	2,716	2,943	3,139	3,107	8.34%	6.69%	-1.02%	14.41%
Winchendon	Worcester	3,447	3,810	4,365	4,795	4,820	14.57%	9.86%	0.52%	26.52%
REGION		85,262	89,816	98,864	105,522	107,413	10.07%	6.73%	1.79%	19.59%
Massachusetts		2,443,580	2,547,075	2,830,145	3,044,477	3,151,722	11.11%	7.57%	3.52%	23.74%



Figure 4 - 34. Montachusett Household Projections 2020 to 2040



Employment

Employment growth in the region is expected to peak in 2020 to 80,996 persons but slightly decrease -1.57% (-1,269 persons) in 2030 and an additional -0.79% in 2040. This follows an anticipated slowdown in employment statewide as growth in the ten-year periods of 2010 to 2020, 2020 to 2030 and 2030 to 2040 are projected at 7.62%, 1.12% and 1.20%, respectively.



Table 4 - 12. Employment Projections – Montachusett Region

TOWN	COUNTY	DET 2000	DET 2010	2020	2030	2040	% Change '10-'20	% Change '20-'30	% Change '30-'40	% Change '10-'40
Ashburnham	Worcester	1,008	1,006	1,055	1,039	1,031	4.92%	-1.57%	-0.79%	2.46%
Ashby	Middlesex	229	278	292	287	285	4.92%	-1.57%	-0.79%	2.46%
Athol	Worcester	3,708	3,352	3,517	3,462	3,434	4.92%	-1.57%	-0.79%	2.46%
Ayer	Middlesex	6,006	4,821	5,058	4,979	4,940	4.92%	-1.57%	-0.79%	2.46%
Clinton	Worcester	4,886	4,915	5,157	5,076	5,036	4.92%	-1.57%	-0.79%	2.46%
Fitchburg	Worcester	14,738	12,668	13,291	13,083	12,980	4.92%	-1.57%	-0.79%	2.46%
Gardner	Worcester	8,434	8,032	8,427	8,295	8,230	4.92%	-1.57%	-0.79%	2.46%
Groton	Middlesex	2,988	4,371	4,586	4,514	4,479	4.92%	-1.57%	-0.79%	2.46%
Harvard	Worcester	1,041	2,722	2,856	2,811	2,789	4.92%	-1.57%	-0.79%	2.46%
Hubbardston	Worcester	597	477	500	493	489	4.92%	-1.57%	-0.79%	2.46%
Lancaster	Worcester	2,823	1,973	2,070	2,038	2,022	4.92%	-1.57%	-0.79%	2.46%
Leominster	Worcester	18,896	17,514	18,375	18,087	17,945	4.92%	-1.57%	-0.79%	2.46%
Lunenburg	Worcester	2,385	2,211	2,320	2,283	2,265	4.92%	-1.57%	-0.79%	2.46%
Petersham	Worcester	142	124	130	128	127	4.92%	-1.57%	-0.79%	2.46%
Phillipston	Worcester	175	170	178	176	174	4.92%	-1.57%	-0.79%	2.46%
Royalston	Worcester	157	125	131	129	128	4.92%	-1.57%	-0.79%	2.46%
Shirley	Middlesex	2,114	2,271	2,383	2,345	2,327	4.92%	-1.57%	-0.79%	2.46%
Sterling	Worcester	2,061	2,338	2,453	2,415	2,396	4.92%	-1.57%	-0.79%	2.46%
Templeton	Worcester	1,692	1,674	1,756	1,729	1,715	4.92%	-1.57%	-0.79%	2.46%
Townsend	Middlesex	2,249	2,030	2,130	2,096	2,080	4.92%	-1.57%	-0.79%	2.46%
Westminster	Worcester	3,641	2,514	2,638	2,596	2,576	4.92%	-1.57%	-0.79%	2.46%
Winchendon	Worcester	1,843	1,613	1,692	1,666	1,653	4.92%	-1.57%	-0.79%	2.46%
REGION		81,813	77,199	80,996	79,726	79,098	4.92%	-1.57%	-0.79%	2.46%
Massachusetts		3,227,286	3,199,467	3,443,242	3,481,819	3,523,509	7.62%	1.12%	1.20%	10.13%



Figure 4 - 35. Montachusett Employment Projections 2020 to 2040

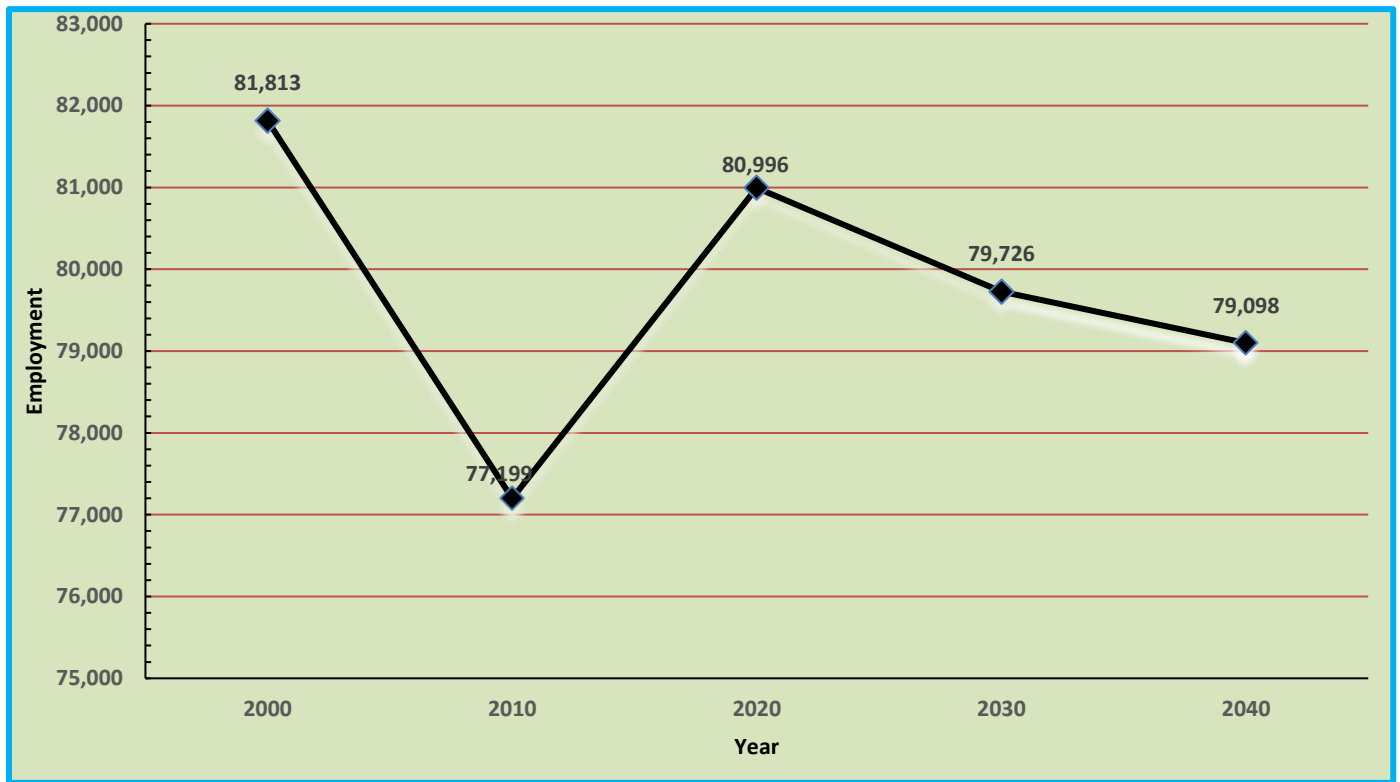
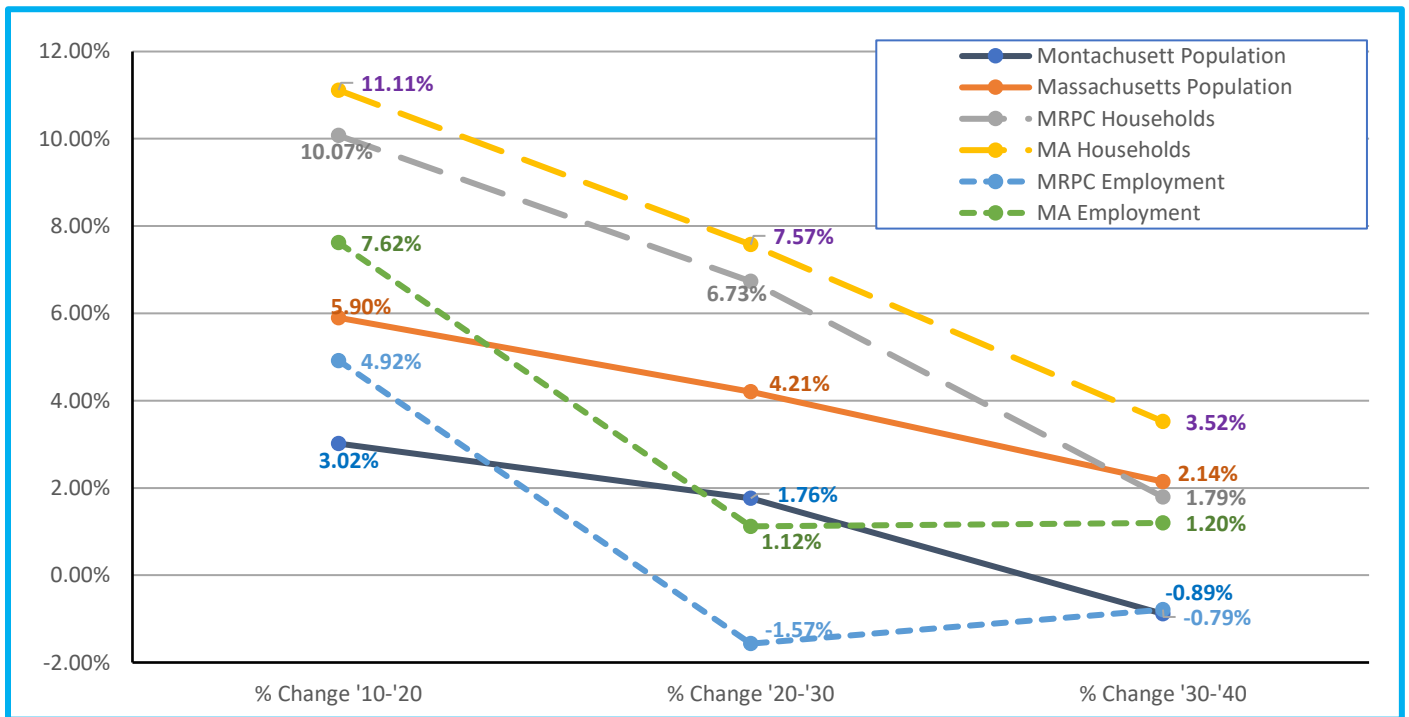


Figure 4 - 36. Montachusett vs Massachusetts - Percent Change Comparison





Trends

Through the development and analysis of the demographics and projections for the Montachusett region, the following trends were identified and noted. Following these trends, a series of recommendations are presented for the region.

- Current growth expected to continue but future projections anticipate a slowdown and gradual decline.
- The population in the region is aging faster than in the state or nation. This trend is also reflected in the 2020, 2030 and 2040 projections where the overall growth in the population of the region is expected to slow and decline. This aging of a large proportion of the population poses a number of planning challenges for the Region, including accessibility to health care and elderly services, public transportation, senior housing. In addition, there will be generational shifts in employment sectors and the workforce.
- Educational attainment rates are increasing in the regions male and female populations. However, they still remain lower than state averages. Efforts are needed in the Region to retain this increasing educated population and subsequently help to address shifts in the employment sectors.
- Ten Montachusett communities have a higher proportion of residents with a disability than the state as a whole. Athol, Phillipston, and Fitchburg top the list. Among other planning considerations, the high percentages of residents with disabilities, coupled with a steadily aging population, only help to emphasize the importance of multimodal and functional transportation network.
- Fifteen (15) of the region's 22 communities have a lower per capita income than the state (\$39,913), while nine rank below the state when examining median household income.
- An estimated 11% of individuals are living in poverty within the Commonwealth of Massachusetts. Six Montachusett communities have a higher concentration of poverty than the state as a whole, with Fitchburg (17.9%), Gardner (16.7%), and Athol (14.7%) also exceeding the national poverty rate of 14.6%. Between 2016 and 2017, poverty rates declined in the region at a quicker pace than both the state and nation. In order to reverse these trends, additional opportunities to create a more diverse employment sector is



needed. Along with this, is the need for improved access to these jobs at a reasonable cost for those in the lower income strata.

- Based on an analysis of current and past transportation and highway projects versus identified Environmental Justice and Title VI populations, there does not appear to be an undo benefit or burden on these populations.
- Housing in the region trends toward single family homes. This along with a rising median home values can affectively price individuals out of the Montachusett Region. This can be especially harmful to younger, more highly educated individuals, which in turn can exasperate the aging population situation. In order to serve the regions changing population characteristics, i.e. aging, diversified, and low income, affordable housing units (either as single or multiple units) need to be an emphasis for the region's officials. Additionally, where appropriate direct tie ins to available transportation options should be a major factor for local officials in this area.
- Manufacturing continues to remain the largest employment sector in the region (17% of total employees) and integral to the economic health of many communities. The level of manufacturing-based employment, despite the decline in recent decades, continues to out strip that of both the state and country. While efforts continue toward diversifying the regional economy into other growing sectors, including the service sectors, the region's comparative advantage of an experienced manufacturing workforce and industrial space will help keep manufacturing as a cornerstone in the region's economy.
- Montachusett Region commuters are more auto-reliant than in the state or the nation. Ninety percent (90%) of workers either drive alone or carpool to work as compared to 78% of workers in Massachusetts, and 85% of workers in the country. Montachusett residents are also significantly less reliant upon public transit. The longer commute times and distances of Montachusett individuals tend to put more emphasis on the traditional commuter roads in the region, i.e. Route 2, I-190, Route 117, Route 119, Route 140, Route 12, etc. The potential for increased public transit usage exists if expansion and costs can be implemented in a reasonable fashion. In addition, these segments of commuters are also likely to be impacted by technological changes in travel modes, i.e. autonomous



vehicles, rideshare options and alternative energy vehicles. With a greater demand or usage of these technologies, critical support infrastructure is needed from long term parking areas for autonomous vehicles, to charging stations, to incentive programs.

Recommendations

The following is a series of recommendations based upon the identified trends related to the demographic profile of the Montachusett Region. It should not be viewed as a complete and finite list but rather a starting point for the continued review of the needs of the region.

1. The aging of the region's population requires that several issues be addressed:
 - a. Expanded transit options to vital services for elderly. Expansion to needed services such as medical and shopping should remain a priority. Additionally, connections between communities should be examined and implemented where feasible.
 - b. Upgrades, expansion and improvements to the pedestrian network in the core centers of communities and in and around identified service areas, i.e. medical facilities, shopping centers, etc. Safer sidewalks and pedestrian corridors will also serve other segments of the population beyond the elderly.
 - c. Safety improvements along the road and pedestrian/bicycle networks need to be expanded and prioritized to help deal with the aging population as well as assisting with other segments with their activities.
2. Identification and prioritization are needed for projects that assist the disabled community throughout the region. This would include better sidewalks, improved access to transit options, and eliminating gaps in the network that prevent or discourage usage (ex. incomplete or non-existing sidewalks on fixed route transit lines).
3. Expansion of employment opportunities are needed in order to retain and expand the regional workforce. As the educational level continues to rise in the region, without adequate employment options, the population will continue to age as younger individuals seek better paying jobs outside of the region. Network improvements are needed to



assist and encourage employers to remain in the region. This would involve infrastructure improvements to support industries, multiple travel options to bring employees to and from work, and expansion of outreach efforts to all segments of the population. Continued emphasis on maintaining pavement conditions and reducing bridge deficiencies will allow for greater marketing by municipalities of available industrial and commercial areas.

4. Expansion of mode options for commuters needs to also be a priority for the region. This would also involve the region's trail/pedestrian/bicycle networks. These systems can be improved and expanded in order to provide additional walking and biking mode options.
5. Additional planning is needed to address future technological advances in transportation as they occur and become more and more feasible. This would include issues such as:
 - a. Autonomous vehicles. Where will they "park" when riders have reached their destinations? Is there a need for special lots or facilities? Are there potential congestion issues at the start and end of work shifts? Will "peak hours" increase because the autonomous vehicle may be making additional trips to desired locations (i.e. one trip in and one trip out in both the AM and PM (4 trips) as opposed to a driver that has one trip in and one trip out in the AM and PM (2 trips))?
 - b. Alternative energy vehicles. Where should charging stations be located? How many facilities exist and do they adequately serve the population now? Environmentally, are there any drawbacks associated with batteries, etc., that need to be addressed?
 - c. Ride share options. Can these systems be expanded to address the needs of the elderly, low income and disabled populations? Can the systems expand to the more rural communities to serve these areas without viable transit options?
6. The population is getting more and more diverse in terms of minority populations and language. Additional efforts are needed to draw these individuals into the transportation planning process to ensure adequate representation and service.



INFRASTRUCTURE

Within the transportation system, the infrastructure that makes up and serves the roadway network is critical to its effectiveness and efficiency. Poorly maintained bridges, and pavement impact all aspects of movement, from commuting and recreation to freight and emergency services.

Bridges

Throughout the Montachusett region, many of its roads travel over numerous brooks, rivers and water bodies. Within the 22 communities of the Montachusett planning area, some 326 bridges are identified and rated by MassDOT as part of their inventory system. MassDOT regularly provides MRPC access to its bridge inventory which includes data such as the community where the bridge is located, the road name that the bridge is located on, the bridge identification number, functional classification of the road, year built, historical significance, rebuilt date (if applicable), AASHTO (American Association of State Highway and Transportation Officials) rating, and the deficiency status of each bridge, i.e. structurally deficient.

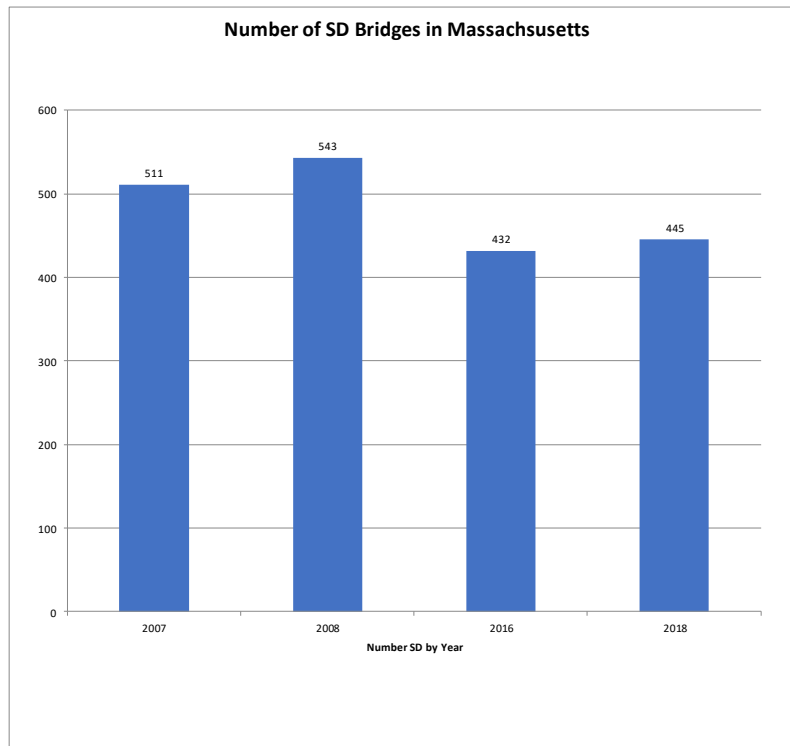
Structurally deficient bridges are a main concern in terms of repair priorities. A Structurally deficient bridge is not necessarily unsafe but is deteriorated to a point where it must be closely monitored and inspected or repaired. Structurally deficient bridges can result in bridge closings and weight restrictions which alter traffic patterns by forcing vehicles to find alternate routes frequently leading through residential streets. The result is increased congestion and pollution, potential loss of business, the potential for more accidents and failure of the emergency response times and planning process.



Accelerated Bridge Program

The Accelerated Bridge Program (ABP) was initiated by the MassDOT in 2008 as an effort to reduce the number of bridges rated as structurally deficient. On February 1, 2007, there were 511 structurally deficient (SD) bridges statewide. This number increased to 543 by July 1, 2008 when the ABP Program was initiated. Without the program, the number of SD bridges was expected to rise to 697 by October 1, 2016. The goal of the program was to reduce the number of SD bridges to fewer than 450 by October 1, 2016. That goal was reached with 432 ABP-eligible structurally deficient bridges as of October 1, 2016. The number of ABP-eligible structurally deficient bridges as of September 1, 2018 was 445.

Figure 4-37: Number of Structurally Deficient Bridges in Massachusetts



Montachusett Bridges – Current & Historical

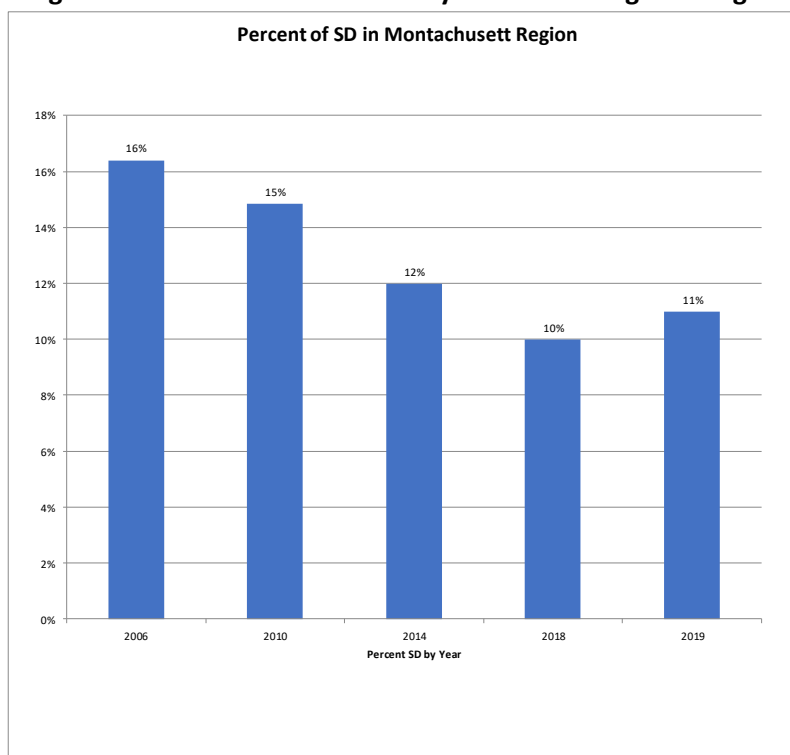
The following table and graph provide a breakdown of the total bridge numbers regionwide as well as the number of SD bridges in each community from bridge inventories over the years.



Table 4-13: Structurally Deficient Bridge Changes

MRPC Region	Year	Total	SD	% of Total
	2019	326	35	10.7%
	2018	324	32	9.9%
	2014	321	38	11.8%
	2010	317	47	14.8%
	2006	317	52	16.4%
	13 Year Change	9	-17	-5.7%

Figure 4-39: Percent of Structurally Deficient Bridges in Region



Within the Montachusett Region, the 2019 bridge inventory lists 35 bridges as SD. This represents approximately 11% (35 of 326) of the Region's total bridges. Of particular note is that bridge inventories from 2006 and 2010 report structurally deficient bridges being around 15% of the total in the region. A major reason for the decrease in both number and percentage of SD bridges throughout the region in the following decade is due to major investments made from the Accelerated Bridge Funding Program. As this funding program has ended, recent inventories



show a plateau trend in which the number and percentage of bridges rated as SD are leveling off, or even increasing.

In order to maintain an efficient movement of goods and people, a responsive and adequately funded bridge maintenance program is essential. It is important to discourage the previous trend of increasing percentage of bridges being rated as structurally deficient. These percentages will be monitored in future inventories to determine where current trends are heading.

Pavement

The *Pavement Management Program* at MRPC consists of surveying all federal aid eligible roadways in the region for the purpose of collecting, maintaining and evaluating pavement condition data for use in transportation plan and project decision making.

There are approximately 666 miles of federal aid eligible roads in the Montachusett region, of which 159 miles are National Highway System (NHS) roads, and 507 miles are Surface Transportation Block Grant (STBG) roads. NHS roadways represent all Interstate roadways such as I-190, and I-495 along with a systematic network of principal arterials such as Route 2 and parts of Routes 12, 140 and 2A; NHS roads are regularly surveyed by MassDOT. STBG roadways, which include all other numbered routes as well as all urban arterials, urban collectors and rural arterials, are surveyed mostly by the MRPC, MassDOT also regularly collects data on all numbered routes.

The Roadway System

Of the approximately 2,094 miles of roads in the Montachusett region, approximately 507 miles are Surface Transportation Block Grant (STBG) eligible roadways and 159 miles are National Highway System (NHS) eligible roadways. This represents 31% of the region's road miles. The remaining 1,425 miles (69%) are state and local aid eligible roads.

They are defined as follows:



National Highway System (NHS) – all interstate roadways and a systematic network of principal arterials spanning the state. In addition, roads connecting the NHS roadways to military bases (known as the Strategic Highway Network) are also considered part of the NHS network. NHS passenger and freight terminals are connected by roadways called NHS connectors.

Surface Transportation Block Grant (STBG) – comprised of any functionally classified roadway not part of the NHS network. STBG funded roadways include all urban arterials, urban collectors and rural arterials. According to previous funding legislation, rural collectors are STBG eligible, but have a limitation on the STBG funding amount.

State and Local Aid – includes Chapter 90 and other non-Federal Aid categories. Roadways that fall under this category are comprised of roads functionally classified as local roads.

The following table provides a breakdown of roads by community by their aid eligibility, NHS, STBG or State Aid/Local.



Table 4-14: Regional Centerline Miles
CENTERLINE MILES

	NHS	STP	Total Fed-Aid	Local	Total
Ashburnham	0.00	20.33	20.33	77.27	97.61
Ashby	0.00	14.21	14.21	49.89	64.09
Athol	11.53	20.86	32.39	80.69	113.08
Ayer	7.25	9.73	16.98	34.27	51.25
Clinton	4.97	12.58	17.54	35.53	53.07
Fitchburg	18.35	47.36	65.72	136.48	202.20
Gardner	10.98	30.69	41.66	75.19	116.86
Groton	13.11	20.88	33.99	74.46	108.44
Harvard	8.84	10.17	19.01	60.48	79.50
Hubbardston	0.00	21.30	21.30	64.47	85.78
Lancaster	12.10	19.30	31.40	39.92	71.32
Leominster	19.18	42.62	61.80	116.99	178.79
Lunenburg	8.81	25.04	33.85	57.72	91.57
Petersham	0.00	19.61	19.61	59.61	79.21
Phillipston	2.97	8.23	11.20	41.31	52.51
Royalston	0.00	20.99	20.99	51.49	72.49
Shirley	1.05	18.89	19.94	31.72	51.66
Sterling	12.03	31.53	43.56	62.56	106.21
Templeton	5.68	35.09	40.78	58.91	99.69
Townsend	4.05	21.64	25.68	67.78	93.46
Westminster	9.28	33.98	43.26	65.29	108.55
Winchendon	8.92	22.86	31.78	85.01	116.80
TOTAL	159.10	507.89	666.98	1427.04	2094.14

Regional Pavement Conditions

The structural conditions of the majority of the Federal Aid eligible roads are determined by MassDOT and MRPC pavement surveys. The condition is determined through pavement surveys and expressed by assigning a Pavement Serviceability Index (PSI) number. PSI is an overall rating of the pavements condition. Conditions are rated as Excellent, Good, Fair and Poor. The following table shows a general correlation between PSI, condition and repair strategies.

**Table 4-15: Condition with Associated Repair**

PSI	Condition	Associated Repair
0 - 2.29	Poor	Reconstruction
2.3 - 2.79	Fair	Rehabilitation (Mill/Overlay)
2.8 - 3.49	Good	Preventative Maintenance
3.5 - 5	Excellent	Routine Maintenance

Utilizing this information, a general condition of the Montachusett Region's federal aid eligible roadway network can be developed. The following table lists pavement condition on federal aid eligible roads regionwide. These federal aid miles are further broken down by local and state jurisdiction. Please note that due to the time frame between data collection and report preparation, conditions of the roadways may change. Additionally, mileage listed in the following charts may not reflect mileage listed on the "Total Fed-Aid Miles" column of the Centerline Miles table as a small percentage of roads may not have been surveyed and are not reflected in the data. Therefore, this information should be viewed in general terms regarding needs and condition.

Table 4-16: 2019 Regionwide Conditions

Regionwide 2019		State	Local	Combined	
		Miles	Miles	Repair Category	Miles
	Excellent	57.21	102.06	Routine Maintenance	159.27
	Good	67.07	87.06	Preventative Maintenance	154.13
	Fair	38.91	117.21	Rehabilitation	156.13
	Poor	22.83	167.07	Reconstruction	189.90
	Total	186.03	473.40	Total	659.43

In comparing current regionwide network conditions to those from 2015, it would appear that the overall condition of federal aid eligible roads to show similarities over the course of four years. The major difference in the combined condition percentage is the increase of roads rated as "Poor" by six percentage points of the total. These percentage comparisons, when taken in context, can be assumed to indicate a slight deterioration of road conditions over the four years from 2015 to 2019. It is important to note that this comparison takes into account the generalized categories of "Excellent, Good, Fair, and Poor" only. Due to a changeover in survey format which



occurred in 2016, it is not possible to compare overall PSI numbers from each year. An overall network PSI comparison will be included in future reports when the network is resurveyed and a more precise comparison of data can be demonstrated.

Table 4-17: 2019 and 2015 Regionwide Percentage Comparisons

2019		State		Local		Combined		
		Miles	%	Miles	%	Repair Category	Miles	%
	Excellent	57.21	31%	102.06	22%	Routine Maintenance	159.27	24%
2015	Good	67.07	36%	87.06	18%	Preventative Maintenance	154.13	23%
	Fair	38.91	21%	117.21	25%	Rehabilitation	156.13	24%
	Poor	22.83	12%	167.07	35%	Reconstruction	189.90	29%
	Total	186.03		473.40		Total	659.43	

Table 4-18: 2019 Condition Percentage Change

2019		State		Local		Combined	
		%	% Points Change	%	% Points Change	%	% Points Change
	Excellent	31%	-16%	22%	9%	24%	-1%
2019	Good	36%	10%	18%	-3%	23%	1%
	Fair	21%	7%	25%	-14%	24%	-6%
	Poor	12%	0%	35%	8%	29%	6%

As with the condition of bridges, the regionwide pavement conditions are in danger of deteriorating. It is important to continue to monitor these conditions and consider trends in the decision-making process.



Trends

Analysis of roads and bridges in the Montachusett region demonstrate a network that is relatively stable, however, in danger of deterioration if proper investments are not maintained. It is important to prioritize maintenance and repair of these existing infrastructures to be able to maximize public funds and allow additional investments for improvements and expansion.

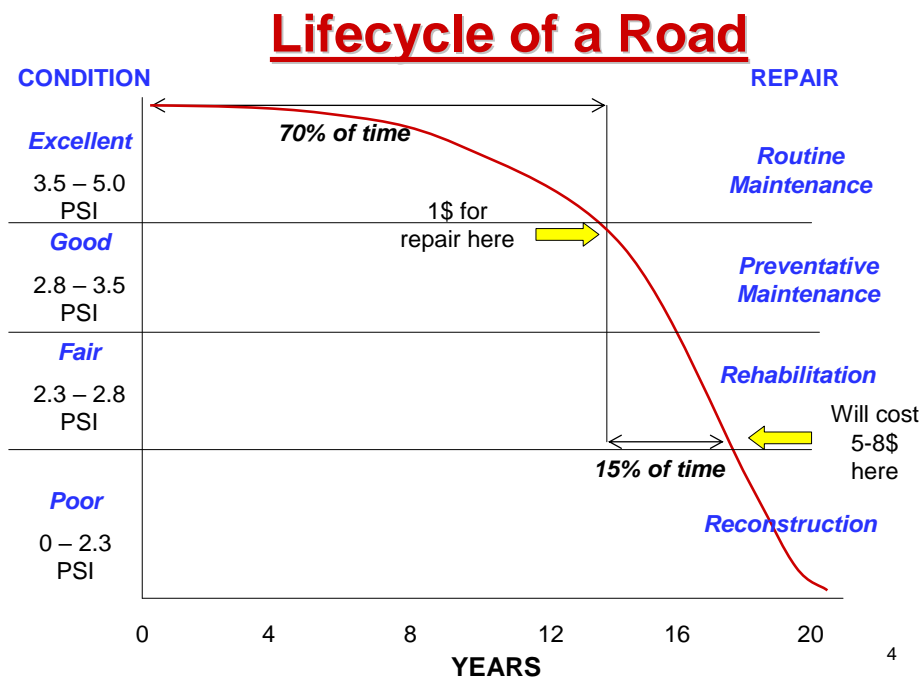
Recommendations

The transportation system in the Montachusett region largely consists of roads and bridges. Maintaining these assets are a challenge, however, we must understand the importance of a properly functioning and safe system. Maintaining a state of good repair should be a main priority and in our best interest in order to stretch our investments to the greatest benefits. Ultimately, it is recommended that investments are guided by proven asset management practices and the proper amount of investment is made to assure these assets do not deteriorate.

The figure below displays the concept of pavement lifecycle cost. A pavements lifecycle is the time between reconstruction periods. Lifecycle cost is the total cost spent on maintenance and repairs for a particular pavement section during its lifecycle. One of the main focuses of pavement management is to keep lifecycle cost low to stretch the dollar in what is commonly an ever-decreasing maintenance budget.



Figure 4-40: Lifecycle of a Road



Due to the rising cost of improvements and the declining funds for preserving existing infrastructure it is challenging to make improvements to the pavement network. Building a historical and measurable database of conditions in the Montachusett region allows for a snapshot of overall conditions which will allow us to determine how the network changes over time. Maintaining historical databases of bridge and pavement data paired with applying proven methods of asset management is recommended.

Network conditions over the last four years show an increase in percentage of roads in “poor” condition and decrease in percentage of “excellent” condition. This indicates that the current funding level of road maintenance projects is inadequate to keep up with the rate of deterioration. An overall increase in pavement repair projects along with investing in roads before they require full depth reconstruction is recommended. Furthermore, conditions should be closely monitored due to the threat of a deteriorating network.



SAFETY

The MRPC is committed to the goal of improving roadway safety in the Montachusett Region. The MRPC has, and will continue to, work with MassDOT and Member Communities to improve roadway safety. The two focus areas below are the approaches to improving safety in the Montachusett Region.

Massachusetts 2018 Strategic Highway Safety Plan Update (SHSP) Focus:

The MRPC is working cooperatively and in coordination with MassDOT to implement the SHSP. The focus area that follows is modelled after the SHSP. See the Appendix for a summary of the SHSP which includes 14 identified Emphasis Areas.

Reducing the number of Fatalities and Incapacitating Injuries is the top priority in the Montachusett Region based on the following:

- In the 2012 – 2016 five-year period, 541 people received an Incapacitating Injury on Montachusett Region roadways for the 2012 – 2016 five-year period, 73 people lost their lives on Montachusett Region roadways for an annual average of 15 Fatalities. Based on the **Safety Needs - Total Fatalities in Member Communities** analysis below, Fatalities have maintained a level annual average of 15 Fatalities which is one above the 2008 – 2012 five-year period annual average of 14 Fatalities.
- an annual average of 108 Incapacitating Injuries. Based on the **Safety Needs - Total Incapacitating Injuries in Member Communities** analysis below, Incapacitating Injuries saw an annual average reduction of -13.6% since the 2008 – 2012 five-year period. The annual average for Incapacitating Injuries dropped from 125 to 108 (-17 Incapacitating Injuries).
- In the 2012 – 2016 five-year period, 67 non-motorized people received either a Fatality or an Incapacitating Injury on Montachusett Region roadways for an annual average of 13



Non-Motorized Fatalities and Incapacitating Injuries. Based on the **Safety Needs - Total Combined Non-Motorized Fatalities and Incapacitating Injuries** analysis below, Non-Motorized Fatalities and Incapacitating Injuries have maintained an annual average of one to two Non-Motorized Fatalities and Incapacitating Injuries above the 2008 – 2012 five-year period annual average of 12 Non-Motorized Fatalities and Incapacitating Injuries.

Below are two links to the SHSP:

2018 SHSP (for low resolution), **2018 SHSP** (for download and/or print)

Montachusett Region All Mode High Crash Locations (HCLs) Focus and Total Crashes Focus:

Reducing the HCLs needs to continue and the Total Crashes needs to be addressed:

- Based on the **Safety Needs - HCLs in Member Communities and Region Total Crashes** analysis below, safety improvement projects have improved safety at former HCLs but reducing the severity and number of crashes at existing and new HCLs needs to occur.
- Between 2012 and 2016, 25,895 crashes occurred on the Region roadways. Based on the **Safety Needs - HCLs in Member Communities and Region Total Crashes** analysis below, total crashes have seen an annual average increase of 655 Total Crashes (15.6%) above the 2008 – 2012 five-year period.

Safety Needs

Total Fatalities

Figure 4-41 below, *Montachusett Region Total Fatalities (5-yr averages)*, graphically represents the number of roadway crash Fatalities that occurred in the region from 2008 – 2016. The number of Fatalities is provided as an annual average based on a five-year rolling average (i.e. years 08-12, 09-13, etc.).



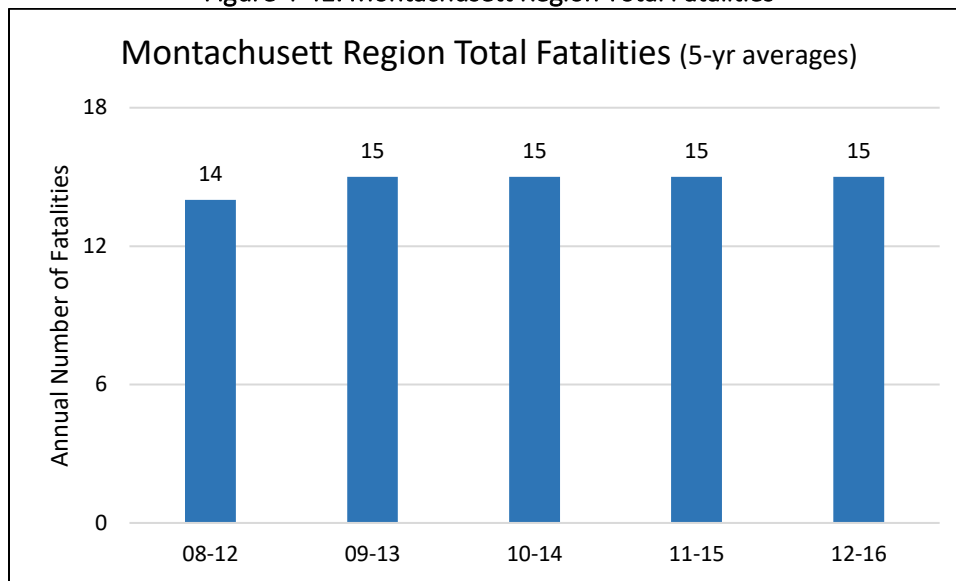
- **Figure 4-41** shows that the annual average number of Fatalities that have occurred remained consistent over the years from 2008 – 2016. Only the 2008 – 2012 five-year period annual average number of Fatalities varied from the 15 Fatalities per year at 14 Fatalities per year.



- On average, Montachusett Region Fatalities represent 4% of the State's total Fatalities.
- To begin to bring down the average number of Fatalities from 15, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas at the locations where Fatalities are occurring in Member Communities.
- Safety project development includes the requirement of conducting a Road Safety Audit (RSA) that will provide safety improvements alternatives before the design is initiated.
- Member Communities may choose to contact the MRPC for the historic locations of Fatalities within their community.
- MRPC will contact Member Communities concerning the historic locations of Fatalities for further study and potential project development.
- Fatality data is updated by MassDOT which will increase or decrease the five-year rolling average. Refer to **Chapter 3: Performance Measures** for further description of **Figure 4-41**.



Figure 4-41: Montachusett Region Total Fatalities



Fatalities Data Source: MassDOT

Total Incapacitating Injuries in Member Communities

The figure *Montachusett Region Total Incapacitating Injuries (5-yr avgs.)* (**Figure 4-42**) below graphically represents the number of roadway crash Incapacitating Injuries that occurred in Member Communities from 2008 – 2016. The number of Incapacitating Injuries is provided as an annual average based on a five-year rolling average.

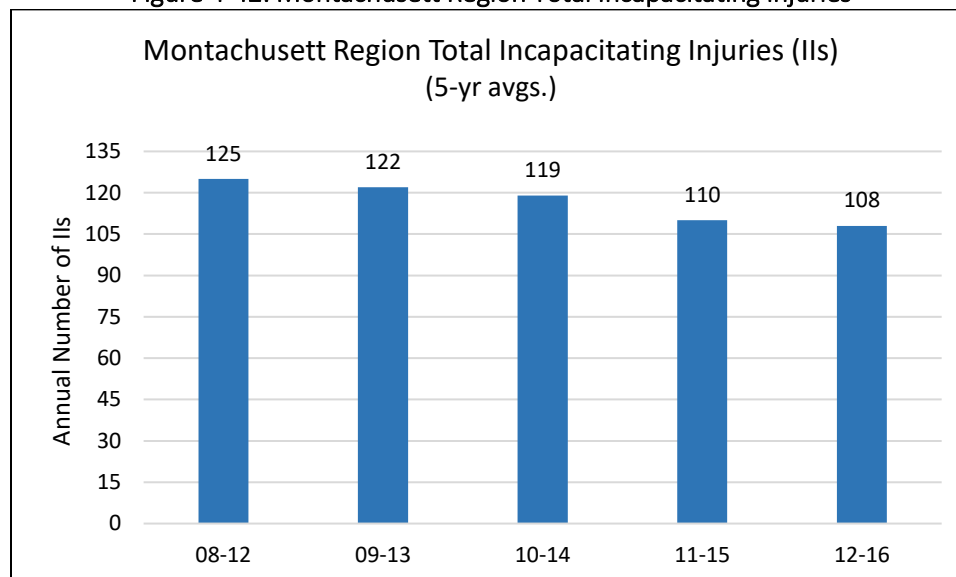
- **Figure 4-42** shows that the annual average number of Incapacitating Injuries that have occurred saw significant reduction since the 2008 – 2012 five-year period (-13.6%, a decrease from 125 to 108 (-17) Incapacitating Injuries.
- On average, Montachusett Region Incapacitating Injuries represent 3.5% of the State's total Incapacitating Injuries.
- To continue to bring down the average number of Incapacitating Injuries from 108, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas at the locations where the Incapacitating Injuries are occurring in Member Communities.





- Safety project development includes the requirement of conducting a Road Safety Audit (RSA) that will provide safety improvements alternatives before the design is initiated.
- Member Communities may choose to contact MRPC for the historic locations of Incapacitating Injuries within their community.
- MRPC will contact Member Communities concerning the historic locations of Incapacitating Injuries for further study and potential project development.
- Incapacitating Injury data is updated by MassDOT which will increase or decrease the five-year rolling average. Refer to **Chapter 3: Performance Measures** for further description of **Figure 4-42**.

Figure 4-42: Montachusett Region Total Incapacitating Injuries



Incapacitating Injuries Data Source: MassDOT

Total Combined Non-Motorized Fatalities and Incapacitating Injuries in MMPO Member Communities

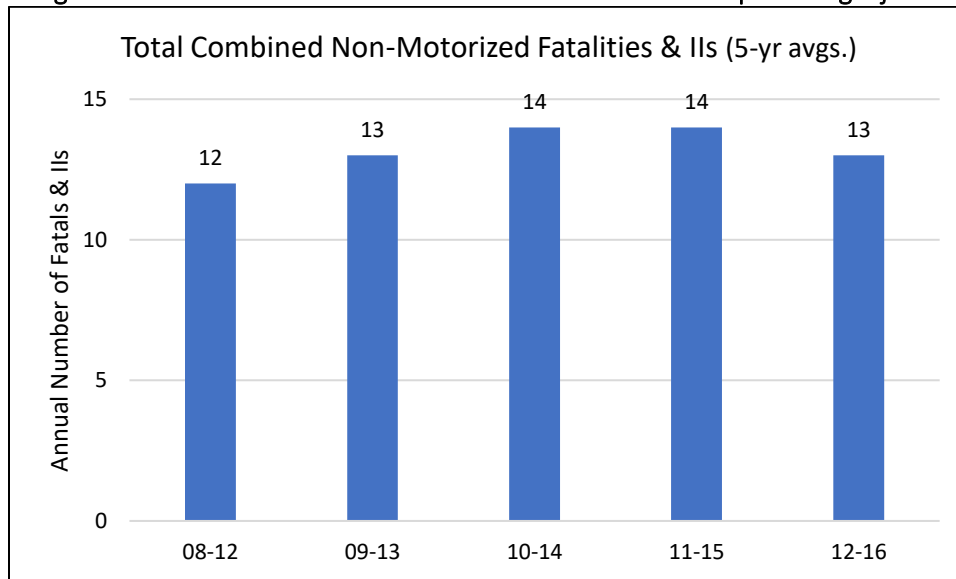
The Montachusett Region figure *Total Combined Non-Motorized Fatalities and Incapacitating Injuries (5-yr avgs.)* (**Figure 4-43**) below graphically represents the number of Non-Motorized Fatalities and Incapacitating Injuries crashes that occurred in the region from 2008 – 2016. The number of Non-Motorized Fatalities and Incapacitating Injuries is provided as an annual average based on a five-year rolling average.



- **Figure 4-43** shows that the annual average number of Non-Motorized Fatalities and Incapacitating Injuries that have occurred ranged from 12 to 14 over the years from 2008 – 2016. The data shows that an upward trend of one to two Non-Motorized Fatalities and Incapacitating Injuries has occurred since 2008 – 2012 five-year period.
- On average, Montachusett Region Non-Motorized Fatalities and Incapacitating Injuries represent 2.6% of the State’s total combined Non-Motorized Fatalities and Incapacitating Injuries.
- To begin to bring down the average number of Non-Motorized Fatalities and Incapacitating Injuries from 13, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas at the locations where Non-Motorized Fatalities and Incapacitating Injuries are occurring throughout the region.
- Safety project development includes the requirement of conducting a Road Safety Audit (RSA) that will provide safety improvements alternatives before the design is initiated.
- Member Communities may choose to contact MRPC for the historic locations of Non-Motorized Fatalities and Incapacitating Injuries within their community.
- MRPC will contact Member Communities concerning the historic locations of Non-Motorized Fatalities and Incapacitating Injuries for further study and potential project development
- Non-Motorized Fatalities and Incapacitating Injury data is updated by MassDOT which will increase or decrease the five-year rolling average. Refer to **Chapter 3: Performance Measures** for further description of **Figure 4-43**.



Figure 4-43: Total Combined Non-Motorized Fatalities & Incapacitating Injuries



Fatals & IIs Data Source: MassDOT

Prioritizing Future Safety Improvement Projects at Fatality Locations

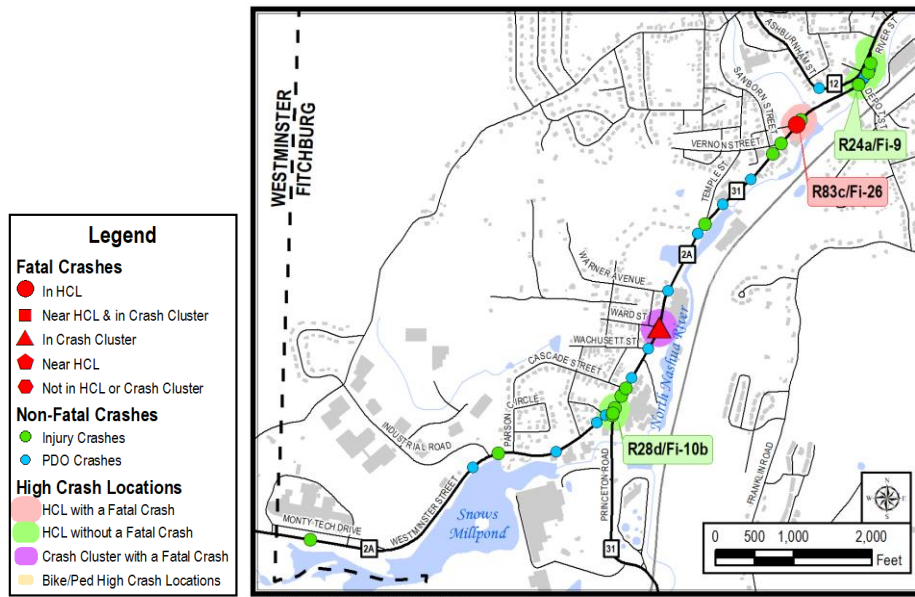
- This prioritization takes into consideration a Fatality's relationship to other crashes.
- A roadway is designated as a Fatal Crash Corridor (FCC) after a Fatality occurs on the segment.
 - The MMPO FCC Table currently contains 42 FCCs
- **Table 4-20** below shows the five FCCs where two or more Fatalities occurred in the region from 2012 – 2014 in the context of their relationship with the number of Injury and Property Damage Only (PDO) crashes that occurred within a one-mile radius of each Fatality.
- **Figure 4-44** below shows the **Route 2A/31, Westminster St** FCC in Fitchburg where three Fatalities occurred.
- Member Communities may choose to contact the MRPC for the FCCs within their community.
- MRPC will contact Member Communities concerning the FCCs for further study and potential project development.
- Fatality data, as with all crash data, is updated by MassDOT.



Table 4-20: Fatal Crash Corridors with Two or More Fatalities

COMMUNITIES	FATAL CRASH CORRIDORS	Fatal	Injury	PDO	Total Corridor Crashes
Ayer	Route 2A & Washington Street	2	18	57	77
Fitchburg	Route 2A/31, Westminster St (Fig 4 below)	3	20	70	93
Fitchburg & Ashby	Route 31, Fitchburg/Ashby	3	19	92	114
Lunenburg & Leominster	Route 13, Electric Ave / Main Street	2	35	121	158
Westminster	Route 2A, State Road West	2	4	6	12
TOTAL CRASHES					454
Total Crashes by Severity		12	96	346	
Percentage of Total Crashes by Severity		2.6%	21.1%	76.2%	

Figure 4-44: Route 2A/31, Westminster St, Fitchburg FCC





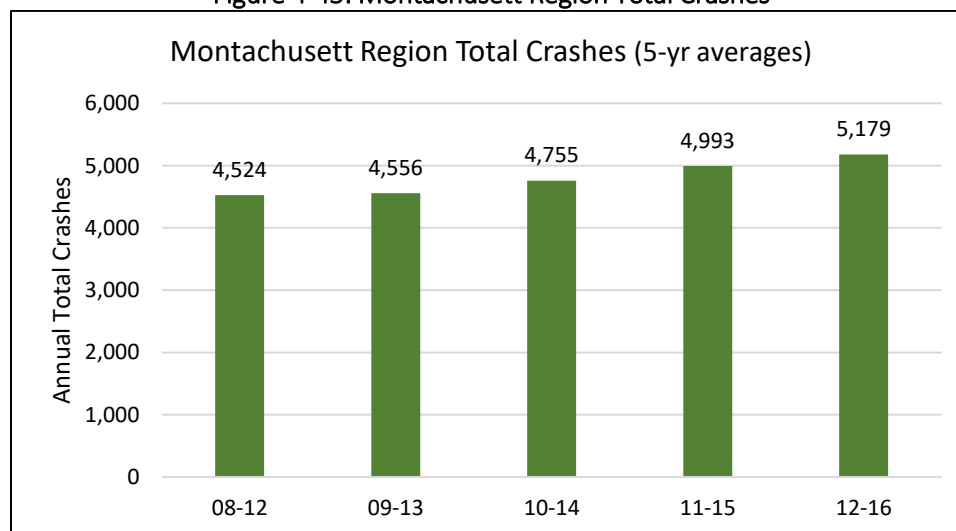
HCLs in Montachusett Member Communities and Region Total Crashes

Montachusett Region Total Crashes

The figure *Montachusett Region Total Crash Totals (5-yr averages)* (**Figure 4-45**) below graphically represents the number of total crashes that occurred on the roadways in Member Communities from 2008 – 2016. The number of crashes is provided as an annual average based on a five-year rolling average.

- **Figure 4-45** shows that the annual average number of Total Crashes that have occurred in the Montachusett Region ranged from 4,524 in 2008 – 2012 five-year period to 5,179 in 2012 – 2016 five-year period which is an annual average increase of 655 in Total Crashes (+14.5%).
- To reduce Total Crashes, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas on corridors and at specific locations in Member Communities.
- Total Crash data is updated by MassDOT which will increase or decrease the five-year rolling average.

Figure 4-45: Montachusett Region Total Crashes



Total Crashes Data Source: MassDOT



HCLs in Montachusett Member Communities

As of April, 2019, MassDOT 2016 HCL information is not available. The most current available MassDOT HCL information is for 2015. The analysis below is based on the 2015 HCL information.

There is a very good reason to continue seeking safety improvement projects at HCLs. There has been significant safety improvement at several former HCLs after projects have been completed. Two of the most notable are no longer listed in the most current MMPO Region HCL Table:

- Central Street (Route 12) at Willard Street intersection, Leominster
- Lunenburg Road (Route 70) at Old Union Turnpike, Lancaster

Future Safety Improvement Projects at HCLs:

- **Table 4-21** below shows that as of the end of 2015, a total of 105 HCLs occurred in Member Communities.
- The HCLs were distributed among 12 Member Communities.
- 82% (86 of 105) of the HCLs occurred in three Member Communities (Fitchburg, Gardner, Leominster).

Table 4-21: HCLs Per Member Communities

COMMUNITIES (Com)	# of HCLs Per Com
ASHBY	1
FITCHBURG	39
GARDNER	12
GROTON	1
HARVARD	1
LANCASTER	7
LEOMINSTER	35
LEOMINSTER & FITCHBURG (City Line)	1
LUNENBURG	1
SHIRLEY	1
STERLING	4
TOWNSEND	1
WINCHENDON	1
MMPO REGION TOTAL:	105



- **Table 4-22** below is a list of the top 18 HCLs (of 105 HCLs) in the region.
- An HCL needed a combination of at least eight Injury crashes and 31 Property Damage Only crashes to be included in **Table 4-22**.
- 67% (12 of 18) occurred in two Member Communities (Fitchburg and Leominster).
- 17 HCLs were forwarded from 2014 while one HCL was added to the Table.
- In 2015-
 - one HCL coincided with a Bike HCL
 - one HCL coincided with a Ped HCL
- Road Safety Audits have been completed at Six HCLs
- Projects have either been initiated or completed at seven HCLs
- To continue to improve safety at HCLs, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas.
- Safety project development includes the requirement of conducting a Road Safety Audit (RSA) that will provide safety improvements alternatives before the design is initiated.
- Member Communities may choose to contact the MRPC for the HCLs within their community.
- MRPC will contact Member Communities concerning the HCLs for further study and potential project development.
- HCL data is updated by MassDOT which may add locations as HCLs, or previous year HCLs may be eliminated.



Table 4-22: Top 18 HCLs in Member Communities

COMMUNITIES	LOCATION NAME	2014 TABLE	BIKE HCL 2015	PED HCL 2015	Top 200 2015	Top 200 2016*	RSA Completed	Project Initiated or Completed
FITCHBURG	WATER STREET (SR12 NB) at WANOOSNOC ROAD	•			•	•		
	BOULDER DRIVE at MAIN STREET (SR2A EB)	•		•			•	•
	SOUTH STREET at WANOOSNOC ROAD	•			•		•	
	WHALON STREET at PIERCE AVENUE	•			•			
	WATER STREET (SR12 NB) at BIRCH STREET	•						
	FRANKLIN ROAD at OAK HILL ROAD	NO					•	•
GARDNER	PEARSON BOULEVARD at UNION SQUARE	•			•			
	TIMPANY BOULEVARD (SR68 NB)	•						
HARVARD	AYER ROAD (SR110 EB) at CONCORD TURNPIKE (SR2 EB)	•						•
LANCASTER	ROUTE 2 (SR2 EB) at JACKSON ROAD	•						•
LEOMINSTER	ROUTE 2 (SR2 EB) at RAMP-RT 12 NB TO RT 2 WB	•						
	NORTH MAIN STREET (SR12 NB)	•			•			
	MAIN STREET (SR13 NB) at NASHUA STREET	•	•		•		•	•
	NORTH MAIN STREET (SR12 NB) at HAMILTON STREET	•					•	•
	ROUTE 2 (SR2 EB) at MEAD STREET	•						
	ROUTE 2 (SR2 EB) at MERRIAM AVENUE	•						
SHIRLEY	TOWNSEND ROAD at GROTON ROAD (SR225 EB)	•						
STERLING	LEOMINSTER ROAD (SR12 NB) at CHOCKSETT ROAD^	•					•	•

*Top 200 statewide (MassDOT). MassDOT changed the HCL methodology for 2016

^roundabout project recently completed and will need to be evaluated in the future

- **Table 4-23** below includes 12 HCLs (of the remaining 87 HCLs) that coincided with the remaining Bike HCLs or Ped HCLs in Member Communities.
- The Athol location was an HCL prior to, but not in, 2015. However, the location coincided with a Bike HCL and a Ped HCL in 2015.
- To improve safety at HCLs or a location with a Bike HCL and/or a Ped HCL, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas.
- Safety project development includes the requirement of conducting a Road Safety Audit (RSA) that will provide safety improvements alternatives before the design is initiated.
- Member Communities may choose to contact the MRPC for the HCLs/Bike HCL/Ped HCL within their community.



- MRPC will contact Member Communities concerning the HCLs/Bike HLC/Ped HCL for further study and potential project development.
- HCL/Bike HLC/Ped HCL data is updated by MassDOT which may add locations as HCLs/Bike HLC/Ped HCL, or previous year HCLs/Bike HLC/Ped may be eliminated.

Table 4-23: HCLs with Coinciding Bike and/or Ped HCL in 2015

COMMUNITIES	LOCATION NAME	2014 TABLE	BIKE HCL 2015	PED HCL 2015	RSA Completed	Project Initiated or Completed
ATHOL	MAIN STREET (SR 2A EB) at EXCHANGE STREET	•	•	•	<input type="checkbox"/>	<input type="checkbox"/>
FITCHBURG	MAIN STREET (SR2A EB)	•		•	<input type="checkbox"/>	<input type="checkbox"/>
	MAIN STREET at MILL STREET	•		•		
	MAIN STREET at WATER STREET	•		•	•	•
	MAIN STREET at CUSHING STREET	•		•		
GARDNER	MAIN STREET (SR68 NB) at WILLOW STREET	•		•	<input type="checkbox"/>	<input type="checkbox"/>
	MAIN STREET (SR68 NB) at TIMPANY BOULEVARD (SR68	•		•	•	•
	TIMPANY BOULEVARD (SR68 SB)	•		•		
LEOMINSTER	WEST STREET at PARK STREET	•		•		
	MAIN STREET (SR12 NB) at MONUMENT SQUARE (SR12	•		•		<input type="checkbox"/>
	MAIN STREET (SR13 NB) at PROSPECT STREET	•	•		•	•
	MAIN STREET (SR13 NB) at RIVER STREET	•	•		•	•
	MECHANIC STREET at WATER STREET	•		•	•	•

*not an HCL in 2015

Safety Trends

Even as the regional population and number of vehicles on the roadways continues to increase, total fatality crashes have not increased. Incapacitating injury crashes decreased significantly but non-motorized crashes increased slightly and total overall crashes continue to rise. It has been proven that the safety projects have resulted in a reduction of crashes and the projects mentioned above are now no longer listed on the high crash listing. It is because of this that serious crash locations will continue to be a focus of the safety planning efforts for the MRPC.



Safety Recommendations

Future Safety Improvement Projects at Fatality Locations

- **Table 4-24** below shows five Fatal Crash Corridors (FCCs) where two or more Fatalities occurred in Member Communities from 2012 – 2014.
- The MRPC maintains an FCC Table that currently contains 42 FCCs.
- No RSAs or Projects have been undertaken at FCCs.
- Member Communities may choose to contact the MRPC for the FCCs within their community.
- MRPC staff will contact Member Communities concerning the FCCs for further study and potential project development.

Table 4-24: Fatal Crash Corridors with Two or More Fatalities

COMMUNITIES	FATAL CRASH CORRIDORS	Fatal	Injury	PDO	Total Corridor Crashes	RSA Completed	Project Initiated or Completed
Ayer	Route 2A & Washington Street	2	18	57	77		
Fitchburg	Route 2A Westminster Street	3	20	70	93		
Fitchburg &	Route 31, Fitchburg/Ashby (south)	3	19	92	114		
L & L*	Rt 13 Electric Ave Main Street	2	35	121	158		
Westminster	Route 2A State Road West	2	4	6	12		
<i>TOTAL CRASHES</i>					454		
<i>Total Crashes by Severity</i>		12	96	346			
<i>Percentage Total Crashes by Severity</i>		2.6%	21.1%	76.2%			

*Lunenburg & Leominster

Future Safety Improvement Projects at High Crash Locations (HCLs):

- **Table 4-25** below is a list of the top 13 HCLs in Member Communities without a Project.
- An RSA has been completed at one HCL.
- **Table 4-26** below is a list of the seven HCLs (of the remaining 87 HCLs) that coincided with the remaining Bike HCLs or Ped HCLs in Member Communities without a Project. No Project has been undertaken at the Athol HCL where coinciding Bike and Ped HCLs occurred.



- The MRPC maintains an HCL Table that currently contains 105 HCLs.
- To continue to improve safety at HCLs, safety improvement projects need to be considered for development based on the strategies and actions found in the SHSP applicable Emphasis Areas.
- Safety project development includes the requirement of conducting a Road Safety Audit (RSA) that will provide safety improvements alternatives before the design is initiated.
- Member Communities may choose to contact the MRPC for the HCLs within their community.
- MRPC staff will contact Member Communities concerning the HCLs for further study and potential project development.

See the **Financial Analysis** chapter for the estimated cost of the projects listed in the FCC Table and the HCC Table.

Table 4-25: Top 13 HCLs in MMPO Member Communities

COMMUNITIES	LOCATION NAME	2014 TABLE	BIKE HCL 2015	PED HCL 2015	Top 200 2015	Top 200 2016*	RSA Completed
FITCHBURG	WATER STREET (SR12 NB) at WANOOSNOC ROAD	•			•	•	
	BOULDER DRIVE at MAIN STREET (SR2A EB)	•		•			□
	SOUTH STREET at WANOOSNOC ROAD	•			•		•
	WHALON STREET at PIERCE AVENUE	•			•		
	WATER STREET (SR12 NB) at BIRCH STREET	•					
	<i>FRANKLIN ROAD at OAK HILL ROAD</i>	<i>NO</i>					□
GARDNER	PEARSON BOULEVARD at UNION SQUARE	•			•		
	TIMPANY BOULEVARD (SR68 NB)	•					
LEOMINSTER	ROUTE 2 (SR2 EB) at RAMP-RT 12 NB TO RT 2 WB	•					
	NORTH MAIN STREET (SR12 NB)	•			•		
	ROUTE 2 (SR2 EB) at MEAD STREET	•					
	ROUTE 2 (SR2 EB) at MERRIAM AVENUE	•					
SHIRLEY	TOWNSEND ROAD at GROTON ROAD (SR225 EB)	•					

*Top 200 statewide (MassDOT). MassDOT changed the HCL methodology for 2016



Table 4-26: HCLs with Coinciding Bike and/or Ped HCL in 2015

COMMUNITIES	LOCATION NAME	2014 TABLE	BIKE HCL 2015	PED HCL 2015	RSA Completed
ATHOL	MAIN STREET (SR 2A EB) at EXCHANGE STREET*	•	•	•	<input type="checkbox"/>
FITCHBURG	MAIN STREET (SR2A EB)	•		•	<input type="checkbox"/>
	MAIN STREET at MILL STREET	•		•	
	MAIN STREET at CUSHING STREET	•		•	
GARDNER	MAIN STREET (SR68 NB) at WILLOW STREET	•		•	<input type="checkbox"/>
	TIMPANY BOULEVARD (SR68 SB)	•		•	
LEOMINSTER	WEST STREET at PARK STREET	•		•	
	MAIN STREET (SR12 NB) at MONUMENT SQUARE (SR12 NB)	•		•	

*not a HCL in 2015



BICYCLE & PEDESTRIAN

Increasing concern for air quality, energy conservation, rising fuel costs, and the health benefits of getting outdoors is generating continued interest in multi-modal transportation in the Montachusett Region and throughout the state. In fact, as part of the public outreach that was done for this RTP, pedestrian and bicycle accessibility came up within the top four of most important categories for the region to address. The MRPC has been working toward a more sustainable transportation system by educating and promoting transportation mode choice throughout the region. This section will review existing and proposed Bicycle and Pedestrian transportation alternatives while focusing on the importance of mode shift.

Existing Infrastructure

Bikeways

Bikeways are special routes and/or facilities established to facilitate the movement of bicycles as an energy efficient transportation and/or recreational mode of travel. Bikeability is a measure of how well an area encourages biking for everyday trip purposes.

In 2019 MassDOT updated the “[Massachusetts Bicycle Transportation Plan](#)”. This plan consists of an overview, a roadmap which includes the vision, goals and principles, as well as initiatives and an action plan. As a part of this update development, MassDOT also developed the “Municipal Resource Guide for Bikeability” to go along with the updated Bike Plan. This plan is meant to assist communities in enhancing community bikeability and includes additional resources.

The Vision, Goals and Principles identified in the updated Bike Plan include –

Vision – Biking in Massachusetts will be a safe, comfortable, and convenient option for everyday travel.



- Goal 1 – Create high-comfort connected bike networks for people of all ages and abilities.
- Goal 2 – Increase the convenience and attractiveness of everyday biking.
 - Principle 1 – Treat all people the same regardless of travel mode
 - Principle 2 – Address gaps and barriers known to discourage everyday biking
 - Principle 3 – Lead by example and partner with municipalities to advance everyday biking

MassDOT developed a Capital Investment Plan (CIP) to manage funding that works towards this vision. This plan includes projects such as small-scale maintenance projects to large-scale multimodal modernization projects. All projects are scored based on their anticipated benefits in order to determine investment priorities. Additional programs include Complete Streets Funding Program, the Chapter 90 Program, the Multi-Use Pathways Program and the MassTrails Funding Program.

Bikeway Projects in the Montachusett Region include –

See Map “Bikeway Projects in the Montachusett Region” in the appendix of this document.

- **Mass Central Rail Trail (MCRT)**– (Clinton/Sterling) This trail has been extended to Sterling Center along the Fitchburg & Worcester RR right-of-way, which ran from Sterling Junction through Sterling Center to Pratt's Junction. An estimated 21 miles of this trail are already open. The Sterling section is complete from Gates Road (where there is parking) north across the Quag bridge to the Sterling Cider Mill (where there is parking) at Waushacum Avenue/Newell Hill Road. It is hoped that the Sterling rail trail can be extended through Sterling Center north to the Police Station. MasDOT's recent construction of a roundabout at Route 12 and Chocksett Road, a second roundabout at I-190 Exit 6, with lane reductions, and additional pedestrian and bicycling accommodations offers the potential for safe extension of the route further north. The general direction of the Sterling Spur of the MCRT offers the potential to connect to the recently-funded Twin Cities Rail Trail in Fitchburg/Leominster.



The Mass Central Rail Trail is planned to extend from Northampton to Boston, and has been completed locally from Rutland to West Boylston (with some gaps). Part of the Sterling trail may likely serve to connect the Mass Central Rail Trail from West Boylston around to the north of the Wachusett Reservoir to Clinton, Berlin, Hudson, etc. and to Boston.

The Clinton/Berlin areas are important components of the MCRT with the 1,000-foot tunnel and the two significant bridges in Clinton and Berlin that would be restored as a part of the over-all trail. The MCRT would be the longest single RR based rail trail in the northeast and at Northampton it is going to connect directly with a North/South trail to New Haven, CT making for a totally sustainable tourism experience for families. Boston to Northampton on the MCRT and then south to New Haven on the Farmington Canal Greenway and then take passenger rail back to Boston.

- **Nashua River Rail Trail** – (Ayer/Groton) This trail is a former railroad right of way that travels 11 miles through the towns of Ayer, Groton, Pepperell and Dunstable. Managed by the Department of Conservation and Recreation, the trail was officially opened to the public on October 25, 2002.



- **North Central Pathway** – (Gardner/Winchendon) This recreational trail connects the communities of Gardner and Winchendon. The trail was broken down into phases to ease the development process.
 - Phase 1 – Dedicated paved trail from Park Street past Crystal Lake to Mount Wachusett Community College (MWCC)
 - Phase 2 – Using existing roads from MWCC, Kelton & Stone Streets to Route 140. This portion of the trail exists only as an on-street connection with signage. Once Phase 6 is completed, this phase will no longer be needed.



- Dunn Park Spur – Existing roads from MWCC to Dunn Park with dedicated connector at the Middle School
- Phase 3 – 3.2 miles paved from Route 140 to Old Gardner Road in Winchendon
- Phase 4 – Downtown Winchendon to Glenn Allen Street
- Phase 5 – \$1.7 Million-dollar project that consists of 2.1 miles starting at North Ashburnham Road to Glennallen Street (Rt. 202).
- Phase 6 – A \$3.1 Million-dollar bridge over Route 140 that is currently in the design process. It is listed on the Draft 2020-2024 TIP for year 2022.
- Phase 7 – Proposed along Park Street to old rail bed, ending where Phase 3 begins.



When completed, this trail will provide the region with a link to many other recreational sites and activities including Dunn Pond, Gardner High School Athletic Facilities, Mount Wachusett Community College, Gardner Municipal Golf Course, the Gardner Veterans Rink, Clark YMCA, Grout Park and many more.

- **Twin Cities Rail Trail** – This 4.5-mile rail trail is currently under the design phase at the time of this document write up. The trail will connect downtown Fitchburg to downtown Leominster via the former CSX railroad bed that parallels Route 12. Due to the complex nature of the trail design, the project was broken up into two phases.



- Phase 1 – This phase will begin to be constructed during FY2020 and will be the main portion of the trail connecting the area of First Street in Fitchburg down to Carter Park in Leominster. This portion of the trail will have two major bridges and many road crossings.
- Phase 2 - The second phase will consist of a bridge over the Nashua River and existing railroad tracks over to the Intermodal station in Fitchburg and the other end of this phase will continue the trail through Carter Park to Mechanic Street in Leominster.



This phase of the trail is extremely important as it will connect trail users directly to the commuter rail as well as MART transit services.

It is believed that this trail will provide a much-needed multi-modal connection from one city center to the other by providing many different populations, including environmental justice neighborhoods, access to recreation, shopping, medical centers as well as to transit options.

- **Ashburnham Rail Trail** – (Ashburnham) Ashburnham Rail Trail (ART) Inc., a private not for profit, is working along with the Town of Ashburnham toward a goal of a safe, non-motorized route between Ashburnham Center and South Ashburnham. This relatively flat, recreational trail will benefit residents and visitors by providing a safe route along a very busy 2.5-mile section of Route 101 where sidewalks are currently unavailable due to geographic constraints.

ART, Inc. is working toward two major aspects of this project:

1. Working with the Town as they complete the engineering and design of the 2.5-mile section of the Rail Trail, which will provide users convenient access to the many existing businesses and service of Ashburnham center, as well as providing excellent opportunity for future growth in this area.



Along the route, the Rail Trail would offer access to the Post Office, municipal soccer fields, J.R. Briggs Elementary School and the William J. Bresnahan Scouting and Community Center. The Town has purchased the abandoned railroad bed and both the Town and volunteers maintain and improve the trail.



2. At the South Ashburnham termination of the current Rail Trail, the ultimate goal is to connect the Ashburnham Rail Trail to the North Central Pathway of greater Gardner and Winchendon via the abandoned Cheshire Branch of the former Boston & Maine Railroad. With this connection, Ashburnham would be a major entryway to a tri-state network of rail trails.



Progress on the 2.5-mile section of the trail has been difficult, slow and expensive. However, the piece described above is vital to the overall goal of the ART, Inc. and Ashburnham's future economic development.

To date, the Town has acquired ownership and/or rights to the majority of segments that comprise the Rail Trail. In 2007 and with support of Ashburnham residents at Town Meeting, a 25% Design Plan Technical Proposal was completed for one section of the Rail Trail and an application for an Abbreviated Notice of Resource Area Delineation was submitted to the Ashburnham Conservation Commission. To move the project forward, the Department of Transportation must deem the project viable. If so, the Town must complete 100% of the design plan for the entire 2.5-mile route before receiving state funding to complete the project.

Challenges that lie ahead for completion of the Rail Trail include:

- Parking and access point delineations
- Clearing, grading and surface preparation
- Bridge surface reconstruction at Whitney Pond
- Bridge construction or bypass at the washed-out gulley behind the soccer fields
- Road crossing measures at Rt. 101
- Municipal, State and Federal permitting
- Applying for and receiving state and federal grant funding



The financial and economic situation has left Ashburnham and ART, Inc. with few options of moving forward with these expensive and major projects. Funding and grant money are limited for such a short but vital section of rail trail. That is why the Cheshire Line is such an important piece of the plan.

With greater awareness of the incredible asset they have in Ashburnham, ART, Inc. hopes to keep their dream of a Tri-State Rail Trail alive.

- **Squannacook River Rail Trail** – (Townsend/Groton) The construction of the Squannacook River Rail Trail is on track to begin in November 2019. The capital campaign has raised \$134,000, and anticipates passing its \$150,000 goal before November. As of June 1, 2019, permitting is completed at the state level and in the town of Groton, and is nearing completion in Townsend. Because the rail trail passes through turtle habitat, construction is limited to the November to March time period.

When completed, the Squannacook River Rail Trail will be 3.7 miles long through the towns of Townsend and Groton, running between the Bertozzi Wildlife Area in Groton and Depot Street in Townsend center. This multi-use recreational trail will parallel the scenic Squannacook River and will connect the town centers of Townsend Harbor and Townsend Center, two historical districts, two shopping centers, the North Middlesex Regional High School, and several major open space/ conservation areas (notably Townsend State Forest and the Squannacook River and Ash Swamp Wildlife Management Areas). In Townsend, this trail closely parallels the bicycle and pedestrian unfriendly Route 119, providing a long-desired safe alternative to that state highway for non-motorized travel. The surface will be stone dust, with a 10-foot width.

The rail bed is owned by the MBTA, and was leased in March 2015 by the non-profit Squannacook Greenways. Squannacook Greenways was the first non-profit in the state of Massachusetts to sign a lease to construct a rail trail with the MBTA. Much more information is available at sqgw.org.



In 2019, the Squannacook Greenways, Inc. received MassTrails funding to continue efforts in project development. This particular funding will be used for a) tasks required for compliance with the Orders of Conditions received from the Groton and Townsend Conservation Commissions, b) trailside signage to display safety, regulatory, accessibility, and resource protection information, c) trailside appurtenances including kiosk, bollards and benches.



Pedestrians

Like the roadway projects in the region, pedestrian facilities in the Montachusett Region are also limited due to a lack of funding. During these tough economic times, communities tend to focus their monies elsewhere. Local communities have expressed interest and support of improved pedestrian ways, often in connection with potential bikeways, but they lack adequate funding for the design and construction of these facilities.

As mentioned in the bicycle section above, in addition to the Massachusetts Bicycle Transportation Plan, the state of Massachusetts also created the [Massachusetts Pedestrian Transportation Plan](#) in 2019.

The Vision, Goals and Principles identified in the updated Pedestrian Plan include:

Vision – All people in Massachusetts will have a safe, comfortable, and convenient option to walk for short trips.

- Goal 1 – Eliminate pedestrian fatalities and serious injuries



- Goal 2 – Increase the percentage of short trips made by walking

Principles

1. Value people walking and their travel needs, especially the most vulnerable – children, elderly, people with disabilities – to ensure they can walk safely.
2. Prioritize improvements for people walking by proactively addressing gaps and barriers that discourage walking and are known to increase the likelihood of crashes.
3. Lead the Commonwealth in meeting the pedestrian plan goals by supporting local municipalities and other agencies to increase everyday walking.

In the 2020 Montachusett Unified Planning Work Program (UPWP), there is a Regional Bike and Ped plan task. This task will include the development of both a Regional Bike Plan and a Regional Pedestrian plan. The MRPC will be sure to incorporate the data from the statewide plans into both of these documents as well as the information and recommendations that were included within this Regional Transportation Plan.

Sidewalks

The majority of the communities in the Montachusett Region are rural in nature with small downtown areas. The areas typically contain sidewalks within the major activity centers. The urban communities have a more extensive infrastructure within the central business districts that facilitates pedestrian circulation. Efforts have been made to improve pedestrian access by means of sidewalk improvements, crosswalk delineation, and construction of handicapped ramps, improved lighting, and connections to municipal parking lots. Designated fixed route bus stops are also common along the sidewalks providing a connection between different modes of travel.

Trails

Using Unified Planning Work Program (UPWP) funds, the MRPC was able to conduct a region wide trail inventory starting in 2005 and finishing in 2011. Through public outreach, local meetings and data collection, the MRPC was able to gather trail data for each of their 22 communities plus Devens. This data was broken down into three categories:



- Existing Formal – Trails that are open to the public.
- Existing Informal – Trails that exist but are not open to the public. These trails are likely on private or environmentally sensitive land.
- Potential – These are trails that are not currently in existence but that have potential for development in the future.

In 2012, the trail inventory data was updated through community outreach and field investigation. A Montachusett Regional Trail Guide was then created with the updated trail data in 2014. This guide includes all of the Existing Formal Trails along with local cultural and historical points of interest. The first guide consisted of 10,000 printed copies that were distributed throughout the region. These guides were so popular that they were all dispersed in just over a few years.

In 2019, the MRPC, with the help of the Montachusett Regional Trails Coalition (MRTC), updated existing trail data once again and published an updated Montachusett Regional Trail Guide. At the time of this document, the MRPC currently has approximately 750 miles of existing formal trails throughout the region.

Resources & Funding

MassDOT developed the Capital Improvement Plan (CIP) which will allow the state to develop and implement the Commonwealth's transportation investment strategy. This plan includes a magnitude of projects and project types – from small-scale maintenance projects to large-scale multimodal modernization projects. All projects listed in the CIP are subject to the MassDOT Healthy Transportation Policy Directive which requires the incorporation of walking, bicycling, and transit in all projects.

Funding sources for multi-modal projects include:

- Complete Streets
- Chapter 90
- Shared Use Path Program



- Safe Routes to School
- MassTrails Grants

Working with the Montachusett Regional Trail Coalition

The MRPC is partnered with the Montachusett Regional Trail Coalition (MRTC) in support of their mission “To advance local and regional connectivity, community commitment, and enthusiasm for trails in the Montachusett Region.” This mission was re-established during a strategic planning process that was made possible in part by a grant from the Community Foundation of North Central Massachusetts. During this process, a vision statement, guiding principles and goals were also established-

Vision Statement

MRTC envisions:

- fostering trail connections in and around the Montachusett region;
- serving as a centralized resource for regional trail planning;
- helping our communities see trails as essential infrastructure.

Guiding Principles

MRTC advances the development of diverse, high-quality shared-use trails and greenways that are sustainable and accessible:

- Collaboration - Seek participation of diverse stakeholders who represent the communities we serve.
- Connectivity - Advocate for trail linkages within and between communities to bring people and places together in the region.
- Accessibility - Provide trail experiences for people of all abilities and ages.
- Sustainable Development - Commit to developing trails that protect the environment and meet user needs through best management practices.
- Economic Vitality - Support the local economy by putting North Central Massachusetts on the map as a recreational and tourist destination.



- Healthy Lifestyles - Encourage the health, fitness, and well-being of residents by providing multimodal trail opportunities.
- Awareness & Education - Work to make trails a part of the community fabric, connect people with the natural world, and provide outdoor learning experiences for people of all ages.

Goals

- Goal 1 – Identify, secure, and appropriately utilize the human and financial resources necessary to carry out the work of the strategic plan.
- Goal 2 – Develop and implement a marketing plan that targets the proper audiences, strengthens brand awareness, and supports MRTC's mission.
- Goal 3 – Promote trail connectivity and usage throughout the region by identifying and acting upon opportunities for outreach, education, and advocacy.

The MRTC has been instrumental in gaining public involvement, education, and working with MRPC to identify trail gaps and priorities. Some of the significant trail projects that have been identified include:

1. Connecting the Twin Cities Rail Trail from its terminus in Leominster south to Sterling where it would connect to the Sterling Spur and the Mass Central Rail Trail.
2. Connecting the North Central Pathway in Winchendon to the Ashburnham Rail Trail to the south
3. A Gardner to Athol connection that has yet to be determined

Sidewalk Inventory & Pedestrian/Bicycle Connections for MART Bus Routes

This study focused on the Cities of Fitchburg, Gardner and Leominster, in particular, the major fixed bus routes within these communities. The goal was to find and prioritize areas where there are gaps in accessing the bus routes. The study area was defined by the areas within ¼ mile of the bus routes.



As part of the process, a sidewalk inventory was conducted within this study area, and trail data was also included to show transportation alternatives. Data was gathered regarding special populations and points of interest were noted. All of these data sets were mapped and assisted in the prioritization of key areas. See Map “Pedestrian & Bicycle Priority Areas” in the appendix of this document.

Priority areas for each community included:

- Fitchburg State University (Fitchburg) – This area was listed as one of the top bus routes (Route 4), is located in both of the top five specialty population block groups, and incorporates a major continuing education facility in the area. John Fitch Highway is also a major roadway in the City of Fitchburg (12,000-20,000 avg. vehicles per day). There is also recreational trails nearby at Coolidge Park and Fitchburg State University’s athletic fields.
- Leominster Hospital (Leominster) – This area incorporates both elderly and disabled populations, is located on one of the top bus routes (Route 2) and travel routes (North Main Street (Rt. 12) - average of 15,000-30,000 vehicles per day), includes a major medical facility and shopping plazas as well as low income and/or elderly housing facilities.
- Johnny Appleseed Plaza (Leominster) – This is a large area that mostly encompasses Central Street (Route 12) along bus route 9 in the area of Johnny Appleseed Plaza and Willard Street, which connects over to the Walmart shopping area. This section includes both top populations of elderly and individuals with disabilities, low income and/or elderly housing facilities, shopping plazas, and a possible trail connection on the east side of the plaza.
- Parker Pond (Gardner) – This area is located in both of the top five specialty population block groups and is located in between two major routes, Route 68 and 101. The smaller



side streets to the east of Parker Pond do not currently have sidewalks. The bus route connects the two routes via Foss Road and Robillard Street. Connections from the smaller side streets near Parker Pond to the bus route and major roadways would be ideal.

- Timpany Plaza (Gardner)– The area just north of Timpany Plaza is listed as having both disabled and elderly populations and is one of the top 5 block groups for elderly residents. It is located within walking distance to the bus route along both Timpany Boulevard and Pearson Boulevard. Both of these locations have many points of interest such as shopping and restaurants and recreational fields/playgrounds.
- Gardner Plaza Shopping Center (Gardner) – The Gardner Plaza is located just off of Route 2 to the north. There are shops and restaurants located here as well as along Pearson Boulevard. There are also two nursing homes and an elementary school located within close proximity. The main focus area is east of Elm Street which is just north of the plaza.

Trends

The desire for more multi modal transportation options within the Montachusett Region has increase significantly over the past few years. More people are seeing the value in having these types of transportation options and are also advocating for the development of new, safer, bicycle and pedestrian facilities throughout the region. Programs such as Complete Streets and Safe Routes to School are gaining support from our communities -

- Complete Streets – 17 out of 22 communities have approved policies, and 8 have received funding for multi modal projects
- Safe Routes to School – 16 out of 22 communities are partners with the program

The State is also contributing financially to trail projects through the MassTrails Grant program. This program provides grants to support recreational trail and shared use pathway projects across the Commonwealth. These grants are reviewed and recommended by the Massachusetts Recreational Trails Advisory Board and the Commonwealth's Inter-Agency Trails Team. There are two funding sources for the grant –



1. Recreational Trails Program (RTP) – these grants are federally funded through the Federal Highway Administration (FHWA), administered at the State level, and provide funding for the development and maintenance of recreational trail projects, both motorized and non-motorized.
2. Commonwealth Trails Grants – “These grants are supported by the State’s annual Capital Investment Plan (CIP) and aim to help communities design, create and maintain off-road shared-use pathway connections between where Massachusetts residents live, learn, work, shop and recreate, especially by building out the longer distance regional networks of multi-use pathways across the state and filling in critical gaps in existing networks, or overcoming current barriers to connectivity.” (www.mass.gov/guides/masstrails-grants)

In 2019, five communities within the Montachusett Region received MassTrails funding – Athol, Fitchburg, Groton, Lunenburg, and Townsend.

Another notable funding source is the Congestion Mitigation and Air Quality Improvement Program (CMAQ) which provides federal funding for states to support projects and programs intended to improve air quality and reduce traffic congestion. Example projects include – traffic flow improvements, public transit services and facilities, bicycle and pedestrian facilities and programs, rideshare activities, etc. The Twin Cities Rail Trail project that is currently scheduled in the FY 2020 & FY 2021 Transportation Improvement Plan was funded through this funding source.

Recommendations

As these multi modal trail and bikeway projects continue to be studied and developed, funding is always a major component. Increasing the existing funding programs and available dollar amounts are always critical to further these regionally significant projects. Additionally, continuing the study and planning of trail related developments in order to identify priority trails and trail connections are also key for alternate modes of transportation.



ECONOMIC VITALITY

The MRPC is committed to the goal of improving economic vitality in the Montachusett Region by focusing on improving the transportation infrastructure that services the diverse economic drivers within the Region. The *Economic Vitality Needs* dialog below provides a snapshot of the existing transportation infrastructure critical to the economic vitality of the Montachusett Region that should be the focus of future improvement.

Economic Vitality Needs

One of the ten federal requirements for the Massachusetts 2018 Freight Plan, as well as for all state freight plans across the United States, was to develop two freight corridor listings:

- **Critical Rural Freight Corridors (CRFCs):** Public roads not in an urbanized area which provide access and connection to the *Primary Highway Freight System* (PHFS) and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities.
- **Critical Urban Freight Corridors (CUFCs):** Public roads in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities.

Purpose and Implications of CUFCs and CRFCs

MRPC Highways that Facilitate Regional Freight Traffic for the MRPC Region (Regional Freight Corridors):

Massachusetts highways that facilitate inbound and outbound freight traffic in Massachusetts:

- Five major Interstate corridors: Interstates 84, 90, 91, 93, and 95;
- Seven auxiliary routes: Interstates 190, 290, 291, 391, 295, 395, and 495;
- Seven major non-Interstate corridors include US-3, US-6, MA-2, MA-3, MA-24, MA-128, and MA-146

Of the above Highways, the following are Regional Freight Corridors:

- I-190 and MA-2



- I-190 and MA-2 form an interchange in Leominster at MA-2 Exit 33 and I-190 Exit 8

The following highways provide access and egress for the Regional Freight Corridors from outside the MRPC Region:

- For MA-2 - I-495 at MA-2 at Exit 29 in Littleton, I-91 at MA-2 at Exit 27 in Greenfield;
- For I-190 - I-290 at I-190 at Exit 19 and Exit 20 in Worcester

I-91 also provides freight traffic access and egress for the MRPC Region at Exit 16 for Route 202

I-495 also provide freight traffic access and egress for the MRPC Region at the following Exits:

- I-495 Exits - Exit 26 for Route 62; Exit 27 for Route 117; Exit 28 for Route 111; Exit 30 for Route 2A/110; and Exit 31 for Route 119

Regional Freight Corridors, CRFCs and CUFCs and National Highway Freight Network Funding

- The FHWA defines the National Highway Freight Network (NHFN) for the purpose of prioritizing through routes critical to interstate commerce;
- The Regional Freight Corridors are included in the NHFN;
- The MRPC Region CRFCs and CUFCs (listed below) provide connectivity to the NHFN for manufacturers and consumers in the MRPC Region;
- The Montachusett MPO used its own analysis and discretion to designate their mileage allotment to develop MRPC Region CRFCs and CUFCs to address the greatest regional freight needs;
- The CRFC and CUFC designations increase NHFN in Massachusetts allowing expanded use of National Highway Freight Program (NHFP) formula funds and FASTLANE Grant Program funds for eligible projects that support identified national goals (23 U.S.C. 167(b), 23 U.S.C. 117(a)(2));
- MassDOT directs resources (funds) toward projects that will improve system performance and the efficient movement of freight on the NHFN in Massachusetts;
- By programming these projects using a mix of NHFP and other funds, MassDOT will advance projects on the roadway segments deemed most critical to freight needs by the MPOs;



- Additionally, each project is screened to make sure it meets at least one statutory requirement before NHFP funds are applied;
- After the development of the STIP and CIP, the project list is updated annually

The following CRFC and CUFC freight corridors received MPO endorsement in 2017:

- 1) **Jackson Road (CUFC)** in Harvard/Devens connects Route 2 to the developing industrial and freight centers at Devens and indirect access to the railroad freight terminal
- 2) **Barnum Road (CUFC)** in Ayer/Devens provides indirect access to the developing industrial and freight centers at Devens and direct access to the railroad freight terminal
- 3) **Princeton Road (Route 31) (CUFC)** in Fitchburg allows direct access to the multi-modal facility at Wachusett Station north of Route 2. South of Route 2 it provides access to Pine Tree Power, a biomass power plant.

Figure 4-46 Route 31 Railroad Bridge in Fitchburg



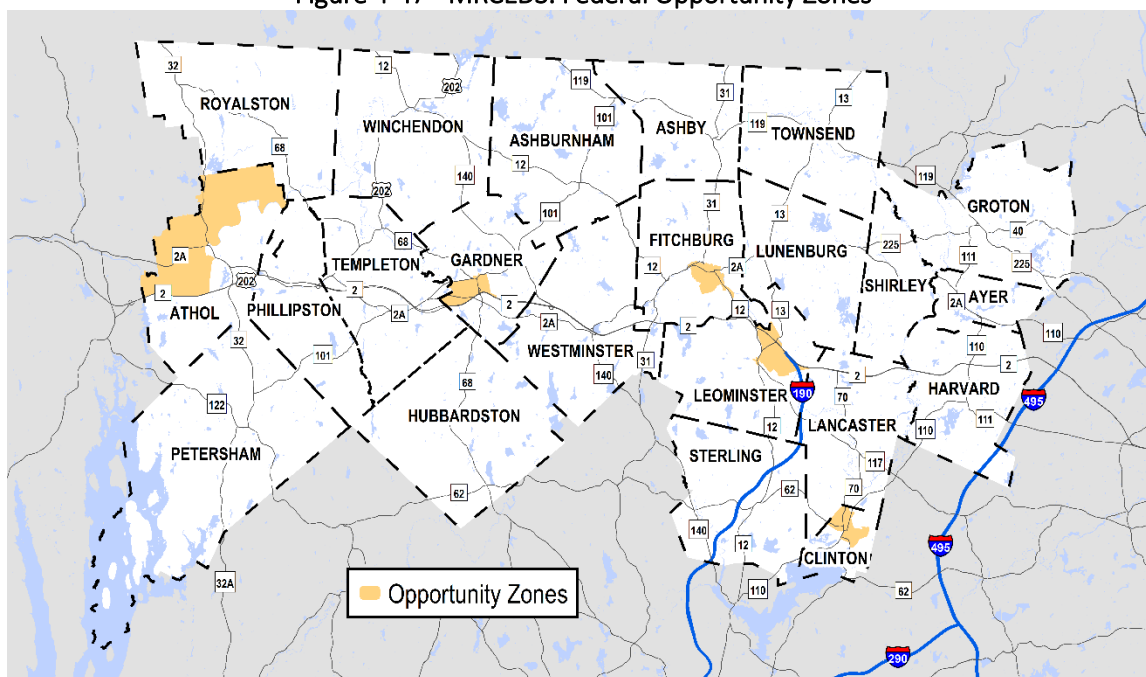
- 4) **Lunenburg/Fort Pond Road (Route 70) (CUFC)** in Lancaster/Lunenburg allows access from Route 2 to mining facilities at P.J. Keating, a manufacturer of construction earth products and installer of hot mix asphalt, and its mines and truck terminals.
- 5 & 6) **Route 2 (CRFC)** segments in Harvard, Phillipston and Templeton. Route 2 is the main east-west corridor in the MRPC region. It is parallel to significant freight and commuter rail infrastructure as well as connecting the regional industrial centers of Devens, Leominster, Fitchburg and Gardner. Route 2 connects to interstates I-495, I-190 within the region and I-91 to the west.



7) Route 111 (CRFC) from Route 2 through the Town of Harvard is a connection between two PHFS, Route 2 in Harvard and I-495 in the Town of Boxborough.

The *Montachusett Region Comprehensive Economic Development Strategy* (MRCEDS) provides a description of the federal *Opportunity Zone* program and the *Opportunity Zones* that are within the Montachusett Region. Opportunity Zones are census tracts generally composed of economically distressed areas. Ten census tracts were approved within five communities in the Region. The Opportunity Zones are distributed evenly (two each) among the following communities – Athol, Clinton, Fitchburg, Gardner, and Leominster (Figure 4-47).

Figure 4-47 - MRCEDS: Federal Opportunity Zones



The ongoing *Athol Route 2 Interchange Study* evaluates the feasibility of a new interchange project on Route 2 at South Athol Road where Athol is seeking to initiate an interchange project. The proposed interchange project falls within the Athol Opportunity Zone that includes Route 2 as does much of the study area for the interchange study.

The MRPC road network constraints are a land use conflict that impact, or potentially impact, economic vitality. The constraints include:

- Congested roads and bottlenecks, include at-grade railroad crossings.



- Economic vitality is hindered by the same congested roads and bottlenecks that affect all traffic in the Montachusett Region. Refer to the *Systems Preservation* section of this document for a more detailed description of the congested roads and bottleneck constraints.
- Railroad at-grade crossings also present a potential congested road and bottleneck problem in several municipalities throughout the region.
- Roadway safety, include safety at at-grade railroad crossings.
 - Economic vitality is hindered by the same fatal crash corridors and high crash locations that affects all traffic in the Montachusett Region. Refer to the Safety Needs section of this document for a more detailed description of the safety constraints.
 - Railroad at-grade crossings also present a potential safety problem in several municipalities throughout the region.

The MRPC will continue to work with the Montachusett Region Trail Coalition (MRTC) to improve the transportation infrastructure that services the regional recreational destinations. Refer to the *Bike & Pedestrian* section of this document for a more detailed description of the transportation infrastructure constraints of the regional recreational destinations.

Future Economic Vitality Improvement Projects and Activities

- Improve freight truck access on the four CUFCs and three CRFCs
- Improve external and internal freight truck access for the 10 Opportunity Zones
- Improve congested roads and bottleneck locations
- Improve safety on fatal crash corridors and at high crash locations
- Improve external and internal access to the regional recreational destinations
- MRPC will continue conducting freight corridor analyses

See the *Financial Analysis* chapter for the estimated cost of the projects listed above.



Guidance Plans

The following plans provided guidance for the completion of this Economic Vitality document.

Massachusetts 2018 Freight Plan (MFP):

The MRPC will seek to apply the MFP recommendations to the Montachusett Region. The MFP (4/18) follows a “scenario-based analysis” model which recognizes that many plausible futures exist. The MFP identifies drivers of change in the world and the range of ways in which they could progress, and combines these into multiple plausible futures and presents strategies which will allow Massachusetts to thrive across the widest range of outcomes. The MFP is a companion plan to the **Massachusetts State Rail Plan** discussed below.

Massachusetts 2018 State Rail Plan (MSRP):

The MRPC will seek to apply the MSRP recommendations to the Montachusett Region. The purpose of the MSRP is to guide the future of the rail system and rail services in Massachusetts. The Goals of the MSRP are:

1. Maintain existing rail system in a state-of-good-repair, expand accessibility, and preserve railroad rights-of-way
2. Support economic growth throughout Massachusetts and enable the State to compete in the changing global economy
3. Improve the safety and security of the rail system
4. Provide a rail system that is environmentally and financially responsible
5. Improve intermodal connectivity for both passenger and freight rail facilities by stronger coordination between rail system users to promote system use and efficiency
6. Maximize the return on public dollars towards rail investment by maximizing the use of existing rights-of-way



Montachusett Region Comprehensive Economic Development Strategy (MRCEDS):

The MRPC will seek to apply the MRCEDS (2019) roadway infrastructure recommendations to the MMPO Region. The Economic Development Administration (EDA) administers the *Comprehensive Economic Development Strategy* (CEDS) program. The CEDS program was established as an economic development planning tool to assist communities, regions and states to advance economic development activities, programs, and projects. Through CEDS, a qualifying economic development organization works to identify a region's flexibility to adapt to the everchanging global economy, persistent economic distresses and learn to utilize the region's assets to maximize economic opportunity that fosters growth and job creation and retention for the region's residents.

Athol Route 2 Interchange Study

The purpose of this ongoing study is to assist Athol in evaluating the feasibility of a new interchange project on Route 2 at South Athol Road where Athol is seeking to initiate an interchange project. The study is evaluating the potential effects of converting the existing grade separated roads into an interchange on the existing transportation system and on the surrounding environment as well as providing ramp alternatives.

The Interchange project was first identified in the Montachusett 2016 RTP. Since these roads are already grade separated, only ramps would be needed to connect them to create the Interchange. The proposed Interchange project is based on the following comments received from the Town:

- Freight movement in Athol is limited due to railroad bridge height restrictions that results in heavy trucks using side streets and driving through residential areas;
- The North Quabbin Commons commercial development on Templeton Rd (Route 2A) has the potential of producing traffic backups on Route 2 at Exit 18;
- The Interchange would improve heavy truck access and egress to Route 2 for South Athol Road;



- The Interchange would promote economic growth in Athol primarily along the South Athol Road Corridor;
- Heavy truck traffic on smaller local roads would cease thus creating a safer roadway environment in neighborhoods, extending the pavement life of neighborhood roads, and healthier neighborhoods through decreased vehicle exhaust emissions;
- The interchange would improve South Athol Road access and egress to essential community and regional services that includes the following:
 - Athol Fire Department;
 - Athol Hospital;
 - MA State Police Barracks in Athol;
 - Athol High School
- The Interchange would improve school bus transportation

Trends

The Economic Vitality section reveals two existing issues that are facilitating an increasing trend in hindering economic vitality growth in the Montachusett Region:

- Aging railroad bridges, most of which were constructed approximately 100 years ago, are narrow and many have bridge height restrictions. Also, the bridge alignment geometry of many railroad bridges is not aligned with the geometry of the intersecting road creating dangerous S- shaped horizontal curves with poor sight distance
- Many Route 2 interchanges, including their ramps, do not have the capacity to meet traffic volume demand. One new interchange is being proposed

The MRPC recognizes that the transportation network plays an important role in the economic growth of the Region. Many sectors of the economy depend heavily on safe and efficient movement of goods and services by truck.



Recommendations

Future Economic Vitality Projects and Activities

- Improve freight truck access on the four Critical Urban Freight Corridors CUFCs and three Critical Rural Freight Corridors
- Improve external and internal freight truck access for the 10 Opportunity Zones
- Improve congested roads and bottleneck locations
- Improve safety on fatal crash corridors and at high crash locations
- Improve external and internal access to the regional recreational destinations
- MRPC will continue conducting freight corridor analyses

See the *Financial Analysis* chapter for the estimated cost of the projects listed above.



CONGESTION

Congestion occurs at intersections and along road segments throughout the region which adversely impact commuter travel, the efficient movement of goods and air quality. The following areas of congestion were identified through local knowledge, public input from surveys, MRPC studies, identified bottlenecks and various technical data sources.

Congested Corridors

Congestion in the following corridors/locations tends to create the greatest impacts to traffic flow in the region. Inadequate geometrics, right-of-way issues and improper signal timings and/or phases result in poor vehicle flows and, in many cases, unsafe conditions. Concerns will range from local intersections and corridors to congestion on regionally important highways such as Route 2.

- Route 2, Harvard, Lancaster, Leominster, Fitchburg, Westminster, and Gardner – This highway serves as the second major east-west connector for the Commonwealth and has a significant effect on development well beyond the Region. Improvements and maintenance are vital along the entire stretch of Route 2 to maintain its usefulness and move commuters. Regular resurfacing and maintenance costs are significant in terms of dollars and are usually well beyond the limited federal funds allocated to the Region. There is still a need for an increased investment to maintain Route 2, along with all roadways in the region, in an acceptable condition. The possibility of the section of Route 2 between I-495 and I-190 being incorporated into the interstate system due to its natural connection between these two major routes has been discussed. Designation of this type, i.e. interstate highway, would make this segment eligible for Interstate Maintenance funds. Connections to nearly all major routes in the region exist on Route 2, as does the interchange of Route 2 and I-190. Recent improvements to the pavement striping in this



location seem to have reduced confusion and congestion, although further study is needed.

- Route 12, Fitchburg and Leominster – This main corridor through the cities of Fitchburg and Leominster may be the most congested in the region. Many improvement projects have been completed in recent years to address congestion issues. Most notably were major signal and lane improvements between Bemis Road in Fitchburg and Erdman Way in Leominster completed in 2010. Adequate access to Route 2 often dominates local concerns. The City of Fitchburg continues to maintain the need for improved access between Route 2 and its downtown as a major force in the communities' economic development; this would also serve as a congestion mitigation measure for traffic on surrounding streets and intersections leading into the city from the highway. This concern is echoed by the North Central Massachusetts Chamber of Commerce as one of the major needs for the area as well as the city. Major issues also remain in both downtown areas of Fitchburg and Leominster especially during peak hours. An MRPC study, *"Downtown Fitchburg Bottleneck Profile"* (2012), ultimately determined that major signal improvements were needed in that area.
- Route 13 Leominster– This segment was well documented in the 1999 MassDOT Study "Fitchburg/Leominster/Lunenburg Transportation Analysis Project". Although many improvements have been made in the last 20 years this corridor still remains among the regions most congested. Several recommendations were proposed to address congestion as well as safety issues associated with heavy traffic volumes and the poor geometrics of the Route 13/Haws Street/Route 2 interchange. In 2008 the Route 13 Bridge over the North Nashua River was rehabilitated and pedestrian safety improvements were made. In 2010 MassDOT introduced design plans for Route 13 in Leominster between Prospect and Haws Streets, the most congested area of Route 13, which involves a new signal at Route 13 and Mead, as well as signal equipment upgrades and coordination of existing signals. Many amendments to this project have been made since the original concept.



The 2020-2014 Transportation Improvement Program lists this project as being funded in 2020.

- South Street/Merriam Avenue, Fitchburg and Leominster – This corridor serves as one of two major connecting roads between Fitchburg and Leominster in addition to providing direct access to Route 2. Volumes along this corridor are mainly affected by a traffic signal at the Route 2 westbound ramp/Twin City Mall entrance crossing as well as by the Merriam Avenue Bridge over Route 2. Road widths are limited by the bridge and abutting land uses to two travel lanes; one northbound and one southbound. In 2018 MRPC completed the Merriam Avenue – South Street Corridor Bottleneck Study which profiled this area and made recommendations to improve congestion.
- Route 117, Lancaster and Leominster – This state route is a major commuter road that provides access to I-190 at the Leominster/Lancaster line and I-495 in Bolton located east of Lancaster. Most of the congestion along this corridor occurs during AM and PM peak hours. Also causing significant delays is an at-grade freight railroad crossing east of Route 70 in Lancaster which frequently stalls traffic for long periods of time as trains pass through. Within the past 20 years there has been major commercial development on both sides of Route 117 on the Leominster/Lancaster line. These commercial developments have been complemented by various improvements to the roadway including the addition of turning lanes and stop lights allowing easier access to both I-190 and the commercial access roads. MRPC conducted the “Route 117 Corridor Profile” (2014) through the town of Lancaster which suggested major improvements to the intersections of Route 117/Lunenburg Road and Route 117/Main Street. Improvements are scheduled to occur in year 2021 of the 2020-2024 Transportation Improvement Program.
- Route 2, Harvard, Lancaster, Leominster, Fitchburg, Westminster, and Gardner – Commuter traffic on Route 2 has grown throughout the Montachusett Region. This highway serves as the second major east-west connector for the Commonwealth and has



a significant effect on development well beyond the Region. Improvements and maintenance are vital along the entire stretch of Route 2 to maintain its usefulness and move commuters.

- Downtown Gardner – Route 101 (Central Street/Parker Street) runs east-west through this corridor while Route 68 (Main Street/Parker Street) runs north-south. The layout of this intersection can be confusing to drivers and is a high crash location in the region. Furthermore, traffic routinely backs up through downtown during peak hours. While many variations of geometrics have been tried over the years Right of Way issues make it difficult to make an ideal improvement. Long term efforts may need to involve complete reconstruction and reconfiguration of this intersection.



Figure 4-48 - Main Street (Route 68)/Central Street (Route 101) in Gardner Looking North.

- Route 119, Townsend and Groton – This road has become a major commuting route for the northern portion of the Region. Route 119 runs southeast from New Hampshire to I-495 in Littleton to Route 2 at the Concord Rotary. Peak hour flows are heaviest eastbound

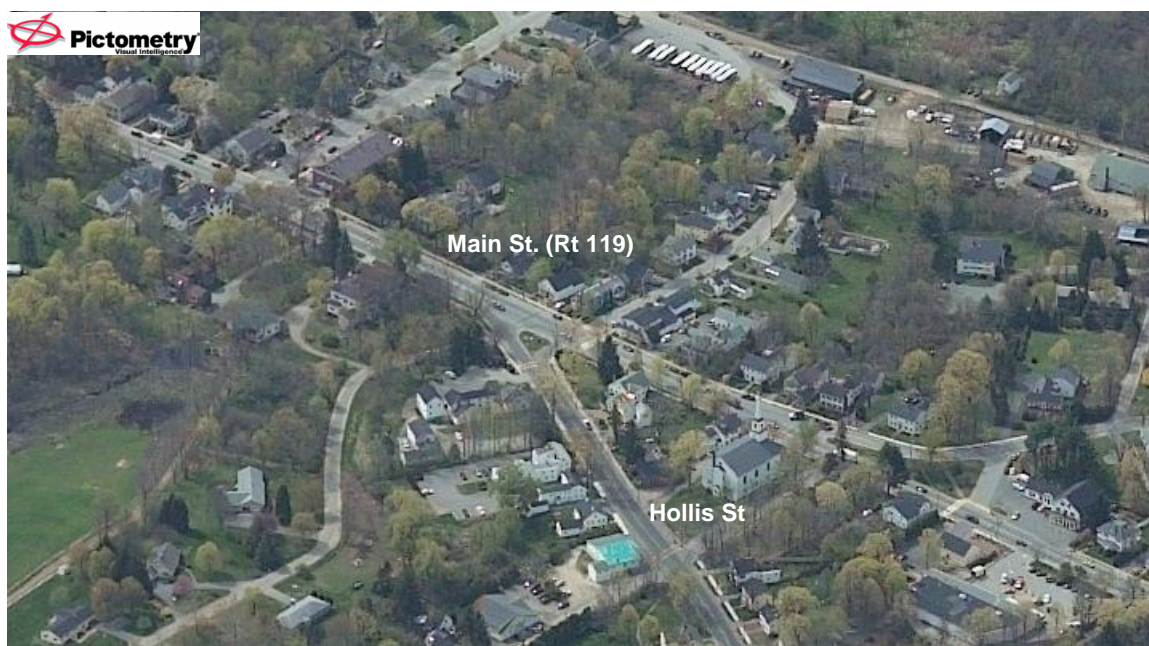


in the AM and reversed in the PM reflecting its use as a commuting road to the I-495/Boston area. The route runs through the town centers of Townsend and Groton and as such greatly impacts local travel patterns.

Figure 4-49 – Route 119 in Townsend Looking North



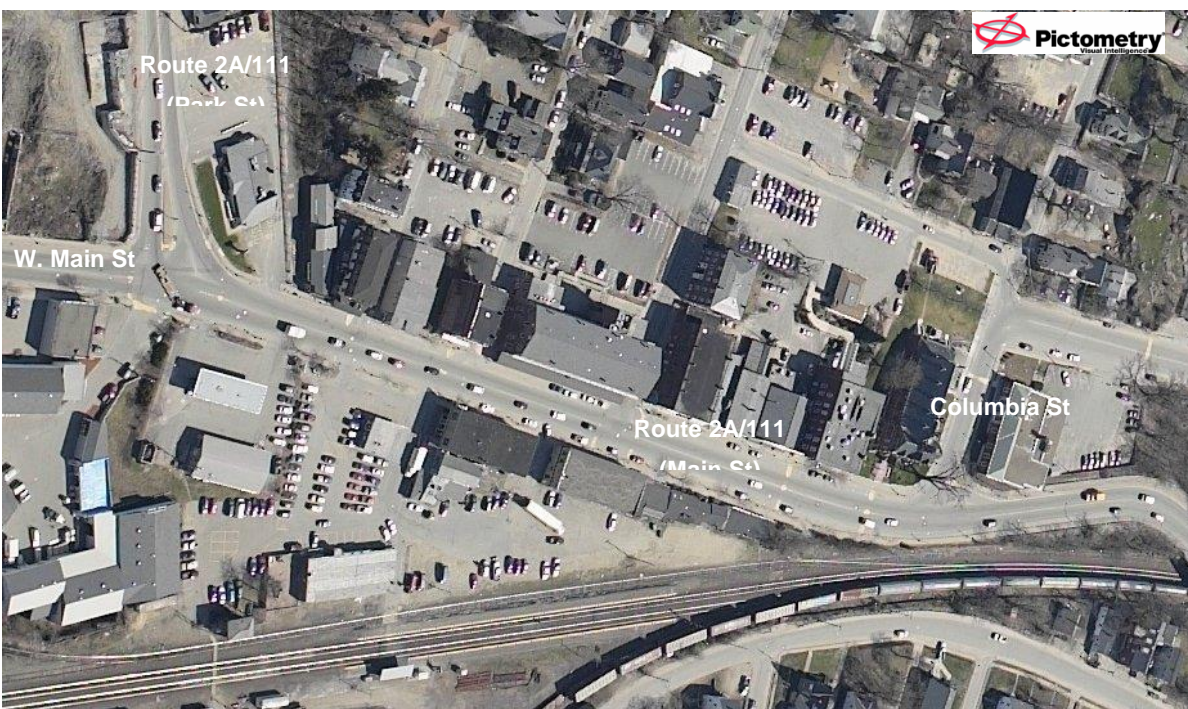
Figure 4-50 – Route 119 in Groton Looking South





- Route 2A, Ayer - from Park Street (Routes 2A/111) to the Littleton town line, includes Main Street, East Main Street, and Littleton Road. Peak hour traffic suffers from slow travel speeds along the Main Street segment through the downtown area due to side street traffic, on-street parking, an MBTA Commuter Rail stop downtown and narrow lanes. A notable intersection in this corridor is Park Street (Routes 2A/111) and Main Street. Park Street traffic looking to continue onto Route 2A east/111 south must stop and wait for a gap in traffic on East Main Street/Main Street which results in long peak hour delays from this approach.

Figure 4-51 - Main Street (Routes 2A/111) in Ayer from Park Street to Columbia Street Looking North



System Analysis

Transportation Studies with Congestion Elements

Member communities regularly request various types of transportation studies which the MRPC conducts through the Unified Planning Work Program (UPWP). Many of these studies involve



examining congestion issues along a roadway or corridor. One of the most useful data sets pertaining to congestion issues is travel time. Travel time data is collected using a GPS Device and TravTime 2.0™, a software program which measures travel time and delays on a roadway. Since MRPC has acquired TravTime software, it has regularly been included in analysis in transportation studies done throughout the region. Numerous travel time runs are taken through the study area. From this, an average travel time can be computed during the peak hour through a particular road or corridor. This data is compared to free flow travel time to depict a travel time index rating. The free-flow travel time is the amount of time in seconds it takes to travel a particular corridor at the posted speed limit without any delay. The travel time index (TTI) is a ratio between the average peak hour travel time and free-flow travel time. For example, a TTI value of 1.30 indicates that the average travel time at peak hour takes 30 percent longer than free flow travel time. The table below shows the different congestion levels of the TTI of an arterial roadway.

Table 4-27 - Travel Time Index (TTI) Levels of Congestion

Functional Class	No/Low Congestion	Moderate Congestion	High Congestion	Severe Congestion
Arterials	< 1.5	1.5 - 2.0	2.0 - 2.6	> 2.6

*Source: Federal Highway Administration

Three recent studies which included travel time analysis have been completed in recent years. Below are descriptions of each of these study areas and results from our Travel Time analysis.

[Downtown Fitchburg Bottleneck Profile \(2012\)](#)

The *Downtown Fitchburg Bottleneck Profile* was an effort to highlight various issues causing one of the most significant bottlenecks in the Montachusett Region – Downtown Fitchburg. Throughout the program year various data was collected and analyzed to draw attention to issues leading to traffic delays in the area.



Study Area

The study area encompasses the downtown area from Moran Square at the intersection of Main (Rte. 2A), Lunenburg (Rte. 2A) and Summer Streets in the east extending west to the area known as the “Upper Common” at the intersection of Main, River (Rte. 31) and Mechanic (Rte. 31) Streets. Traffic along the roadways of Main Street and Boulder Drive, including the intersections with other side streets were considered for this report.

Travel Time

	Run 1	Run 2	Run 3	Run 4	Run 5	Average Time	Travel Time Index (TTI)
Eastbound (Minutes)	3.73	3.63	3.73	3.85	3.45	3.08	1.40
Westbound (Minutes)	5.7	5.83	4.35	3.95	6.03	5.17	2.18
Posted Speed Limit = 25 MPH	Corridor Distance (Miles) = 0.99 WB / 0.92 EB			Free Flow Travel Time (Minutes) = 2.38 WB / 2.21 EB			

From the travel time results it is clear that traveling westbound on Main Street during peak hour entails dealing with a high level of congestion. A major inhibitor of traffic flow through downtown was the lack of a system of properly operating and coordinated network of traffic signals.

Figure 4-52 - Main Street in Fitchburg Looking North





Route 117 Corridor Profile (2014)

The Town of Lancaster requested the Montachusett Regional Planning Commission (MRPC) to conduct a study of Route 117 through the community in the spring of 2013. In its efforts the MRPC in turn has engaged town officials to form an informal Steering Committee to assist, offer guidance and provide local knowledge that would contribute to a Corridor Profile along the road. The goal was to assess the conditions and problems that may exist along Route 117 and offer recommendations and avenues to make improvements where necessary. After much data collection, analysis, site visits and public engagement the MRPC completed the **Route 117 Lancaster Corridor Profile** in 2014. As part of the report, multiple Travel Time runs were taken during the measured peak hour times through the entire 4.7 miles of Route 117 in Lancaster.

Travel Time

	Run 1	Run 2	Run 3	Average Time	Travel Time Index (TTI)
Eastbound (Minutes)	8.68	8.33	8.93	8.65	1.15
Westbound (Minutes)	8.3	8.47	11.95	9.57	1.28
Posted Speed Limit = 40 MPH	Corridor Distance (Miles) = 5.0 Miles			Free Flow Travel Time (Minutes) = 7.5 WB / 7.5 EB	

Although congestion did not pose a great issue through the corridor as a whole, the junction of Route 117 and Route 70 and its two major intersections were identified as having long delays for the Route 70 approaches. Improvement alternatives were presented to the town and a project at this location is listed in year 2021 of the 2020-2024 Transportation Improvement Program.



Figure 4-53 - Lancaster Route 117/70 looking North



Merriam Avenue – South Street Corridor Bottleneck Study (2018)

The Merriam Avenue - South Street Bottleneck study stems from a goal set in the 2016 RTP of the to “reduce congestion and improve mobility”. One performance measure set under this goal was to “identify one (1) bottleneck location and conduct a study every 2 years in order to develop and/or implement corrective measures”. This section of Merriam Avenue and South Street in the cities of Leominster and Fitchburg has long been considered one of the regions congested corridors and is considered a traffic “bottleneck”. The Federal Highway Administration’s (FHWA) definition of a traffic bottleneck is "a localized section of highway that experiences reduced speeds and inherent delays due to a recurring operational influence or a nonrecurring impacting event." This study profiles existing conditions and identifies factors adding to the congestion of the Merriam Avenue - South Street corridor.



Study Area

The study area extends from the south at the intersection of Merriam Avenue and Lindell Avenue in Leominster, to the north at the intersection of South Street and Wanoosnoc road in Fitchburg. The Merriam Avenue - South Street corridor serves as one of two major connecting roads between the cities of Fitchburg and Leominster in addition to providing direct access to Route 2. Contained within this corridor are the following primary locations, listed from south to north, which are the main catalysts for congestion and are highlighted in this study.

- Intersection of Merriam Ave./ Route 2 East ramp
- Merriam Ave. bridge over Route 2
- Signalized Intersection of Merriam Ave./ South St./ Whalon St./ Twin City Plaza
- Signalized Intersection of South St./ Wanoosnoc Rd.

Figure 4-54 - Leominster/Fitchburg, Merriam Ave/South Street Corridor





Travel Time

Functional Class	No/Low Congestion	Moderate Congestion	High Congestion	Severe Congestion
Arterials	< 1.5	1.5 - 2.0	2.0 - 2.6	> 2.6

Southbound

Northbound

Southbound Traffic through the study area measures no or low congestion (TTI of 1.34). Northbound traffic experienced high congestion (TTI of 2.51). The study also considered delay caused by the intersections along the corridor and physical challenges along the road such as the road being limited to two lanes over the route 2 bridge. A number of improvement alternatives were presented in the study.

Continuous Count Stations in Region

The following tables list average daily traffic volumes from MassDOT continuous count stations on major routes (Route 2 and I-190) in the Montachusett region going back to 2001. From these tables the following patterns can be seen.

- Counts have recuperated to pre-recession levels after a period of decline throughout the region in the mid 2000's.
- Steady growth has been occurring throughout the region since 2015
- If the trend of traffic growth continues, increased congestion can be expected, especially during rush hour.



Route 2 Littleton East of Harvard Town Line			Route 2 Lancaster West of Route 70			Route 2 Westminster East of Route 140		
Year	Volume	Growth	Year	Volume	Growth	Year	Volume	Growth
2018	54,452	2%	2018	59,761	7%	2018	52,062	2%
2016	53,207	2%	2016	55,471	2%	2016	50,872	4%
2015	52,262	9%	2015	54,277	6%	2015	48,912	15%
2014	47,432	2%	2013	50,847	1%	2014	41,401	2%
2013	46,642	2%	2012	50,113	1%	2013	40,614	2%
2012	45,692	0%	2011	49,476	-3%	2012	39,880	-6%
2011	45,569	-3%	2010	51,104	1%	2011	42,088	-2%
2010	47,100	-3%	2009	50,435	5%	2010	43,000	1%
2009	48,540	-1%	2008	47,806	1%	2009	42,770	-1%
2008	48,803	0%	2007	47,186	-1%	2008	42,999	3%
2007	48,800	8%	2006	47,800	6%	2007	41,887	-1%
2006	45,112	-2%	2005	45,104	-3%	2006	42,172	-2%
2005	46,229	-1%	2004	46,433	2%	2005	42,991	-1%
2004	46,900	-7%	2003	45,454	0%	2004	43,257	3%
2003	50,022	-1%	2002	45,457		2003	42,168	-1%
2002	50,603	1%	Growth since 2015: 9%			2002	42,663	4%
2001	50,000					2001	40,923	
Growth since 2015: 4%						Growth since 2015: 6%		

Route 2 Athol East of Orange TL			I-190 Leominster North of Route 117			I-190 Sterling North of Route 12		
Year	Volume	Growth	Year	Volume	Growth	Year	Volume	Growth
2018	14,910	15%	2018	51,923	2%	2018	39,013	2%
2016	12,699	9%	2016	50,736	6%	2016	38,121	0%
2015	11,514	5%	2015	47,892	7%	2015	37,931	4%
2014	10,965	3%	2013	44,399	0%	2014	36,505	6%
2013	10,615	-2%	2012	44,239	1%	2013	34,322	-1%
2012	10,826	-5%	2011	43,774	-1%	2012	34,819	8%
2011	11,385	1%	2010	44,293	1%	2011	32,080	3%
2010	11,274	-30%	2009	43,792	3%	2010	31,131	-12%
2009	14,711	27%	2008	42,272	7%	2009	34,735	7%
2008	10,740	-2%	2007	39,149	-6%	2008	32,180	-1%
2007	11,003	-2%	2006	41,503	1%	2007	32,612	-2%
2006	11,202	0%	2005	41,154	0%	2006	33,168	2%
2005	11,180	0%	2004	41,168	4%	2005	32,646	-9%
2004	11,127	1%	2003	39,579	0%	2004	35,700	22%
2003	10,967	2%	2002	39,700	8%	2003	28,000	0%
2002	10,800	4%	2001	36,548		2002	28,000	10%
2001	10,415		Growth since 2015: 8%			2001	25,100	
Growth since 2015: 23%			Growth since 2015: 8%			Growth since 2015: 3%		



I-190 Sterling North of Route 140			I-190 Sterling South of Route 140			12 Sterling North of I-190		
Year	Volume	Growth	Year	Volume	Growth	Year	Volume	Growth
2018	37,374	6%	2018	39,961	23%	2018	9,193	5%
2016	34,959	2%	2016	30,844	0%	2016	8,709	1%
2015	34,322	7%	2015	30,691	-8%	2015	8,629	-1%
2014	31,828	4%	2014	33,143	2%	2014	8,712	-14%
2013	30,586	-1%	2013	32,625	-1%	2013	9,946	12%
2012	30,764	0%	2012	33,058	1%	2012	8,763	-17%
2011	30,802	3%	2011	32,629	-1%	2011	10,284	21%
2010	30,003	-3%	2010	33,026	2%	2010	8,137	-3%
2009	31,050	-15%	2009	32,483	3%	2009	8,375	-2%
2008	35,782	17%	2008	31,398	-1%	2008	8,501	1%
2007	29,524	0%	2007	31,653	6%	2007	8,385	0%
2006	29,537	1%	2006	29,722	6%	2006	8,379	-3%
2005	29,290	0%	2005	27,919	-23%	2005	8,625	-4%
2004	29,300	4%	2004	34,300	0%	2004	9,003	0%
2003	28,078	4%	2003	34,200	11%	2003	8,969	4%
2002	26,965	1%	2002	30,600	23%	2002	8,647	-1%
2001	26,800		2001	23,500		2001	8,693	
Growth since 2015:		8%	Growth since 2015:		23%	Growth since 2015:		6%

202 North of Templeton Town-Line		
Year	Volume	Growth
2018	5,130	2%
2016	5,013	6%
2015	4,720	
Growth since 2015:		8%

Progress

The table 4-28 below shows projects with congestion benefits which are scheduled on the 2020-2024 Transportation Improvement Program. As mentioned, some of the most congested roadways have been or will be addressed in the near future. Perhaps most notable in the below list is Route 13 through Leominster, currently listed for major improvements in 2020.



Table 4-28 - 2020-2024 TIP Projects with Congestion Benefits

City/Town	Project	Year	Cost
Leominster	LEOMINSTER- RECONSTRUCTION ON ROUTE 13, FROM HAWES STREET TO PROSPECT STREET	2020	\$5,994,626
Lancaster	LANCASTER- INTERSECTION IMPROVEMENTS ON ROUTE 117/ROUTE 70 AT LUNENBURG ROAD AND ROUTE 117/ROUTE 70 AT MAIN STREET	2021	\$2,723,583
Fitchburg	FITCHBURG- BRIDGE REPLACEMENT AND RELATED WORK, F-04-017, WATER STREET (STATE 2A) OVER BOULDER DRIVE AND PANAM RAILROAD & F-04-018, WATER STREET (ROUTE 12) OVER NORTH NASHUA RIVER	2021	\$21,543,216
Leominster	LEOMINSTER- RECONSTRUCTION/ REHABILITATION ON ROUTE 12 (CENTRAL STREET), INCLUDING REHABILITATION OF L-08-022	2022	\$9,537,724
Sterling- West Boylston	STERLING- WEST BOYLSTON- IMPROVEMENTS ON ROUTE 140 AT I-190	2023	\$834,840
Templeton	TEMPLETON- ROUNDABOUT CONSTRUCTION AT THE INTERSECTION OF PATRIOTS ROAD, SOUTH MAIN STREET, NORTH MAIN STREET AND GARDNER ROAD	2023	\$2,495,018
Lancaster	LANCASTER- INTERCHANGE IMPROVEMENTS AT ROUTE 2 EXIT 34 (OLD UNION TURNPIKE)	2024	\$5,568,000
Leominster	LEOMINSTER- IMPROVEMENTS AT ROUTE 12 (NORTH MAIN STREET) AT HAMILTON STREET; ROUTE 12 (NORTH MAIN STREET) AT NELSON STREET	2024	\$5,145,920

Trends

Traffic

Counts throughout the region show a period of increased traffic. Along with increased traffic comes heavier and more frequent periods of congestion. Many of the highlighted areas in this section have shown congestion for many years, especially during rush hour. Trends indicate that these areas, along with others, will continue to face problems with congestion as they currently exist.

Recommendations

It is important to prepare for increased traffic and congestion throughout the region. Investments must be well thought out and balanced with other needs such as investments in maintenance and expansion. The following recommendations are made to help prevent the spread of congestion in the region.

- Continue to monitor trends throughout the region.



- Continue to monitor emerging technologies such as autonomous vehicles and ride hailing services and the impact made on congestion throughout the region.
- Continue to profile areas of heavy congestion and make recommendations for improvements.
- Work with MART and the MBTA to increase ridership in modes other than automobiles.



TRANSIT

Transit is an important mode of transportation in the Montachusett region. Transit provides access to essential services such as jobs, grocery stores, medical facilities, schools and social services, in addition to recreational transportation. In order to encourage people to switch from driving to riding, a transit system must be efficient and effective, convenient and safe.

Montachusett Regional Transit Authority (MART) provides a variety of transportation services for residents of the Montachusett Region and other areas throughout the Commonwealth. The communities served by MART have grown steadily over the years. MART now serves 22 communities in and out of the MRPC region: Fitchburg, Leominster, Gardner, Ashburnham, Shirley, Ayer, Lancaster, Sterling, Hubbardston, Royalston, Littleton, Winchendon, Ashby, Templeton, Westminster, Hardwick, Lunenburg, Harvard, Bolton, Boxborough, Stow and Athol. Fixed route bus services, paratransit and subscription services are operated by a private management company, namely, Management of Transportation Services, Inc. All other transportation is operated by a variety of private vendors in Massachusetts. The Massachusetts Bay Transportation Authority (MBTA) is responsible for commuter rail services from Fitchburg to Boston.

Transit Equity

The Montachusett Regional Transit Authority (MART) operates the fixed route transit system in the region. Fixed route service is concentrated within the urban cities of Fitchburg, Leominster and Gardner. Over the years, service has expanded slowly into neighboring communities based upon need, local requests and area attractions. MART has been striving to accomplish many of the goals that were set established in the 2015 RTP.

Additionally, on a regular basis, the MRPC conducts Transit Development Plan (TDP) for the fixed route communities that involve a review of demographics, attractions and local



public outreach to identify issues and needs for the system. From these studies, adjustments are made to better serve the population.

In September 2018, the Montachusett MPO endorsed a “Coordinated Public Transit–Human Services Transportation Plan (CPT-HST)” update that documents the region’s unmet human-service transportation needs of individuals with disabilities, low-income individuals (or persons below the poverty level) and the elderly. The target populations for the CPT-HST align with the Title VI and EJ target populations.

The CPT-HST Plan was developed as a tool to help local transportation providers and communities improve transportation services, increase efficiency of service delivery, and expand outreach to meet growing needs. It also seeks to provide a framework to guide the investment of existing transportation resources and the acquisition of future funds. A series of priorities and recommendations are included in the CPT-HST Update to address transit equity issues and are incorporated in this RTP within the Transit chapter.

Improvements Made Since 2015

MART has been striving to accomplish many of the goals that were set established in the 2015 RTP.

- MART, as a result of the Comprehensive Service Analysis, revised its bus schedules for all local routes in Fitchburg/Leominster and Gardner effective in September 2015.
- Route 11 was re-routed to the new Great Wolf Lodge resort in Fitchburg to accommodate the workforce of that business.
- In order to ensure continued service levels a fare increase was implemented in July 2015. MART had not previously increased fares in eight years. Due to the increasing demand and lack of increase in Commonwealth funding, this fare increase was an important part of the overall financing of MART. This may have had a negative impact on ridership, although downward ridership is being experienced all over the country.
- Brokerage services continue to increase in volume every year. Services have grown from \$105 million in 2014 to \$160 million in 2018.



- MART received a TIGGER II grant in 2011 to implement projects to reduce its carbon footprint. With this grant MART has made several improvements to its facilities resulting in substantial energy savings overall. MART has:
 - i. Built two Solar PV systems at its Water Street facility in Fitchburg and the Maintenance Facility in Gardner
 - ii. Replaced all lighting in all facilities with LEDs
 - iii. Replaced its HVAC systems with new high efficiency systems in its Water Street and Main Street facilities,
 - iv. Installed a BackNet Energy Management system in all its facilities
 - v. Installed Thermal Destratification Fans in all its vehicle storage facilities.
- Wachusett Station was completed and opened for commuter rail and commuter shuttle service on September 30, 2016. The Wachusett Shuttle runs from Gardner City Hall in a 20-minute one-way run from 5:15am to 7:40pm with break intervals throughout the day. The service times are meant to coincide with train arrival and departure times.
- MART added three new fixed route shuttles since the last RTP:
 - i. Wachusett Shuttle began on 9/30/2016 to coincide with the opening of Wachusett Station.
 - ii. On April 24, 2017 MART began a pilot project to provide service between Fitchburg/ Leominster and the Devens Enterprise Zone. The service was designed by a public-private collaborative between MART, the Devens Enterprise Commission, Mass Development, and private companies with businesses located in the Devens Zone. The shuttle brings workers from Fitchburg and Leominster to stops in Shirley, throughout Devens, and Ayer. The service was made into a normal route in October 2017.
 - iii. On June 4, 2018 MART began a “last mile” commuter rail shuttle service. This shuttle travels between the MBTA Littleton Commuter Rail Station and goes along Route 110 in Littleton and Westford out to the Westford Technology Park (Juniper Networks). The service



only runs at AM peak and PM peak commuting hours and is designed to meet the commuters coming off and going to the Littleton commuter train station.

Fixed Route

Local - Fitchburg/Leominster and Gardner

Local fixed route bus services operate along set routes and follows a set schedule Monday through Saturday. Twelve (12) routes are available in Fitchburg, Leominster and Gardner. There is also a supplemental route to Lunenburg in the afternoon. Buses also run more frequently (15 minutes) to and from Fitchburg State University during the campus school year on weekdays. Bus services are not offered on Sundays and holidays. Regional frequencies vary depending on the route

Table 4-29: Fixed Routes Yearly Ridership

Fixed Routes	2015	2016	2017	2018	Percent Change 2015 to 2018
Leominster/Fitchburg	605,952	591,374	496,005	470,744	-22.31%
Gardner	57,193	58,852	47,548	45,848	-19.84%

Source: Montachusett Regional Transit Authority

As Table 4-29 shows, MART's fixed-route bus ridership decreased over the 4-year period from FYs 2015-2018. The biggest single decline is from 2016 to 2017 with at 16% drop in Leominster/Fitchburg ridership and a 19% drop in Gardner ridership. Ridership data from 2018 seems to indicate that the decline has leveled off between FY 2017 and 2018, with a 5.09% drop in Leominster/Fitchburg ridership and a 3.58% drop in Gardner ridership.

Regional Services

MART has a number of regional fixed route bus and shuttle services that span a wide geographic area. Most of the services are new and don't cover the entire 4 years of the 2015 RTP.

The Link Bus service is available along the Route 2/2A between Greenfield and Gardner, stopping in Gardner, Templeton, Phillipston, and Athol. The Athol Link connects to Route



32 operated by the Franklin Regional Transit Authority (FRTA). MART also operates the Winchendon Link which travels along state routes 68 & 202 from Gardner through Baldwinville and into Winchendon Center.

Table 4-30: Link Yearly Ridership

Link Route	2015	2016	2017	2018	Percent Change 2015 to 2018
Athol Link	31,238	19,559*	13,883	10,694	**
Athol-Orange Shuttle	N/A	10,318	18,124	22,043	**
Winchendon Link	5,760	6,022	5,388	5,158	-10.45%

Source: Montachusett Regional Transit Authority

*The dramatic drop in ridership on the Athol/Orange link between 2015 and 2016 was due to a change in services. In FY16 the Athol-Orange Fixed Route Shuttle began (November 2015). This service replaced an old Dial-A-Ride service and instituted a local fixed route between Athol and Orange. Therefore, the ridership was not truly lost, just diverted to a different route.

Combining Athol Link ridership with the Athol-Orange Shuttle ridership shows an increase of almost 5%. The Winchendon Link continues to have its ups and downs; peaking in FY16 at 6,022 riders and bottoming out at 5,158 in FY18.

The Intercity Bus Route travels within Gardner, then through Westminster (began in 2016), then to Fitchburg and Leominster. This route has always run from around Labor Day up to Memorial Day.

Table 4-31: Intercity Yearly Ridership

Intercity Routes	2015	2016	2017	2018	Percent Change 2015 to 2018
Intercity Bus	18,409	16,690	10,383*	7,608	-58.67% [!]
Wachusett Shuttle	N/A	N/A	2,284	4,284	**

Source: Montachusett Regional Transit Authority

* This figure includes the Commuter Bus runs through May, and excludes the riders diverted to the new Wachusett Shuttle.

[!] 58% decrease includes the Wachusett Shuttle riders.

The Wachusett Shuttle, which began service in on September 30, 2016 (FY 2017), has had an 87.57% increase in ridership due to the opening of Wachusett Station. (Also includes riders served by MART brought between MBTA stations due to track construction in some months.) This new route diverted some of the riders from the



Intercity Bus who rode to access the downtown Fitchburg Commuter Rail Station. This shuttle is a shorter route and more runs with direct access between Gardner City Hall and Wachusett Station.

In FY2017 MART, through a public-private partnership with the Devens Enterprise Commission, launched a new regional shuttle to provide the commuters from Fitchburg and Leominster with access to jobs in Devens, with stops in the local communities of Shirley and Ayer including the Commuter Rail Stations there to provide the last mile connection. It began slowly but was able to achieve measurable ridership in only ten weeks. It continued to grow in 2018 with a peak ridership of 508 in the month of March 2018.

In June 2018, in collaboration with the towns of Littleton and Westford, MART launched the Littleton-Westford Commuter Rail Shuttle, which provide last mile access from the Littleton/495 MBTA Commuter Rail Station to the many business and technology companies along Route 110 in Littleton and Westford. The first month of ridership had an outstanding 250 for only 4 hours of service a day, Monday through Friday. The following table (Table 4-32) displays the ridership for these routes.

Table 4-32: Other Regional Shuttle Yearly Ridership

Intercity Routes	2015	2016	2017	2018	Percent Change 2015 to 2018
Devens Regional	--	--	416*	4701	**
Littleton-Westford Commuter	--	--	--	250†	**

Source: Montachusett Regional Transit Authority

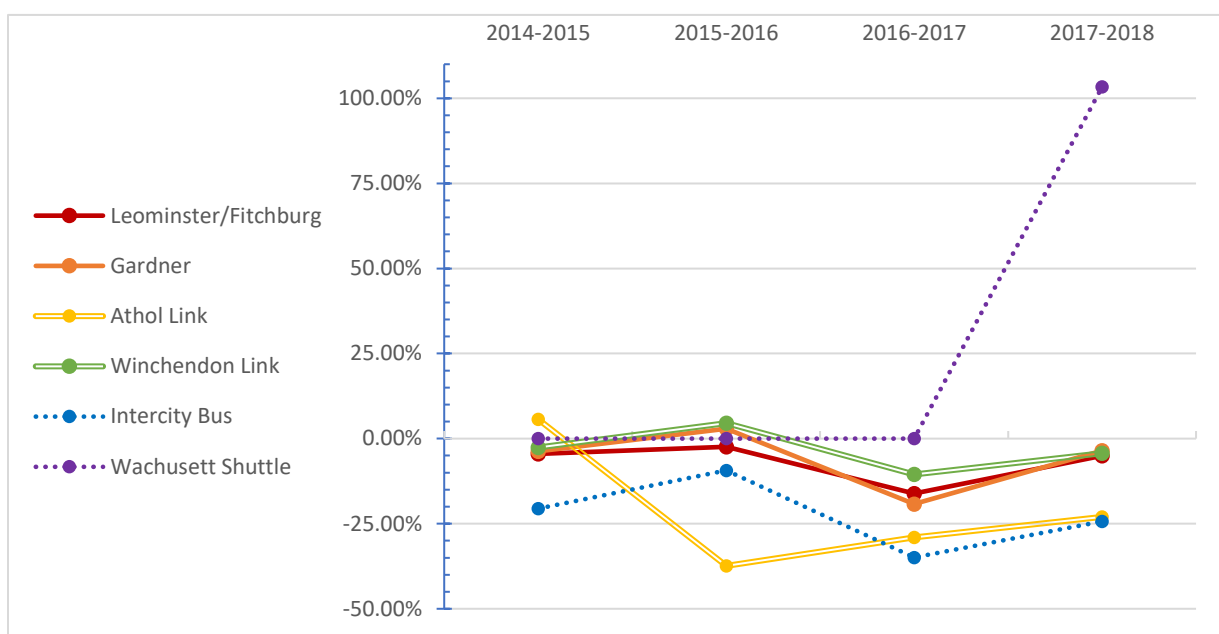
* Started as a pilot in late April 2017. Launched at full-time route in October 2017.

† Launched on June 4, 2018. Only 1 month of ridership.

The following figure (Figure 4-55) displays the percent change in ridership from each fiscal year. The Devens Shuttle and Littleton-Westford Commuter Shuttles are **not included** due to the lack of data to accurately calculate percent change in service.



Figure 4-55: Change in Yearly Ridership, Fixed Routes



Source: Montachusett Regional Transit Authority

While ridership on fixed routes (excluding the Wachusett Shuttle) has continued to decrease, the change from FY2017 to FY2018 seems to show the decrease slowing, from an overall decrease of -21.96% between FY2016 and FY2017 to -12.04% between FY2017 and FY2018.

Paratransit

MART has a fleet of 165 vans and small buses for paratransit service. MART's complementary paratransit service includes origin to destination transportation for citizens with disabilities who are eligible under the criteria of the Americans with Disabilities Act (ADA). In other communities in the region, twenty-one (21) member Councils on Aging (COA) provide service for seniors and the disabled; Royalston does not have MART affiliated COA transportation available. Prices and times of operation vary per community.

**Table 4-33: Paratransit Yearly Ridership (not including COA)**

Communities	2015	2016	2017	2018	Percent Change 2015-2018
Leominster/Fitchburg	93,655	74,095	68,606	71,565	-23.59%
Gardner	18,707	15,341 [†]	16,367	18,837	0.69%
Athol	51,081	17,760 [‡]	1,485	1,470	**
Dial-A-MART Services*	155,958	158,758	155,627	146,166	-6.28%

Source: Montachusett Regional Transit Authority

* Includes traditional Dial-A-MART for social service agencies such as GVNA & 7 Hills, as well as HST services such as MassHealth rides and routes for DDS. DDS routes account for 65% of the rides.

[†] Westminster ADA new service added.

[‡] Athol services changed from full scale Dial-A-Ride to breakout into Athol ADA, Athol COA & Athol Fixed Route shuttle beginning in November 2015. This number reflects 4 months of full Dial-A-Ride and 8 months of Athol ADA only. About 40% of the ridership was diverted to the fixed route shuttle in the first year. FY17 reflects a full year of Athol ADA Only. Athol COA ridership is about 10% of the original Dial-A-Ride (~5100 rides per year). The percentage change from FY 2017 to FY 2018 is a decrease of 1.01%.

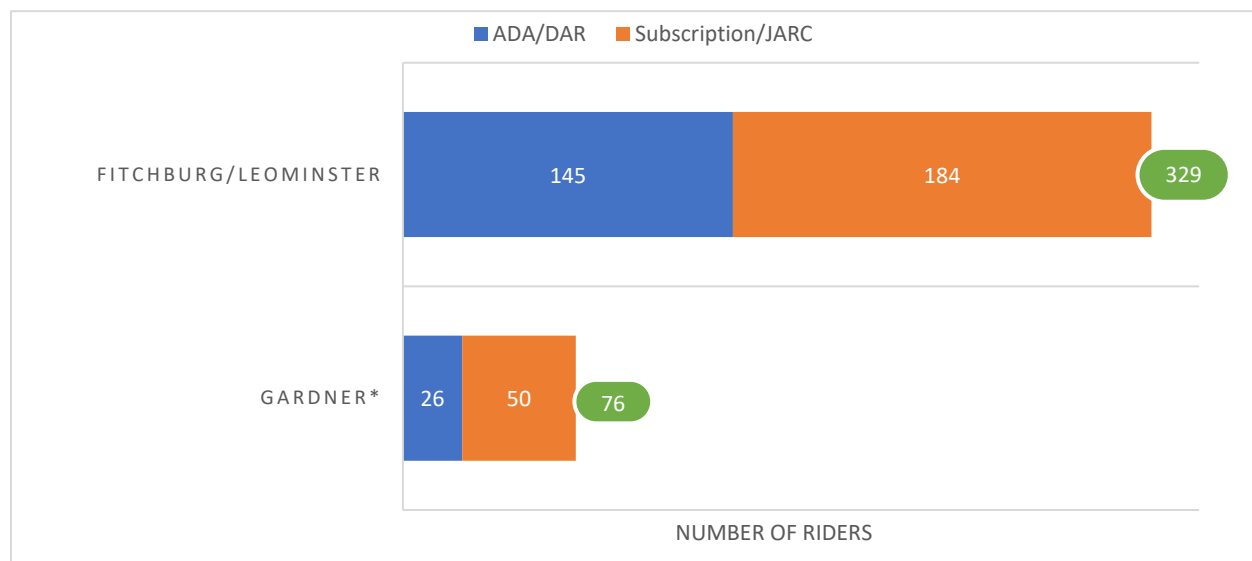
Table 4-34: COA Yearly Ridership

Communities	2015	2016	2017	2018	Percent Change 2015-2018
All COA Service	116,756	117,084	111,100	107,830	-7.65%

During 2015, paratransit and COA ridership peaked, but since then has seen a gradual decline. The following charts (Figures 4-56 and 4-57) highlight average daily paratransit (not including contracted social service agency rides) and COA ridership across different services and communities.

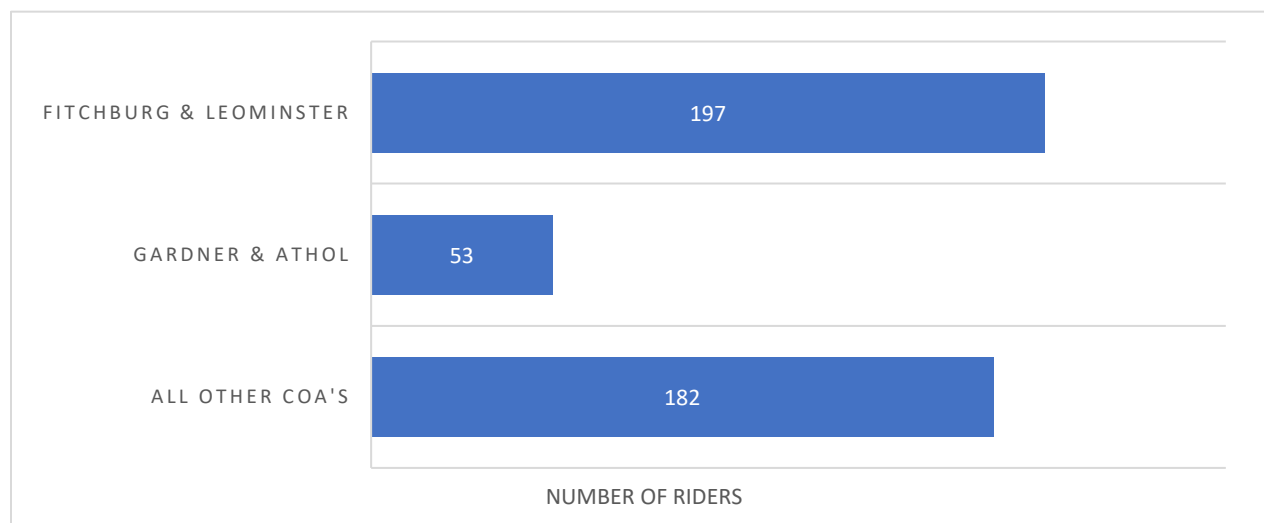


Figure 4-56: Paratransit Average Daily Ridership (2018)



Source: Montachusett Regional Transit Authority

Figure 4-57: Council on Aging Average Daily Ridership (2018)



Source: Montachusett Regional Transit Authority

Dial-A-MART

Dial-A-MART service is transportation that serves the needs of either human service agencies or targeted populations (elderly, individuals with disabilities, and/or low-income



individuals) through eligible agency sponsored trips. Service is provided on a negotiated cost basis with the agencies. MART utilizes the Dial-A-Mart Services to allow its operating company to act as a private vendor to the Brokerage Services Division of MART. This allows for cost savings to the brokerage program and increased revenue to support paratransit operations.

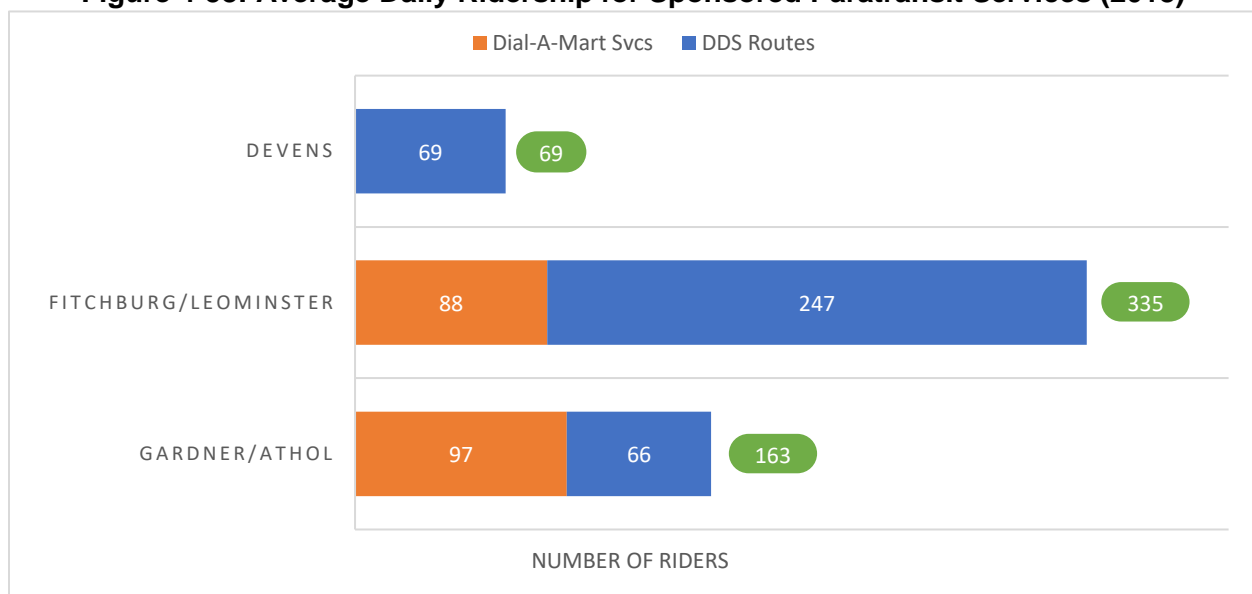
The following chart (Figure 5-58) highlights average daily ridership figures for the Dial-A-Mart services and the Department of Developmental Services (DDS) routes brokered by MART. Overall, average daily ridership has decreased by approximately 2%. However, ridership fluctuates each year, as can be seen in Table 4-35.

Table 4-35: Dial-A-MART Yearly Ridership

Communities	2015	2016	2017	2018	Percent Change 2015 to 2018
Dial-A-MART Services*	155,958	158,758	155,627	146,166	-6.28%

Source: Montachusett Regional Transit Authority

Figure 4-58: Average Daily Ridership for Sponsored Paratransit Services (2018)



Source: Montachusett Regional Transit Authority



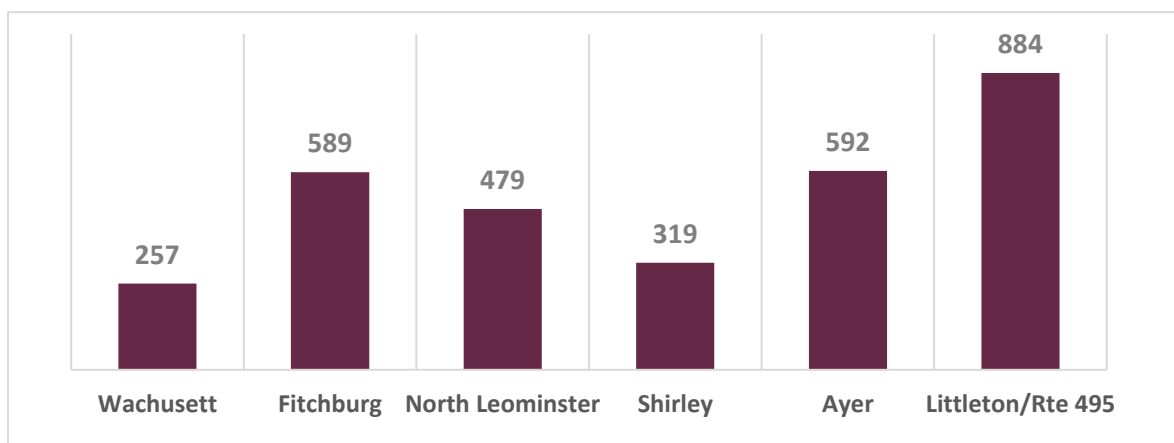
Commuter Train Stations and Parking Facilities

Commuter rail service is managed by the Massachusetts Bay Transportation Authority (MBTA). In September 2016, MBTA extended service 4.5 miles of the Fitchburg Line with the opening of the Wachusett Station in Fitchburg. MART provides a transit shuttle from Gardner to Wachusett Station. The service operates from Wachusett to Boston, with stops in Fitchburg, Leominster, Shirley, Ayer and Littleton.

The MBTA audit reports that of the north-side commuter rail lines, the Fitchburg line has experienced the largest real increase and percentage increase for riders. Since 2012, two inbound trains and two outbound trains were added to increase service.

The daily ridership for the commuter line can be seen in Figure 4-59, with a large number of riders boarding and alighting at the Littleton stop. Notably, the Littleton stop's parking facilities recently added parking for an additional 50 vehicles, but is still often at capacity daily, with some drivers parking illegally. Current parking capacity and potential additions are presented in Table 4-36.

Figure 4-59: Commuter Rail Average Daily Ridership



Source: Massachusetts Bay Transit Authority and Central Transportation Planning Staff

**Table 4-36: Commuter Rail Lot Parking Spaces – Current and Future Potential**

Community	Commuter Rail Station	Current No. of Parking Spaces	In use*	Percent usage	Potential/Planned Parking Spaces	Estimated Year of Completion
Fitchburg	Wachusett Station	360	127	35.28%	360	Completed
	Main Street	425	311	73.18%	425	Completed
Leominster	North Leominster	360	133	36.94%	360	Completed
Shirley	Front Street	65	120	184.6%	65	N/A
Ayer	Main Street/Park Street	65	65	100%	200	Under construction
Littleton	Foster Street	250	255	102%	250	Completed
Total		1,530			1,665	

Source: Montachusett Regional Transit Authority

*Parking lot use counted on Thursday July 11, 2019 by MRPC.

Table 4-37 displays the percentage changes in ridership from 2012 to 2018. Due to Wachusett station's introduction in 2016, data to calculate a percentage change for boarding/alighting at Wachusett Station, as well as some percentages for the Fitchburg stop. Most notable is the inbound change for the Littleton stop, an increase of 135.6% boarding and a 700% increase in alighting. Other notable changes include a 50% increase of outbound boarders at the North Leominster stop, a 38% decrease in the same measure at the Shirley stop, and in 71.6% increase in outbound alighting at the Littleton station.

The changes in daily ridership can be seen in Figure 4-60. The trend seems to indicate that ridership is holding steady, with a large increase at the Littleton station. Once again data for 2012 ridership for Wachusett Station is unavailable due to its introduction in 2016.



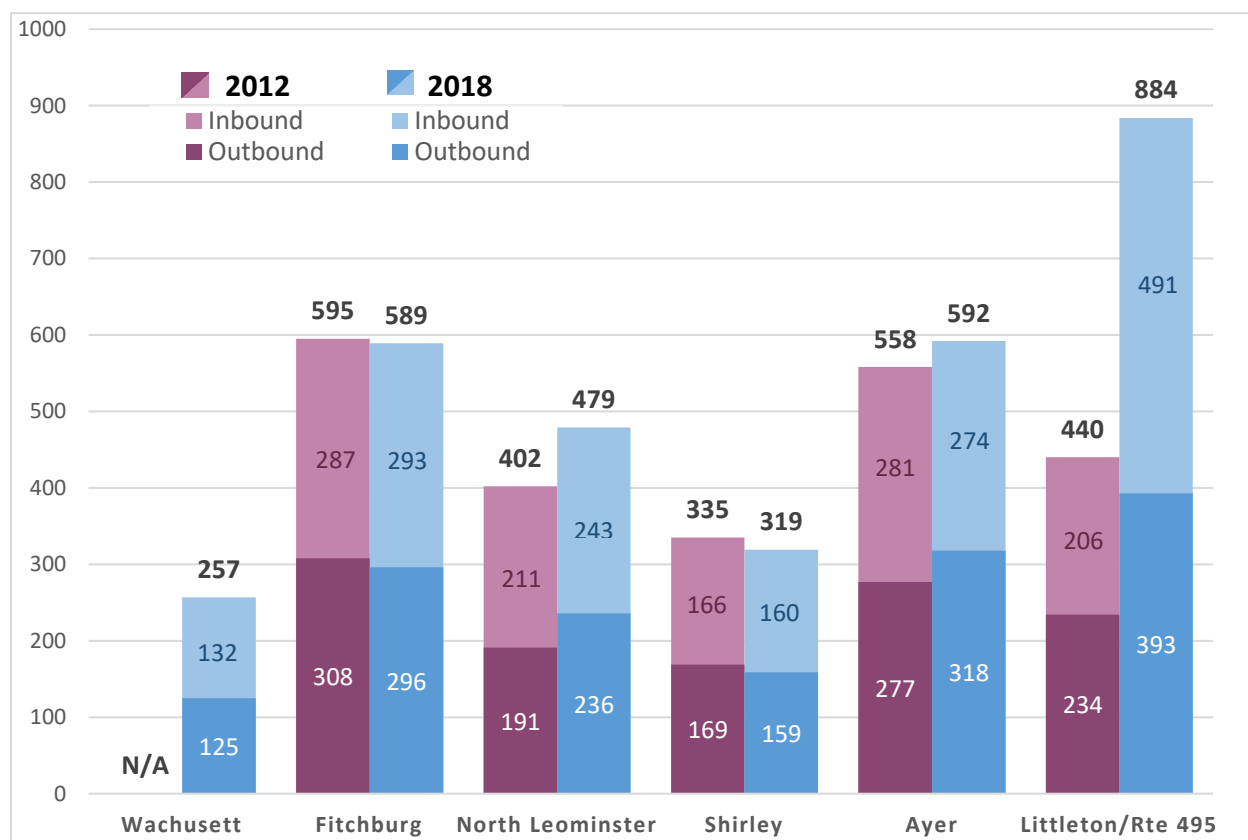
Table 4-37: Percentage Change in Commuter Ridership from 2012 to 2018

	Inbound		Outbound	
	Boarding	Alighting	Boarding	Alighting
Wachusett	n/a	n/a	n/a	n/a
Fitchburg	n/a	n/a	n/a	-3.9%
North Leominster	11.8%	n/a*	50%	23.3%
Shirley	-4.5%	8.3%	-38%	-3.2%
Ayer	-2.0%	-6.3%	-9%	18.2%
Littleton/Rte 495	135.6%	700.0%	-22%	71.6%

Source: Massachusetts Bay Transit Authority and Central Transportation Planning Staff

*Data collected by the MBTA and the CTPS did not record any alighting at the North Leominster stop during their study in 2012, and therefore a percent change cannot be calculated.

Figure 4-60: Commuter Rail Daily Ridership, 2012 vs 2018



Source: Massachusetts Bay Transit Authority and Central Transportation Planning Staff



Trends

Analysis of ridership on all MART services indicates a decrease in ridership, which is being experienced all over the country. Filling service gaps, meeting service needs, and increasing accessibility to residents continues to be a priority for MART. MART has been making improvements to its facilities to increase energy efficiency, and continued improvements to its parking facilities at commuter rail stations will benefit commuter ridership and the residents of the Montachusett region.

Recommendations

In order to provide increased mobility for Montachusett area residents that do not own automobiles or that choose to be less dependent on a personal vehicle, MART will need to continue to refine and implement public transit programs designed to increase ridership. It will be necessary to examine the routes and schedules to determine the most efficient and effective service. MART is open to expanding services wherever possible to fill service gaps, meet unmet regional needs and increase accessibility to health facilities and social services. Where it becomes apparent that certain services are needed, for example evening transportation to local colleges (Mount Wachusett Community College, Fitchburg State University, etc.), MART should continue to work with those institutions to examine requests, organizational involvement and ways to help defray the cost of the additional services. Continued participation of local industries, businesses, major shopping centers and schools in developing appropriate schedules, routes and promotional programs is an important part of this ongoing planning and implementation of services.

Special service provided to the elderly and the disabled will need to be monitored to insure continuation of appropriate levels of service in light of MART's complementary ADA plan. Continue brokerage programs with the Department of Public Health, Department of Developmental Services, MassHealth, Department of Mental Health, MRC, and MCB.

In addition to increased and improved routing and scheduling, it will be necessary for MART to maintain and improve the operating condition of its vehicle fleet. The present vehicle fleet is constantly being replaced with new lift equipped ADA compliant



equipment. The Montachusett TIP process should continue to be utilized to upgrade and replace buses and vans for the MART fleet, as well as continue to upgrade maintenance facilities.

It is recommended that MART collaborate with municipalities to lift the age requirement on the Council on Aging public transportation vehicles in order to provide service to a larger portion of the community. The Council on Aging van services could be expanded to operate on weekends and nights so that those who utilize the service have more scheduling opportunities.

It is recommended that MART increases its social media presence to better promote services and information to the community. MART could collaborate with local municipalities to promote available public transit options on the municipalities' websites and social media pages. It is recommended that MART disseminates information through traditional media like local newspapers, local access television, and radio. It is also recommended that MART consider holding periodic training sessions in order to teach users on how to read and follow bus schedules.

Most of the above actions are designed to improve efficiency and lower overall demand on the highway system at a relatively low cost. In summary, there are several key and identifiable avenues by which the MART system can be both properly maintained and improved. They are:

- Continued monitoring of routes and schedules so that any beneficial changes can be identified and implemented;
- Alternative sources of funding for continued transit operations must be developed and instituted;
- The marketing effort must be upgraded and increased to inform the public of transit availability and efficiency;



- Additional equipment such as radios, lift equipped trolleys, lift equipped buses, lift equipped vans, etc., should be acquired;
- Driver safety, CPR, first aid, and sensitivity courses should be maintained;
- Transit services for the elderly and disabled should continue to be upgraded as necessary to insure both availability and accessibility in compliance with MART's ADA complementary paratransit plan;
- Paratransit services provided by MART to social service agency clients should continue to be monitored for coordination of effort;
- Brokerage programs with Department of Public Health, MassHealth, Department of Mental Health, MRC, MCB, and Department of Developmental Services should be monitored for greater coordination and continued use of private enterprises.
- MAP Purchases for Elderly and Disabled Services (Section 5310).
- Collaborate with MART and municipalities to lift age restriction on COA public transit as well as increase service hours in order to better serve the communities that rely on COA public transit.
- Increase social media presence to better promote information (such as schedules, services, etc) to local community; hold periodic training sessions for the communities on how to read schedules

The following are recommendations limited to commuter rail operations that likely effect the identified target populations.

- Increase available parking at the Shirley, Ayer and Littleton commuter rail stations.
- Extend train service to Gardner.
- Improve Handicapped accessibility at Shirley and Ayer Train Stations.
- Explore possibility of a regional commuter rail facility in the Devens Enterprise Zone.



ENVIRONMENT & CLIMATE CHANGE

Environment and climate change are important areas of consideration for transportation planning. The Montachusett Region needs to help protect and minimize negative impacts to its many areas of environmental value and its air, water, soil and wildlife. Along with environmental protection, the Montachusett Region hopes to reduce greenhouse gas emissions which contribute to global climate change. This section will discuss the current and future activities the Montachusett Region is undertaking to protect its environment and reduce greenhouse gas emissions.

In response to building concerns on the effect of global climate change and the development of The Commission on the Future of Transportation in the Commonwealth, the MRPC has looked at ways climate change will impact the Montachusett Region. In particular, staff has focused on potential flooding by identifying flood prone areas and the effects that it will have on each

“The threats that climate change poses to transportation systems—including flooding, changes in average temperatures, and extreme weather events—are clear. But MPOs and DOTs have little if any information on precisely what impacts they can expect, where, and in what time frames. As a result, agencies are largely not acting to adapt the transportation system to climate change, or are waiting for further guidance on the topic.”

– FHWA *Integrating Climate Change into the Transportation Planning Process*

community in relation to major transportation infrastructure. Transportation infrastructures such as roadways, bridges, rail lines etc. are essential for the economic wellbeing of our region. More than half the country’s population now lives along the nation’s coasts, and one third lives in the highly populated coastal areas of the Northeast. The area between Boston and Philadelphia is one of the most populous areas of the country. The Montachusett region, being a part of this larger corridor, not only has infrastructure which carries regional significance, but national as well.



Regional Significance

“Global climate change affects the coastal areas with rising air temperature, increasing rainfall, rising ocean temperatures and rising sea levels, which lead to increased coastal flooding. In addition to sea level rises, much of the Northeast shoreline is gradually sinking, increasing the effects of rising ocean waters.” Even though there are no coastal areas in the Montachusett region it is important to note other effects climate change may have on inland areas. “The Northeast is projected to see a steady increase in precipitation, with total increase of around 10 percent, about four inches per year, by the end of the century. It is winter precipitation that is rising fastest, with more precipitation expected to fall as rain rather than snow. Rainfall is expected to become more intense and periods of heavy rainfall are expected to become more frequent.”ⁱ Since flooding is a major concern to transportation infrastructure in the region, it is important to identify and recognize areas which are vulnerable to such events.

The flood zone maps at the end of this document show Federal Emergency Management Agency (FEMA) 100-year flood zones in the Montachusett region. A 100 year flood is “calculated to be the level of flood water expected to be equaled or exceeded every 100 years on average. The 100-year flood is more accurately referred to as the 1% annual exceedance probability flood, since it is a flood that has a 1% chance of being equaled or exceeded in any single year.”ⁱⁱ

The map ***FEMA 100-Year Flood Zones, MA DOT Bridges, and DCR Dams*** in the appendix shows all “High” and “Significant” hazard dams in the region and bridges that structurally deficient. According to the Massachusetts Highway Project Development and Design Guidebook, a *structurally deficient* bridge is defined as “a bridge structure that has a defect requiring corrective action.”ⁱⁱⁱ

Dams are shown by their Hazard Codes, a system that categorizes dams according to the degree of adverse incremental consequences of a failure or mis-operation of a dam. The hazard potential classification does not reflect in any way on the current condition of the dam (e.g., safety, structural integrity, flood routing capacity), rather the potential hazards downstream that would



be realized by a failure. Three classification levels are *Low, Significant, and High*. According to the Massachusetts Office of Dam Safety a...

High Hazard Potential dam refers to dams located where failure will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).

Significant Hazard Potential dam refers to dams located where failure may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.

Low Hazard Potential dam refers to dams located where failure may cause minimal property damage to others. Loss of life is not expected.



Table 4-38: High Hazard Dams in the Montachusett Region

HIGH HAZARD DAMS IN THE MONTACHUSETT REGION				
Dam Name	City/Town	Ownership	Regulating Authority	ID Code
Lower Naukeag Lake Dam	Ashburnham	Municipality	Office of Dam Safety	MA00002
Upper Naukeag Lake Dam	Ashburnham	Municipality	Office of Dam Safety	MA00003
Winnekeag Lake Dam	Ashburnham	Private	Office of Dam Safety	MA00007
Lake Wampanoag Dam	Ashburnham	Private	Office of Dam Safety	MA00010
Ashby Reservoir Dam	Ashby	Municipality	Office of Dam Safety	MA00334
Whites Mill Pond Dam	Winchendon	Private	Office of Dam Safety	MA00630
Lake Monomonac Dam	Winchendon	Municipality	Office of Dam Safety	MA00631
Whitney Pond Dam	Winchendon	Municipality	Office of Dam Safety	MA00633
Crocker Pond Dam	Westminster	Private	Office of Dam Safety	MA00638
Westminster Reservoir Dam	Westminster	Private	Office of Dam Safety	MA00639
Wyman Pond Compensating Reservoir Dam	Westminster	Municipality	Office of Dam Safety	MA00641
Hickory Hills Lake Dam	Lunenburg	Private	Office of Dam Safety	MA00851
Fall Brook Reservoir Dam and Dike	Leominster	Municipality	Office of Dam Safety	MA00869
Notown Reservoir Dam	Leominster	Municipality	Office of Dam Safety	MA00870
Scott Reservoir Dam	Fitchburg	Municipality	Office of Dam Safety	MA00871
Lovell Reservoir Dam	Fitchburg	Municipality	Office of Dam Safety	MA00872
Wrights Reservoir Dam	Gardner	Municipality	Office of Dam Safety	MA00117
Cowee Pond Dam	Gardner	Municipality	Office of Dam Safety	MA00118
Perley Brook Reservoir Dam	Gardner	Municipality	Office of Dam Safety	MA00119
Lake Shirley Dam	Lunenburg	Municipality	Office of Dam Safety	MA00455
Lost Lake Dam	Groton	Municipality	Office of Dam Safety	MA00808
Greenes Pond Dam	Fitchburg	Municipality	Office of Dam Safety	MA00875
Overlook Reservoir Dam	Fitchburg	Municipality	Office of Dam Safety	MA00876
Snows Mill Pond Dam	Fitchburg	Private	Office of Dam Safety	MA00878
McTaggarts Pond Dam	Fitchburg	Municipality	Office of Dam Safety	MA00879
Rockwell Pond Dam	Leominster	Municipality	Office of Dam Safety	MA00882
Pierce Pond Dam	Leominster	Private	Office of Dam Safety	MA00883
Wachusett Reservoir Dam	Clinton	State	Office of Dam Safety	MA00886
Cresticon Upper Dam	Athol	Private	FERC Jurisdiction	MA00932
Crescent Street Dam	Athol	Private	Office of Dam Safety	MA00934
Birch Hill Dam	Royalston	Federal Agency	Army Corps of Engineers	MA00963
Tully Lake Dam	Royalston	Federal Agency	Army Corps of Engineers	MA00970
Bickford Pond Dike	Hubbardston	Municipality	Office of Dam Safety	MA01022
Wachusett Reservoir North Dike	Clinton	State	Office of Dam Safety	MA01294
Lovell Reservoir Dike	Fitchburg	Municipality	Office of Dam Safety	MA01334
Lake Samoset Dam	Leominster	Private	Office of Dam Safety	MA00866
Notown Reservoir Dike	Leominster	Municipality	Office of Dam Safety	MA01240
Overlook Reservoir Dike	Fitchburg	Municipality	Office of Dam Safety	MA01236
Falulah Reservoir Dam	Fitchburg	Municipality	Office of Dam Safety	MA02312
Red Dam	Winchendon	Municipality	Office of Dam Safety	MA02345
Damon Pond Dam	Ashby	State	Office of Dam Safety	MA02518



Environmental Impacts of Transportation

The environmental impact of transportation is significant because it is a major user of energy, and burns most of the world's petroleum. This creates air pollution, including nitrous oxides and particulates, and is a significant contributor to global warming through emission of carbon dioxide.^{iv} One of the most well documented human contributors to climate change is emissions from automobiles. According to the Environmental Protection Agency (EPA) around 14% of all global greenhouse gas emissions are from the transportation sector and almost all (95%) of the world's transportation energy comes from petroleum-based fuels, largely gasoline and diesel. A significant contributor to overall transportation emissions is congestion on our roadways, causing cars to idle and produce more byproduct from burning fuel.

Transportation generates 30 percent of America's total global warming emissions, including more than one-third of all U.S. carbon dioxide emissions. More than 60 percent of U.S. transportation emissions come from cars and light trucks.

Source: EPA

Regional Initiatives

Environment and climate change are important areas of consideration in transportation planning. It is important to account for the most vulnerable infrastructure when considering improvements and planning future developments. Efforts to prepare and mitigate the effects of climate change have been made and are currently underway in the region which MRPC has been both directly and indirectly involved in. The following are brief descriptions of such efforts.

Montachusett Regional Stormwater Development Program

During the 2016/2017 UPWP MRPC developed a Stormwater Data Collection App which was made available to member communities required to abide by the EPA's MS4 Permit. This app is capable of collecting GPS coordinates and pertinent information of stormwater assets in the field. MRPC continues to offer support to member communities who wish to utilize the app.



Central Massachusetts Evacuation Plan Mapping

MRPC, in coordination with the Central Massachusetts Planning Commission (CMRPC) and the Central Massachusetts Homeland Security Council, developed a data assessment/SWOT Analysis (strategic planning method to evaluate the Strengths, Weaknesses, Opportunities and Threats) of existing conditions, that was included in the development of a county-wide evacuation plan. This multiyear project was completed in 2016 and was partially funded through the Homeland Security Council and focused mainly on the development of evacuation zones, critical infrastructure, demographic data and the designation of evacuation routes.

Multi-Modal Corridors

To lessen the reliance on driving and burning fossil fuels, which contributed to global climate change, the region is initiating programs that make it easier and safer to have more transportation mode choices. Within the Montachusett region, this includes the development and promotion of bicycle and pedestrian trails and lanes and the establishment of Safe Routes to School and Complete Streets programs in member communities.

Over the last few years, the MRPC has utilized GIS mapping to document where various pedestrian, bicycle and mixed-use trails are in the region. All 22 MRPC communities and Devens have been surveyed and mapped. An inventory is available for the public that shows trails which are available for use. Using trail inventories in these ways can encourage the use of bike and pedestrian modes of travel and might be a first step in planning for future trail construction.

The MRPC also works to assist communities with walkability and complete streets. In 2012, Walkability studies were conducted in the towns of Groton and Westminster and in 2019 Lunenburg was studied. These planning documents were requested to study the downtown areas of each town and how walkable or accessible they are for residents and visitors. These reports showed detailed information for traffic counts, sidewalk inventory and condition, points of interest locations, etc. The MRPC was also hired by the town of Shirley to assist with their Complete Streets Prioritization Plan which was approved in 2018.



Trail Inventory

This project was driven by the Montachusett Regional Trail Coalition (MRTC). The MRTC is focused on trail connectivity by establishing new trails as well as maintaining the existing trail network. This group was formed in March 2012 and is made up of state and local officials and other interested parties who are passionate about trails in the region. These individuals made a request to MRPC for assistance with developing a regional trail map that can be used to boost trail interest, awareness and tourism for the region. The Montachusett Region Trail Guide was published in 2014 and was distributed to various locations across the region including all public libraries, town halls and visitors' centers. A trail inventory update was conducted in 2017 and an updated Regional Trail Guide was created in 2018.

Renewable Energy

The Montachusett Region has worked to increase the use of renewable energy sources. Some Montachusett Region communities have Wind-Energy Bylaws and Wind-Energy Turbines. The Montachusett Regional Planning Commission (MRPC) also has a Regional Energy Plan.

Montachusett Regional Energy Plan

The MRPC completed the development of a Regional Energy Plan. In the fall of 2011 MRPC was awarded \$66,000 from the federal Department of Commerce's Economic Development Administration (EDA) to put together the plan. The goal of the plan is to make recommendations to the Montachusett Region's 22 communities to promote the reduction of electricity used, energy used for transportation, a non-electric energy used for heating; replacement of fossil fuels with renewable resources and the reduction of global climate change emissions. The scope of work for this project included a renewable energy regional inventory (mentioned above), design and construction of energy educational exhibits, and series of community workshops. An assessment and analysis of the Montachusett Region Current Energy Needs/Demands (by end-user) was also undertaken. Based upon this information, Worcester Polytechnic Institute students worked to build a system dynamics simulation model of future energy demands and



needs within the Montachusett Region. The model can be used to simulate a variety of path-altering scenarios. The study and its recommendations can be found on the MRPC.org website in the Comprehensive Planning section under “Energy Planning”.

Renewable Energy Systems

Throughout the Montachusett Region, there are various renewable energy systems including wind turbines, solar photovoltaic, geothermal, landfill gas, hydro, and biomass. In recent years, there has been an increase in these types of systems throughout the region. The increase in renewable energy systems is helping relieve the demand on burning fossil fuels which lowers CO₂ emissions and greenhouse gases.

Siting of Renewable Energy Facilities

The Montachusett Regional Planning Commission (MRPC) and the Northern Middlesex Council of Governments (NMCOG) were awarded \$188,512 in grant funds in fall 2012 from the federal Department of Commerce’s Economic Development Administration (EDA) to develop a plan for the Siting of Renewable Energy Facilities for the Montachusett Region and the Northern Middlesex Region.

The goal of this project was to create a Regional Renewable Energy Facility Siting Plan encompassing the MRPC and NMCOG communities containing recommendations for siting and promoting renewable energy facilities. Adequately siting and promoting renewable energy facilities in appropriate locations will decrease reliance on fossil fuels and petroleum products. Currently, there are insufficient siting standards for renewables; therefore developers of renewable energy often do not know what criteria they need to meet in order to develop wind, solar, geothermal, hydropower and other facilities. This project was completed in 2014.

Wind-Energy Bylaws/Ordinances

Wind-Energy Bylaws/Ordinances detail specific height and setbacks requirements for wind-energy systems and provide identified areas in which people are allowed to put up wind-energy



turbines either by right or through a special permit. This provides an easier, quicker and less costly method than obtaining a zoning variance. In communities that do not have wind-energy bylaws/ordinances, a person might need to get a zoning variance to build their wind-energy turbine.

Climate Change Preparedness

In 2017-2018, MRPC was awarded a grant from the MA [Office of Technical Assistance and Technology](#) (OTA) and the US Environmental Protection Agency (EPA) to sponsor workshops designed to educate municipal officials, community leaders, Local Emergency Planning Committees (LEPCs) and businesses about the toxic chemicals stored, used and transported through their communities.

MRPC collaborated with OTA, EPA, the New England Consortium, and ESIS Health, Safety and Environmental to develop chemical safety trainings and pollution prevention assessment tools that can be used and adopted in future climate change preparedness planning. The goal was to ensure our region's communities are more capable of addressing climate change-related disasters by providing information and thoughtful preparation needed for targeted planning.

MRPC and OTA hosted trainings for local authorities and vulnerable facilities to help raise awareness on the issue and as part of their emergency preparedness plans. The trainings built models for incorporating toxics use reduction into community and regional emergency preparedness and climate resiliency planning and supply toxics users with the tools they need to prevent industrial accidents.

Pre-Disaster Mitigation Plans

In 2008, MRPC wrote Natural Hazard Pre-Disaster Mitigation Plans for all 22 communities in the Montachusett Region and in the winter of 2014, MRPC completed the updates to these same plans with funding provided by the Federal Emergency Management Agency through the Massachusetts Emergency Management Agency and the Massachusetts Department of



Conservation and Recreation. These plans identified natural hazards and assessed their risk of occurring. These hazards included climate change as well as flooding, wind, winter storm and fire related hazards. Flooding, droughts and severe winter storms can be caused by climate change's increase in temperature and storm frequency. These plans also included mitigation strategies for these types of hazards ranging from increased drainage management to increased communication between community boards and departments.

Montachusett Regional Transit Authority (MART) Initiatives

Along with environmental protection, the Montachusett Region hopes to reduce greenhouse gases emissions which contribute to global climate change. As a Regional Transit Agency, MART provides public transportation to area residents and visitors. Environmentally friendly initiatives include the outfitting of maintenance facilities in Gardner and Fitchburg with solar power and the inclusion of Hybrid powered buses and cars to their fleet of vehicles. MART continuously looks to upgrade the efficiency of their fleet and currently operates 23 city buses, of which 3 are Hybrids.

Green Communities

The Green Communities Designation and Grant Program helps municipalities become designated as a "Green Community" and provides funding to qualified municipalities for energy efficiency and renewable energy initiatives. The Program is open to all communities served by investor-owned utilities and those served by municipal light plants that adopt the renewable energy charge.

To achieve "Green Community" designation, a municipality must meet five clean energy benchmarks:

- Provide as-of-right siting;
- Provide expedited permitting;
- Establish an Energy Reduction Plan (ERP);
- Purchase only fuel-efficient vehicles; and
- Minimize life-cycle costs.



The MA Department of Energy Resources (DOER) calculates community funding allocations using a formula that provides each community with a \$125,000 base grant plus additional amounts based on per capita income and population. The “Green Community” designation also makes municipalities eligible for special initiatives such as electric vehicle charging stations and additional competitive grant rounds subsequent to the initial Green Communities grant.

There are currently sixteen communities in the Montachusett region that are designated Green Communities: **Ashburnham, Ashby, Athol, Ayer, Fitchburg, Gardner, Harvard, Lancaster, Leominster, Lunenburg, Petersham, Royalston, Shirley, Townsend, Westminster, and Winchendon.** Collectively, these communities have received over \$4.5 million in funding through the program which has been used in municipal and school buildings for weatherization, HVAC upgrades, variable frequency drive installations, energy management systems, heating fuel conversions, LED lighting retrofits, energy audits, and building envelope upgrades, to name a few. MRPC is working with **Groton, Hubbardston and Templeton** in 2019 to become designated Green Communities and assists many of our communities with tasks associated with maintaining Green Community status on an annual basis.

MRPC strongly supports the Green Communities Program and we believe becoming a Green Community produces significant energy improvements and cost savings for municipalities. Such action also demonstrates the community’s commitment to green energy and environmental protection.

Statewide Initiatives

In May 2016, the Supreme Judicial Court of Massachusetts ruled that the Massachusetts Global Warming Solutions Act (GWSA) requires MassDEP to promulgate new regulations that “impose a limit on [greenhouse gas] emissions that may be released, limit the aggregate emissions released from each group of regulated sources or categories of sources, set emission limits for each year, and set limits that decline on an annual basis” to meet the requirements of Section 3(d) of Chapter 21N of the General Laws.



Executive Order 569 was signed by Governor Baker in September 2016, which directed the Executive Office of Energy and Environmental Affairs (EOEEA) to coordinate and make consistent new and existing efforts to mitigate and reduce greenhouse gas emissions and to build resilience and adapt to the impacts of climate change.

The Executive Order also directed MassDEP to promulgate regulations satisfying the mandate of Section 3(d) by August 2017 to ensure that the Commonwealth meets the 2020 statewide emissions limit mandated by the GWSA.

Trends

Climate change impacts such as global warming is expected to increase the frequency of precipitation and severity of weather events. It is important to anticipate the impact of such factors on transportation infrastructure.

Recommendations

- Encourage the development of more projects which qualify for Congestion Mitigation and Air Quality (CMAQ) funds.
- Maintain the prevalence of environmental factors when reviewing and prioritizing transportation projects.
- Continue to monitor and assess vulnerable infrastructures.

The importance of the environment in the Montachusett region goes beyond just the moral responsibility to protect our planet. Natural resources and attractions which exist in the region could also have economic benefits as well. Both the protection of our environment and the efficient connectivity of people to these assets should play a prominent role in transportation decision making now and in the future. Environmental Performance Measures set in this plan will help ensure progress continues to be made.



ⁱ “Confronting Climate Change in the U.S. Northeast: Science, Impacts and Solutions,” a report of the Northeast Climate Impacts Assessment © 2007 Union of Concerned Scientists.

ⁱⁱ Holmes, R.R., Jr., and Dinicola, K. (2010) *100-Year flood—it's all about chance* [U.S. Geological Survey General Information Product 106](#)

ⁱⁱⁱ Massachusetts Highway Project Development and Design Handbook. (January 2006):

Massachusetts Highway Department; Executive Office of Transportation

^{iv} [Center for International Climate and Environmental Research](#) (2007). ["Climate forcing from the transport sectors"](#)