3. Existing Conditions

The following pages offer an overview of land use patterns, demographic and socioeconomic makeup and commuting travel patterns in the MPO region, as well snapshots of the modal components of the transportation system, including highways, bicycle and pedestrian facilities, public transportation, transportation demand management, and freight transportation facilities and programs.

Population & Growth

Demographic conditions and trends significantly influence the trajectory of the region's future development, land use, housing, and infrastructure needs; along with virtually all other aspects of planning. For most of the past 50 years, the RPC has been strongly influenced by rapid population growth. The population of the region doubled between 1960 and 1990, and at times during the 1970s and 1980s several towns in the region grew at a faster pace than any in the state. The number of people added between 1956 and 1990 averaged nearly 2,750 per year. The growth rate began to drop substantially after 1990, slowing to about 1,700 people a year between then and 2000, and slowing even further between 2000 and 2010 to about 1,000 persons per year across the region (Figures 3-1 and 3-2). More recently, population growth has slowed further with State Office of Strategic Initiatives (formerly the Office of Energy and Planning) estimates adding just under 3,100 people (about 620 per year) to the region between 2010 and 2015.

Figure 3-1: Census Population of Region

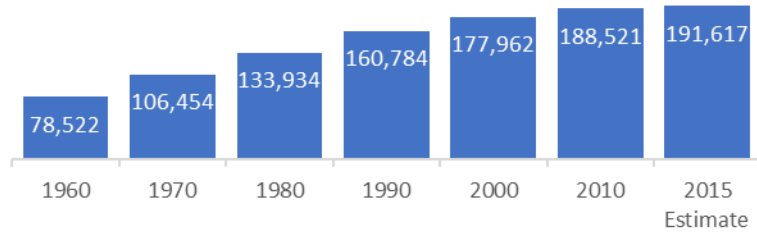
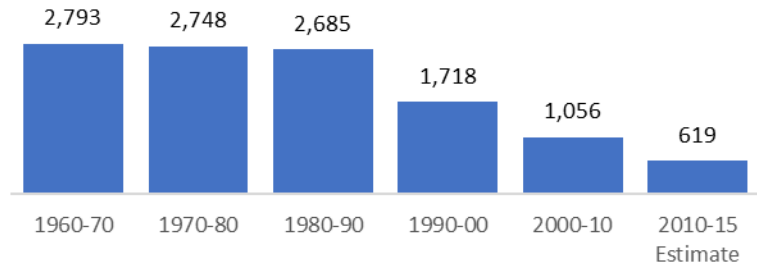
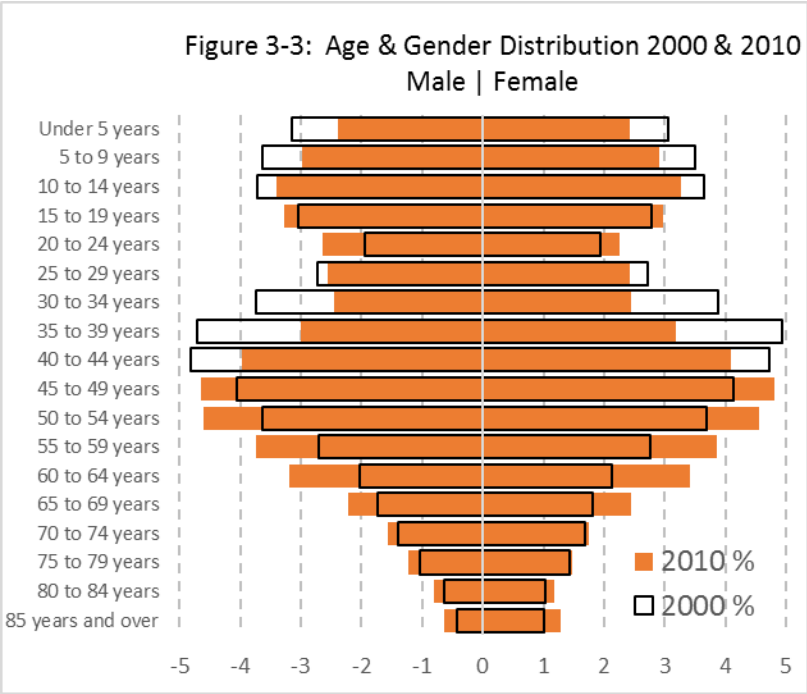


Figure 3-2: Ave Population Growth per Year by Decade

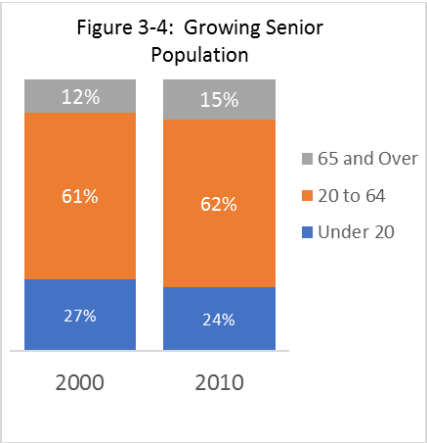


Age Demographics

Demographically, the region is trending older with fewer children being born in the area. Figure 3-3 compares the distribution of the population by 5-year age and gender cohorts for 2000 and 2010. During that time period, it can be seen that the percentage of the population for each cohort under age 15 is decreasing over the ten years, while the population of each group between 25 and 44 is

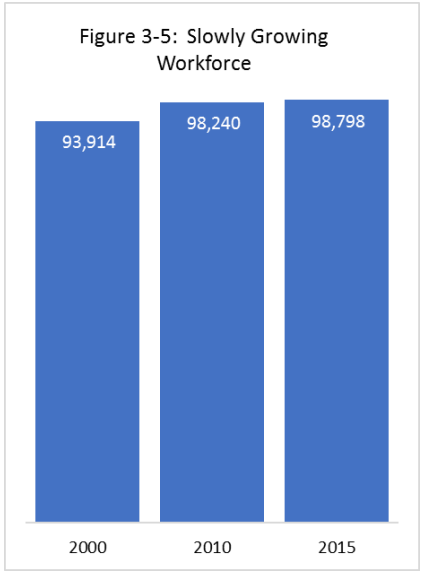


also decreasing. Cohorts for groups 45 and older all increased between 2000 and 2010. This trend is expected to continue as the Baby Boomer generation enters retirement years with smaller sized cohorts following. This produced a net increase of nearly 6000 individuals 65 and older which is 26% increase over 10 years. This shift translates to an overall percentage increase in the population in the population of residents aged 65 and over from 12 % to 15 % of the total population, and a similar decrease in those under 20 from 27% to 24% over the same time period.



Labor Force

From the 1960's onward, the national work force participation rate grew from about 59% of all individuals 16 and over to over 67% when the rate peaked in 1997-2000. Since that time, participation in the labor force has declined due to demographic, structural, and other factors and the current rate has hovered around 63% since 2013 (Toossi, 2015). This does not mean that the work force has not grown, however, as population growth has been sufficient to offset the declining participation rate. In New Hampshire, the seasonally adjusted labor force has grown from just over 620,000 in 1990 to nearly 743,000 in 2015 according to the Economic and Labor Market Information Bureau. In the RPC region, growth in the total labor force has been occurring as well, although at a very slow pace (.3% per year since 2000) with approximately 5,000 potential workers added to the region over the last 15 years. This mirrors the larger demographic shift that has been seen (Figures 3-3 and 3-4) with the large "Baby Boomer" generation beginning to age out of the workforce in larger numbers and offsetting the growth in the work force to some degree.



Population Diversity

Figure 3-6 identifies of racial and ethnic minority residents for each municipality in the RPC region, as well as minority residents as a percentage of overall population. Region-wide minorities make up approximately 7.1 percent of the population, a very low

percentage by national standards and lower than the statewide average of 9.2 percent. This average is exceeded in five communities: Portsmouth (13.3 percent), Salem (13.1 percent), Raymond (8.3 percent), New Castle (8.3 percent) and Hampton Falls (7.2 percent). This is a significant increase since the 2000 census, when racial and ethnic minorities made up only 5.6 percent of the population statewide, and 3.5 percent of the population in the MPO region. Both the region's and state's population diversity is expected to slowly increase with time, but remain behind surrounding state's and regions.

Populations in Poverty

According to the U.S. Census Bureau, for 2018 the poverty threshold in the RPC region was approximately $25,465 for a family of four. **Figure-3-7** uses the American Community Survey 2018 5-year data compilation to show the number and percent of households in poverty by municipality in the Rockingham Planning Commission region. The mean percentage of households in poverty for the MPO region was 4.8 percent. In eleven MPO communities the percentage of households in poverty exceeds this regional mean: Epping (8.9 percent). Raymond (8.1 percent), Hampstead (6.5 percent), Kingston (6.3 percent), Portsmouth (6.1 percent), East Kingston (5.6 percent), South Hampton (5.3 percent), Exeter (5.5 percent), North Hampton (5.2 percent), and Hampton (4.9 percent), and Seabrook (4.9 percent). Statewide, approximately 7.9 percent of the population falls below the federal poverty line, while nationally for 2018 an estimated 14.1 percent of the population lived in poverty.

This represents minimal change from the 2000 Census data, which showed five percent of residents in the region living in poverty. Several towns with above average populations in poverty in 2018 were below average in 2000. These include East Kingston,

Figure 3-6 – Minority Population by Census Tract

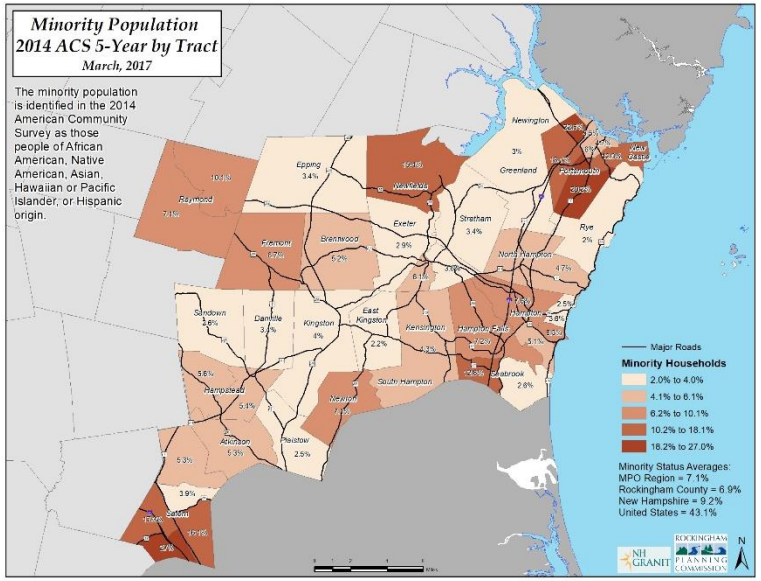
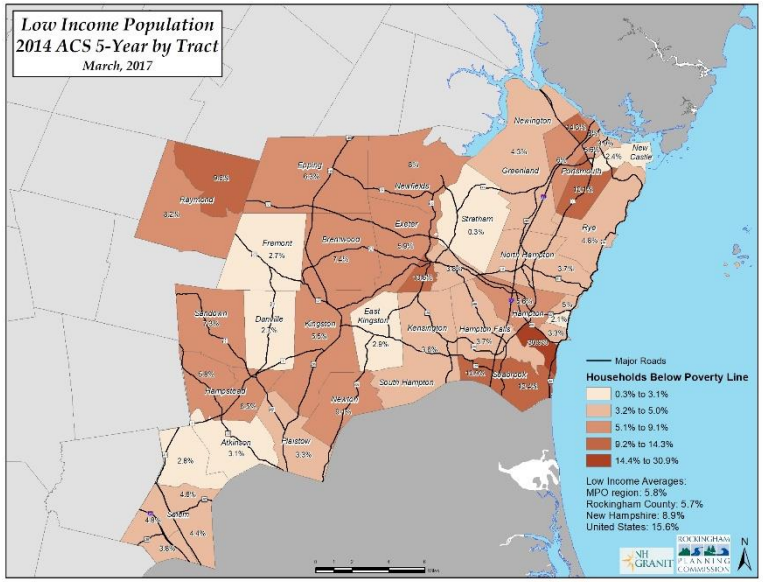


Figure 3-7 – Population in Poverty by Census Tract



Statewide, the percentage of households where costs for housing exceed 30% of income is similar to the other New England states. Contrary to expectations, the rate of overpayment in Rockingham County and the Seacoast region is only modestly higher due to higher household incomes in the region.

North Hampton and South Hampton. This may reflect demographic shift or may to some degree reflect sampling anomalies in these small towns. Hampton traditionally shows a high population in poverty due to short term winter rental residents in the beach district, while Portsmouth as the only city in the area, and a community with many students and retail workers, also traditionally shows above average poverty levels.

LAND USE

Transportation and land use are intimately linked. A new transportation infrastructure project such as expansion of a highway will spur housing and employment growth, and land development in the communities it serves. Likewise, an increase in population or employment in a sparsely settled area can overwhelm the existing road system and require major investment in new or expanded infrastructure. The prospect of cheaper land is usually a driving factor in the location of large new development projects on community outskirts and more rural areas, whether retail centers or high schools. However, the cost savings in land is often offset by a range of other costs. These include the cost to extend or expand roads and utilities to the site, the additional energy requirements, traffic congestion, limited access for those without automobiles, loss of open space, and increased air pollution as more people need to make more vehicle trips to access goods and services. The resulting development pattern has commonly become referred to as sprawl.

While many definitions of sprawl have been put forward in recent years, perhaps the simplest definition relates to the inefficient way such development consumes land. We are consuming land in the region at a greater rate than previous generations, and not just because population grew faster in the latter part of the 20th century than in prior periods.

Between 1953 and 1974, 0.75 acres of land were developed in Rockingham County for each person added to the population. Between 1974 and 1982, this rate of land consumption more than doubled to 1.59 acres per capita.

Many communities responded to growth in the 1970s through 1990s by establishing a low density development pattern through large lot zoning or soil-based lot sizing that could sustain both on-site septic disposal and private wells for water supply without the necessity of sewer or water or built in fire suppression systems. One result of this approach (called by some a 'sewer avoidance strategy') was growth that did not require large expenditures for physical infrastructure, except for schools. Another was that buildout of these communities would be limited to a density of less than 1 house per acre on average, thus retaining a non-urban, if not exactly rural, character. The dispersed land use pattern this creates is reflected in a comparison of population growth to traffic volume in the region. From 1982 to 1997 population in Seacoast New Hampshire grew by about 38%, while traffic volume in the region grew by 169% - a factor of more than 4 to 1.

The land use patterns in the region have a significant effect on its transportation system, and vice-versa. Unlike many regions of its size in the United States, the MPO region is fortunate to have a number of traditional downtown and village centers that remain active and viable.

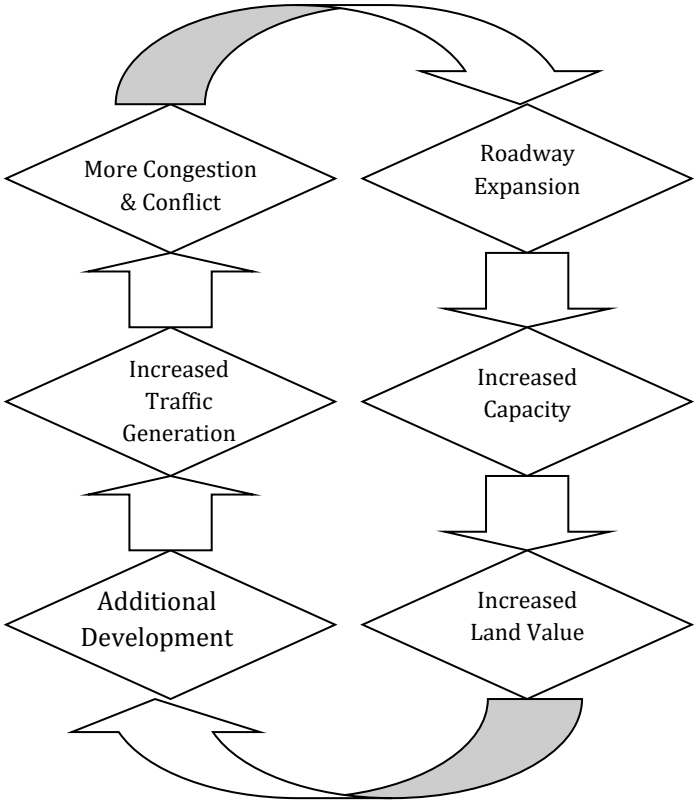


Figure 3-8 - The Transportation Land Use Cycle

"...this cycle continues until it is physically or economically impossible to further expand capacity. Access Management together with good land use controls can preserve highway capacity and effectively slow down or halt the cycle." -- FHWA Access Management Project

Nonetheless, much of the residential, commercial, and industrial development is dispersed, encouraging and sometimes necessitating a large amount of travel for individuals to work, shop, and fulfill their other daily needs. This sprawling development pattern makes it difficult for any mode other than the automobile to meet these needs.

The result is a high level of vehicle miles traveled (VMT) per capita and inefficient (if not infeasible) public transportation services. Not surprisingly, a large majority of the population uses private automobiles exclusively to meet their transportation needs. This increases traffic volumes, and places a greater demand on road infrastructure as the population grows. This pattern has also meant that individuals without access to an automobile encounter serious mobility problems. In turn, new road infrastructure needed to accommodate growth in traffic, encourages development and a continuation of dispersed land use patterns.

This pattern illustrates the classic example of inadequate integration of land use and transportation planning which has resulted in congestion, safety problems, lack of access by modes other than automobile, and eventual need for expensive capacity improvements on the roadways. This is the scenario of the "Transportation Land Use Cycle" depicted in ***Figure 3-8***. In this cycle a road with excess capacity attracts additional land development (often retail or commercial development in need of high visibility and access). This results in additional traffic generation and the erosion of highway capacity and function.

Eventually the congestion becomes severe enough that further expansion of the roadway is prompted, and the cycle begins again. This cycle can be seen along nearly every highway in the region from the strip commercial development on US 1 and NH 28 to large lot residential developments along Routes 121A and 108 among others. This pattern can also be seen in the relocation of public facilities such as schools, post offices, or court houses to the outskirts of town where land is inexpensive, but facilities are inaccessible by foot and difficult to access by bicycle or transit.

In the past decade there has been increased interest in multiple communities in the MPO region in shifting these patterns. Approaches have included updating zoning regulations, encouraging more compact mixed-use development in their town centers, while leaving open and rural areas for agriculture, recreation and other suitable uses. More residential development in close proximity to town centers and schools increases accessibility by walking, bicycling or transit. It also boosts the vitality of downtowns as easier access supports increased patronage of downtown businesses. Stratham, Seabrook, Hampton Falls and Portsmouth have adopted form-based type zoning to achieve this result. Additional towns such as Newington have focused on access management to limit curb cuts from new development on state highways, and thus manage the impact of new development on road capacity and congestion.

CLIMATE CHANGE

New Hampshire coastal municipalities are confronted by a particularly challenging set of land use and hazard management concerns that include extreme weather events, storm surges, flooding, coastal erosion, and loss of key coastal habitats. These issues are exacerbated by changes in climate that result in an increase in the frequency and intensity of storms and an increasing rate of sea level rise. These effects are compounded by growth and development through increasing stormwater runoff and flooding. Sea level rise has the potential to displace coastal populations, threaten infrastructure, intensify coastal flooding and can ultimately lead to the loss of private property, public infrastructure, recreation areas, public space, and natural resources. Residential and commercial structures, roads, and bridges may be more prone to flooding over time as precipitation increases and storms become more frequent and severe. Sea level rise could reduce the effectiveness and integrity of existing seawalls and protective barriers, which have been designed for historically lower water levels. Climate-related changes projected for the Seacoast region (at right) are reported in *Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future* [Wake, 2011]

Climate Related Changes Projected for the Region

Sea Level Rise and Higher Coastal Storm Surge

Increased Precipitation During Extreme Events

Increased Winter and Summer Temperatures

Changes in Snow and Rainfall Patterns

Shifts in Flora and Fauna Ranges

[Wake, 2011]

Changes in New Hampshire's climate are well documented in local records of sea level, growing seasons, range of flora and fauna, precipitation and temperature. Similar to national trends and projections of current climate models, the state has experienced more extreme weather events including floods, drought and rising tides. Some degree of future impact will be influenced by changes to the atmosphere and warming of land, atmosphere and oceans already in progress. Longer term impacts will reflect decisions made today that influence how climate may change further into the future. Such decisions include energy choices such as fossil based versus renewable sources, land use and environmental protection, and transportation systems.

Sea-Level Rise

Under current conditions, sections of state roadways in the region, and their associated infrastructure, are vulnerable to frequent flooding from seasonal highest tides and coastal storm surge including NH Routes 1A, 1B, 1, 101 and 286. Since 1900, sea levels have risen an average of 0.7 inches per decade or a total of 8.5 inches in the seacoast region; however, the rate of sea level rise has increased to approximately 1/3 inches per decade since 1993 [NH coastal Risk and Hazards Commission, 2014].

Extreme Precipitation and Flooding

Under current conditions, sections of state roadways in the region, and their associated infrastructure, are vulnerable to frequent flooding from seasonal highest tides and coastal storm surge including NH Routes 1A, 1B, 1, 101 and 286. In recent years, coastal roadway flooding across NH's seacoast has been widely documented as part of annual "King Tide Photo Contest" sponsored by the NH Costal Adaptation Workgroup and the Piscataqua Region Estuaries Partnership: http://www.nhcaw.org/what/king-tide-contests/.

Figure 3-9 shows that the frequency and intensity of extreme precipitation events have substantially increased since the 1990's. As reported by the Federal Emergency Management Agency (FEMA), NH has had 34 major disaster declarations since 1953: 15 from 1953-1999 (a 46-year period), and 19 from 2000 to 2015 (15-year period) [FEMA, website].

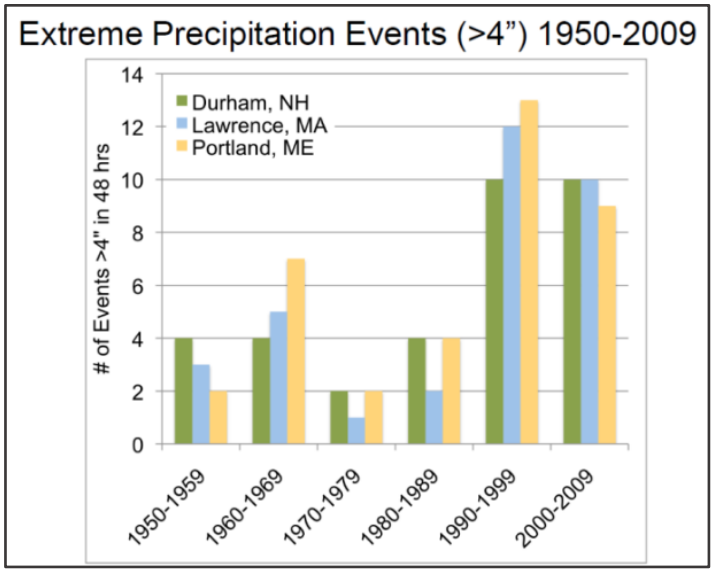


Figure 3-9 . *Total number of events with greater than four inches of precipitation in 48 hours per decade since 1950 (Wake et al, 2011).*

Established in 1983 and funded by National Oceanic and Atmospheric Administration, the Northeast Regional Climate Center (NRCC) is located in the Department of Earth and Atmospheric Sciences at Cornell University. The NRCC has published new extreme precipitation data for New Hampshire which shows for the southeast region of the state substantial increases in the amount of rain associated with large precipitation events (i.e. the 25-, 50-, and 100-year storms). The NRCC online database is available online at: http://precip.eas.cornell.edu/.

Figure 3-10. *Comparison of rainfall data for several locations around the region from Technical Review Paper No. 40 (TP40) Rainfall Frequency Atlas of the Eastern United States (1961) and the Atlas of Precipitation Extremes for the Northeastern United States by the Northeast Regional Climate Center (NRCC) (2013).*

Location	50-year storm Precip. (TP-40)	50-year storm Precip. (NRCC)	100-year storm Precip. (TP-40)	100-year storm Precip. (NRCC)
Portsmouth	5.8	7.39	6.5	8.85
Seabrook	5.8	7.64	6.5	9.19
Exeter	5.8	7.5	6.4	9.0
Epping	5.2	7.21	6.4	8.64
Sandown	5.7	7.10	6.4	8.52
Precipitation reported in inches				

Figure 3-10 reports a comparison of rainfall data from Technical Review Paper No. 40 (TP40) Rainfall Frequency Atlas of the Easter United States (the previous national atlas comprised of data collected prior to 1957) and the current Atlas of

Precipitation Extremes for the Northeastern United States published by the Northeast Regional Climate Center (2013).

The data sample from across the RPC region in Figure 3-10 shows an increase in rainfall amounts of 25-39 percent for the 50-year storm event and 35-49 percent for the 100-year storm event. Since the early 200's, freshwater flooding from extreme precipitation events have frequently impacted state roadways in the region including Routes 150, 108, 111, 111A, 88 and 27 as well as numerous local roadways, bridges, and culverts. This flooding is not unexpected given that these roads and supporting infrastructure were designed based on the TP-40 precipitation data making stormwater conveyance systems undersized for today's conditions.

In response to the publication of new precipitation data, the Department of Environmental Services incorporated NRCC's new precipitation atlas as part of its Alteration of Terrain permit program in 2014, requiring site development and stormwater management plans to design infrastructure to account for increased rainfall and runoff. Some municipalities in the region are using the NRCC data in the design and planning of road and stormwater infrastructure improvement projects.

Integration of Environment and Land Use

New Hampshire has good information from which to plan for climate change impacts but more research and analysis is needed to develop site and asset specific actions to build resilience into natural and man-made systems. Certainly, common sense practices such as incorporating new precipitation data and current sea-level rise projections into project planning and design are prudent short terms action. We know that stormwater runoff, the evolution of floodplains and changing shorelines can have negative impacts on transportation infrastructure and the environment. Investigating these interactions is a necessary step in understanding how these systems can be managed to sustain them into the future.

HOUSING

Cost of Ownership

Housing availability, diversity and affordability are important factors in creating and maintaining a favorable environment for creative, diverse, vibrant communities and healthy economic development. The quality of the housing stock in the region, as measured by common census statistics like age of units, number of bedrooms, utility status, etc., is generally good. Another positive metric for the state and region is the high homeownership rate, which correlates with overall prosperity. New Hampshire ranked second nationwide in homeownership with 71 percent of occupied housing units being owned versus rented (ACS 2012, 3 Year Data). In Rockingham County, 77 percent are owned, the highest of all areas in the state except Carroll County. On the other hand, the RPC region has comparatively high housing costs which can translate into higher living costs for the region's workforce, and in turn, high labor costs for the region's employers if higher wages are needed to attract the workforce their businesses.

Supply of Workforce Housing

Beginning in the 1970s and continuing to today, the region has had a relatively constrained supply of workforce-affordable housing, both owned and rental. At least two factors have and continue to contribute to this. First, the proximity to the Boston housing market and high housing costs in neighboring communities in Massachusetts tend to inflate the cost of housing here, whereas wages are not as strongly affected. Second, there is

an undersupply in multifamily housing - an important source of both rental and other affordable housing units in the region. Two additional factors contribute to this lack of multifamily housing: lack of municipal sewer and water services which permit development density conducive to multifamily development; and zoning provisions that discourage or make it infeasible. The Workforce Housing statute (RSA 674:58-674:61) requires municipalities to provide reasonable and realistic opportunities for the development of workforce housing by removing unnecessary barriers in zoning and land use regulations. Nevertheless legacy zoning provisions, combined with density limitations from lack of sewer, make such housing economically unattractive to developers in many parts of the region.

Lack of Affordable and Multi-Family Units

As of the 2010 Census, about two-thirds of the housing units in the region were single-family units, but for many small communities that number is over 80 percent. Zoning restrictions in many communities make it more difficult to construct affordable multi-family housing, but these restrictions are often in place because of the lack of municipal sewer and water infrastructure in the majority of the towns in the region. Only ten of the 26 RPC communities have municipal sewer systems, and in most of those, the sewer district covers only a small portion of the town. Even where allowed by zoning, that lack of infrastructure increases the relative cost of multifamily construction in rural areas and becomes less attractive to builders. Another factor in the comparatively small supply of multifamily housing presently available in the region is the relative weakness in the housing construction sector which began with the recession in the early to mid-1990s which affected the multi-family sector more than the single family sector.

TRANSPORTATION

The region is served by a well-developed roadway network, a small and geographically limited public transportation system, and a large variety of domestic and international freight transportation carriers. All modes of transport and goods movement are available within or near to the region including the Port of New Hampshire, Pan Am Railways main line (the former Eastern Line of the Boston and Maine Railroad) and the Pease and Manchester airports. Rail freight access has significantly declined over the past 50 year, while motor carrier freight access has dramatically increased.

STATE AND LOCAL ROADWAY NETWORK

In post-World War II New Hampshire the pattern of development has been defined almost solely by the extent of the roadway network. Since that time, emphasis has been placed on expansion of the capacity of the highway system, and this is reflected in the more than 1,800 miles of well-developed state, local, and private roads in the region. These roadways are organized in different classification schemes depending upon their urban or rural location, their role in providing mobility or access to property, and the volume and type of traffic that they are intended to serve, who they are maintained and owned by, or other attributes. Several of these classification schemes are used in New Hampshire.

Functional Classification

The roadway functional classification system is designed to provide consistency in how roadways are categorized based on how the facility serves varying transportation needs. This is couched in terms of how each facilitates accessibility and mobility for communities, the region, and the state while taking into account locational context and other livability factors (***Figure 3-11***). Accessibility refers to the ability to reach desired opportunities (property, goods, services, activities and destinations), while mobility refers to the actual physical movement between locations (Victoria Transport Policy Institute, 2014). All regional highways are shown on ***Map 3-1*** and discussed below, organized by classification from the most heavily used roadways to the least. While there is some overlap at the transition points, larger capacity roadways generally have the role of providing mobility between regions and have more restricted access while local roads have frequent direct access to individual properties but operate at much lower volumes and speeds.

Figure 3-11: Road Miles by Functional Class

More Mobility ↑ / More Accessibility ↓

Rural Roadways	Miles	Urban Roadways	Miles
Principal Arterials	1.8	Principal Arterials – Interstate	61.9
Minor Arterials	0.6	Principal Arterials – Other Freeways and Expressways	67.6
Major Collector	22.3	Principal Arterials –Other	54.6
Minor Collector	27.0	Minor Arterial	88.2
Local Road	240.3	Collector	150.3
Private Roads	245.9	Local Road	885.5
Sub-total	**537.9**	**Sub-total**	**1,308.1**

Total Road Miles = 1,846.2 miles

Legislative Classification

Another method of organizing roadways in New Hampshire is based on the ownership of the facility and who is responsible for maintenance. The New Hampshire Legislative Classification is required by RSA 229:5 and helps to define what roadways are eligible for different types of state aid. The breakdown of these types of roads within the region can be seen on ***Map 3-2***.

- ***Class I*** – Trunk line highways that consists of all highways on the primary state highway system except for those that are part of the urban compact. The state maintains full control over maintenance and construction activities.
- ***Class II*** – Highways on the state secondary highway system except for those within urban compacts. All improved sections of these roadways are maintained by the state.
- ***Class III*** – Recreational roads that access state parks and other reservations.
- ***Class IV*** – All roadways within the urban compact sections of certain communities. These roadways are maintained by the community even though some may be portions of numbered state highways. RSA 229:5 establishes which communities can have urban compacts.
- ***Class V*** – Rural roadways owned and maintained by communities.
- ***Class VI*** – Unmaintained highways owned by a community or the state.

NH Highway Tiers

More recently, the New Hampshire Department of Transportation has looked to group highways based around similarities such as connectivity to economic centers, regional significance, and maintenance requirements to manage the road network in a more

efficient and effective method. In that regard, the agency has established a six tiered system from highest to lowest priority roadways that combines aspects of both the functional and legislative classification systems. This classification scheme can be seen on ***Map 3-3***, the NHDOT website, and is generally defined as follows:

- ***Tier 1 – Interstates, Turnpikes, and Divided Highways*** that have high traffic volumes and carry the majority of commuter, tourist, and freight traffic around the state.
- ***Tier 2 – Statewide Corridors*** have moderate to high traffic volumes as they carry passengers and freight between regions of the state and to and from adjacent states. Some of these roadways are high speed while others are more rural roadways that have gained traffic as development has spread
- ***Tier 3 – Regional Transportation Corridors*** that provide travel with regions, access the statewide corridors and support moderate traffic volumes at moderate speeds.
- ***Tier 4 – Local Connectors*** are low volume and speed secondary highways and unnumbered state routes that act as local connectors and proved travel between communities.
- ***Tier 5 – Local Roads*** are community owned roads and bridges or state owned roads with urban compact limits that provide travel within communities. These facilities carry varying volumes of traffic at varying speeds.
- ***Tier 6 – Off Network*** are assets such as park and ride lots, rest stops, and maintenance facilities.

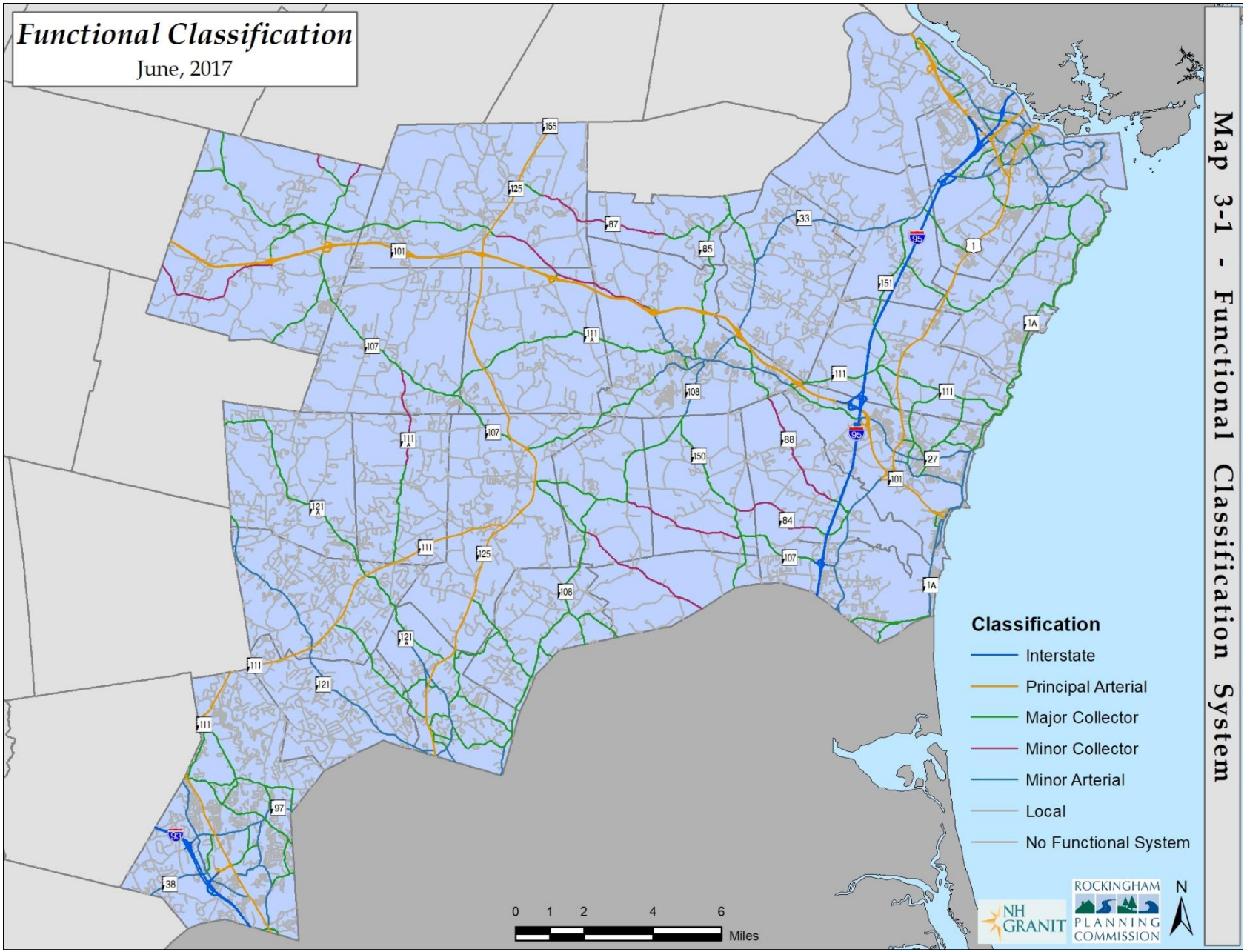
Congestion Management Network

Federal law requires that metropolitan regions with more than 200,000 people, known as Transportation Management Areas (TMAs), maintain a Congestion Management Process (CMP) and use it to improve transportation planning and decision making. While the RPC region is not a TMA, the region includes 12 communities that are part of the Boston Urbanized Area and was required by FHWA NH Division to implement a CMP. As part of that process, the MPO defined the components of the transportation network that should be included and evaluated for congestion related impacts. This network is shown on ***Map 3-4*** and generally includes the primary arterials in the region along with routes serving the largest tourist destinations, regional and intercity transit services, and the park and ride facilities in the region.

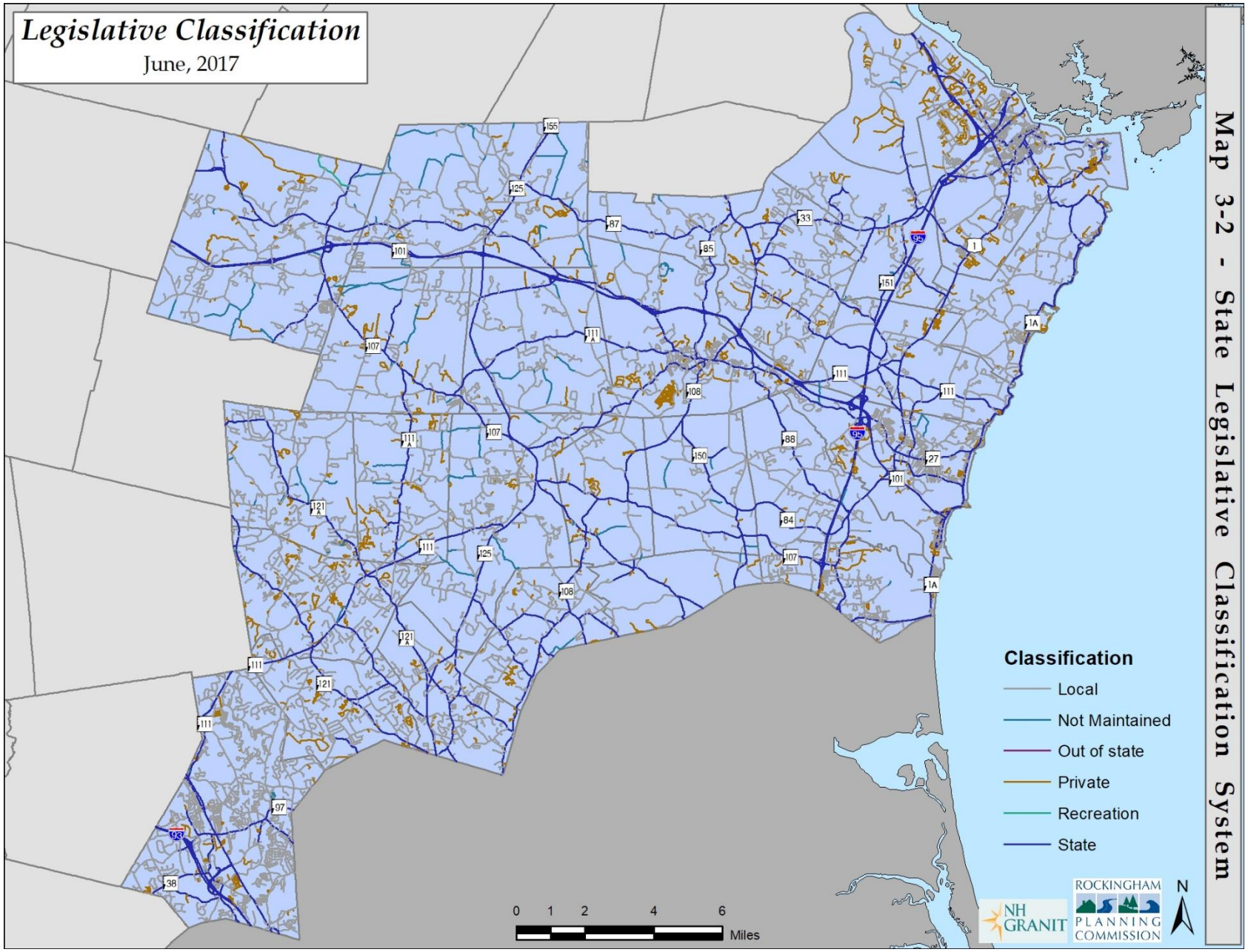
National Highway System

The National Highway System (NHS) is a subset of roadways considered important nationally for economic, mobility, and defense purposes. Until 2012, this system consists of only interstate highways and other principal arterials, intermodal connectors that provide access between intermodal facilities (such as ports) and the rest of the NHS, and the Strategic Highway Network (SRAHNET) and related network connectors which include the access roads to major military installation and other highways designated to provide defense access, continuity, and emergency capabilities. With the passing of the MAP-21 legislation in 2012, the National Highway System was expanded by 230,000 miles nationally and now also includes all roadways classified as principal arterials. These roadways must comply with Federal design standards, contract administration requirements, oversight procedures, Highway Performance Monitoring System (HPMS) and National Bridge Inventory (NBI) reporting, data collection for national performance measures, and outdoor advertising and junkyard control in exchange for access to greater levels of Federal funding via the NHS subset of the funding provided to states for transportation improvements.

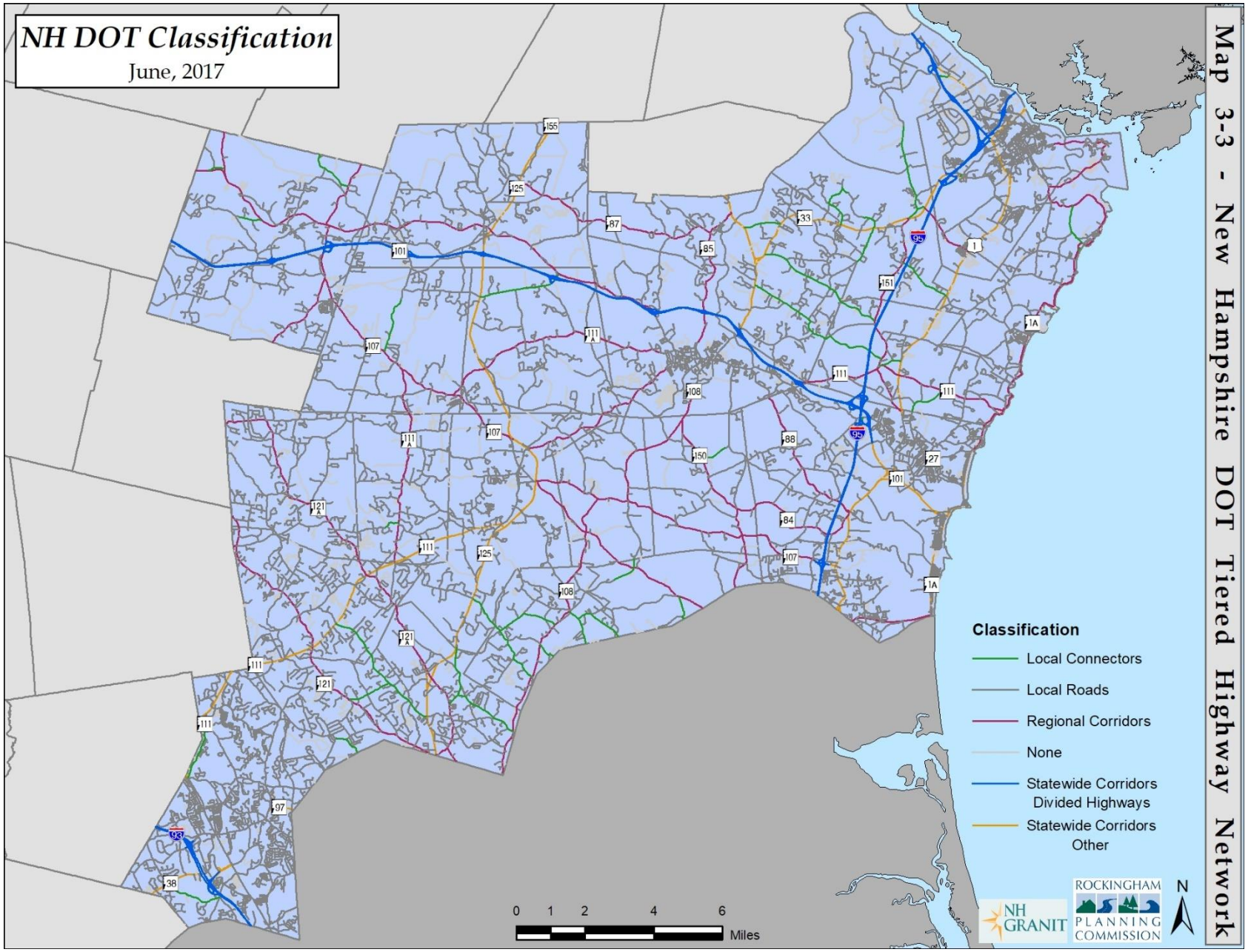
Map 3-1: Functional Classification



Map 3-2: Legislative Classifications



Map 3-3: NH Tiered Highway Network



The intent of this system is to encourage states and MPOs to focus federal aid improvement funds on a limited number of high-priority roadways within their bounds. The NHS roadways in this region are listed below and can be seen on ***Map 3-5***:

- Interstate 93
- Interstate 95
- NH 101
- NH 16(Spaulding Turnpike) and NH 101
- US 1 from the Hampton/Hampton Falls border to the US 1 Bypass and following the bypass to Maine.
- The connection from I-95 to the Portsmouth Transportation Center
- The connection from I-95 to the Port of New Hampshire.
- Route 103 in Maine connecting I-95 and US 1 Bypass to the Portsmouth Naval Shipyard is part of the STRAHNET.
- NH 125 (entire length)
- NH 111 from Kingston west to Nashua
- NH 28 from the Massachusetts border to Windham.

The movement towards Performance Based Planning has placed additional emphasis on NHS roadways in that a majority of the Federally mandated performance measures, particularly those related to pavement condition and congestion, apply separately or only to that subset of highways. There are ten measures that apply specifically to the NHS:

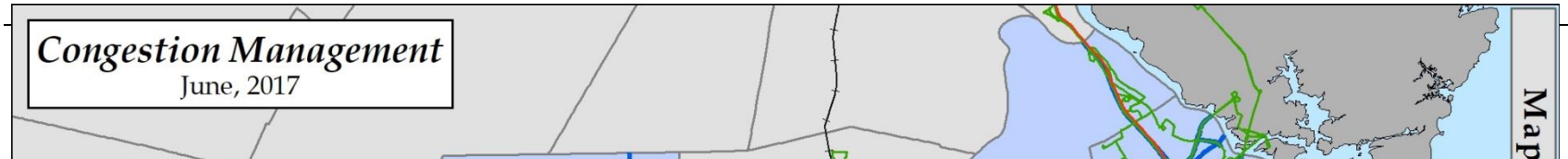
- Percent of NHS bridges by deck area in Good condition
- Percent of NH bridges by deck area in Poor condition
- Percent of Interstate pavements in Good condition
- Percent of Interstate pavements in Poor condition
- Percent of non-Interstate NHS pavements in Good condition
- Percent of non-Interstate NHS pavements in Poor condition
- A measure that will assess the percent of reliable person-miles traveled on the Interstate
- A measure that will assess the percent of reliable person-miles traveled on the non-Interstate NHS
- A measure that will assess freight movement on the Interstate by the percentage of Interstate system mileage providing for reliable truck travel time.
- Annual hours of peak hour excessive delay (PHED) per capita on the NHS.

These measures were implemented at the State level in October 2018 and for the MPO in January 2019. Performance Targets are being set for each of these measures and outcomes incorporated into the System Performance Report integrated into this minor update of the Long Range Transportation Plan, and fully integrated into the next major Plan update. In this current iteration of the document, these metrics will be discussed and available data identified where possible in both this Existing Conditions chapter as well as the Current Trends and Future Conditions discussions.

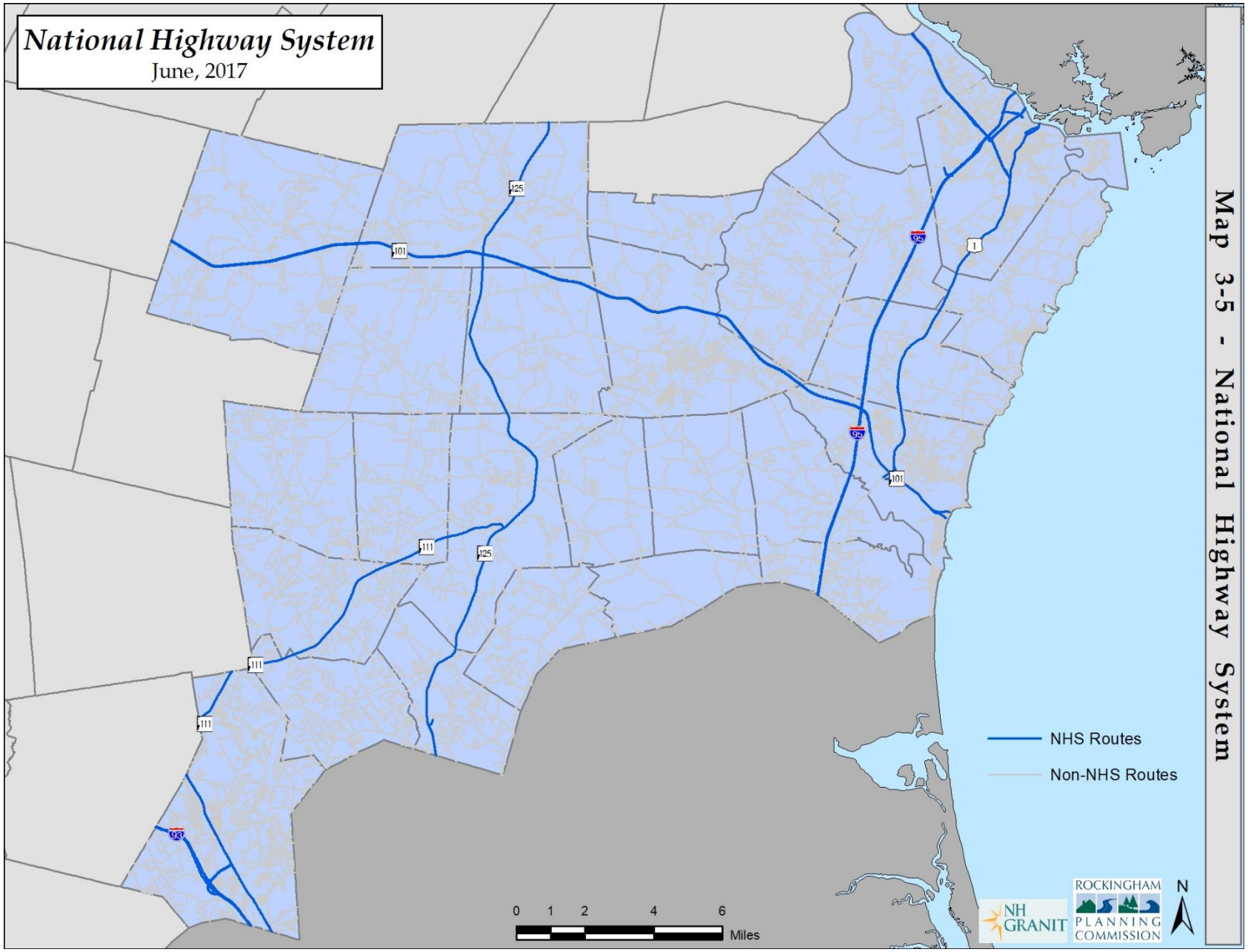
Vehicle Miles of Travel and Congestion

From the 1970's until the 2004, the annual amount of vehicle miles of travel per person (per capita VMT) in the United States grew over 85% from 5,465 miles to 10,125 miles per year. This averages to an annual rate of about 1.8 percent per year (FHWA, 2014) that exceeded the 1 percent per year average annual growth in population over the same time period (US Census Bureau, 2014). Beginning around 2004, this pattern changed as the per capita VMT peaked and began to decline with the 9,447

Map 3-4: Congestion Management Process Network



Map 3-5: National Highway System Roadways in the RPC Region



Map 3-6: Change in Congestion from 2013 to 2016

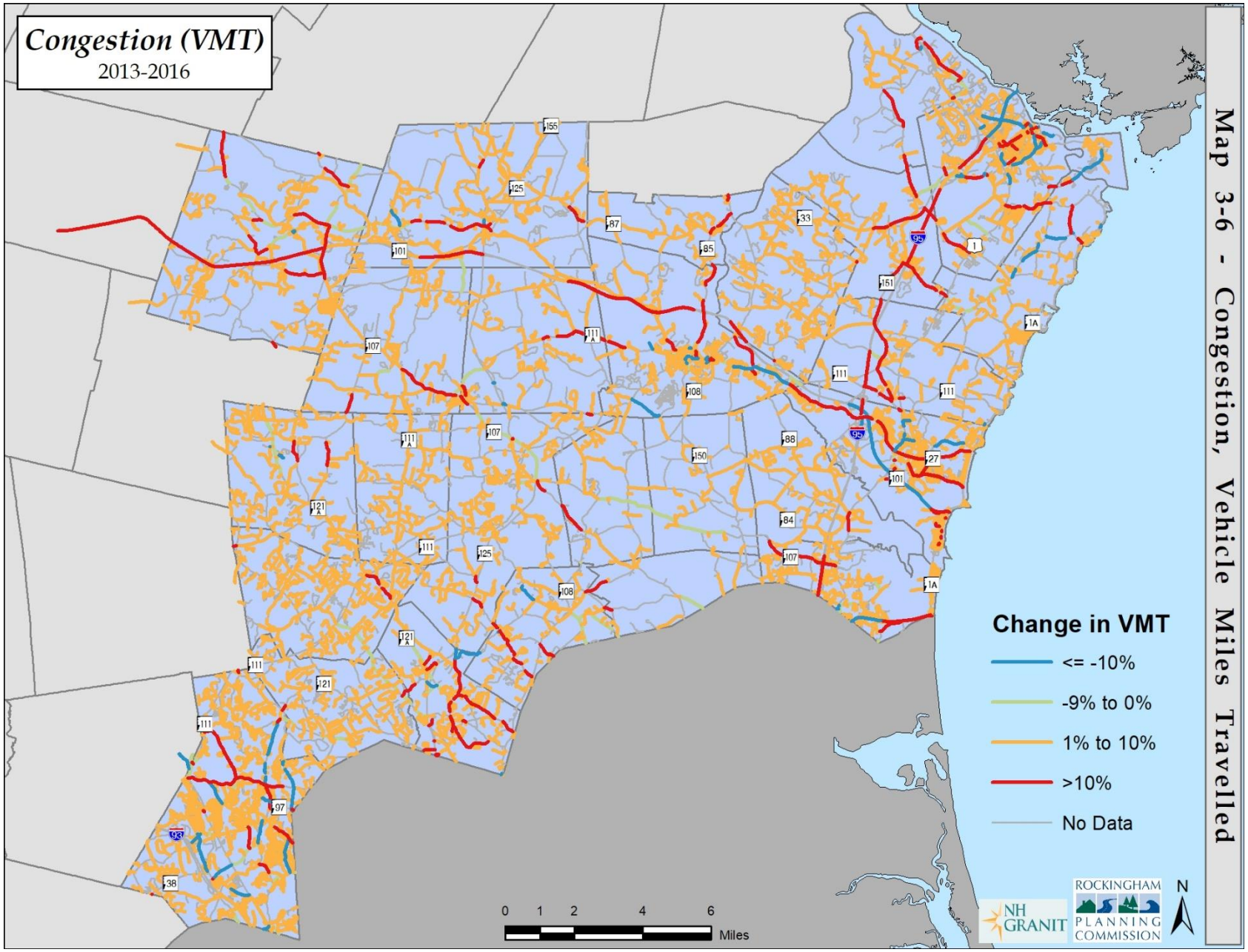
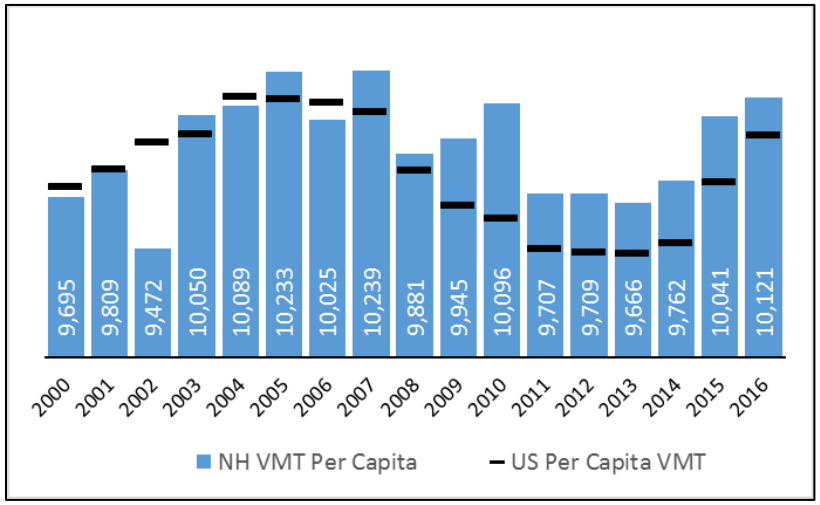


Figure 3-12: NH and US Per Capita VMT



miles per person seen in 2013 the lowest amount of travel since 1996. 2014 saw the first per capita VMT increase since 2003, and growth is continuing at a pace of about 1.3 percent per year. The national pattern of growth until the mid-2000s, followed by a decline and then renewed growth beginning in 2014 is reflected with some variation in the New Hampshire data as well (***Figure 3-12***). This trend is seen in the traffic count data as well with approximately 67 percent of count locations showing year over year declines in volumes between 2007 and 2013. This has important implications for future investment in the transportation network as current efforts are focused on expanding capacity to reduce congestion.

The economic downturn in the mid-2000's played a part in reducing individual vehicle travel in this country, although this trend started before that crisis and has continued into the economic rebound that occurred. This is generally attributed to fuel prices continuing to remain high at the time, lower car ownership among the Millennial generation, and the replacement of some trip making needs by technological improvements such as social networking, video conferencing, and improved access to information (Davis, 2012). The resumed growth of VMT over the last few years is attributed to increased employment and economic activity as well as substantially lower gas prices that has increased discretionary income for many households, and in turn allowed for increased travel (Polzin, 2016).

Commuter Flows

Data on where people live and work provide valuable insight for assessing transportation. Of the 94,960 workers aged 16 and over that the American Community Survey estimated to live in the MPO region in 2014, approximately 41 percent worked within the MPO region, while 59 percent of residents worked outside the region. ***Figures 3-13*** and ***3-14*** show workplace by county for MPO region

Figure 3-13
Workplace by County for Workers in MPO Region

	2000	2000	2014	2014
Rockingham	54,277	57.2%	42,779	45.0%
Essex, MA	17,232	18.2%	14,261	15.0%
Hillsborough	4,493	4.7%	10,305	10.9%
Middlesex, MA	8,783	9.3%	8,516	9.0%
Strafford	2,641	2.8%	4,968	5.2%
Suffolk, MA	2,840	3.0%	3,302	3.5%
Merrimack	970	1.0%	2,968	3.1%
York, ME	1,106	1.2%	984	1.0%
Other	2,545	2.7%	6,877	7.2%
Total	**94,887**	**100%**	**94960**	**100%**

Source: ACS 2010-2014, Census 2000

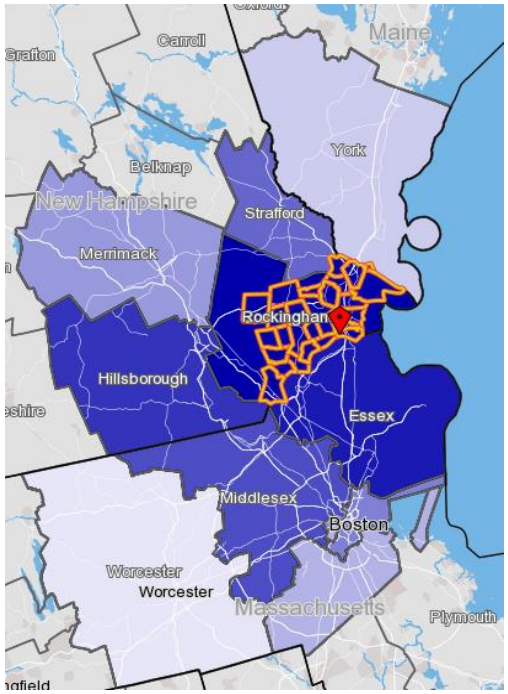


Figure 3-14 – Commute destination by county for MPO region residents

commuting patterns. Residents of the region employed in Rockingham County dropped significantly, as did commutes to Essex County. Conversely, commutes to Hillsborough, Strafford and Merrimack Counties roughly doubled. Growth in commutes to Hillsborough and Merrimack Counties have likely been influenced by improvements to NH101 completed in the late 1990s, while growth in commutes to Strafford County likely reflects overall employment growth in that county.

residents. After Rockingham County, the next largest concentration of employment was in Essex County, MA at 15 percent, Hillsborough County at 10.9 percent, Middlesex County, MA at 9 percent and Strafford County at 5.2 percent. Compared to the 2000 Census commuter flow data shown in ***Figure 3-15*** these numbers show some notable shifts in

Looking at workers employed in the MPO region live, approximately 38% live in the MPO region, while 62% live outside the MPO region. Top origination counties for commuters to the MPO region include Rockingham County at 47 percent, Strafford County at 13.7 percent, Hillsborough County at 10.5 percent and Essex County, MA at 8.1 percent. As with commutes by MPO region residents, these numbers also show significant changes since 2000. Commuters from Strafford County dropped slightly and commuters from all of Rockingham County dropped significantly from 61 percent of workers employed in the MPO region to only 48 percent. Commuters from Hillsborough County more than doubled, while commuters from Merrimack County more than tripled. Notably commuters from Other counties beyond southern New Hampshire southern Maine and northern Massachusetts more than tripled as well. A partial explanation for this, borne out by mode share data in ***Figure 3-15***, is the expansion of telecommuting, reducing the importance of proximity between home and work.

Figure 3-15: Commuter Mode Share 2000-2015

Mode of Travel to Work	NH 2000	NH 2015	Rock County 2000	Rock County 2015	Exeter 2000	Exeter 2015	Ports-mouth 2000	Ports-mouth 2015
Car, truck, or van - drove alone	81.8%	81.1%	84.8%	84.1%	78.2%	79.7%	80.5%	74.9%
Car, truck, or van - carpooled	9.8%	8.0%	7.8%	6.2%	9.9%	5.6%	6.4%	7.6%
Public transportation	0.6%	0.8%	0.7%	0.9%	0.8%	0.6%	1.4%	1.4%
Walked	2.9%	2.9%	1.7%	1.7%	4.6%	6.5%	4.9%	5.5%
Bicycled	0.2%	0.2%	0.1%	0.3%	0.5%	1.5%	0.3%	0.9%
Worked at home	4.0%	6.0%	4.1%	6.2%	5.2%	5.7%	5.4%	9.2%

Source: ACS 2011-2015, Census 2000

TRAFFIC SAFETY

Crash data from the NH Crash Records Database is available for the region covering the years from 2002-2019. Other than the fatal crashes where there is a federal crash database (Fatality Analysis Reporting System, or FARS) to corroborate the information, there are substantial issues with the accuracy and consistency of that dataset, and so rates and totals presented should be considered general estimates. To identify patterns and rates, five-year averages are generally utilized as they account for the variability from year to year in the number and severity of crashes. Given the data available, ten five-year periods were utilized to understand any patterns in the region beginning with the 2002-2006 and ending with the 2011-2015 five-year period. In general, there has been a decrease in the average number of total crashes (***Figure 3-16***) and crash rates per 100 Million Vehicle Miles of Travel (VMT) (***Figure 3-17***) between the 2002-2006 and 2011-2015 five-year periods. That being said, both saw lowest values during the 2009-2013 period and have started to increase again.

Figure 3-16: Five Year Average Numbers of Crashes

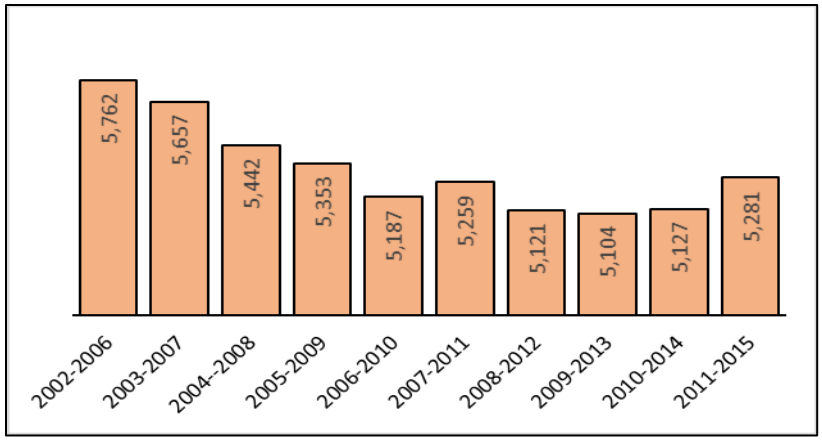
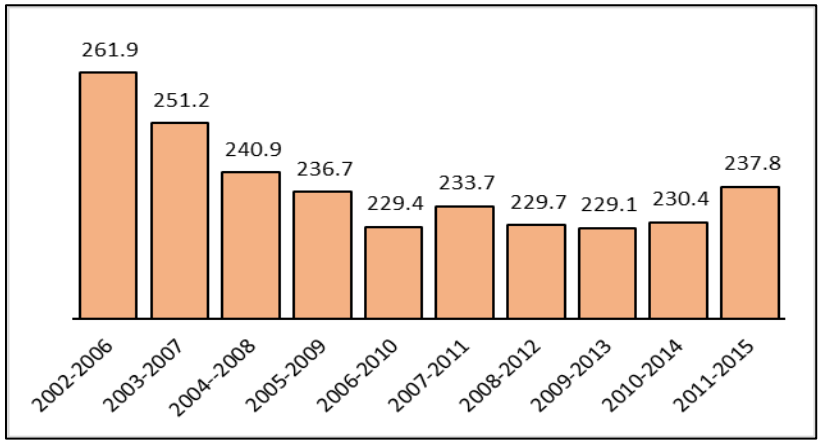


Figure 3-17: 5-Year Average Crash Rate per 100 Million VMT



Traffic safety is a primary focus of the National Performance Goals and that has been translated by the Federal Highway Administration into five performance measures that the MPO will be implementing utilizing crash data from National Highway Traffic Safety Administration (NHTSA), the New Hampshire Department of Safety (DOS) and traffic volume data collected by the MPO and NHDOT as part of the Highway Performance Monitoring System (HPMS):

- Number of fatalities
- Rate of fatalities per 100 Million Vehicle Miles of Travel (VMT)
- Number of serious injuries
- Rate of serious injuries per 100 Million VMT
- Non-motorized fatalities and serious injuries

It is anticipated that the Federal Transit Administration will be developing transit related safety measures that the MPO will need to implement as well, but these have not been finalized at this time. Further, the MPO worked with the other New Hampshire MPOs, NHDOT, FHWA, FTA, and NHDES to develop a set of supplemental performance measures including one that is safety related: the number of Motorcycle Fatalities. Each of these measures will be discussed as part of the remainder of this section.

Fatalities and Injuries

The number of traffic fatalities each year is inconsistent, which is not surprising given the randomness of traffic deaths. There were 217 traffic deaths in the region between 2002 and 2015, an average of 16 per year, with annual values between 11 deaths (2011) and 22 (2007). For this reason, five-year moving averages are calculated to normalize the crash data over a longer time period in order to account for anomalies that can skew the analysis. Examining the five year averages shown in ***Figure 3-18***, it can be seen that there has been about an 11% increase in the number of deaths from an average of 14.2 in 2002-2006 to 15.8 in the 2011-2015 five year period (top graphic). The rate of fatalities per 100 Million VMT has shown a similar amount of variance, also increasing by 11% between the 2002-2006 and 2011-2015 five-year periods (bottom graphic). There has been consistent improvement in the number and rate of serious injuries occurring as the result of motor vehicle related crashes. From the 2002-2006 period to the 2011-2015 period the five-year average number of serious injuries has decreased from 96 to 62.6 and at the same time, the rate has dropped substantially from 4.37 per 100 Million VMT to 2.82 per 100 Million VMT (***Figure 3-18***), both of which are decreases of approximately 35%. At least some of the reduction in the rate and number of serious injuries is related to an increased use of safety equipment. In 2002, about 70% of the individuals involved in a motor vehicle crash were utilizing the installed restraints. By 2009 this had increased to 90% of individuals, and in 2015 stands at just under 92%.

Figure 3-18: 5-Year Average Fatalities (top) and Average Fatality Rate per 100 Million VMT (bottom)

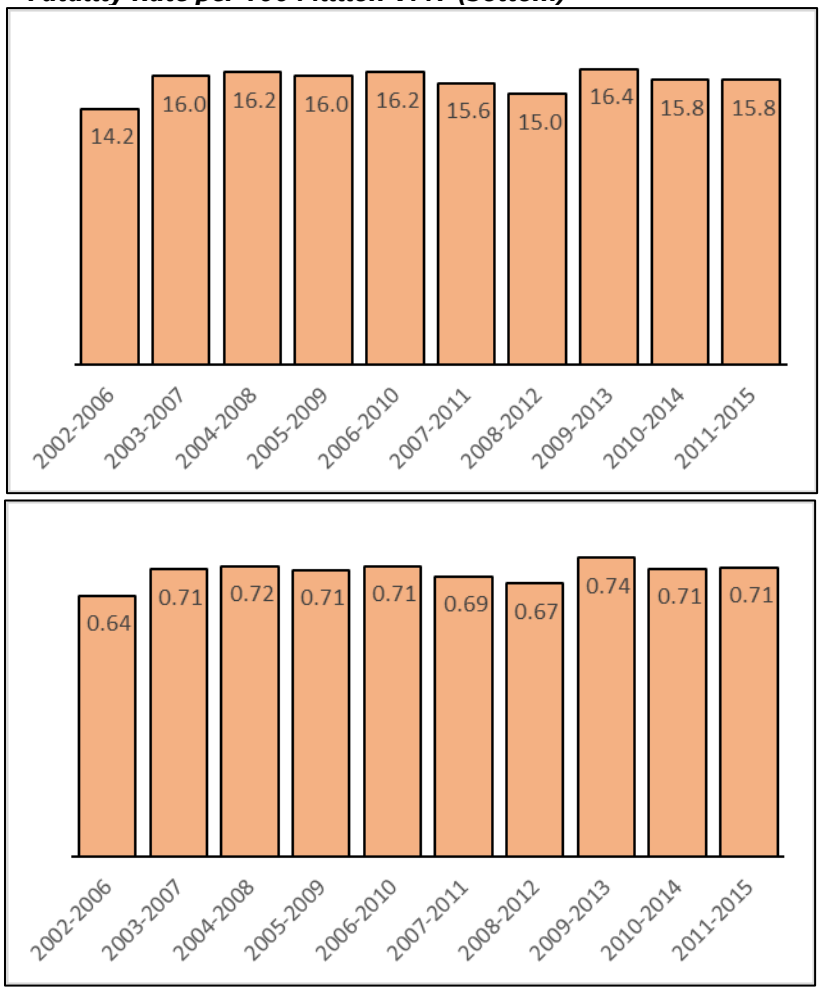
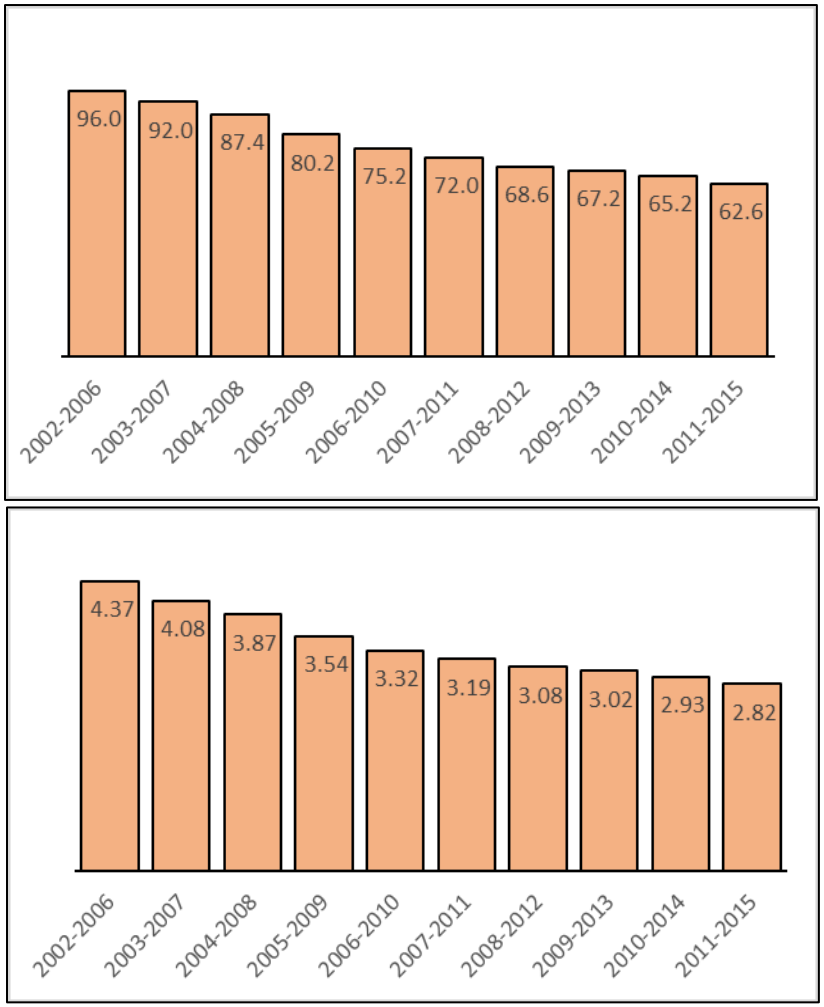


Figure 3-19: 5-Year Average Serious Injuries (top) and Serious Injury Rate per 100 Million VMT (bottom)



Correspondingly, the distribution of injury severity has shifted as well. In 2003, nearly 39% of individuals in a crash received some sort of injury with over 3% incapacitated or killed. By 2015, about 8.4% receive some sort of injury and less than 1% are incapacitated or killed (***Figure 3-20***).

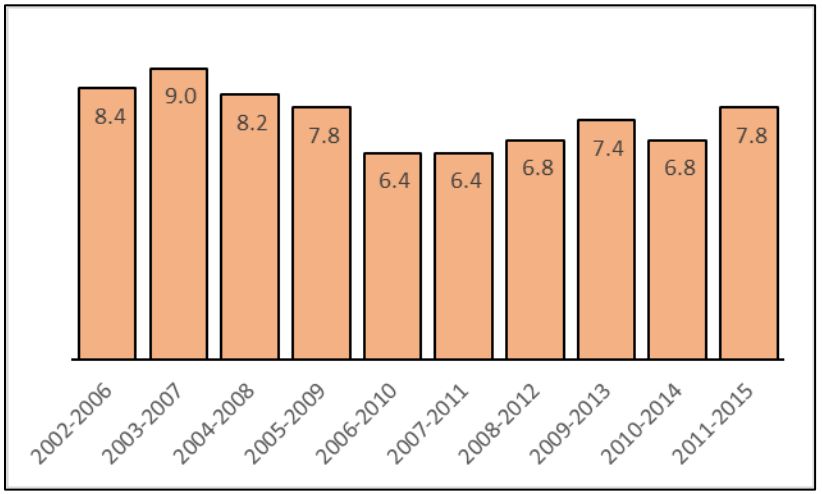
Non-Motorized Fatalities & Serious Injuries

Figure 3-20: Change in Distribution of Injury Types 2003–2015

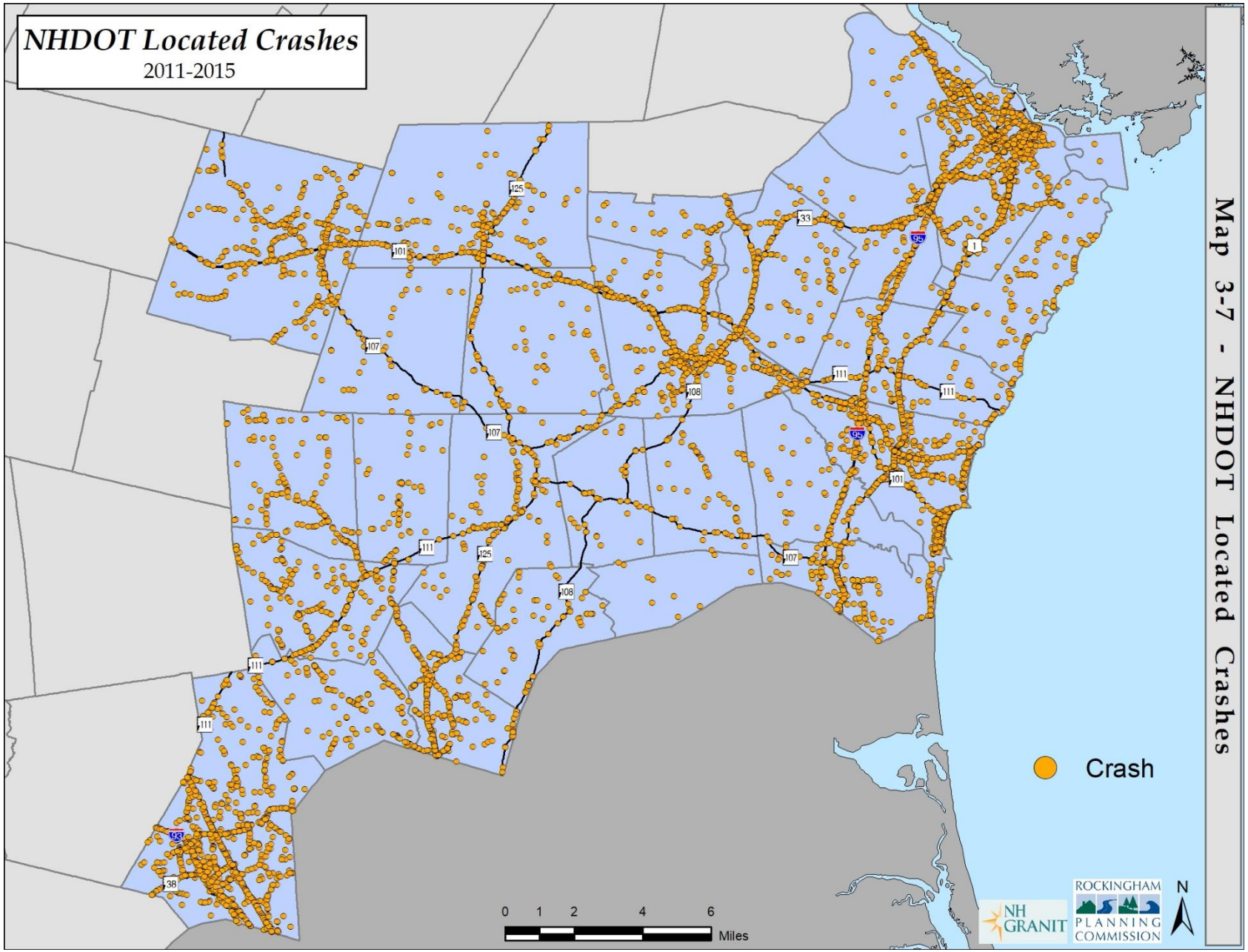
	2003	2015
Killed	0.31%	0.13%
Incapacitating Injury	2.87%	0.54%
Non-Incapacitating Injury	22.08%	5.18%
Possible Injury	13.36%	2.53%
No Apparent Injury	49.53%	82.66%
Unknown	11.85%	8.96%
Total Injuries	3,899	13,176

Non-motorized crashes are those that involve a bicyclist or pedestrian and given the small number of these crashes each year, fatalities and serious injuries to these roadway users are considered together. Looking at the five-year average non-motorized fatalities and serious injuries shows an overall 7% decrease between the 2002-2006 period and the most recent five years.

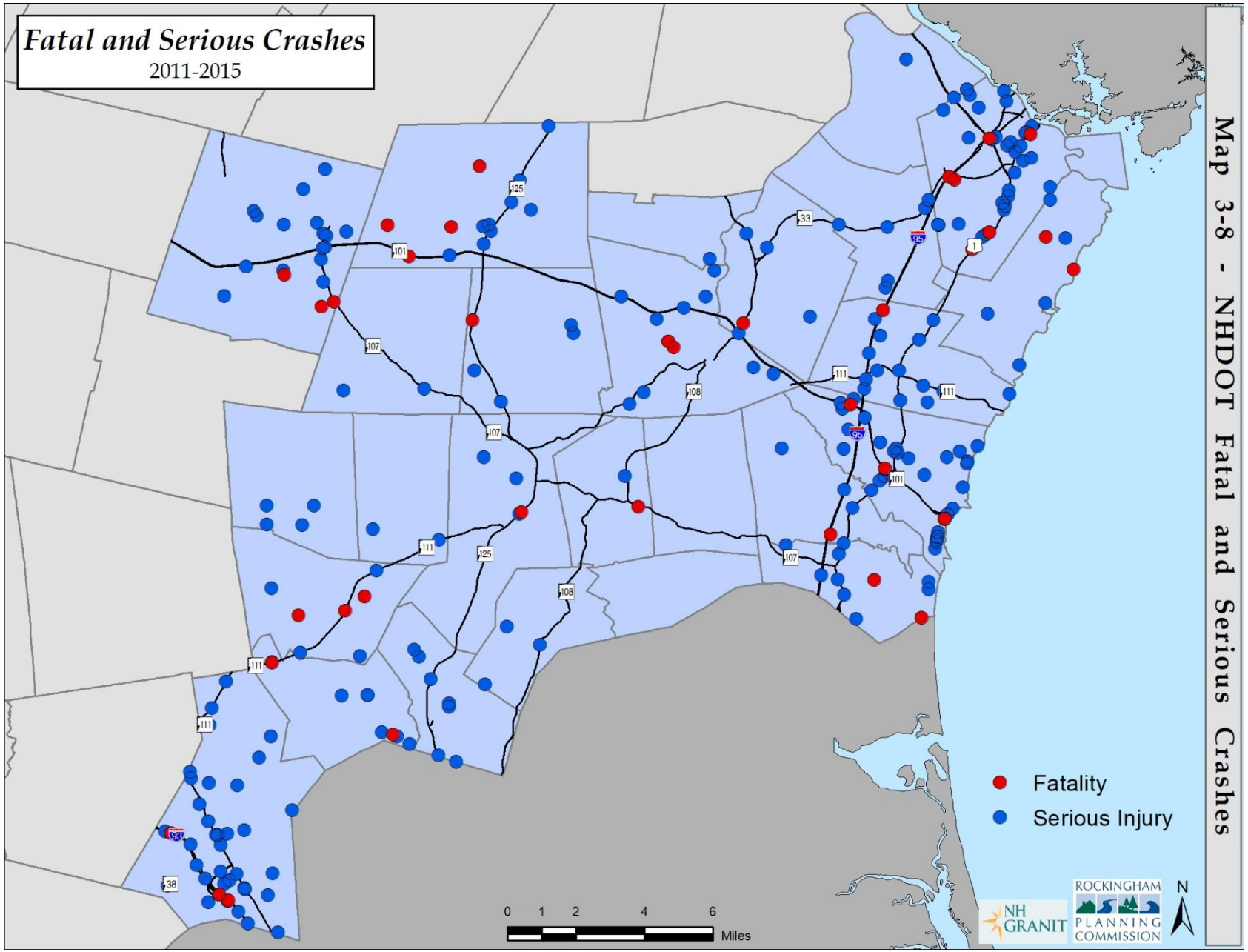
Figure 3-21: Five Year Average Non-Motorized Fatalities and Serious Injuries



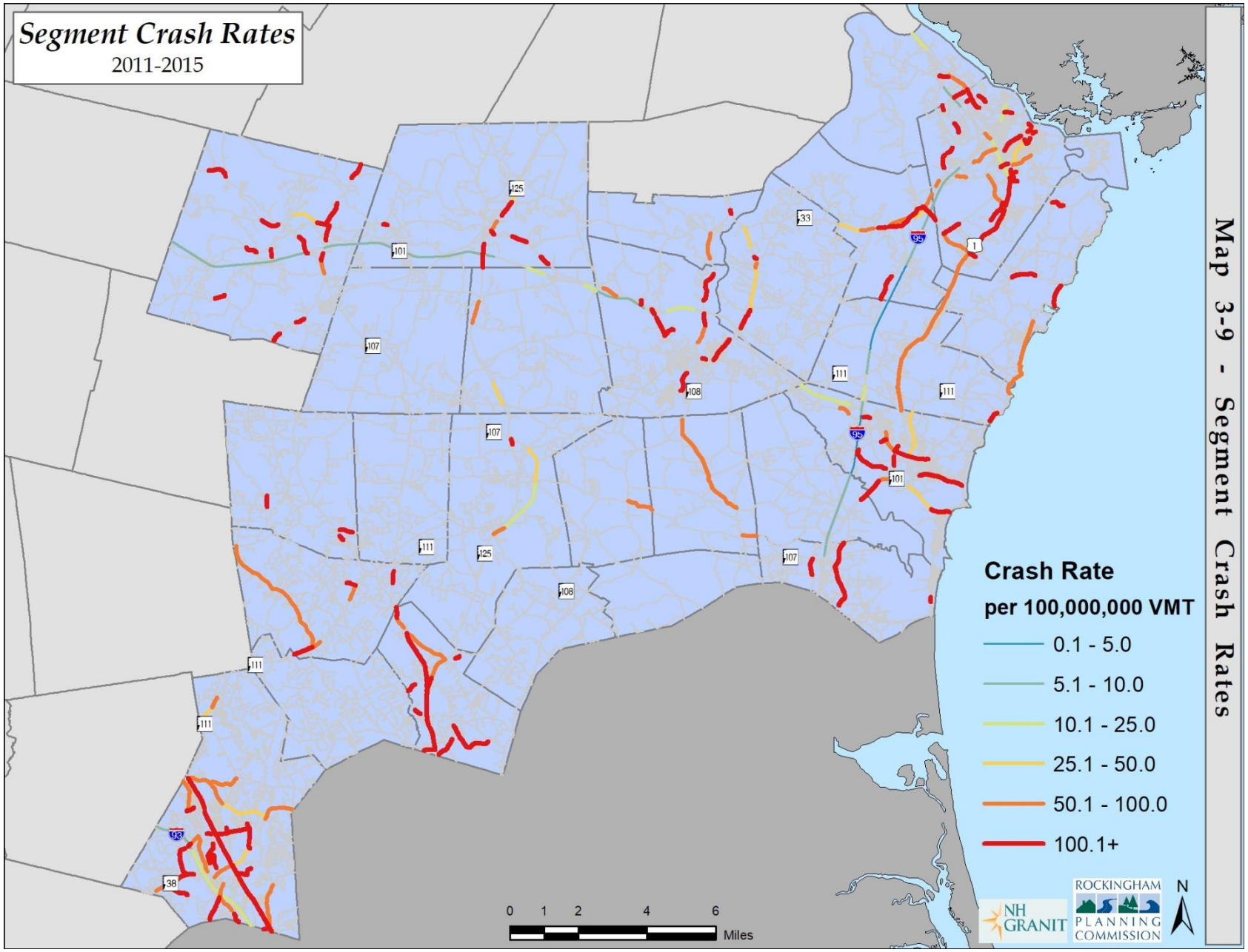
Map 3-7: 5-Year All Crashes



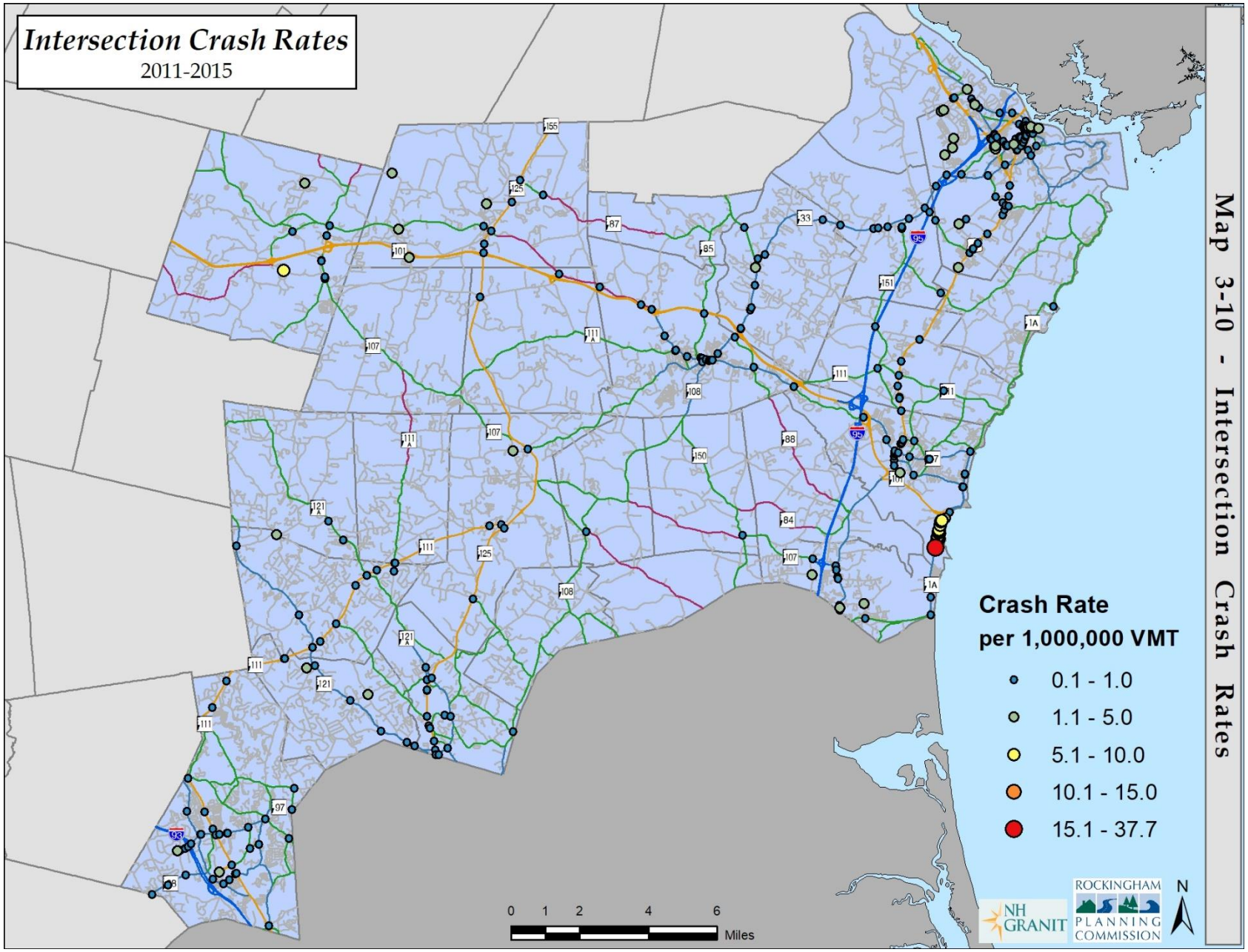
Map 3-8: 5-Year Fatal and Serious Injury Crashes



Map 3-9: 5-Year Segment Crash Rates



Map 3-10: 5-Year Intersection Crash Rates



Pavement Conditions

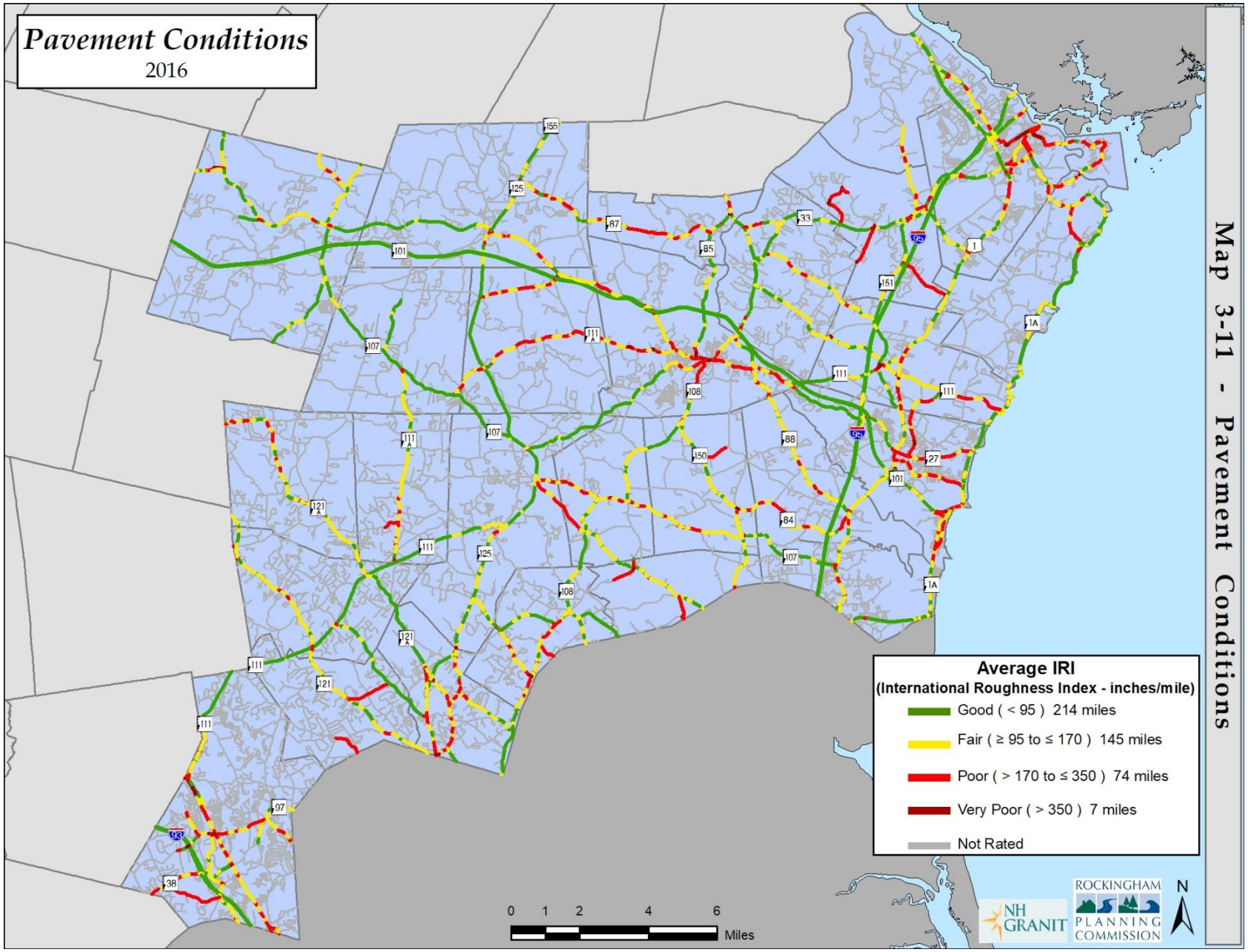
NHDOT monitors state owned highways by collecting roadway surface conditions on a biennial basis and uses the data to implement its Pavement Management Strategy. As of 2016, approximately 49% of the state owned roadway mileage in the region is considered to be in "Good" condition while only 19% is in "Poor" or "Very Poor" condition. This is largely due to the application of the NHDOT's current pavement strategy over the last four years and an infusion of additional state and federal funding dedicated to maintenance activities. Much of the focus has been on addressing roadways on the National Highway System (NHS) which tend to be the heaviest traveled facilities, and as of 2016 81% of that mileage is considered to be in "Good" condition, while only 32% of the non-NHS mileage in the region is considered to be in "Good" condition. These represent substantial improvements, but indicate a growing gap between roads on and off the NHS.

Bridge Conditions

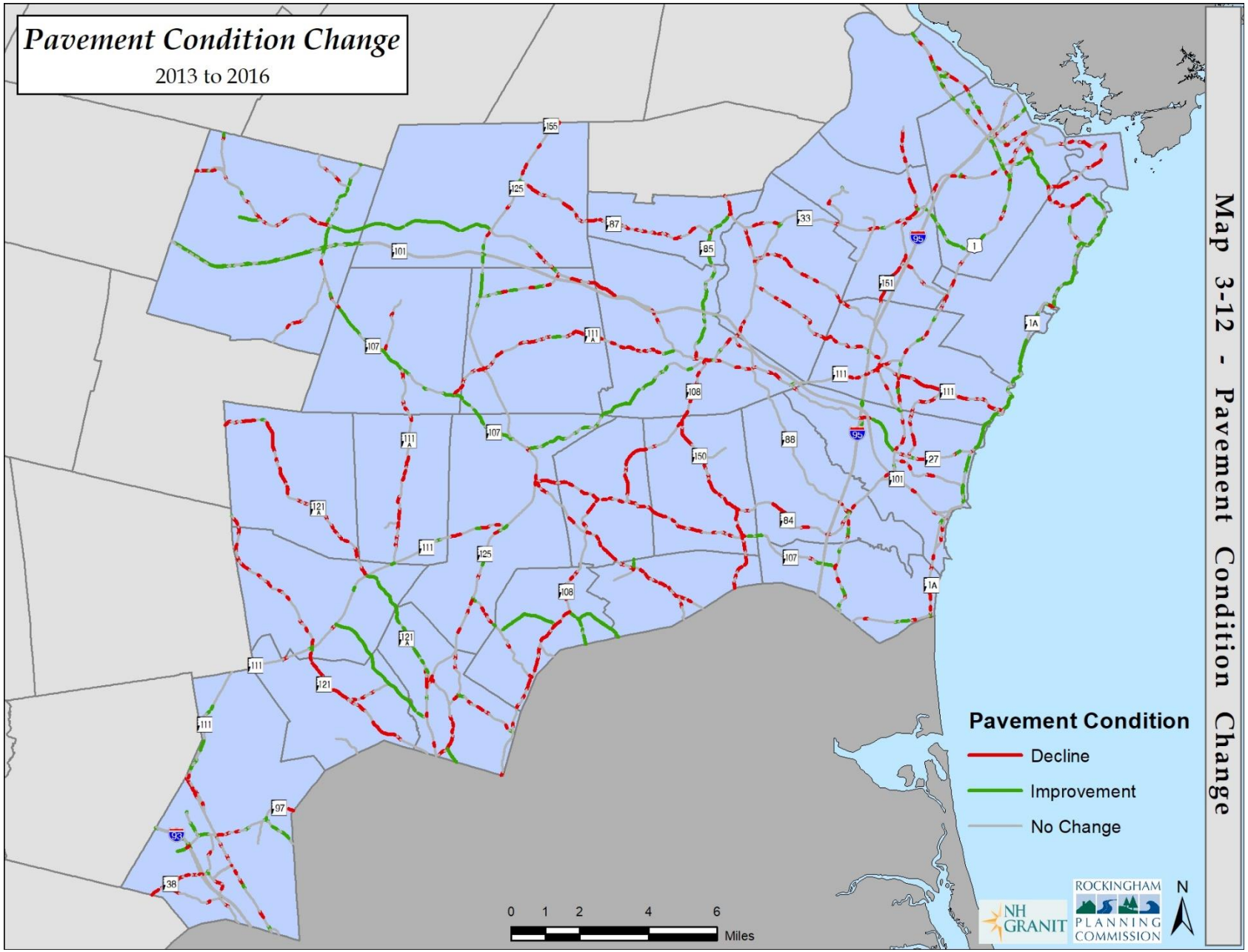
Increased awareness of the dangers of structural deficiencies in the wake of high-profile bridge failures in other parts of the United States has accelerated work on many bridges in the area including the Memorial (replaced in 2013) and the Sarah Mildred Long Bridges (replacement completed in 2018) over the Piscataqua River between Portsmouth and Kittery. As of 2016, there are 151 state-owned and 324 municipally-owned bridges listed as "Red Listed" indicating structural or functional obsolescence. The RPC region hosts 31 of these structures that need to be rehabilitated or replaced and basic information about these bridges can be found in the appendix of this chapter. ***Figure 3-22*** shows the challenge that the state and communities face in addressing the bridge replacement and rehabilitation needs of the state. Since 2000, the state has averaged adding 18 state bridges each year to the list of those in need of repair while removing 17.6. If this timeframe is narrowed to the last five years, 22 have been added on average while only 20 have been removed, which indicates that bridges are deteriorating into poor condition faster than they can be repaired given existing resources. This points to the increasing complexity and cost of these projects and while some very large projects are currently being addressed (Sarah Long Bridge for instance), resources do not allow for continued strong progress in reducing the number of structurally and functionally deficient bridges in the state and the region. On the municipal side, an average of 21.4 bridges have been added to the Red List each year while 27.5 have been removed, and so greater progress is being made in reducing the number of structurally deficient bridges. These municipal bridges are often smaller structures on lower volume roads that are rehabilitated rather than replaced. This enables them to be addressed more quickly, and at substantially lower cost.

There are currently 31 red list bridges in the RPC region, down from 41 in 2014. 18 of these are state owned bridges while 13 are municipally owned. Of the state bridges, two are currently in construction, four more are in the TIP to be addressed in the next few years, and two additional are in the planning stages.

Map 3-11: 2016 Pavement Conditions



Map 3-12: Pavement Condition Change from 2013 to 2016



FREIGHT TRANSPORTATION

The Rockingham Planning Commission area is well served by a broad range of domestic and international freight transportation carriers and all modes of goods movement are available within or near to the region. In addition to the major highways, the region is home to the Port of New Hampshire, Pan Am Railways main line (the former Eastern Line of the Boston and Maine Railroad), the Pease Airport, and a natural gas pipeline.

Figure 3-22: NH State & Municipal Red List Bridge Totals

	State Red List Bridges			Municipal Red List Bridges		
Year	Start Total	End Total	Net Change	Start Total	End Total	Net Change
2000	144	157	13			
2001	157	168	11			
2002	168	167	-1			
2003	167	153	-14			
2004	153	146	-7	397	373	-24
2005	146	140	-6	373	365	-8
2006	140	137	-3	364	363	-1
2007	137	137	0	363	370	7
2008	137	139	2	370	358	-12
2009	139	142	3	358	366	8
2010	142	148	6	366	359	-7
2011	148	140	-8	359	353	-6
2012	140	145	5	353	352	-1
2013	145	147	2	352	344	-8
2014	147	153	6	351	344	-7
2015	153	154	1	344	338	-6
2016	154	151	-3	338	324	-14

Shipping

The region is host to the Port of New Hampshire in Portsmouth, an active port handling over 8.8 million tons of cargo each year and expected to nearly double that by 2040 (USDOT). The Division of Ports and Harbors (DPH) Market Street Marine Terminal, located on the Piscataqua River, is the only public access, general cargo terminal on the River. The Piscataqua is a year-round, ice-free, deep draft river. The Market Street Terminal has 8 acres of paved outside lay down area, 50,000 square feet of covered warehouse space, onsite rail access, and is close to the regional highway network (1/2 mile from Interstate 95). The terminal can handle bulk cargo such as scrap metal, salt and wood chips, break bulk such as industrial machinery parts and construction materials, project cargo such as power plant components and vacuum tanks, as well as container cargo. In addition, Portsmouth is within 50 miles of the Port of Boston, one of America's major port facilities, and has convenient access by highway and rail to other major and regional ports including New York, Portland, and Montreal.

Port of New Hampshire, 2003 Source: RPC

Rail

The area is served by the main line of Pan Am Railways, a major U.S. regional railroad, which was historically known as the Boston and Maine Railroad (B&M) Main Line West running between Boston and Portland, and in the RPC region traversing the towns of Atkinson, Plaistow, Newton, Kingston, East Kingston, Exeter, and Newfields. The mainline is currently categorized as a Class 4

track which allows passenger rail speeds up to 80 MPH and freight rail speeds of up to 60 MPH. Branch line freight services are currently available between the main line and Portsmouth and over the Sarah Long Bridge into Maine on a Class 1 track that limits speeds to 10 MPH. The Eastern Railroad corridor also ran from Boston to Portland, via Seabrook and Portsmouth in the RPC region. This later became the B&M Main Line East, and is also known as the Hampton Branch, but is no longer in active rail use. The State has owned the segment from Hampton center to the Massachusetts border since the late 1990s, and purchased the balance of the line, from Hampton to Portsmouth, in 2019. Intermodal (rail-truck) facilities operated both by Pan Am and Conrail in the Boston area and by the St. Lawrence and Atlantic Railway in Auburn, Maine are within easy reach of the Seacoast region. Through these connections, shippers have access by rail to points throughout North America and, using Rail Land Bridge services, throughout the world.

Truck

While the trucking industry is privately operated, it depends upon state and local government to provide and maintain the highway network upon which it operates. The majority of freight shipments, both long distance movement to distribution centers and local delivery services to factories, wholesale and retail facilities, and households within the United States, occur via truck. Southeastern New Hampshire shippers and receivers are well served by motor carriers. High quality services are provided by the following types of carriers:

- National TL (truckload) and LTL (less-than-truckload) carriers such as Roadway and J.B. Hunt
- Regional TL and LTL carriers such as Atlas Motor Express.
- Bulk liquid carriers such a Superior and Matlack.
- Private carriers serving special markets such as the Wal-Mart fleet.
- Major parcel carriers such as United Parcel Service and Federal Express.

Air Freight

The region enjoys the potential for direct airfreight service at Pease International Tradeport. The Fixed Base Operator at Pease Airport provides cargo handling capability for build, break, load, offload, and onload, and includes cross dock transfer fly-truck, truck-fly operations. The facility can accommodate the largest cargo planes and includes 45,000 square feet of warehouse facilities available in close proximity to rail, deep water port and I-95. Boston's Logan Airport and the Manchester-Boston Regional Airport are located less than 50 miles away, adding access to a wide variety of air cargo services serving markets throughout North America and the world.

Pipeline

A natural gas pipeline is currently in place. As reported in the Federal Energy Regulatory Commission publication FERC/EIS-0111D, dated April 1997, Granite State Pipeline operates "a 10- and an 8-inch-diameter pipeline between Haverhill and Exeter" as well as "an 8-inch-diameter pipeline between Exeter, New Hampshire and Wells, Maine." (Federal Energy Regulatory Commission, 1997) In addition, Portland Natural Gas Transmission System and Maritimes & Northeast Pipeline, L.L.C. (Maritimes), are currently developing expanded natural gas pipeline service with the construction of a 30-inch-diameter high-pressure natural-gas pipeline between Dracut, MA and Wells, Maine. The pipeline is designed to deliver 60 million cubic feet per day of natural gas from the Sable Offshore Energy Project, offshore from Nova Scotia. The project includes 31.4 miles of 30-inch-

diameter pipeline passing through Plaistow, Newton, East Kingston, Exeter, Stratham, Greenland, Portsmouth and Newington, in Rockingham County. The project also includes lateral lines as follows: 0.6 mile of 20-inch pipeline between the main trunk line in Plaistow and Haverhill, MA and 1.1 miles of 16-inch-pipeline in Newington. A number of projects are currently underway to interconnect pipelines to bring additional natural gas into the New England region from the Southeast states.

Goods Movement

The primary source of data regarding freight movement is the FHWA Freight Analysis Framework (FAF) and this system measures goods movement in three ways:

- Value – In 2015 dollars
- Tons – In thousands of short tons (2000 lbs.)
- Ton-miles – Product of tons and the weighted average distance by mode of shipment

Depending upon the unit of measure, each mode of goods movement handles a different percentage of the total volume of freight moving into and out of the state. The facts and figures in this section will focus on the tonnage of freight moved, however, Appendix C will include the full tables with value and ton-miles as well. With the exception of the data for the Port of New Hampshire, all information available is for the state as a whole and not specific to the region.

With the exception of air based freight services at Pease Tradeport, and Atlas Motor Express in Plaistow, freight transportation companies do not operate transportation facilities in the RPC region. Freight carriers located in other parts of New Hampshire and in other New England states use trucks to carry freight to and from companies located here. LTL and TL motor carriers all (except Atlas) operate from terminal facilities outside of the region. With the minor exception of limited direct rail loading in Portsmouth and Newington, all rail shipments are loaded in or on rail cars at facilities located outside the area as well. The Port of New Hampshire is expected to expand and accept containerized shipments. Currently they move by highway to and from ports in Boston, Montreal and New York. Containerized shipments to and from the Far East generally move to rail facilities in Massachusetts for rail shipment via "Mini Land Bridge" to the West Coast for ship movement across the Pacific. Increasing volumes of airfreight move though Pease, but most airfreight continues to move through Logan. Carriers provide most truck services through freight terminals located elsewhere in New Hampshire or in Massachusetts.

Data from the Freight Analysis Framework (FAF) version four (USDOT), shown in ***Figure 3-23***, estimates that currently about 100 million tons of freight is shipped to, from, or within New Hampshire (2015). In terms of goods originating in New Hampshire, trucks carrying 92.6 percent of the tonnage

Figure 3-23: New Hampshire Goods Movement (2015)

	Originating in NH		Destined for NH	
Mode	1000s of Tons	Millions of Dollars	1000s of Tons	Millions of Dollars
Truck	37,418.26	$35,035.6	47,256.92	$53,270.2
Rail	164.16	$137.6	2,071.99	$845
Water	61.22	$432.9	6,714.49	$2,902
Air (inc. truck-air)	15.75	$1,404.9	12.59	$1,165.6
Mult modes & mail	247.14	$8,921.9	536.85	$10,475
Pipeline	2,489.59	$716.9	2,889.15	$841
Other & unknown	3.97	$15.2	1.19	$37.8
	40,400.09	**$46,665.12**	**59,483.18**	**$69,536.8**

whilepipelines move another 6.2 percent. Multiple mode and mail movement (.6%), Rail (0.4%), water (0.15%), and air (0.04%) make up the small remaining portion of goods movement. The mode of travel for goods destined for a location in New Hampshire is somewhat more distributed. While trucks carry 79.5 percent, the Port of New Hampshire brings in 11.3 percent and pipelines provide another 4.9 percent. Rail brings in 3.5 percent while air, and multiple modes and mail, combine to carry about 1 percent of goods. state. By value there was approximately $116 billion in shipped goods moved to or from New Hampshire. 75 percent of the value originating in New Hampshire moves by truck while another 19 percent travels by multiple modes and mail. Air makes up the third highest percentage at 3 percent, while pipeline (1.5%), water (0.0%) and rail (0.3%) make up the rest. For goods destined for a location in New Hampshire trucks carry 76.6 percent of the total value while multiple modes and mail carry the bulk of the remainder at 15.1 percent. The Port of New Hampshire brings in another 4.2 percent, air 1.7 percent, and rail and pipeline 1.2 percent each.

PUBLIC TRANSPORTATION

Public transportation plays an important and growing role in addressing the mobility, traffic congestion, and air quality issues facing the RPC region. The number of communities in the region served by transit has increased in the past ten years, from five to seven; and ridership on all forms of transit has seen dramatic growth in response to rising fuel prices and growing transit dependent populations. Still, fewer than a third of the 26 communities in the region are served by public transportation, and significant challenges exist to expanding services, including funding availability, low density development patterns making fixed route service inefficient in many towns. Regional transit routes are shown on ***Map 3-6.***

Local and Regional Public Transportation Service

Two public transit agencies serve the communities in the RPC region. The Cooperative Alliance for Seacoast Transportation (COAST) provides fixed-route bus service in Portsmouth, Newington, Exeter and Stratham; with connections northward to Dover, Somersworth, Rochester, Newmarket, Farmington, and South Berwick, Maine. COAST ridership has seen a slight decline since 2013 as fuel prices have declined and COAST's Route 7 service has been curtailed. However prior to COVID-19 impacts in 2020, ridership was up 27% in the past decade, and has more than doubled since 2000 as shown in ***Figure 3-24***. Most COAST services operate with one hour headways during the day, though trunk Route 2 and the Portsmouth Trolley system feature 30 minute headways during peak commute hours. This mitigation measure for the Newington-Dover Spaulding Turnpike Expansion project has helped drive this long term increase, along with other popular services such as the Clipper Connection serving Portsmouth Naval Shipyard.

The Greater Derry-Salem Cooperative Alliance for Regional Transportation (CART) serves the RPC communities of Salem and Hampstead; as well as Derry, Londonderry, Chester, and out-of-region medical facilities in Manchester. CART provides mainly demand-response transit service given the low density of much of its service area, but added a flex route service in 2012 with the Salem Shuttle. As a demand-response service, a large portion of CART's ridership is senior citizens, individuals with disabilities and other lacking private transportation. CART has grown from carrying fewer than 500 passengers per month at start-up in 2006, to moving approximately 1,200 passengers/month in 2017. In 2020 CART merged with the Manchester Transit Authority (MTA) and is now a program of MTA.

Figure 3-24: COAST Ridership

Fiscal Year	Ridership
2000	199,967
2001	211,920
2002	212,502
2003	242,235
2004	293,917
2005	316,867
2006	354,433
2007	375,535
2008	398,853
2009	370,068
2010	416,942
2011	461,866
2012	506,514
2013	506,173
2014	489,408
2015	487,594
2016	477,729

Source: COAST

A third publicly funded transit system is UNH Wildcat Transit. Wildcat Transit operates extensive on-campus shuttle service, and also runs regional routes connecting the UNH campus in Durham to Newington and Portsmouth in the RPC region, as well as to Dover, Madbury, and Newmarket. The service areas of all three transit providers are shown on ***Map 3-6***

Intercity Bus Service

Intercity bus service is available in the I95 and I93 corridors, with an emphasis on Boston-bound commuter travel as well as access to Logan Airport. Pre-COVID, C&J Bus Lines provided 32 round trips daily between Boston and the Portsmouth Transportation Center, with northbound connections to Dover. In the I93 corridor Boston Express operates extensive Boston-bound commuter bus service out of Exits 4 and 5 in Londonderry plus Exit 2 in Salem, with a combined 29 daily round trips pre-COVID. Greyhound provides two daily round trips between Portland and Boston with service to downtown Portsmouth. Current mid-pandemic ridership for intercity bus services is down dramatically as airport travel has declined and many Boston commuters work from home. Between 2013 and 2016 NHDOT supported a pilot East-West Express transit connection between Portsmouth, Epping, Manchester airport and downtown Manchester. While East-West service between the Seacoast, Manchester and Concord has long been seen as a need in the region, the service was not as productive as projected, and was discontinued at the end of its pilot funding in 2016. Factors in this underperformance likely include declining enplanements at Manchester Airport, and the relative ease of access and inexpensiveness of parking relative to Boston, which reduce the incentive to take transit.

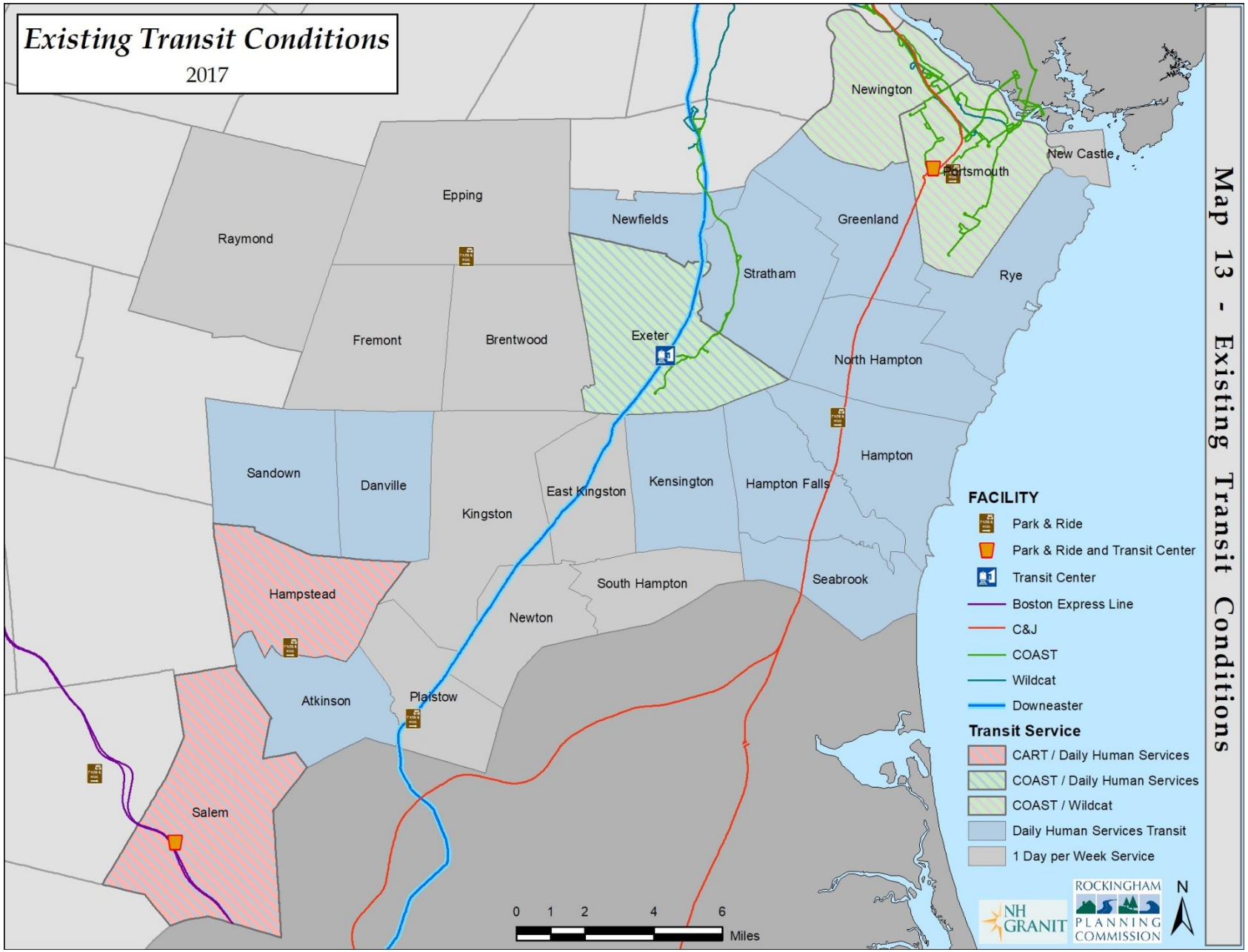
Passenger Rail Service

Amtrak's Downeaster service between Boston, Portland and Brunswick Maine includes several station stops in Southern Maine, Northern Massachusetts, and three New Hampshire communities – Exeter, Durham, and Dover. The service provides five daily round trips between Boston and Portland. Three daily trains extend the service from Portland north to Freeport and Brunswick, Maine. In 2016 the Northern New England Passenger Rail Authority (NNEPRA), which oversees the Downeaster service, completed an enclosed layover facility in Brunswick.

This facility will eventually allow all five daily trains to make stops at Freeport and Brunswick with a potential 6th daily round trip being added between Brunswick and Boston. During 2016 the Downeaster carried over 492,000 riders, with 30 percent of passengers boarding or alighting at New Hampshire stations. MBTA commuter rail service is available from Newburyport, Haverhill and Lawrence in Northern Massachusetts.

In 2014-2015 a feasibility study was conducted to determine if an extension of the Haverhill commuter service to Plaistow, N.H., would have sufficient ridership to be financially viable. The service concept also included a partnership with the MBTA to construct a new layover facility at or near the station site. In 2015 voters in Plaistow rejected the rail extension concept.

Map 3-13: Existing Transit Conditions



Park and Ride Facilities

There are currently seven Park & Ride facilities in the region operated by the N.H. Department of Transportation (NHDOT). These include lots in Epping at the intersection of Routes 101 and 125; in Hampstead at the intersection of Route 111 and 121; in Hampton at the intersection of Route 101 and 27; in Plaistow on Westville Road just east of Route 125; in Salem at Exit 2 on I93 and in Portsmouth at Exit 3A on I95, and on Route 33 just east of I95. The Exeter rail station, operated by the Town of Exeter, also functions as a Park & Ride facility. Of these, three feature Boston-bound intercity transit service (Portsmouth, Salem and Exeter). Those park and ride facilities without transit service see lower usage. Park & Ride locations are noted on **Map 3-13.**

Other Community Transportation Services

In addition to the transportation providers listed above, there are a number of other transportation services available to communities in the RPC region. These can most easily be differentiated by type of service provided.

Shuttle and Taxi Services

Numerous companies offer private market-rate shuttle services between the RPC region, Logan Airport and Manchester-Boston Regional Airport. Both door-to-door service and scheduled pickups at central locations are available. Over twenty companies also offer local and regional taxi service.

Special Population Services

There are more than two dozen health and human service agencies and volunteer driver organizations in Rockingham County providing demand response transportation for agency clients or specific eligible populations such as senior citizens or individuals with disabilities. Towns shown in red or blue on **Map 3-13** benefit from demand-response transit service for seniors and individuals with disabilities that operate at least five days per week. A gap in service is readily identifiable in the center of Rockingham County, shaded gray, roughly following NH125. This area is west of the TASC volunteer driver program service area, and east of the region covered by Greater Salem Caregivers and Community Caregivers of Greater Derry.

Many of these agencies have been involved with regional planning initiatives in the Derry-Salem area or Seacoast area focused on coordinating and consolidating functions such as trip scheduling and dispatching, and expanding access in communities with limited service. These collaborative efforts are formalized through the Southeast New Hampshire Regional Coordination Council (RCC) for Community Transportation (RCC), and the companion Greater Derry-Salem RCC in western Rockingham County.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is an approach to improving the efficiency of the transportation system through encouraging alternatives to driving alone – particularly for commute trips. Three TDM initiatives serve the RPC region, including statewide programs for New Hampshire and Massachusetts, as well as CommuteSMART Seacoast, the regional Transportation Management Association (TMA) working with Seacoast employers to encourage alternatives to driving alone on daily commutes. Efforts targeting Boston area commuters have a successful history, given high levels of congestion, high parking costs, a long commute distance, and a Massachusetts state law requiring large employers to invest in commute trip reduction programs. Initiatives in New Hampshire have had a more difficult

time convincing employees to shift modes, given relatively limited traffic congestion, relatively abundant free parking, less frequent transit services, and lack of a state mandate for employers. However, over the past ten years these efforts have gained traction. Multiple years of increasing gas prices were one driver of this, but even with relatively low gas prices in 2015-2017, interest and participation in ridesharing continued to increase. Ridesharing is down during the pandemic as commuters seek to minimize social contact. Existing TDM programs serving the region are described below.

Rideshare Programs Managed by NHDOT and MassDOT

MassRides, funded by the State of Massachusetts, operates a relatively successful ride matching and vanpool program for Boston commuters. Daily vanpools to Boston and suburban employment centers depart from Hampton (2), Portsmouth (4), Salem (1), and other New Hampshire communities outside the RPC region. Between 1996-2011 the NHDOT ran a statewide Rideshare program designed to match individuals interested in carpooling or vanpooling using an on-line ride matching service. This program was eliminated by the legislature in 2011 as part of cuts to the NHDOT budget, though a statewide ride matching database continues to exist, with software purchased by NHDOT for use by regional ridesharing initiatives.

Transportation Management Associations (TMAs)

In 2013 COAST launched *CommuteSMART Seacoast* – a TMA focused on employees at Pease Tradeport and other major employers in the Greater Portsmouth-Dover Area. TMAs work with employers to promote alternative commute options to employees and establish incentives such as discounted transit passes, online ride matching programs, commuter challenges and prize drawings, emergency rides home to provide flexibility for transit users, and programs allowing use of pre-tax dollars for transit or vanpool expenses. Funding for CommuteSMART Seacoast is part of the Newington-Dover Little Bay Bridges highway widening project. As of 2017 CommuteSMART Seacoast has signed up 49 member companies representing 11,599 employees, established over 243 carpools, and won national awards for successful commuter challenge events encouraging commuters who previously drove alone to try alternate commute options. As part of CommuteSMART's month-long 2020 Business to Business (B2B) commuter challenge, 614 participants logged 9,652 commute trips via carpool, transit, walking, bicycling or telecommuting. These avoided 352,534 automobile miles, saving $200,944 in normal auto commute costs. Funding has also been programmed as part of the I93 widening project for TDM activities in the I93 corridor. Planning for these activities is currently underway by NHDOT.

Telecommuting Infrastructure

The number of people working from home and telecommuting in the United States has grown significantly since 2000. Between 2000 and 2015, those working from home nationally grew from an estimated 3.3 percent to 4.4 percent of the workforce. Telecommuters make up a larger share of the workforce in Rockingham County, where telecommuting grew from an estimated 4.1 percent to 6.2 percent of the workforce between 2000 and 2015. For Portsmouth this share is still larger, and grew from 5.4 percent to 9.2 percent between 2000 and 2015.

This relatively high instance of telecommuting in the region is consistent with the relatively high education levels and employment mix in the region. The increase since 2000 is also consistent with improvements in access to broadband internet infrastructure, but there are still gaps within the region.

Bicycle Facilities and Programs

While the private automobile is the dominant mode of transportation in the RPC region, and will continue to be for the foreseeable future, improving the safety and convenience of non-motorized transportation is a key policy of the MPO. According to the most recent National Household Travel Survey (2009) for which data are available, more than 60 percent of all trips are fewer than five miles in length, and more than 22 percent are shorter than one mile – distances easily traveled by bicycle or on foot. However, more than 80 percent of these trips are taken with an automobile. Converting some of these short trips to bicycling and walking has the potential to reduce vehicle miles traveled, and consequently congestion, air quality impacts, and parking demand in downtowns. Investments in bicycle and pedestrian facilities also support public health and safety; and even economic development in the form of bicycle tourism. Achieving this increase in non-motorized transportation, though, will require investments in a combination of facility improvements and programs to encourage bicycling, teach safe bicycle operation to children and adults, and ensure enforcement of laws related to bicycle operation and safety.

The ***"Five E"s*** of bicycle/pedestrian accommodation:

- Engineering
- Education
- Encouragement
- Enforcement
- Evaluation

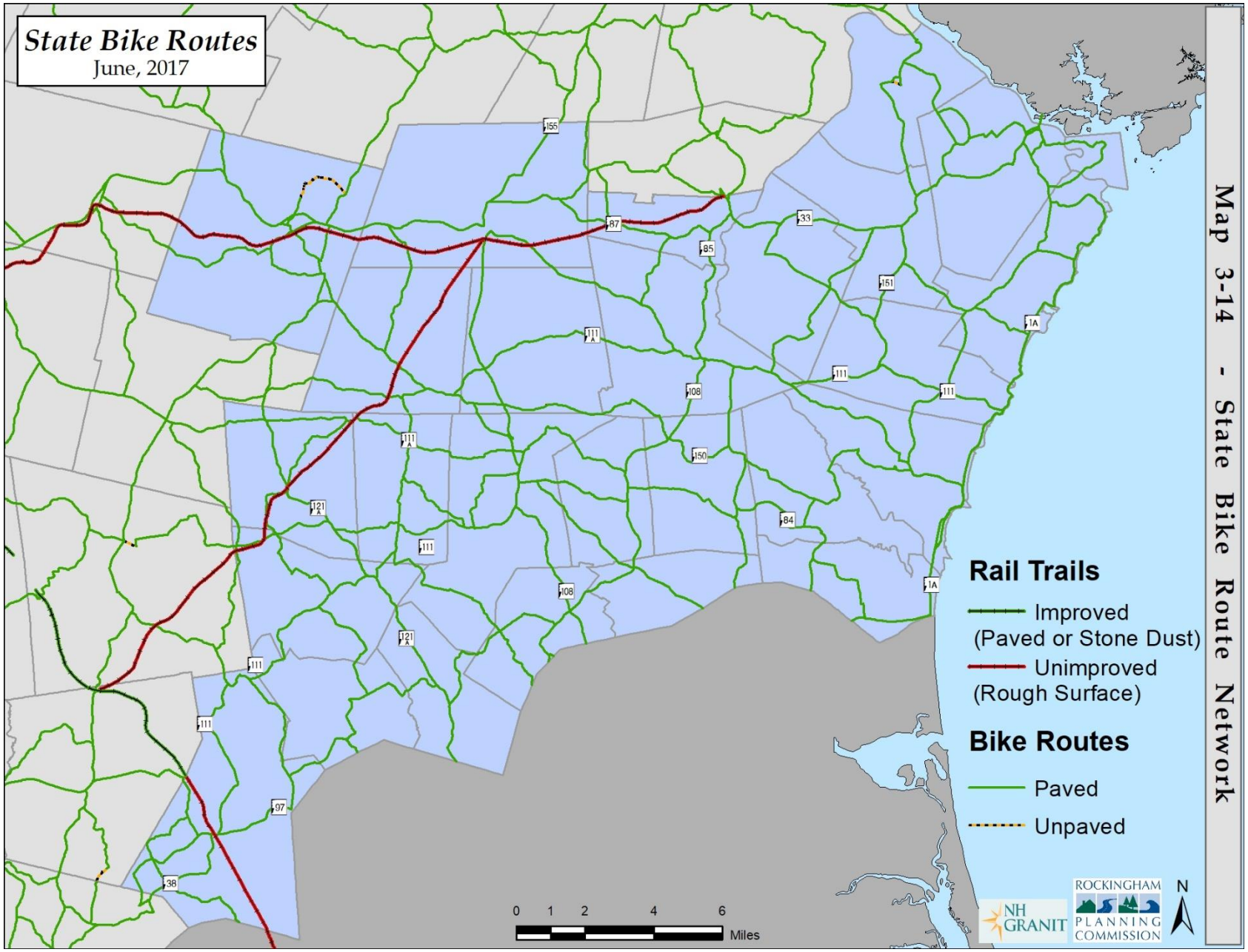
Bicycle Transportation Facilities

For the purposes of this chapter, bicycle transportation facilities consist of shoulders with a width of four feet or greater on the region's roads (the minimum width for a shoulder bicycle route recommended by AASHTO, except next to curb or guardrail where minimum width increases to five feet) and paved off-road multi-use paths. This said, roads without such provisions are still legally and appropriately used by bicyclists. In addition, the State Bureau of Trails maintains numerous trails in the State and region that are unpaved or feature a stonedust surface, such as the Rockingham Recreation Trail connecting Newfields-Manchester, and Fremont-Windham .

Paved off-road paths in the region are uncommon, but include the Southern New Hampshire Rail Trail being developed between Salem and Concord, the recently completed Pease Multi-Use Path at the south entrance to the Pease TradePort, a path connecting Fox Point Road in Newington to the Tradeport, and a side-path in Odiorne State Park in Rye. Planning is also underway for the New Hampshire segment of the East Coast Greenway, stretching from Florida to Maine. The State of New Hampshire in 2019 purchased the 9.7-mile segment of the Hampton Branch rail corridor between Hampton and Portsmouth and is currently in the design phase to construct the first phase of New Hampshire's segment of the East Coast Greenway. The State already owns the southern 4.5 miles of the corridor between Hampton and the Massachusetts border, on which the Town of Seabrook is also actively pursuing rail trail development.

The remainder of what may be termed bicycle facilities in the region consists of paved shoulders on roads. Shoulders on many state roads in the region are narrower than four feet. **Map 3-14** shows the State Bicycle Route Network in the MPO region. These routes were designated through a process that gathered public input on commonly traveled routes, then assessed these routes for safety and filled in connections between towns based on a combination of shoulder width and traffic volume.

Map 3-14: State Bike Routes



The RPC has worked with Seacoast Area Bicycle Riders (SABR) and member communities to secure funding to extend shoulders and complete regional routes including the Great Bay Bicycle Loop, the Exeter-Hampton-North Hampton Bicycle Loop and the NH Coastal Byway. The success of these efforts has varied by municipality, depending on the interest of Towns to appropriate matching funding needed to access federal funding under the Transportation Alternatives (TAP), or Congestion Mitigation/Air Quality (CMAQ) programs. NHDOT has adopted a policy to add width for shoulder bicycle routes when state highways are reconstructed, which happens on a 20-30 year cycle. NHDOT Maintenance District 6 has also created extra shoulder width in some cases as part of routine resurfacing by narrowing travel lanes to 11 feet or even 10 feet from a traditional 12 feet or more. In some cases opportunities remain to allocate more width to shoulders on low-speed roads where 10 foot lanes would be adequate (Institute for Transportation Engineers).

After "maintenance of roads and bridges", respondents to the UNH Regional Needs Survey identified "availability of bike paths" as the next highest priority for increased transportation system investment in the region. Community meeting and other public input underscored this, identifying a particular need for improved bicycle and pedestrian facilities within communities that connect residential areas to services and schools and provide safe passage for students or adults on foot or bicycle. Reflecting this, seven communities in the RPC region have initiated Safe Routes to School (SRTS) initiatives, including Hampton, Newfields, Plaistow, Portsmouth, Rye, Seabrook and Stratham. While federal Safe Routes to School funds have now been rolled into the new Transportation Alternatives program under MAP-21 and the FAST Act, the SRTS model remains an excellent one for municipalities and school districts.

Supporting Facilities for Bicycles

A safe place to park your bike can be a major factor for commuters deciding whether to drive or bicycle to school, work or recreational areas. Some larger businesses in the area do provide amenities for bicycle commuters such as allowing them to store their bicycles indoors and providing shower facilities.

Another important step is to support better connections between bicycles and other modes of transportation. This includes secure parking at bus stops and train stations as well as accommodations for carrying bicycles such as racks on the front of buses. COAST has installed bike racks on the front of all their buses, as has Wildcat Transit. The NHDOT has installed bicycle lockers or racks at most Park & Ride locations as well as the Exeter rail station. With assistance of FTA Transit Enhancements funding from COAST, the City of Portsmouth has made extensive improvements to bicycle parking at downtown transit stops and other locations the past four years.

In 2017 Portsmouth launched a city-wide bike-share program in collaboration with the firm Zagster. Bike stations are located in five pilot sites around the city, and for a nominal membership fee users can check out a bicycle free for up to two hours, with incremental cost for longer trips.

Education, Encouragement, and Enforcement

Providing new facilities is only part of the solution to encouraging non-motorized alternatives to driving. The other part of the equation involves changing behavior – of both potential cyclists as well as drivers. This integrated approach is often referred to as the "Five Es" – Engineering (bicycle infrastructure) must be accompanied by efforts at Education (regarding cyclists rights and responsibilities), Encouragement (to try a new way to travel),

Enforcement (of traffic rules for both drivers and cyclists), and Evaluation to ensure data-driven decision making.

At present, educational efforts in the region and much of the state are limited to outreach to young children first learning to ride a bicycle. The Bike/Walk Alliance of New Hampshire (BWANH) provides classroom instruction in bike safety to 4th and 5th grade classes with funding through the Safe Routes to School program. Efforts targeting older children, as well as adult cyclists and drivers are more limited. RSA 265:143a, passed in 2010, clarified many state traffic laws around bicycling, and included an innovative provision known as the Three Foot Law – that automobiles must allow at least 3 feet of buffer when passing a bicycle at 30 mph, and an additional foot for each 10 mph above that. BWANH has worked to get information on bike-related traffic law into the state driver education curriculum, as well as into police officer training.

Initiatives to encourage more people to ride bicycle and ensure they can do so safely include the RPC's work with CommuteSMART Seacoast to promote annual events for national Bike Month and Seacoast Bike/Walk to Work Day, and assistance to communities in implementing Safe Routes to School programs.

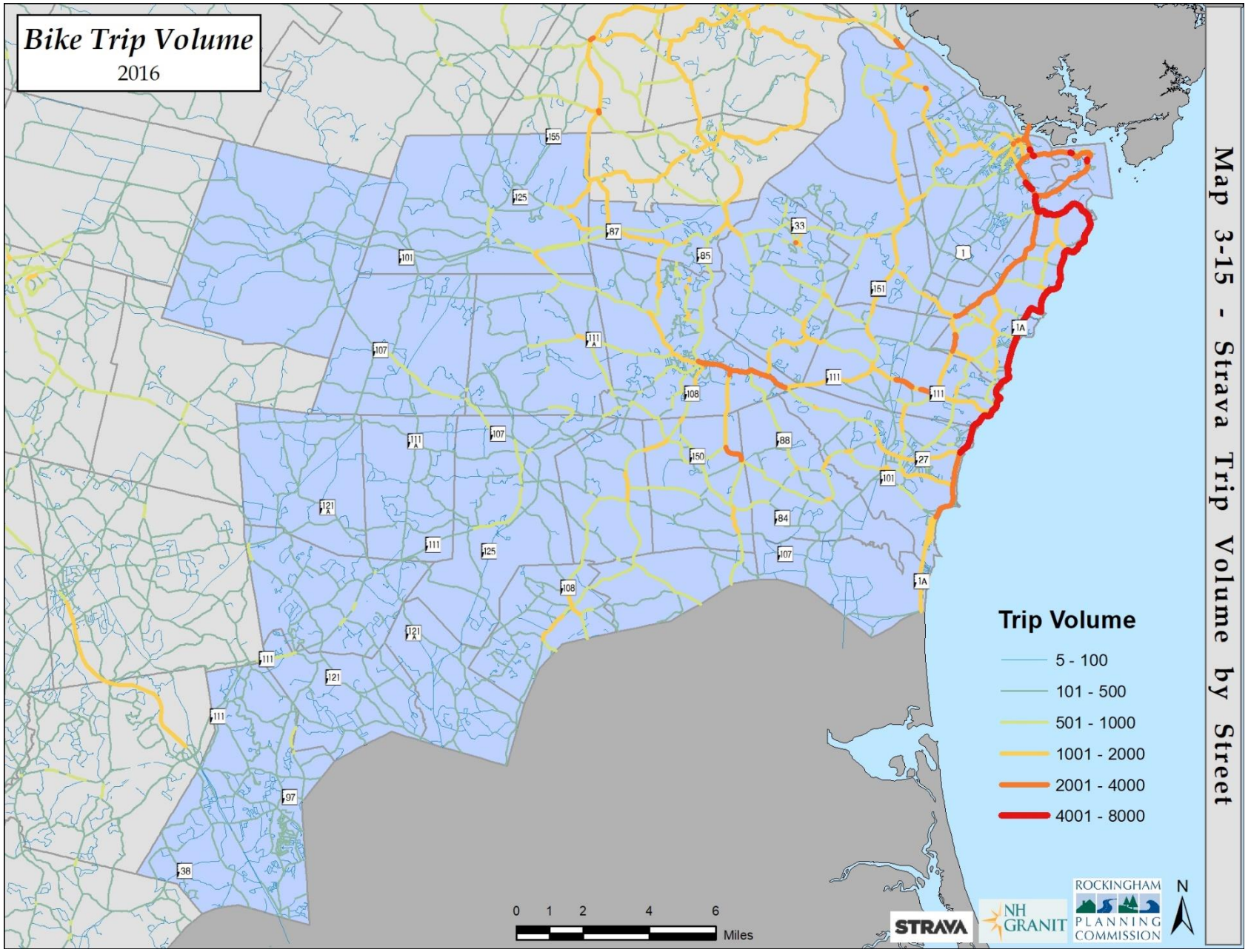
A challenge in evaluating the success of facility improvements or education and encouragement efforts is the lack of data on bicycling and walking relative to automobile traffic. Improving data on bicycle and pedestrian travel volume is a key need identified through the work of the BPTAC, the Regional Master Plan process, and efforts to date to define performance metrics for the MPO. While extensive data are available on automobile traffic volumes, data on bicycle and pedestrian travel has to-date been collected only as part of specific planning studies such as the Corridor Management Plan for the NH Coastal Byway, the NH-ME Connections Study, or the Portsmouth Bicycle/Pedestrian Master Plan. In 2015 RPC purchased automated bicycle and pedestrian counting equipment as part of a statewide project initiated through the BPTAC. RPC is also analyzing three years of data from the smartphone app Strava, purchased by NHDOT. The Strava app is used by many recreational walkers and bicycle riders for tracking riding and walking trips, and allows a statewide picture of major walking and riding routes.

Map 3-15 shows Strava trip volume from 2016, highlighting the relatively heavy usage of NH1A and NH1B – both State bicycle routes, part of U.S. Bike Route 1, the NH Coastal Byway. Work is underway to identify the extent to which Strava volume data correlates with overall bike/ped usage. Combined with an expanded program of manual bicycle and pedestrian counts, the Strava data and automated counting equipment will expand the MPO's data on bicycle and pedestrian travel patterns to support planning and project evaluation.

Pedestrian Facilities and Programs

In the RPC region, pedestrian facilities vary considerably from community to community. Portsmouth, Exeter and Hampton feature substantial downtowns, as well as centrally located elementary schools, which encourage people to walk. Many of the more rural communities in the region have few if any sidewalks. Beyond sheer size, the presence or absence of sidewalks relates in large part to when and how a community has grown. Salem provides a case in point. While the largest municipality in the region, Salem has experienced much of its development in the last 40 years when accommodating the automobile has been the focus of most transportation planning. As such, the town has a less comprehensive sidewalk network than smaller communities that developed earlier, such as Portsmouth and Exeter.

Map 3-15: Bike Trip Volume



In more rural communities residents walk on shoulder or in the automobile travel lane. While people have done this for generations, increasing traffic volumes and speeds, and drivers increasingly distracted by cell phones and other devices, have reduced safety for all users of the road, whether on foot, on bicycle or in an automobile. This can be made somewhat safer when shoulder lanes are available for use.

In general sidewalks and other pedestrian accommodations are limited in the more rural communities in the region, with an exception for recreational trails in some communities. Much of this has to do with density, and the relatively long distances between schools or other town facilities and the nearest residential neighborhoods which would discourage walking even if sidewalks existed. Communities with concentrations of residential development or other trip produces in their town center, though, are recognizing that pedestrian facilities will play an important role in future development. For example, in Plaistow sidewalks are already in place in parts of Town and the Town has developed a three-phase plan for developing sidewalks linking all the major facilities in the community that generate substantial pedestrian traffic. The Town has implemented the plan incrementally using Transportation Enhancement (TE) funds. The Town of Salem also has sidewalks in place in some areas, but they do not form a cohesive network.

Construction of sidewalks can be expensive, and many communities are unable to identify local funds to fully support construction of facilities for pedestrians. The Transportation Alternatives Program (TAP) and its predecessor the TE program, have been is the primary sources of federal funding assistance for sidewalk construction used in New Hampshire. These funds have always been limited and highly competitive, and will be still more competitive in the future as TAP program is funded at a level about 30% lower than the combination of the four programs it replaced.

Another barrier to sidewalk construction is the cost of long term maintenance, including winter snow clearing; and the question of who assumes this responsibility. Current NHDOT policy is to build sidewalks as part of highway reconstruction projects, but only if municipalities request the sidewalks and will assume maintenance responsibility. In some cases municipalities have been unwilling to take on this maintenance responsibility out of cost concerns, and the result has been a lost opportunity to improve pedestrian safety along state highways.

Figure 3-25: Road Miles by Functional Class and Community

	Rural						Urban						
							Principal Arterials						
Town	Private Roads	Principal Arterials	Minor Arterials	Major Collector	Minor Collector	Local Road	Interstate	Other Freeways & Expressways	Other	Minor Arterial	Collector	Local Road	Grand Total
Atkinson	11.8								1.2	4.2	2.2	49.8	69.2
Brentwood	6.4			3.4	1.3	32.1		8.9	1.8		2.5	9.3	65.8
Danville	12.9				1.5	11.3			1.7		2.9	24.0	54.4
East Kingston	7.3			2.5	2.1	7.4					4.8	7.1	31.2
Epping	22.4	1.8			4.1	38.8		16.2			5.0	27.9	116.1
Exeter	17.9		0.6	1.0	1.8	11.7		15.5		9.5	9.3	45.6	112.8
Fremont	15.2			3.6	1.4	23.4					1.4	15.6	60.6
Greenland	4.1			1.1		3.8	6.2			3.3	3.7	23.5	45.8
Hampstead	14.3								4.2	5.0	3.4	59.8	86.7
Hampton	10.1					3.1	8.5	4.2	11.8	13.8	9.3	56.1	116.9
Hampton Falls	0.9			0.4	6.0	16.4	4.3			1.8	1.9	9.2	41.0
Kensington	2.4			6.7	3.5	20.6							33.2
Kingston	9.6					11.1			10.6		6.7	52.0	90.0
New Castle	3.4									2.6		5.0	11.0
Newfields	0.4				2.4	5.2					4.2	9.0	21.1
Newington	19.0					8.4		7.7		1.0	2.4	9.9	48.4
Newton	4.4			0.6		1.7					10.3	28.3	45.3
North Hampton	6.5			1.1		10.3	7.9		3.4		12.4	22.4	64.0
Plaistow	4.7								3.5	7.0	13.9	28.2	57.2
Portsmouth	24.9						18.0	10.4	6.1	14.1	8.1	82.9	164.5
Rye	7.7					4.2			1.2	1.1	15.2	34.7	64.1
Salem	11.2					0.2	12.2		9.2	14.1	17.4	153.0	217.3
Sandown	7.7			0.4		12.8					6.6	42.8	70.2
Seabrook	8.3			0.1			4.9			4.7	5.2	38.3	61.4
South Hampton	2.6			1.4	2.9	8.3						1.8	17.1
Stratham	9.8					9.4	0.0	4.7		6.0	1.5	49.5	80.9
Grand Total	**245.9**	**1.8**	**0.6**	**22.3**	**27.0**	**240.3**	**61.9**	**67.6**	**54.6**	**88.2**	**150.3**	**885.5**	**1846.2**