

CENTRAL NEW HAMPSHIRE REGIONAL PLAN

2015



Prepared by:

The Central New Hampshire Regional Planning Commission

The work that provided the basis for this publication was supported by funding under an award with the U.S. Department of Housing and Urban Development. The substance and findings of the work are dedicated to the public. The author and publisher are solely responsible for the accuracy of the statements and interpretations contained in this publication. Such interpretations do not necessarily reflect the views of the Federal Government.

ACKNOWLEDGMENTS

The Central New Hampshire Regional Plan is an advisory document that is intended to provide communities with important information, analysis and recommended strategic actions that can be used in the preparation of master plans and other local documents. It also serves as a source of information on regional issues that can benefit from coordination of planning and development in the region. The Plan was prepared in accordance with RSA 36:47, the state statute that governs the development and adoption of regional plans by the nine regional planning commissions.

There are many individuals and organization to acknowledge who provided valuable assistance in the preparation of this Plan. The Central New Hampshire Regional Planning Commission (CNHRPC) wishes to first thank all members of the Advisory Committee for their review and advice as the Plan was under development.

Regional Plan Advisory Committee Members:

- Harold Wright - Bradford, *RPAC Chair, Board of Selectmen, CNHRPC Executive Committee*
- Robert Cole - Loudon, *Planning Board, CNHRPC Full Commission*
- Alice Veenstra - Canterbury, *CEDS Committee Chair*
- Tyson Miller - Canterbury, *Board of Selectmen, CNHRPC Executive Committee*
- Elizabeth Bosiak - Epsom, *Board of Selectmen, CNHRPC Full Commission*
- Robyn Payson - Hillsborough, *Planning Director*
- Stephanie Verdile - Pembroke, *TAC Member, Town Planner*
- Stephen Henniger - Concord, *Former TAC Chair, Former Assistant City Planner*
- Terri Paige - RCC, *Regional Transportation Coordinator*
- Kenneth Milender - Warner, *Planning Board, CNHRPC Full Commission*
- Emilio Cancio-Bello - Sutton, *Kearsarge Regional School Board, CNHRPC Full Commission, TAC Member*

CNHRPC also thanks the following advisors who reviewed individual chapters of the Regional Plan and provided the staff of CNHRPC with important comments and guidance.

Laura Richardson - *Executive Director, The Jordan Institute*

Jack Ruderman - *Former Director of the Sustainable Energy Division, NH Public Utilities Commission*

Lorraine Merrill - *Commissioner, NH Department of Agriculture, Markets and Food*

CNHRPC Transportation Advisory Committee (TAC)

TABLE OF CONTENTS

Chapter 1: Regional Story

- Introduction
- The Story Today
- The Future Story
- Moving the Plan Forward

Chapter 2: Vision

- Overall Vision Statement
- Guiding Principles
- Chapter Vision Statements

Chapter 3: Implementation

- Overview: One Plan – Six Key Topics
- Implementation/Action items

Chapter 4: Housing

- Introduction
- Existing Conditions: Demographics & Housing Economics
- Housing Needs Projection Model & Housing Projections
- Fair Housing Equity Assessment & Barriers to Housing
- Perspective on Housing: Local Master Plans
- Public Input and Outreach
- Implications for Local/Regional Planning: Challenges and Opportunities
- Central NH Vision - Housing

Chapter 5: Economic Development

- Introduction
- The Central/Southern NH Comprehensive Economic Development Strategy (CEDS)
- Snapshot of the Economy

- Economic Development Efforts In The Region's Communities
- Public Sentiment Regarding the Local Economy
- Implications for Local/Regional Planning: Challenges and Opportunities
- Central NH Vision – Economic Development

Chapter 6: Transportation

- Introduction
- Existing Conditions
- Understanding Transportation: Challenges and Opportunities
- Public Opinion on Transportation in the Central NH Region
- A Vision for the Central NH Region Transportation System

Chapter 7: Natural Resources

- Introduction
- Existing Conditions: Water and Land
- Connecting Rural Character with Agriculture
- Recreation: Connecting People to the Land
- Perspectives From Around the Region
- Implications for Local and Regional Planning: Challenges and Opportunities
- Central NH Vision – Natural Resources

Chapter 8: Weather Hazards

- Introduction
- Advent of Local Hazard Mitigation Plans
- Natural Disasters Within the Central NH Region

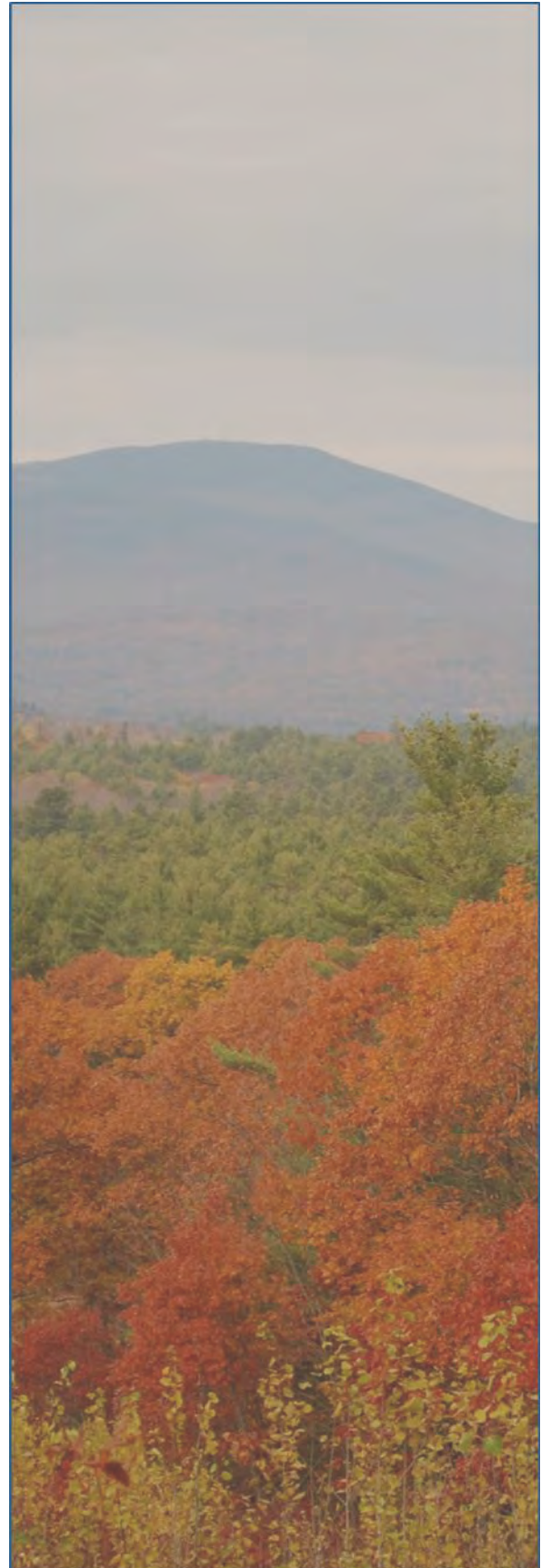
- Regional Weather Patterns and Climate Trends Observations
- Projected Changes in Climate Around the Region
- Anticipated Extreme Weather and Climate Change Concerns in Central New Hampshire
- Public Opinion About Changing Weather Events
- Weather Hazard Implications for Local and Regional Planning
- Central NH Vision – Preparing for Future Weather Hazards

Chapter 9: Energy

- Introduction
- Existing Conditions/New Hampshire's Energy Landscape
- Renewable Energy Sources
- Energy Efficiency Programs and Resources
- State Energy Policy Initiatives
- Other Initiatives
- Energy Efficiency Work In and Around the Central NH Region
- Energy Efficiency and Public Sentiment in the Central NH Region
- Implications for Local/Regional Planning: Challenges and Opportunities
- Central NH Vision - Energy

Appendix A: Existing Conditions

Appendix B: Housing Data





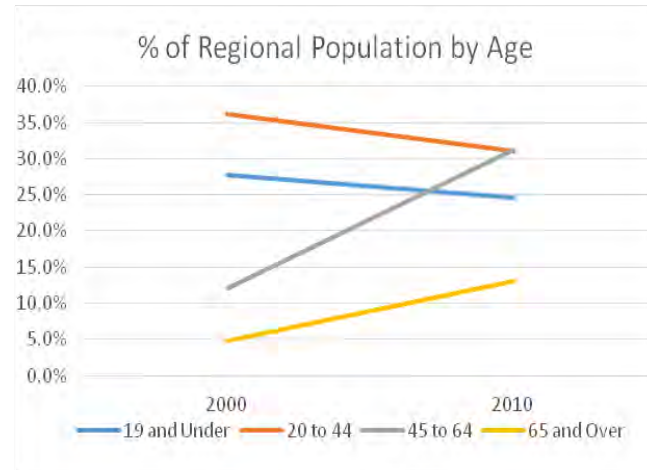
Central New Hampshire Regional Plan

"A region that builds on what we already have - supporting growth and prosperity while at the same time conserving our heritage, natural resources, and sense of community. CNHRPC is committed to supporting the uniqueness of this region and the quality of life that is both a strength and competitive advantage."



Key Trends and Facts: Community and Economy

⇒ Attracting a younger population is increasingly important to maintaining a viable workforce that supports an older population.



⇒ The continuing decline in the number of people coming forward to volunteer may impact New Hampshire's long tradition of volunteerism to fulfill local and regional functions.

⇒ Regional employment is forecast to increase by approximately 10% by 2020, with the largest growth rates in Healthcare and Social Assistance (25.4%)

⇒ The regional unemployment rate has dropped from 5.6% in 2009 to 4.8% in 2013. Statewide unemployment has dropped from 6.2% in 2009 to 5.3% in 2013.

⇒ The vast majority of residents in the region (93%) have broadband at home, but there are many areas where speeds are not adequate for business and teleworking.

⇒ Key recommendations from Central / Southern NH Comprehensive Economic Development Strategy (CEDS) include:

- Focus on growing local businesses
- Engage local entrepreneurs and investors
- Support and incubate new businesses
- Make local permitting processes easier to navigate
- Emphasize skills training and work readiness
- Increase business development services and technical assistance
- Take a regional approach...create a regional brand

As the region moves forward, it is:

- a vibrant region** → where commercial growth for key industries is thriving, there is a broad range of employment opportunities and a diverse supply of housing stock, all while maintaining the region's unique characteristics and quality of life.
- an efficient region** → with its land use development, transportation, energy usage and fiscal expenditures.
- an accessible region** → with a balanced, sustainable, and diverse transportation system that integrates transportation and land use to improve mobility and job accessibility.
- a united region** → where there is a collaborative spirit and regional cooperation on planning issues.
- a balanced region** → where the environment/open space/farmland and traditional settlement patterns are balanced successfully with residential and economic development
- a connected region** → where all residents feel connected to neighborhoods, activity centers and recreation areas.

What We Heard:

What is best about the region?

- ♦ **Community** - friendly, small town, close knit
- ♦ **Natural Resources and Recreation** - rural landscape, scenic beauty, access to outdoor recreation
- ♦ **Economic Vitality** - downtown, town centers, local businesses, farms and local food

"Neighbors are friendly, quiet at night, great elementary schools."

What could make this region better?

- ♦ **Economic Vitality** - stronger downtowns, job opportunities, lower taxes, better broadband
- ♦ **Transportation** - public transportation, improved infrastructure, bicycle and pedestrian options
- ♦ **Community Services** - more town and social services, community centers and events

"Public transportation, carpool to Concord, airport; entertainment, more young folks and ideas."

Key Trends and Facts: Natural Resources and the Environment

- ⇒ Stewardship of natural resources is an important investment to maintain the rural and scenic qualities valued by residents.
- ⇒ Merrimack County is the top county in New Hampshire for agriculture sales; however, the average farm size continues to decrease in Hillsborough and Merrimack Counties but there is an increase in the number of farms.
- ⇒ As the population ages in place, more people will be looking for recreation opportunities close to home.
- ⇒ Twenty major disasters within the previous 41 years have been declared, 11 of which were within the last nine-year disaster period.

Key Trends and Facts: Housing and Infrastructure

⇒ An aging population leads to more homeowners planning for different housing types.

⇒ Rental costs in the Central NH Region (\$970) are less than the state median (\$1,005). However, there are pockets in the region where some residents are paying over 50% of income on rent.

⇒ All wastewater systems in the region have surpassed their 20 year design life as many of the systems were implemented over 30 years ago and are immensely inefficient.

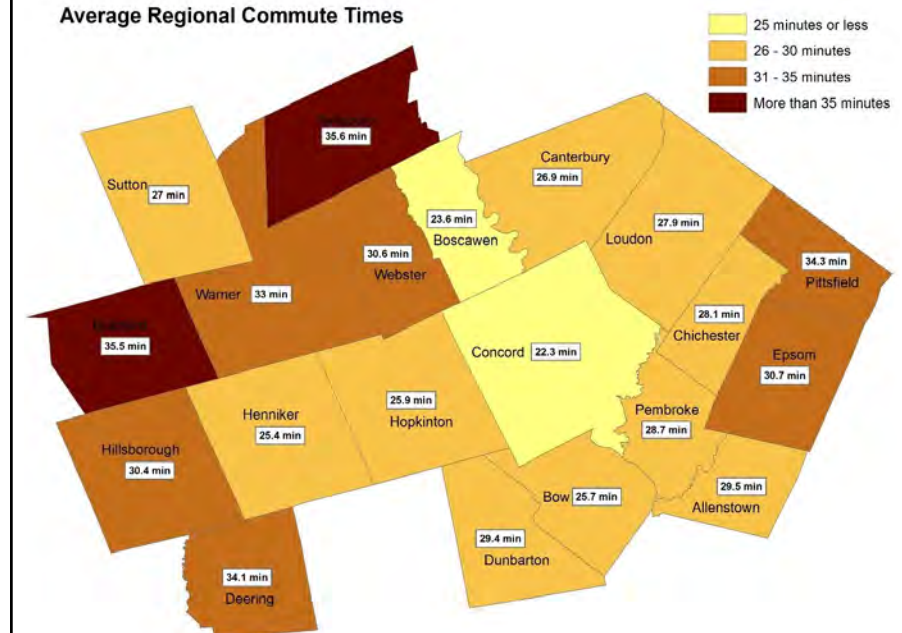
⇒ The region's rural settlement pattern is a challenge for transportation needs for vulnerable populations such as seniors and the disabled.

⇒ 30% of the region's highway pavement condition is in poor condition. The aging transportation infrastructure continues to be an issue.

⇒ 5% of NHDOT bridges and 22% of municipality owned bridges in the region are red listed.

⇒ 80% of the region's residents drive alone to work and the average commute time is 22.1 minutes.

Average Regional Commute Times





Connect



Sustain



Invest



Partner



The Regional Economy

As a region with a high quality of life and a strong sense of community, there are opportunities to enjoy a rural lifestyle with access to recreational activities while still being a short distance to metropolitan areas. The workforce, though older, is well educated and skilled and is a draw for businesses. The region's median income is high. Taken together, all of these factors can serve as effective tools to attract economic activity. Challenges for the region's economy include an aging infrastructure in need of repair and expansion of broadband access for business growth.

The recently completed Central/Southern NH Comprehensive Economic Development Strategy (CEDS) includes the identification of a wide range of regional priority projects, including economic development initiatives such as water/sewer improvements, the expansion and enhancement of broadband services and numerous transportation related projects. Another important element is the completion of an economic development based strengths, weaknesses, opportunities and threats analysis (SWOT) that includes recommendations such as emphasizing skills training and work readiness, increasing business development services and technical assistance, taking a regional approach and focusing on "growing your own" local businesses.

What Communities can do:

- ⇒ Participate in CEDS update process.
- ⇒ Form/support local Economic Development Committees.
- ⇒ Participate in local and regional broadband development initiatives.

What CNHRPC can do:

- ⇒ Continue to support the CEDS development and annual update process.
- ⇒ Facilitate and participate in regional broadband initiatives.
- ⇒ Provide local economic development and circuit rider planner assistance.

The Path to Energy Efficiency

According to the Granite State Futures survey conducted for RPCs, residents view energy efficiency as the second highest priority for investment of public dollars. Seven (35%) of the region's master plans have goals that support and encourage energy efficiency and conservation. The challenge is often how to make it happen. Shifting reliance on energy from an imported product to a local one is a sought after vision but it will take time to counter the realities of such a strong dependency on fossil fuels and its market forces.

Encouraging the supply of energy needs of the region today and in the foreseeable future in a way that reverses our dependence on external sources of energy is an important partnership at the local, regional and state level. Energy costs are major line items in government, business and personal budgets. Everyone benefits from cost effective energy efficiency improvements and conservation measures as a reduction in energy consumption leads to lower energy rates due to load reduction and deferred investments in transmission and generation.

What Communities can do:

- ⇒ Track energy use by conducting an inventory and audit of municipal buildings.
- ⇒ Create a local energy committee.
- ⇒ Develop an energy chapter in the master plan.

What CNHRPC can do:

- ⇒ Provide assistance to communities that want to pursue energy chapters and energy efficiency improvements.
- ⇒ Connect local officials to programs, funding, and initiatives available that address energy efficiency improvements.
- ⇒ Be sure communities are prepared to review larger scale renewable energy projects.

Meeting Housing Demands

The housing picture in the region suggests that because population growth is slowing, the housing need is being met. Lower costs for both purchase and rental housing suggests that housing demand will be met in terms of units and cost. However, just below the surface there are some areas of concern. These include: 1) a need to "downsize" for seniors to smaller units; 2) the cost of housing for various groups, including younger people starting out and seniors on fixed incomes, disabled persons, refugees, and single parents; and 3) transportation issues given the rural nature of the region and the dependency upon the single occupancy vehicle. These challenges present municipalities with housing issues to plan for in the future as well as opportunities to manage change within the community.

What Communities can do:

- ⇒ Allow for a variety of housing types in the regulatory framework.
- ⇒ Monitor demographic and population changes.
- ⇒ Develop strategies to limit transportation impacts on housing choice.
- ⇒ Maximize incentives like RSA 79E, TIF Districts and RSA 162N.

What CNHRPC can do:

- ⇒ Assist communities with developing ordinances and regulations.
- ⇒ Provide regional demographic and population data; assist communities with analysis of the numbers at the local level.
- ⇒ Conduct analyses and engage in transportation planning support.
- ⇒ Assist municipalities with strategy development and adoption/implementation process.

One Landscape – Using it Wisely

Residents appreciate the rural landscape and the recreational opportunities it provides. All municipalities in the region have master plan objectives that aim to preserve and protect the natural resources and traditional rural character through effective management and conservation.

As the landscape changes over time to accommodate development, balancing natural resource protection with other uses becomes increasingly important. Protecting water quality and maintaining a clean water supply and efficient infrastructure are important to preserve quality of life. Municipalities and the state partner in the protection of water and land resources, but there is also a strong stewardship element that is dependent on local efforts and volunteers. Equally important is connecting people to outdoor recreational opportunities and supporting the continuing role of agriculture in the region.

What Communities can do:

- ⇒ Ensure that local conservation values are reflected in land use regulations and master plan objectives.
- ⇒ Communicate between local land use boards and committees to ensure effective planning efforts.
- ⇒ Support connectivity of open space lands and trails also across municipal boundaries.

What CNHRPC can do:

- ⇒ Inform local officials of funding opportunities.
- ⇒ Facilitate communication and partnerships between communities to address data sharing and information on natural resource management across boundaries.
- ⇒ Provide information on best practices for stewardship as a resource for communities.

Moving Around the Region

The region's extensive system of roads, highways and bridges provides residents, visitors and businesses with a high level of mobility. The transportation system forms the backbone that supports the region's economy by providing access to customers, materials, suppliers, and employees. Reliance on private vehicles is a reality for most of the region and can be a challenge for an aging population. Residents expressed interest in more public transportation, pedestrian and bicycle options. The Volunteer Driver Program is a region-scaled approach to addressing transportation needs.

The regional transportation planning process in the region is driven by bottom-up community participation through the Planning Commission's Transportation Advisory Committee (TAC) which is supported by CNHRPC and New Hampshire Department of Transportation (NHDOT) staff. TAC membership consists of representatives from CNHRPC member communities who act as liaison to local boards and councils.

What Communities can do:

- ⇒ Be members of the TAC and regularly attend TAC meetings.
- ⇒ Participate in the Transportation Improvement Program (TIP) update by completing projects proposal forms and ranking the regions projects.
- ⇒ Update transportation chapters in master plans and use for guidance when making decisions.

What CNHRPC can do:

- ⇒ Provide assistance to communities to update transportation chapters.
- ⇒ Connect local officials to programs, funding, and initiatives available that address transportation improvements.
- ⇒ Encourage communities and NHDOT to work in partnership on transportation projects throughout the region.

Managing the Effects of Weather Hazards

Weather in the region has become more extreme, more variable, and more wet in the past two decades. Heavy rains are now regularly experienced, many of which result in flooding conditions. Fluvial erosion is choking rivers with sediment and debris, exacerbating floodwaters. Community budgets stretch to respond to road washouts, salting and sanding expenses, debris removal, and emergency assistance overtime. No community within the region has been spared from these extreme weather effects of a changing climate.

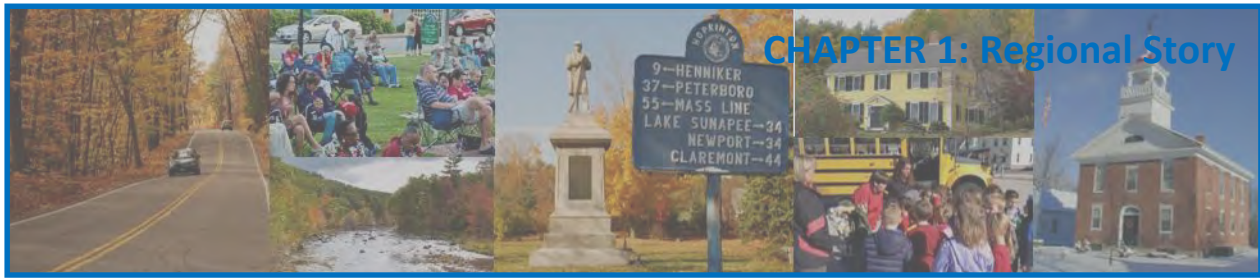
This continuing transformation into a warmer, wetter region means local communities should consider adapting to these new circumstances. Local Hazard Mitigation Plans examine the potential effect of weather hazards and develop a series of recommendations to help reduce the impact of these disasters. Multi-faceted approaches are necessary to preserve the region's assets and adapt to the changing new normal of climate and weather.

What Communities can do:

- ⇒ Update Hazard Mitigation Plans and fulfill the implementation actions.
- ⇒ Upsize small culverts to accommodate flooding conditions.
- ⇒ Review and update the municipal Emergency Operations (EOP) Plan.
- ⇒ Use fluvial erosion hazard assessments to identify infrastructure projects.

What CNHRPC can do:

- ⇒ Assist communities with Hazard Mitigation Plans.
- ⇒ Inform emergency responders and local officials on mitigation and adaptation resources and projects.
- ⇒ Develop culvert assessments and Road Surface Management Systems (RSMS) inventories for communities.



CHAPTER 1: Regional Story

INTRODUCTION

For any plan it is first important to have an understanding of the region. The demographic trends and patterns of development, as well as the extensive public input, build the profile of what we experience today. This Chapter highlights major themes in the region that are supported by key data from other chapters as well as from input through public outreach. By analyzing the data in combination with the extensive public outreach, the region's story emerges and sets the framework for identifying the challenges that need to be addressed. There are two main parts to telling the story: where we are today and where we want to be. The Vision Chapter provides the direction to lead us there. Before we look forward, however, we first need to have an understanding of the present, including the trends in the region and what we heard from the public outreach efforts. For a further review of existing trends and conditions for the region, please refer to Appendix A, Existing Conditions, and the individual chapter topics.

THE STORY TODAY:

The region includes the state capital and a wide range of communities with a mix of rural and urban development. There is a high quality of life in the region that is valued for its strong sense of community and access to natural resources and open space. A key trend, but not isolated to the region, is the aging population combined with a slowing of overall growth. With this trend expected to continue, there is concern that it will lead to a potential loss of human capital and the skilled labor force necessary to fuel economic growth. Maintaining a productive economy, with good jobs and competitive salaries, is essential for supporting the high quality of life that residents enjoy. In an economy where businesses can locate just about anywhere, the attraction of key amenities such as a sense of place and stewardship of natural resources become more important to the region's competitive advantage. Many of the values that residents rank highly are related to the natural resources, rural quality, and small-town character of the overall region. These qualities are linked to the overall demographics of the region and the current landscape patterns. Transportation and maintaining access to amenities and services is a continuing concern, as is the availability of adequate housing types and locations. These considerations are especially significant when considering the changing demographics in the region. There is a strong connection with a high quality of life being defined by educational opportunities, services, recreational and cultural opportunities and a healthy environment. How the demographic trends anticipated in the future will impact these values is a common concern expressed during the public outreach.

A FAMILIAR PATTERN:

The profile of the Central NH Region historically follows the pattern of much of the northeast and also reflects some of the trends of the nation as well.

Aging Population

While an aging population is certainly a national trend, the northeast and New Hampshire in particular are aging more quickly. The median age in New Hampshire was 41.1 in 2010, the 4th highest median age in the country; the Central NH Region reflects the statewide median age with Bradford, Canterbury, Hopkinton and Sutton sharing the highest median age range of 45-50 years (Figure 1). The data clearly shows that the trend of an aging population is continuing in New Hampshire and the region. From 2000 to 2010 the change in the percent of regional population by age illustrates this demographic trend (Figure 2). While much of the demographic change is fueled by historic fertility patterns, and not completely by out-migration of young adults, the make-up of the population in New Hampshire is changing and poses implications for the region (*Ken Johnson, New Hampshire Demographic Trends in Twenty-First Century, 2012*). With the Baby Boom generation aging and the population of younger adults (with the exception of the 18 to 24 year cohort) decreasing by several thousand, there is a dramatic shift in the makeup of the population. The shift towards an older population with fewer younger adults in the region has many potential impacts, including a decrease in the available workforce for early to mid-career positions, fewer children attending schools, and the fewer younger adults available to positions on many of the volunteer departments in town including emergency response.

Migration certainly influences the changing demographics, but the primary driver behind the aging population is the pattern of aging in place by those currently residing in the state. This trend will continue in the region as the Baby Boom generation ages. While it is certainly true that some older New Hampshire residents leave the state for retirement in the Sunbelt states, there is a trend of the state gaining older migrants as New Hampshire is an attractive state to retire to and many demographers anticipate that this will likely continue. “The combined effect of this aging in place and senior migration is a likely doubling of the population aged 65 to 74 in the next twenty years.” (*Ken Johnson, New Hampshire Demographic Trends in Twenty-First Century, 2012. Pg. 13*)

WHAT WE HEARD:

Horseshoe Pond Place and Senior Resource Center

The renovated Page Belting Building at Horseshoe Pond Place in Concord illustrates creative re-use, desirable senior housing, downtown proximity and accessibility to nearby amenities. The public Senior Resource Center at Horseshoe Pond Place (HSPP) is a senior residence as well as a full-service senior center that serves Concord area older adults. The immediate area includes offices, hotel and conference center, and a walk-in urgent care Concord Hospital facility. The adjacent farmed fields and Horseshoe Pond offers scenic views. Even though Horseshoe Pond Place is adjacent to downtown Concord, there is no convenient and safe pedestrian route directly connecting downtown and the Senior Center. A few residents brave the walk, but the pedestrian connections between HSPP and downtown destinations could be much stronger and safer, allowing for more exercise, reduced vehicle miles traveled, and increased accessibility for those living there and people going to the senior center.

How we plan for an increasingly older population with less mobility is a challenge that many of the communities and the region will need to address. Current programs like the Volunteer Driver Program help extend transportation options to those who need it. More long term and short term strategies need to be developed including more walkable communities, housing choices in locations connected to reliable, safe transportation options, accessible recreation opportunities, and places to connect with others. The needs and choices of an aging population are also redefining how communities need to plan for housing options that are attractive and in demand in the market.

Figure 1.1: Median Age

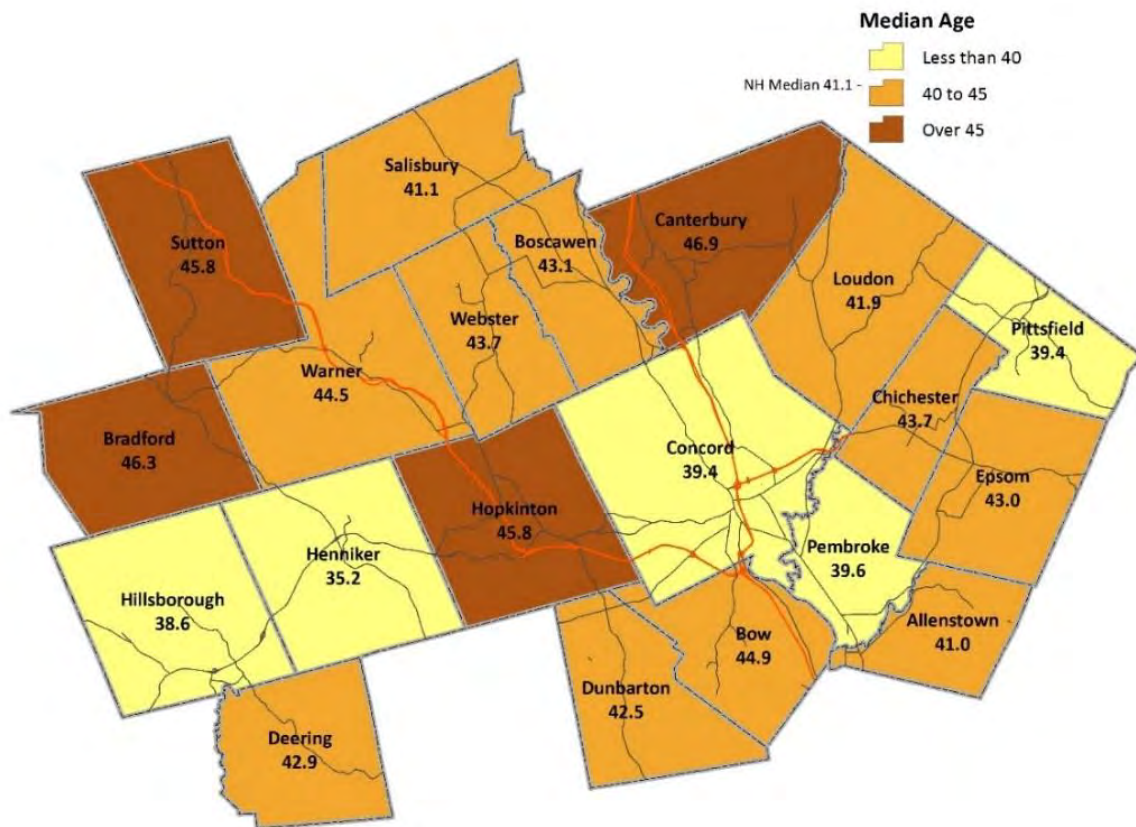
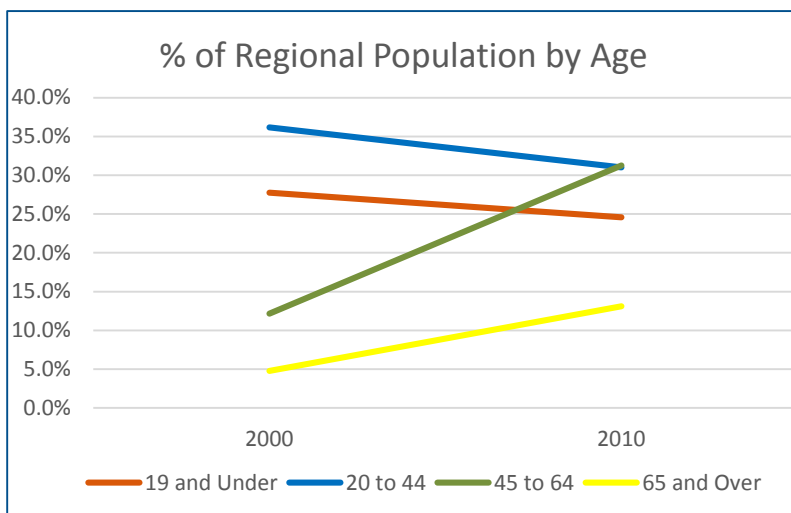


Figure 1.2: Regional Population by Age

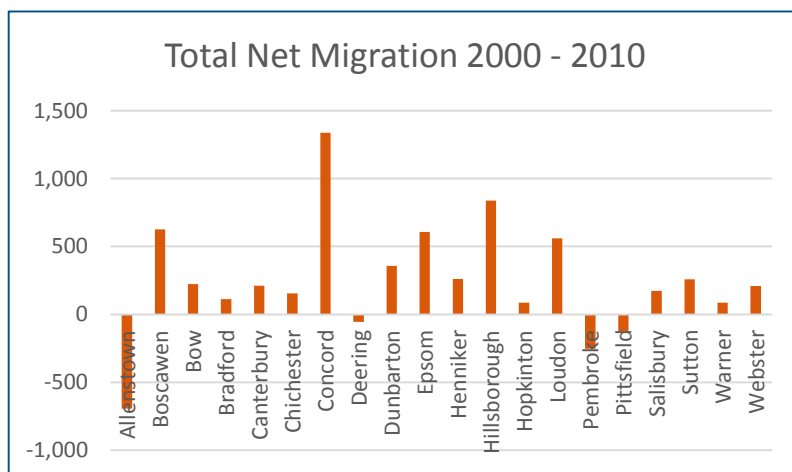


Source: U.S. Census 2000 and 2010

Changes in the Workforce

Migration of new residents from other states to New Hampshire has slowed considerably compared to the years of high in-migration. Over the most recent ten year period, 2000 to 2010, 4,970 new residents moved into the region, contributing to a total increase in population of 7,689 from 2000 to 2010 (Figure 3). This increase is modest compared to the growth from 1990 to 2000, with an increase of 11,306 in total population (US Census Bureau, NHNetwork). Much of the state's historic population gains through migration have come from Massachusetts, which has added to the attainment level of education in the workforce. New Hampshire has historically had a very high education level and may be affected in the future by the slowing of in-migration from Massachusetts.

Figure 1.3: Total Net Migration 2000 – 2010



Sources: U.S. Census 2000 and 2010, NH Vital Records

WHAT WE HEARD:

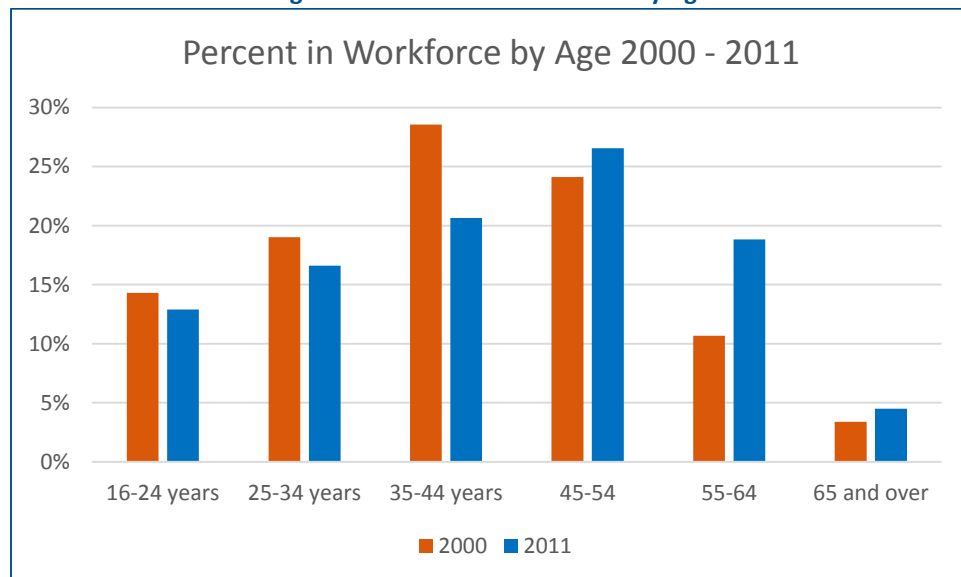
Kearsarge Area Chamber of Commerce

A Familiar Storyline: Young people are leaving the region's small towns for opportunities in education and jobs elsewhere and out of state. How does an area of rural small towns retain and attract residents of all ages? The high cost of college education in New Hampshire is perceived to contribute to this trend of student out-migration. New Hampshire college graduates have the second highest debt load in the country on average owing close to \$33,000 (Delaware is ranked first www.projectonstudentdebt.org). To provide more options there is interest expressed in connecting high school students with local businesses in the area for on the job training and professional experience. Programs such as New Hampshire Technical Institute (NHTI) to provide training for local business needs as well as Granite State College online courses can provide opportunities for students to learn skills relevant to the area's business needs. The quality of life in the region and in New Hampshire is a draw for many and communities are hoping that young people will move to the area. A familiar challenge: They will need job prospects, opportunity, and the broadband connection to stay connected in their careers.

Migration is a driving factor in the demographic changes occurring in the United States, New Hampshire, and the region. There are life-cycle age-specific migration patterns evident nationally that are identified by demographers (Johnson, Winkler, Rogers, Carsey Institute UNH, 2013). Nationally, young adults (age 25 to 29) are moving to large metropolitan cores in migration that often reflects the completion of education or training and the transition to full time, career-oriented employment. Family age population (adults age 30 to 49), often with dependent children, migrate towards suburban areas and to rural areas with scenic and recreational amenities that have histories of sustained migration gains. For these adults and families to move to such areas, including the Central NH Region, there needs to be economic and employment opportunities in addition to the quality of life. Improving the broadband and telecommunications infrastructure is key to connecting the region to economic opportunities in the global economy.

The aging population trend creates changes in the workforce population. Currently, New Hampshire and the region have a high proportion of experienced workers at the peak of their earning potential with considerable social, economic, and intellectual capital. However looking to the future, the aging of the population presents challenges and changes in the workforce. As the population ages, there are a higher proportion of workers who are getting closer to retirement. There is also an increase in workers who are age 65 and older in the workforce (Figure 4). The population and in-migration trends indicate that as many workers near retirement there may be a shortfall in the workforce to fill those positions. The region may see many of these positions go unfilled as government and businesses choose not to fill positions due to tightening of budgets or lack of qualified workers. With a higher proportion of the population nearing retirement in the near future there is an opportunity to look at ways to continue to engage this highly experienced population in community, business, and stewardship of natural resources that contribute to the high quality of life enjoyed in the region.

Figure 1.4: Percent in Workforce by Age



Sources: CNHRPC Estimate Using Region's share of County Workforce. US Census ACS 2009-2011

The demographic trends under way in the region present both challenges and opportunities. There are opportunities as a result of the changing demographics as the region positions itself to attract young professionals. Attracting a younger population will contribute to the well-being of the region by providing human capital that enhances the workforce and contribute to the social, intellectual, and economic life. Economic development today requires more of a placed (i.e. community centered) based approach while highlighting a skilled workforce, as quality of life becomes as prominent of a draw as highway access once was. Clarification of local government processes and improved broadband infrastructure are also important factors in economic development. Many young adults in their twenties and thirties are looking for opportunities to spend less time commuting in a car and are buying smaller houses later in life compared to their predecessors. Many of these trends are not unique patterns to the region, but in light of the changing demographics and workforce, it is important the region's communities and businesses to come together to look at this issue.

Increasing Diversity and Social Community

The region, while still mostly white, has seen an increase in racial and ethnic diversity over the past decade, a national and statewide trend that is expected to continue. Nationally, minority births exceeded non-Hispanic white births for the first time in US history in 2011 (US Census estimates). In the region, this increase in diversity is particularly noticeable in the youth population and the increasing refugee population in Concord (Figure 5). This change may point to potential changing needs in public policy for school programs, health care and community services to be responsive to cultural needs. Safe, accessible youth recreation opportunities close to home, such as parks and sports fields, as well as a more walkable neighborhoods are important to consider.

The sense of community is considered one of the highest valued qualities of the region. As new populations move into the area or children grow up in the community, there may be a need for more opportunities for social interaction across different segments of the population to build trust and community cohesiveness. The World Refugee Celebration Day in Concord, celebrated over the summer as a festival of music, food, and culture, is one such opportunity. With increasing diversity also comes opportunity for the wider community to participate in more diverse cultural experiences such as new restaurants, festivals, and broader exposure awareness to diverse cultures in schools for students. Building on the cultural amenities in a place-based approach is one aspect to attracting young workers to the region who may be looking for 'what to do' after work.

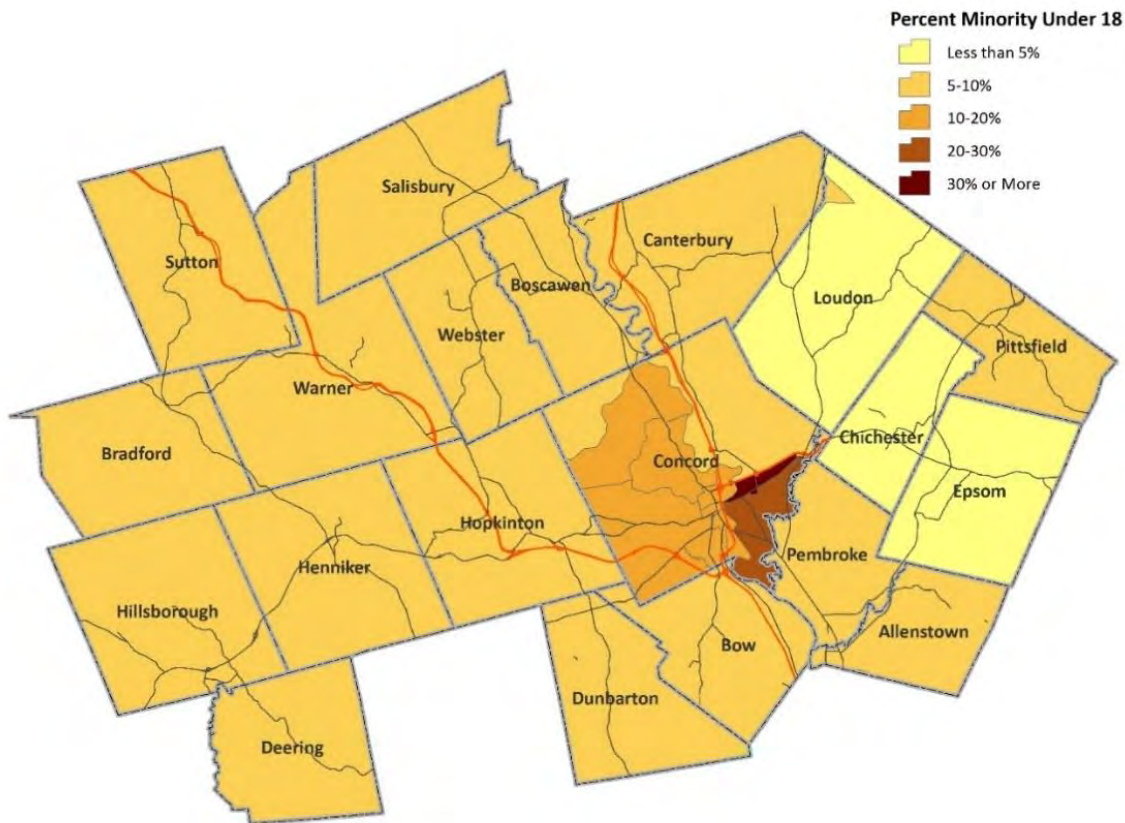
WHAT WE HEARD:

Lutheran Social Services

English for Speakers of Other Languages Class

New residents to the region arrive from many different places, for many different reasons. Refugees resettling in the region contribute to the number of new residents. From the Federal Fiscal Year 2010 to 2012, 154 school aged children were resettled in Concord as refugees from other countries. Refugees from Bhutan are a growing tight-knit community in the Concord and Manchester areas after being resettled in New Hampshire. The increased diversity adds to the community with a richness of heritage and culture, including the active non-profit organization the Bhutanese Community of New Hampshire. Many English language learners spoke similarly as others around the region about the appreciation of parks and recreation, especially opportunities for children. There are challenges facing this community that are often very difficult. The need for jobs, specifically farming as well as small home based jobs, like tailoring, as well as affordable housing within the vicinity of stores, jobs, and public transportation was expressed.

Figure 1.5: Percent Minority under 18 Years

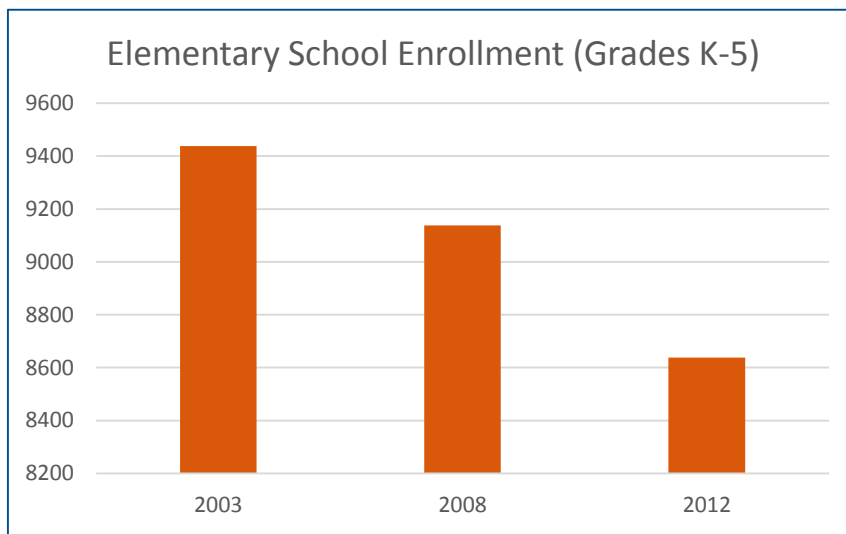


Declining School Enrollment

Population trends in the public schools show fewer school aged children in the region. Overall the kindergarten to grade five enrollment in the region has declined from 2003 to 2012 with a wide range in decreases throughout the region. Local elementary schools have school enrollments that have dropped between four percent to up to 30% from 2003 to 2012. While the decrease in enrollment numbers in public schools is evident, there also may be a shift to charter or private schools contributing to the trend in the area. Opening in 2007 with 51 students, the Strong Foundations Charter School in Pembroke increased enrollment to 172 students in 2012. The catchment area for the school goes beyond the region, but may be a contributor in the trend of decreased public school population. What this means for the community vitality in smaller communities with small elementary schools is an upcoming challenge to be considered. While school populations have decreased, there is a concern about addressing the wide range of per pupil expenditures across the region's communities to create a more equitable public school experience and outcomes. There are opportunities to create engaging, meaningful K-12 civics education and engagement curricula to increase the knowledge and skills of high

school graduates with respect to their roles as active citizens and community leaders. This is especially important in New Hampshire where small communities rely on volunteers and sense of civic duty.

Figure 1.6: Elementary School Enrollment



Source: *NH Department of Education*

Stewardship

The conservation lands, scenic character, and access to recreation opportunities are essential to the quality of life in the region. The sense of stewardship is very strong around the region from local conservation commissions, land trusts, to snowmobile associations. The population trends will affect needs in the type of recreation and the access to recreation areas, scenic view points, and trail. Recreation opportunities closer to home and a range of transportation options to get there are needed as residents age in place. Hoping to attract businesses and new population to the region, the value of natural resources and recreation opportunities are seen as valued assets to many communities in the region. Investing in the region's natural resources, scenic quality, and recreation opportunities is part of the economic equation.

Investment is already occurring throughout the region as residents clearly value the quality of the open space and access to recreational opportunities. Volunteer stewards of the land work to protect and maintain the quality of natural resources and open space. As the population ages there will be a need for a continued sense of stewardship passed along to younger generations in addition to the active older population to sustain the quality and improvement for access to recreation opportunities on open space conservation land. While conserving undeveloped land is the first step towards protecting open space, it is maintaining the easements, clearing trails, and being stewards of the land that takes much of the effort.

WHAT WE HEARD:

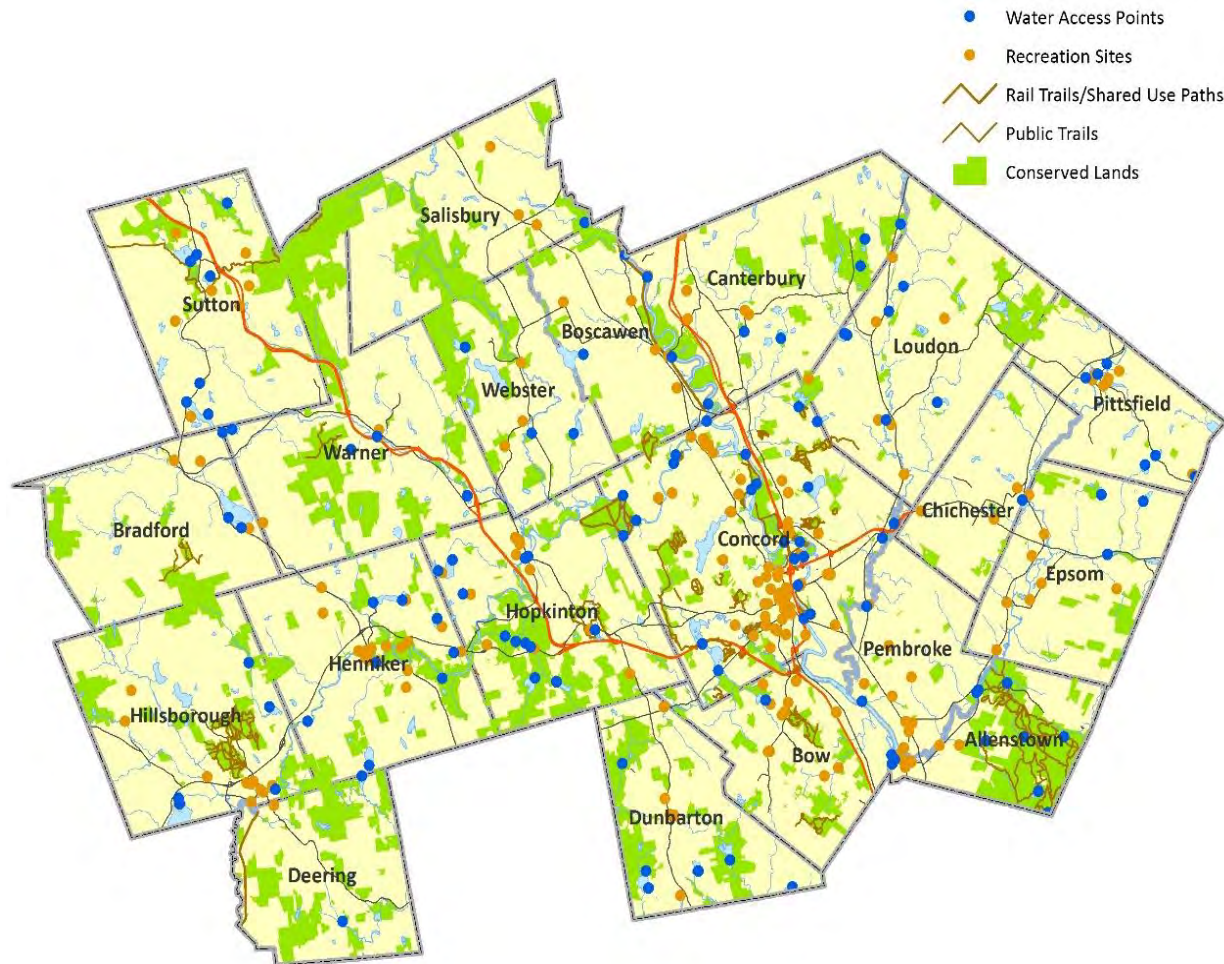
Salisbury Elementary School 5th Grade Class

Similar to other elementary schools in the region, Salisbury Elementary School has seen a decline in school enrollment over the past decade due to overarching demographic shifts experienced in the community, the region and New Hampshire. One of the smaller, rural schools in the region, enrollment in the 2012 – 2013 school year was 82 students. A member of the regional Merrimack Valley School District, the principal position is shared across Salisbury Elementary and Webster Elementary schools. There is concern about the vitality of rural communities that continue to face declining school enrollment. When asked what they thought about their community, the 5th graders shared an appreciation for open spaces, a desire for recreation opportunities and places to play, and requested a Gamestop store in town. What do you like best about your town?

"The woods, the town is small, you know everyone and the houses aren't close together." – Salisbury 5th grader

There are many recreation sites on open space, wooded trails, and water access points throughout the region. As one of the highest valued aspects of living in the region, these opportunities for recreation will need to continue to be maintained. Tied very closely to stewardship is volunteerism in the communities in the region, small communities are dependent on volunteers for many town positions in addition to depending on local conservation commissions and recreation departments to maintain conservation lands. To maintain the quality of recreation and natural resources, in addition to the quality of life, volunteer stewardship plays a large role in the success of the region

Figure 1.7: Open Space Recreation Access Sites

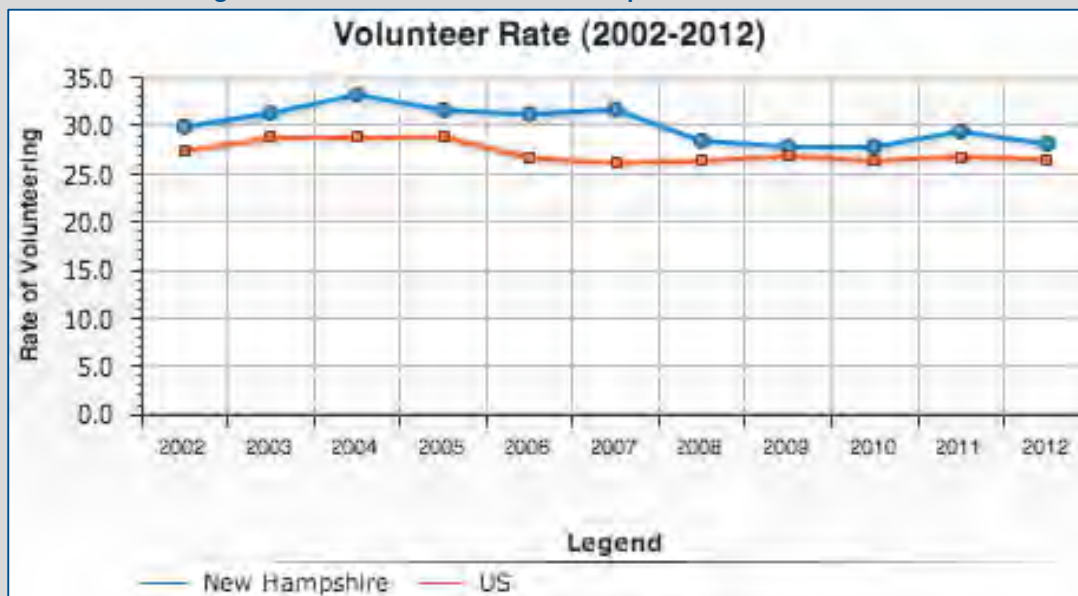


The Challenge of Volunteerism

New Hampshire communities have a long tradition of reliance on volunteerism to fulfill many local and regional functions. Municipal governments are dependent on volunteer boards and committees to conduct such activities as land use planning, land use reviews and decisions, conservation/open space planning and trail development as well as social/community services. Local control and decision making is at the root of many New Hampshire communities, including those in the region. A continuing concern for many volunteer boards is the noticeable decline in the number of people who are coming forward to volunteer for boards and committees. It is difficult to overlook the age of our current roster of volunteers and the absence of a younger pool of participants. Particularly in the smaller, rural communities in the region, volunteerism is critically important to the success and the health of the community.

There are some quantitative sources of data on volunteer rates but unfortunately, not at the municipal level. For example, according to the Bureau of Labor Statistics, the national volunteer rate in 2013 was the lowest it has been since the data was first collected in 2002 and now sits at 25.4%. Women continue to volunteer at a slightly higher rate (22.2% and 28.4%, respectively) across all age groups, educational levels, income, etc. There is some data available for New Hampshire from the Corporation for National and Community Service that indicates that in 2012, 28.4% of residents volunteered, ranking New Hampshire 23 among the 50 states (<http://www.volunteeringinamerica.gov/nh>). The figure below shows the volunteer rate from 2002-2012 for both the US and New Hampshire.

Figure 1.8: Volunteer Rate in New Hampshire and US 2002-2012



Why an individual decides to volunteer is instrumental in understanding how to approach recruitment of a broader base of volunteers in our communities - specifically, it is critical that we figure out what will attract a younger demographic to participate in more of our local and regional boards and committees. Reliable data on **why** people volunteer is not readily available but one can easily assume that it can be for reasons such as a strong commitment to civic engagement/giving back to the community or a personal commitment or interest in a particular

service or local project. Historically, the social contact/connection from volunteering was a common motivator, but it may be less prevalent today now that there are more avenues available for interaction through various social technologies.

Why people do not volunteer can be typically attributed to work commitments such as long commutes that result in little free time, being overcommitted with school/family activities for children or caregiving to elderly parents or just a reluctance to get involved. It is often observed that the same people are involved with many volunteer efforts in communities.

As stated earlier, New Hampshire and our communities rely on volunteers to staff many of the land use boards and other service organizations, each contributing to the success and to the health of our communities. How the region responds to the reality of an aging population, a declining pool of a younger population ready to take over, and the overall drop in the volunteering rate is going to be critical to maintaining the integrity and sense of community so valued by our communities.

Quality Of Life

The Central NH Region is valued for its small town feeling and there is a strong appreciation of the family-oriented environment. Community connections are highly valued and often described as either a tight-knit community, close community, or a small community. There is enjoyment of small villages or town centers, libraries, schools, and recreation centers and fields as they are important assets in the community that contribute to the quality of life and provide an opportunity for residents to interact with each other. Outreach identified an interest in more community oriented facilities such as community centers, and indoor recreation opportunities for youth as well as older adults. All local master plans mention the goal of protecting and maintaining community character, whether described as rural by 18 of the region's municipalities, or vital for Pittsfield, and essential for Concord.

There is emphasis from the local master plans, to comment cards, to outreach with small groups, that there is an appreciation for the quality of life in the region. The concerns about economic development, housing, transportation are often seen as maintaining the current conditions with specific improvements such as more bike lanes, ridesharing, small downtown development, and housing options, rather than a shift away from the current condition. There are current trends such as aging population, changing workforce, and volunteerism that are

WHAT WE HEARD: Riverbend Community Health Program

Transportation and housing are different sides of the same coin for many. Desired housing and location is influenced by public transportation options and safe walking routes to access stores, jobs, and appointments. Access to services is an ongoing need and is determined by housing location and transportation options. Concord Area Transit service does not run on the weekends and some are homebound by this. There is a reported increased demand for affordable housing with the influx of refugees in the area over recent years and some have experienced fewer housing options available. Despite the many challenges, many participants enjoy the scenic quality of the region and the quality of life in the area.

strong impacts that need to be addressed by planning for the future that allows the quality of life in the Central NH Region to continue.

The Challenge of Finding a Place to Call Home

The need for housing is driven both by increases in population, albeit slow, and the decline in household size over the last couple of decades. The aging population also affects demands in the housing market. While the region's population continues to grow slowly, average household size continues to decrease. This is a trend that is seen throughout the state and will drive the future need for housing. While smaller household size seems to suggest smaller housing units in the future, current building trends point to continued construction of larger homes than those built in the past.

Community vitality requires a mix of available housing options. Many different housing needs, including cost, were expressed during public outreach sessions. Although the median rental cost in the region (\$970) is less than the state median (\$1,005), rental costs have not come down as housing values have, putting a burden on renters in a slow economy. There are geographic areas in the region where rental costs exceed 50% of the income of renters. Concord provides the majority of the rental and affordable rental units for the region, but there is demand for affordable rental units in communities in the greater Concord area as well as in some of the more rural communities. There is also an increase in the demand for the limited supply of rental housing available with the addition of refugees resettled in the Concord area over the past decade.

As the population ages, there is an expressed need for smaller housing as people age in place and downsize. There are areas in the region where there is a significant concentration of population over the age of 75 years. There are current and future needs in housing, transportation, and accessibility that come with an older community, especially where there is a concentration. Looking at future need there is a concern about the high cost of housing, and taxes, in the more suburban communities as the older population moves onto fixed incomes. While there are housing concerns in terms of size of housing, supply, cost, and location, the majority of the region values the single family home on one lot, a similar pattern to what is currently available. Downtown apartments were also of interest, especially to those in the immediate Concord area, because of the available transportation options and proximity to amenities. This housing choice is not perceived to be as readily available despite the increasing demand. Housing affordability is more difficult to find in the owner-occupied market where 11% of the owner occupied units are affordable, while more than half (54%) of the renter-occupied housing units are affordable. During outreach, there was expressed demand for more affordable units near transit options.

The impact of long term, reduced energy costs through energy efficiency improvements and renewables will continue to be an attractive incentive as we look to the future. While the housing market has slowed over the last few years the growth of the green home industry continues to increase. Creating energy efficiency improvements on existing and new structures has benefits for homeowners with energy costs unpredictable in the future.

Getting Around the Region - Are We Meeting the Need?

Land use patterns, an aging population and the facilitation of viable economic development are all key factors to consider for the region and how best to plan for the maintenance and future upgrades of the

transportation network. Transportation choices provide a number of options to allow people in both rural and more densely settled areas to safely and efficiently get where they need to go, whether it is by walking, driving, biking, public transportation, carpooling, or taking a train or plane. Historically, Vehicle Miles Traveled (VMT) have followed an increasing trajectory, but nationally the levels have declined and plateaued since about 2008. This may be indicative of changing preferences, especially in the younger demographic, towards more compact living with shorter commute times, less reliance on the single occupancy vehicle (SOV), and owning fewer cars. While the region may not be experiencing this trend in force, maintaining a safe and efficient transportation system serving the rural, suburban, and more urban settings is essential. A major concern across the region is the deterioration of the region's physical transportation infrastructure.

Deterioration of pavement condition and bridges is a trend that has continued to impact the region. Thirty percent of the region's highway pavement condition is in poor condition (see Figure 1.9). This trend has been increasing statewide since 2000. Fourteen (5.9%) of NHDOT owned bridges and 37 (22%) of municipal owned bridges are Red Listed, a designation that indicates that a bridge has major structural elements in poor condition or limitations for use. At the state level, the current available funding makes it difficult to maintain the road infrastructure with resurfacing mileage and the increasing cost of asphalt cement. In the region the continued trend of deteriorating infrastructure is expected to continue if funding is not addressed.

The majority of residents make daily trips to work and appointments by car. The dependence on single occupancy vehicle characterizes the transportation pattern in the region. Eighty percent of the region's residents drive alone to work with a mean travel time of 22.1 minutes (See Figure 8) (ACS 2007-2011). With an aging population, this dependence on individual vehicles can be isolating to those who can no longer drive or do not have access to a vehicle, especially in the rural areas of the region. The recently established Volunteer Driver Program provides flexible transportation options to those who need a ride to appointments driven by volunteer drivers who receive a small reimbursement. The program is growing in demand and capacity and similar to other programs in the region, relies on the willingness of community members to participate as volunteer drivers. More short term and long term solutions to address transportation concerns include; walkable communities, bicycle lanes, rail trails, park and ride lots, and land use patterns that are scalable to the region to address the transportation access needs of all residents.

Over the most recent decades, drivers have driven longer travel distances and increased congestion caused as more vehicles are added to the roadways. Vehicle miles traveled in New Hampshire increased by 29% from 1990 to 2011,

WHAT WE HEARD:

Hillsborough Outreach Session

Mobility for an increasing aging population factors into transportation needs, access to nearby activities and recreation, and community connections. For some, getting from rural communities into Concord or Manchester for appointments is difficult and moving closer to downtown centers is not an option because of the higher cost of housing. The Volunteer Driver Program is working to address transportation needs by assisting residents with getting to and from appointments. Other transportation efforts, such as Safe Routes to School, and other pedestrian connections are important to many communities for connecting residents with active transportation and recreation opportunities for all ages.

jumping from 9.8 billion vehicle miles traveled (VMT) in 1990 to 12.7 billion VMT in 2011. While there is some indication of the rate of increase of VMT slowing, vehicles continue to be added to the roadways contributing to air pollution and greenhouse gas emissions. Twenty seven percent of greenhouse gas emissions in the country are attributed to the transportation sector.

A long term, sustainable transportation funding source for transportation infrastructure in the region is essential. Along with investment in traditional transportation infrastructure, investments in alternative travel modes, more flexible land use, and better coordination between transportation and utility providers will be essential in the region moving forward. Nationally, New Hampshire ranks 42 in state funding to public transportation while towns and cities have difficulty in raising the money required to match federal funds for transportation infrastructure.

Commute Green New Hampshire

CNHRPC is working with a number of other regional planning commissions and transit agencies throughout the state to encourage transportation demand management (TDM) strategies such as ridesharing, the provision of new park and ride facilities, and employer-based programs that promote alternative transportation. For more information on CGNH, see commutegreennh.org.



Source: Londonderry.net

Figure 1.9: Pavement Condition

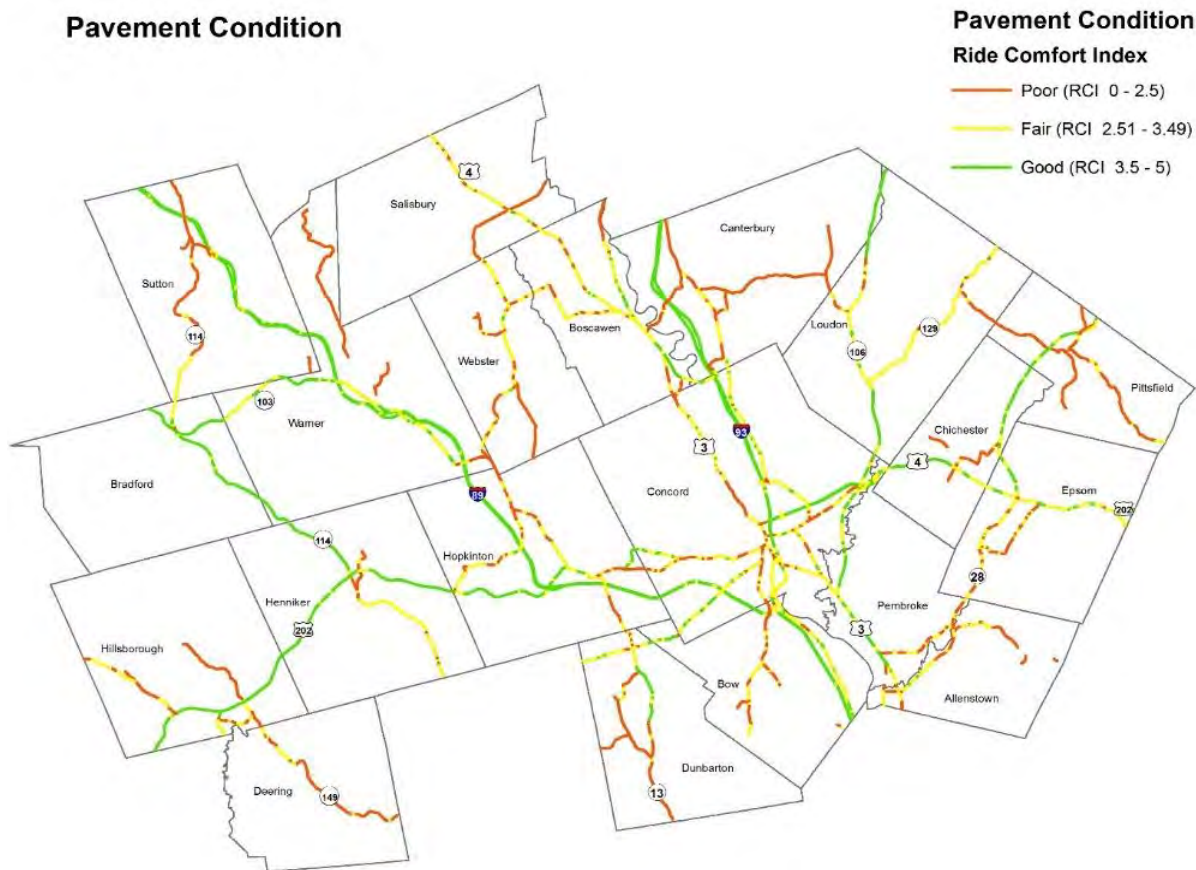
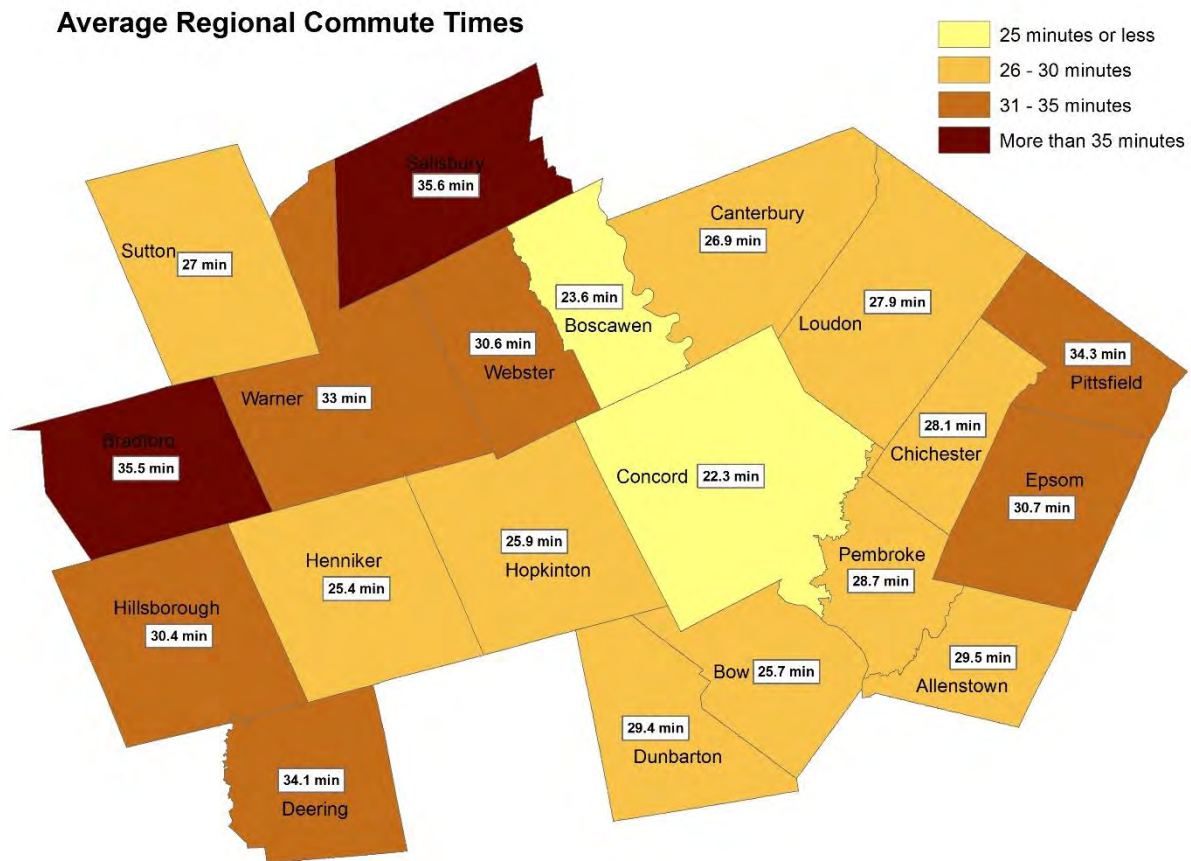


Figure 1.10: Average Commute Times



Increasing Weather Hazards – Building Resiliency

The region has experienced the effects of increasing instances of extreme and unpredictable weather events. Over the last nine year disaster period, 2005 to 2013, eleven presidentially-declared major disasters in Hillsborough and Merrimack Counties struck the Central NH Region as indicated in Table 1.1. Flooding, high winds, hurricanes, snow and ice storms, and even an tornado caused damage by washing out roads, damaging roofs, breaking trees and blocking roadways, disrupting utility infrastructure, and flooding basements. Repairing the damages and cleaning up the debris costs communities and individuals large amounts of money for emergency response and recovery. Prior to the 2005 Columbus Day flood, the last declared disaster in the region was the December 1998 Ice Storm. Between 1973 and this 1998 storm, only nine (9) major disasters were declared over a 25 year period for the Central NH Region. Overall, 20 major disasters within the previous 41 years were declared, 11 of which were within the last nine-year disaster period. The frequency of weather hazard occurrence has doubled since 1970.

Table 1.1: Major Disaster Declarations

Central NH Region Major Disaster Declarations, 2005 to 2013 Hillsborough and Merrimack Counties				
FEMA Disaster Type	FEMA Number	Local Disaster Name	Incident Period	Includes County M / H*
DR	4105	2013 Severe Winter Storm and Snowstorm	Feb 8-10, 2013	H/M
DR	4049	2011 Halloween Snow Storm	Oct 29-30, 2011	H
DR	4026	2011 Tropical Storm Irene	Aug 26-Sep 6, 2011	M
DR	1913	2010 Severe Storms and Flooding	Mar 14-31, 2010	H/M
DR	1892	2010 Severe Wind and Winter Storm	Feb 23-Mar 3, 2010	H/M
DR	1812	2008 December Ice Storm	Dec 11-23, 2008	H/M
DR	1799	2008 Fall Flood	Sep 6-7, 2008	H/M
DR	1782	2008 July Tornado	Jul 24, 2008	H/M
DR	1695	2007 April Flood	Apr 15-23, 2007	H/M
DR	1643	2006 Mother's Day Flood	May 12-23, 2006	H/M
DR	1610	2005 Columbus Day Flood	Oct 7-18, 2005	H/M

Source: <http://www.fema.gov/disasters>

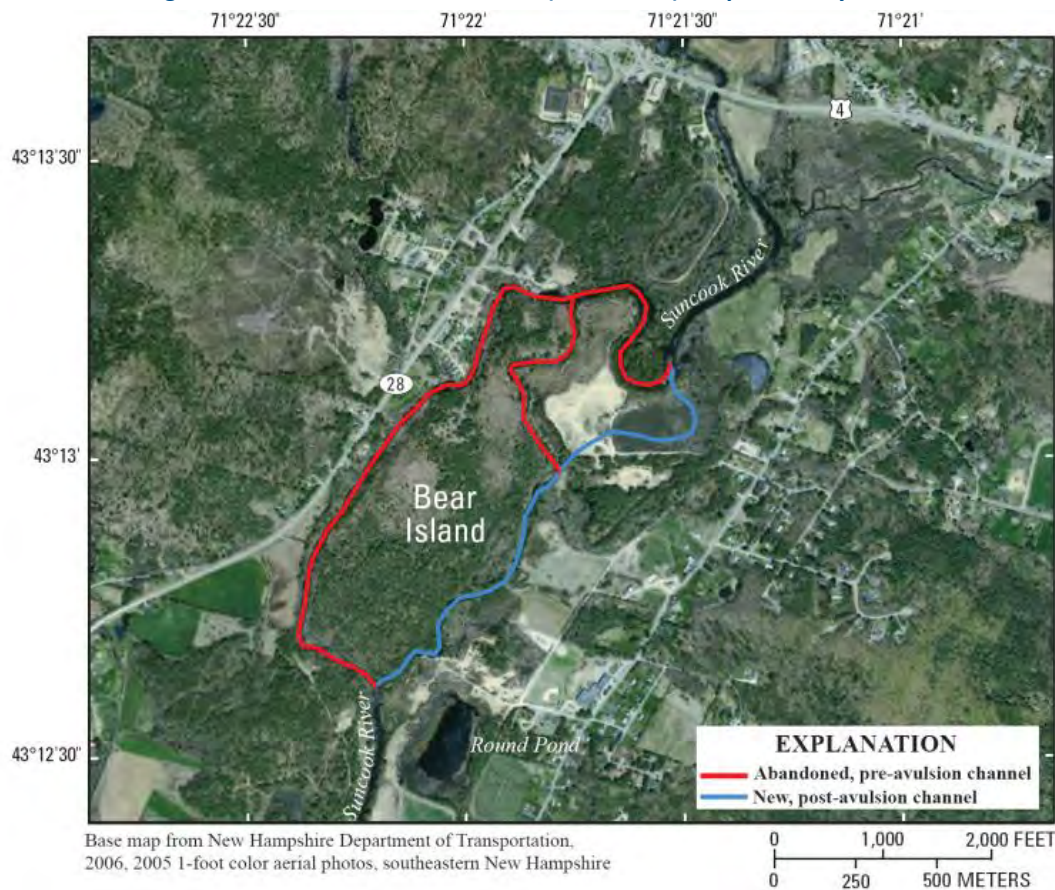
* *Disasters typically include more than just Merrimack or Hillsborough County in NH*

(M) Merrimack County comprises **18** communities in the CNHRPC Region

(H) Hillsborough County comprises **2** communities in the CNHRPC Region

In May 2006, the region experienced its most devastating natural disaster in recent memory. Wide-spread flooding occurred in every community within the region and impacted seven of the ten New Hampshire counties. The US Geological Survey recorded peak discharges equaling or exceeding 100-year floods at 14 stream gages in New Hampshire, including three in the region at the Contoocook River in Davisville village (Warner) and at two along the Soucook River in Concord. This flooding event overflowed roads, damaged bridges, destroyed drainage and culvert systems, stranded people within their homes, thwarted business, and overwhelmed stormwater collection systems. Within floodplains areas, homes and their contents were damaged by floodwaters. A breach in the riverbank of the Suncook River in Epsom caused an avulsion, or the abandonment of a river channel and the formation of a new channel, as displayed in Figure 1.11. This was an event of lasting significance to the communities through which the Suncook River flows. Extensive waterfront home and property damage occurred, lot lines were shifted as banks fell into the river, an island was no longer surrounded by water, and silt and sand sedimentation of the Suncook and Merrimack Rivers continues to present day.

Figure 1.11: Suncook River Avulsion (Relocation) in Epsom, May 2006



Source: *USGS Flood Study of the Suncook River 2009*

The 2006 flood, in combination with the 2005 Columbus Day flood six months prior and the subsequent April 2007 flood one year later, raised the awareness of the region to the importance of the effects of severe weather on municipalities and residents within the Central NH Region. Hazard Mitigation Plans, already developed for most of the region's communities by the time of the 2007 flood, continued to identify projects for reducing the impact of weather hazards such as severe rain, wind, snow, fire, drought and other types of hazard events on property, people, and infrastructure. Emergency preparedness rose in importance as smaller communities struggled with the lack of resources needed to adequately get their municipalities ready for the next big disaster.

The Central NH Region weather is comprised of daily changes in local weather indicators such as temperature, precipitation, humidity, and wind. The extreme weather events the region has experienced will continue in the future and are caused by a changing climate, which is the long-term average of the weather indicators over larger areas. The University of New Hampshire and partners researched the weather patterns and climate change in Southern New Hampshire, which includes the Central NH Region (*Climate Change in Southern New Hampshire: Past, Present, and Future*, by Climate Solutions New England 2014). Some long-term trend findings from the assessment are:

- Days above 90 degrees have increased
- Days below 32 degrees have decreased

- Amount of precipitation has increased
- Snow-covered days have decreased
- Days of the growing season have increased
- Wettest day of the year's inches of water have increased
- Since 1970, lake ice-out dates are one week earlier than they were in 1895

These shifting weather patterns the Central NH Region communities are experiencing will require further planning to reduce the impact of the major disaster events. Municipal budgets are tight, particularly in tough economic times, but a few actions can be undertaken to help proactively plan for expected forthcoming weather hazards as a result of southern New Hampshire's changing climate. Investments in infrastructure through the use of capital improvements programs and capital reserve funds are a necessary first step to help ensure municipal infrastructure, including transportation, water and sewer, gas, electrical power, and municipal building and response capability, remains as intact as possible to ensure appropriate response to the weather hazard events.

THE FUTURE STORY:

There are many opportunities to address the trends and emerging issues that are shaping our present environment. These trends have certainly influenced CNHRPC's vision and its approach to developing the guiding principles and implementation strategies. While we fully enjoy the many positive qualities of the region now, it is important to plan ahead to not only ensure that these qualities are maintained but to take advantage of the opportunity to respond proactively to any emerging trends that could impact the future.

The public outreach response and the goal/vision statements from the region's master plans all point to the theme that there is a strong connection to the region as it is, but there are opportunities to strengthen what is working and what needs to be addressed.

There are four main themes that tell the story of the direction where the region can go. These themes are the foundation for the vision statement and are used to frame the guiding principles and implementation initiatives discussed in the Vision and Implementation Chapters.

1. CONNECT

The importance of connections as the region moves forward is a valued asset that needs to be a central focus of the vision and implementation strategies. Connection was a dominant topic throughout the public outreach process and the data collected for this Plan. A region where people have more choices on how they connect to the places where they live, work and recreate is highly desirable. The term is used in its broadest sense here as it addresses connections for the transportation system, schools, recreation access and broadband and will be further refined in the Vision Chapter. Some of the ways this plan will examine connections is through:

- Facilitating a transportation infrastructure that supports vitality of communities and the economy;
- Supporting training programs that develop workplace readiness skills;

- Bringing residents to the outdoors closer to home; and
- Promoting an expanded and faster broadband and telecommunications infrastructure.

2. INVEST

There is a challenge to be met regarding the lack of a regional identity and how to develop economically in ways that are strategic and focused on what already works in this region. Certainly the quality of life is an asset that can attract and retain workers, employers and visitors. Capitalizing on this asset and investing in what is currently valued is an important strategy as businesses want to operate in an area that has a readily available, talented workforce.

As we focus on the trends of today, it is important to look forward to fostering a climate that is attractive to investment and opportunity. There are many ways to market the region that will be explored in later chapters, including:

- “Growing our own” by focusing on retention, expansion and fostering a climate of investment and economic opportunity in the region;
- Encouraging economic development that is a “good fit” for the region and fosters a prosperous quality of life that provides opportunity and supports the needs of the region; and
- Promoting and developing new and existing businesses.

3. PARTNER

There is a strong history of successful partnerships in the region and this trend needs to be continued and improved in the future. Some strategies to bring this theme forward that will be further refined in the Vision and Implementation Chapters include:

- Addressing regional issues such as watershed management and economic development with a collaborative response from the region’s communities;
- Actively coordinating regional efforts such as broadband, transportation and natural resource protection;
- Cooperating locally and regionally to improve energy efficiency;
- Fostering collaboration on response to hazardous events, including weather disasters; and
- Creating a culture of collaboration that encourages innovation and sharing of resources

4. SUSTAIN

The theme of sustainability has its roots in the public outreach and comments received throughout the planning process. How we maintain the current status quo in light of an aging population will need to be addressed. The region is already a special space for residents and highly valued for its quality of life. How we sustain and enhance what residents value about the region and its communities is a challenge that must be met. Some key opportunities that will be further refined in future chapters include:

- Maintaining access to a local food supply in the region;
- Encouraging/maintaining a strong volunteer base in our communities;

- Reducing energy consumption in order to sustain a healthy environment;
- Preserving our natural and built environment;
- Being strategic and efficient in fiscal expenditures; and
- Steward natural resources so that future generations are able to enjoy the same amenities we experience today.

MOVING THE PLAN FORWARD:

The Central NH Region is going through several demographic changes that will be felt in the housing market, the economy, health care and the workforce, to name a few areas. Telling the Regional Story is one way to call out these changes and trends and to look for ways to proactively address any identified concerns or issues and how they measure against what is valued by the residents in the region. The following Chapters use the Regional Story either as a taking off point for building the vision and guiding principles or as the foundation for creating a “deeper” profile of the region in the areas of economic development, transportation, housing, natural resources, energy efficiency, and weather hazards.



OVERALL VISION STATEMENT:

A region that builds on what we already have - supporting growth and prosperity while at the same time conserving our heritage, natural resources, and sense of community. The Central New Hampshire Regional Planning Commission (CNHRPC) is committed to supporting the uniqueness of this region and the quality of life that is both a strength and competitive advantage.

As the region moves forward, it is:

- V** ----- ***a vibrant region → where commercial growth for key industries is thriving, there is a broad range of employment opportunities and a diverse supply of housing stock, all while maintaining the region's unique characteristics and quality of life.***
- I** ----- ***an efficient region → with its land use development, transportation, energy usage and fiscal expenditures.***
- S** ----- ***an accessible region → with a balanced, sustainable and diverse transportation system that integrates transportation and land use to improve mobility and job accessibility.***
- I** ----- ***a united region → where there is a collaborative spirit and regional cooperation on planning issues.***
- O** ----- ***a balanced region → where the environment/open space/farmland and traditional settlement patterns are balanced successfully with residential and economic development.***
- N** ----- ***a connected region → where all residents feel connected to neighborhoods, activity centers and recreation areas.***

WHY A VISION?

It always starts with a vision. This Regional Plan is a visible statement of where the Central NH Region is now, where it should be in the future and what is required to get there. Regional plans are most successful when they represent a vision that brings together the concerns of different interest groups, resulting in recommendations that create solid community support. “Good” master plans also need to have built-in flexibility and have involved the community and other stakeholders from the outset, thus giving the plan a legitimate base, and a better chance to see the full vision implemented successfully. CNHRPC is also committed to a plan that contains recommendations that people can easily visualize and that tie ideas and projects to realistic goals and expectations.

The vision statement and its relationship to the major themes, guiding principles and action/implementation items define the framework for this Regional Plan. A regional vision should allow all of the stakeholders to work together on regional challenges and project implementation. This Plan has simple and realistic principles that: 1) educate the audience about local and regional issues; 2) identify regional activities/initiatives that support and enhance local planning; 3) provide the rationale and framework for future work; 4) outline the role of regional planning in planning and land use; and 5) can be used as a guide for decision-making about specific projects/activities.

A positive outcome of preparing this Regional Plan is the creation and continuation of a base of active community involvement and support. Building community interest, participation, and consensus as part of the regional master planning process involves sharing the concerns/challenges that the region and its communities are facing and suggests ways to move forward in concert with the vision for the region.

HOW DID THE VISION GET CREATED?

The vision statement has its roots in the extensive community input received throughout the outreach phase of the project.

In addition to gathering input from individuals around the region, CNHRPC staff conducted a review of local master plan vision, goals and priorities of the twenty municipalities in the region. Traditional settlement patterns, housing choices, transportation, natural resource functions and quality, community and economic vitality, hazard mitigation, and energy efficiency are all topics that are discussed thoroughly in the Regional Plan and reflect the themes in many of the region’s master plans.

Input was collected through a variety of methods. Beginning in the fall of 2012, CNHRPC distributed suggestion boxes in locations across the region such as general stores, town offices, restaurants, community centers, libraries, schools, and office buildings. Comment cards were included asking individuals to note what they like best about where they live, what could make it better, and whether they live, work, or are a visitor of the region. Over 300 individuals submitted comment cards. Responses were collected in a database and analyzed for themes such as community vitality, economic development, housing, transportation, environment and natural resources, and recreation.

CNHRPC staff attended community events and led neighborhood discussions with various groups around the region to hear about what people value about their community and what they would like to see improved. Over the course of 2012 and 2013, CNHRPC staff conducted over 20 outreach events and discussions ranging from hosting a community input table at local farmer’s markets to in-depth discussion with seniors at a senior center. Outreach included an interactive visual preference survey

(picture survey) where participants could indicate their preference in choices for use of land, recreation, housing, transportation, and business. Striving for demographically representative engagement, CNHRPC reached out to engage groups that represent different perspectives in the community. Some of these groups may not traditionally participate in regional planning efforts for reasons of place, economic status, age, education levels, mobility limitations, or cultural and ethnic differences. CNHRPC staff met with seniors, elementary and high school students, Chambers of Commerce, refugees and English language learners, community mental health clients, and many others.

In the fall of 2013, residents were invited to attend three sub-regional public outreach sessions to discuss strengths, challenges, and opportunities facing the Central NH Region. CNHRPC staff presented information on demographics, housing, land use, economic activity, transportation, recreation and natural resources to prompt discussion about local and regional strengths and opportunities.

Common themes emerged from a close examination of the extensive public outreach efforts. Appreciation of community and access to natural resources were repeated, valued strengths of the region. A strong appreciation for the region's quality of life and its value in attracting/retaining residents and businesses was another theme. Many people appreciate their downtown centers, the region's scenic landscape, recreation, local culture, historic resources, and good schools. The region itself is often described as being central to many desired amenities.

Similarly, the community outreach highlighted shared concerns across the region. Identified concerns include balancing economic opportunity while protecting community character, as well as growing businesses for shopping and keeping activity in downtowns. Transportation improvements related to options in public transportation, or alternatives to the single-occupancy vehicle, as well as pedestrian and bicycle infrastructure are other common themes. There is a concern about the deteriorating state of the transportation system and the need for maintaining efficient and safe infrastructure for accessibility around the region.

PUTTING IT ALL TOGETHER

Using the public input and also the array of data available to build a profile of the region all contributed to the final vision. A review of the master plans in the region was a key source of data on vision/goals. This statement is also heavily influenced by the Telling the Regional Story Chapter. As the "story" unfolds from the present day to the future, four themes are developed that function as the framework for the guiding principles and the implementation/action items. These four themes of Connect, Sustain, Invest and Partner and are discussed in detail in the Regional Story Chapter. They support and frame the guiding principles. By examining the characteristics of the region in concert with the public input, CNHRPC developed a series of guiding principles that characterize the vision. An important note on the use of these principles is that no one principle will achieve the vision as they all need to work in combination to get to a desired outcome. However, starting with one or at best two principles to implement is often the first step on the path to achieving the vision.

The following chart describes the process in more graphic form and highlights the four themes and principles that were developed. These principles are also used to build the implementation/action items under each heading (see Implementation Chapter). As stated earlier, the themes are developed in the Regional Story Chapter and help frame the guiding principles; each guiding principle is cross-walked with

a major applicable theme (shown with a red checkmark **✓**) and secondary ones in a lighter color (✓) to emphasize their connection with the story of the region.

Themes from the Regional Story				GUIDING PRINCIPLES
Connect	Sustain	Invest	Partner	
✓	✓		✓	COMMUNITY CONNECTIONS
				Strengthen community-based partnerships.
				Promote and support the development of and planning for municipal services to best utilize local and regional resources to serve current and future residents.
				Strengthen opportunities for community members to gather and interact to support a sense of community.
				Support communications across municipal borders in response to weather hazards.
✓	✓	✓	✓	ECONOMIC DEVELOPMENT
				Encourage economic development that is a “good fit” for the region and fosters a prosperous quality of life that provides opportunity and supports the needs of the region.
				Connect communities to a global economy with expanded and faster broadband and telecommunications.
				“Grow our own” by focusing on retention, expansion, and fostering a climate of investment and economic opportunity in the region.
				Position and protect the quality of life as an asset of the region that can attract and retain employees, employers, and visitors.
				Promote and develop new and existing businesses.
				Strengthen the regional identity as a good place for business, residents, and tourism.
				Support and strengthen key regional industry clusters.
✓	✓	✓	✓	HOUSING OPPORTUNITIES
				Support efforts to expand housing opportunities that are affordable in developed areas that can accommodate changing housing needs.
				Support a housing supply that addresses the housing needs of the region, including the younger workforce population and those wishing to age in place.
				Look for opportunities to facilitate the development of housing that addresses that addresses other identified limitations such as transportation access, housing costs for renters and disabled populations.

Themes from the Regional Story				GUIDING PRINCIPLES
Connect	Sustain	Invest	Partner	
✓	✓	✓	✓	HOUSING OPPORTUNITIES (Cont.)
				Work collaboratively to broaden the understanding of the links between housing and economic growth.
✓	✓	✓	✓	TRANSPORTATION CHOICES
				Develop and enhance the ability of municipalities to conduct effective local transportation planning.
				Promote, enhance, and maintain safety for the traveling public, including pedestrians, bicyclists, and drivers.
				Improve and maintain municipal and regional capacity to fund transportation systems improvements.
				Assist in the development of a safe, efficient, accessible and coordinated multi-modal transportation system that provides for cost-effective movement of people and goods
				Promote economic development, tourism, and energy efficiency through the transportation planning process.
	✓	✓		EFFICIENT COMMUNITIES
				Support local efforts to foster mixed-use development and densities that encourage walking and reduced auto trips.
				Assist efforts to reinvigorate town centers and rural villages to maintain the character of the region's communities, utilize existing infrastructure, and preserve open space.
				Encourage the adoption of energy efficiency approaches to building and site planning to promote efficient use of resources and reduce pollution.
✓	✓		✓	NATURAL RESOURCE PROTECTION
				Support municipal efforts and promote inter-municipal cooperation on conservation, protection, and sound management of natural resources and historic sites.
				Facilitate effective stewardship of conservation acquisitions and recreational areas.
				Foster development of local food systems.
				Encourage the management of growth that protects farmland, environmentally sensitive areas and important ecosystems.

Themes from the Regional Story				GUIDING PRINCIPLES
Connect	Sustain	Invest	Partner	
✓	✓		✓	NATURAL RESOURCE PROTECTION (Cont.)
				Support more recreation opportunities close to home for all to meet the changing needs of the region's residents to promote active, healthy lifestyle, especially among youth and the older demographic.
				Support local efforts to conserve open space to preserve the region's natural heritage and environmental health.
				Promote inter-municipal cooperation on protective strategies for river corridors and water recharge areas including wetlands.
				Plan for, coordinate, and support the management and protection of the region's water resources, recharge systems, and wetlands.
	✓		✓	WATER RESOURCES AND INFRASTRUCTURE
				Plan for, coordinate, and support the management and protection of the region's water resources, recharge areas, and wetlands.
				Promote inter-municipal cooperation on strategies for river corridors and water recharge areas including wetlands.
				Support expansion of water and sewer services where appropriate.
✓	✓		✓	RESILIENT COMMUNITIES
				Encourage efficient communities that are adaptive, responsive and resilient to multi-hazard challenges.
				Encourage sharing of emergency facilities and equipment across municipal borders for regional responsiveness and to provide more resources for individual communities.
				Encourage proactive planning to mitigate the loss of life, property, infrastructure and natural resources from extreme weather events and other disasters.
✓		✓	✓	REGIONAL COOPERATION
				Maintain and share best practices information on local and regional planning topics.
				Assist with identifying grant opportunities for local and cooperative projects.
				Facilitate cooperation of local governments across municipal boundaries on issues common to local government.
				Promote the individuality and diversity of communities in the region while serving as a regional resource.

Themes from the Regional Story				GUIDING PRINCIPLES
Connect	Sustain	Invest	Partner	
✓		✓	✓	REGIONAL COOPERATION (Cont.)
				Promote efficient expenditures of public funds for the benefit of the region.
✓	✓		✓	PUBLIC ENGAGEMENT AND VOLUNTEERISM
				Ensure that local and regional data contained in this Plan are readily available to local communities.
				Assist towns with fostering volunteer participation in town, community groups.
				Promote a sense of regional community and identity.
				Support efforts to recruit volunteers at the local level.

HOW DOES THE REGIONAL PLAN FIT WITH OTHER PLANS?

The philosophy behind both a regional master plan and local master plans is that they need to work together to support the work of land use planning in the region. The local master plans inform the regional plan and communities can incorporate/use the document's content as needed. There is also another layer of planning and that is the state development plan, mandated by RSA 9-A. According to this statute, there is a framework built for consistency between all three plans – the local plan, the regional plan and the state development plan. Each plan should consult the overall vision and goals/principles from the other plans in an attempt to achieve overall consistency in the planning framework. While there is not a current State Development Plan, there are guiding principles in RSA 9-B (State Economic Growth, Resource Protection, and Planning Policy) that can be used for guidance.

CHAPTER VISION STATEMENTS:

The Regional Plan's topics/chapters are woven together and need to work together with common themes and complementary vision statements. Aspects of the regional story, the public outreach, the region's local master plans, and the data collected all feed into not only the overall vision statement but the individual chapter visions as well. Each chapter also addresses opportunities and challenges as we prepare to move forward. These connections are described in more detail below and help to place each chapter into context with the overall plan.

Economic Development

"The region has a diverse and thriving economy that takes advantage of the region's strong natural and cultural assets and builds on existing businesses while encouraging entrepreneurial opportunities and innovation."

Every chapter is linked to Economic Development in some way. Housing, demographics and transportation are strongly linked. Transportation connects goods to market, but also gets customers and employees to places of businesses. Travel time can be a crucial piece to choosing to locate a business in a particular location. Housing and demographics are tied to the workforce and customer base - a critical mass of both is needed for a successful business. Other chapters, such as natural resources, water infrastructure and energy efficiency play a role, albeit more secondary. Water infrastructure is key as it is needed for any business location. Protecting both well water, aquifers and municipal water systems is an economic development activity, among the other benefits of such resources. Natural resources are key in two ways: 1) they define our “character” which serves as a quality of life draw for all segments of the population, including employers, workers and customers; and, 2) many sectors of our economy are based upon outdoor recreation. Energy efficiency can provide: 1) cost efficiency for business owners; and, 2) it also presents opportunities for new industries and economic expansion. Finally, hazards can also play a negative role in economic development. Major disasters will, at least, temporarily disrupt a local economy. Additionally, if recovery takes too long it can result in permanent damage to a local economy.

Housing

“Traditional settlement patterns are maintained while there are sufficient housing options that meet a range of needs from single adults, young families to older residents.”

The Housing Chapter’s connections to other Chapters are similar to the economic development ties, though in a slightly different manner. Economics, demographics and transportation networks can drive housing needs geographically, and in turn, housing can then drive economics and transportation - it is a “push/pull” relationship among the three areas. As businesses expand they create employment opportunities which draw people to certain areas; as more people settle in an area, transportation networks expand and businesses develop to serve their needs. Transportation also plays a role in how far people must travel to amenities, services and entertainment - all key to deciding where one wants to live. Water Infrastructure, natural resources and energy efficiency all play a role as well. Water infrastructure is needed to support housing development - any permanent structure will need water. Natural resources are directly related to our quality of life which not only serves as a draw for where someone lives, but also our economy. Energy efficiency is key in that: 1) it can help keep people’s homes warm in the winter and cool in the summer; and, 2) if done right, it can help keep the cost of living down. Finally, hazards, as in economic development, can have a negative impact on housing. In the short term, power outages and minor damage can create temporary problems for both quality of life and cost of living. More intermediate problems can exacerbate those situations. Major hazards have the potential to destroy communities, displace residents and strap state, town and personal budgets.

Natural Resources

“There is a sustainable balance between development and the protection of the region’s natural resources and working landscapes. Residents enjoy a high quality of life with easy access to a connected system of recreational

opportunities, clean water and a healthy ecosystem that supports diverse habitats.”

The Natural Resources Chapter is closely connected to all the Plan’s Chapters. Our working landscapes, open space and recreational lands, and water resources are among the most valued aspects of the quality of life in the region. As the region plans for future development, water infrastructure needs and resource management decisions, the protection of natural resources needs to continue to be an important consideration. Safe, efficient and well-managed water and sewer infrastructures support economic development, protect our citizens and maintain a healthy ecosystem. From economic growth to quality of life for residents, protecting natural resources and providing access to forests, rivers, lakes, fields and other natural qualities is central to the region.

Transportation

“A balanced, sustainable and diverse transportation system that is operated and maintained to ensure residents have safe, reliable choices for travel needs.”

Transportation is an essential component of all Plan Chapters. Economic Development, Housing, Natural Resources and Energy Efficiency are all supported by a safe, efficient and accessible multimodal transportation system connecting rural and urban communities. A well-maintained highway and non-motorized networks, along with enhanced transit options, help to provide mobility that promotes coordinated land use and sustainable economic development, while reducing transportation impacts on the region’s environmental, cultural, and natural resources.

Weather Hazards

“Communities are well informed and have adequate resources to plan for and respond to weather hazard events at the local and regional levels.”

Weather hazards have profound connections to all other Regional Plan Chapters. The effects of weather and climate on the natural and built environments are often unpredictable and extreme, costing communities and taxpayers thousands of dollars yearly. Flooding, high winds, and snow storms in the Central NH Region can impair transportation and utility infrastructure, damage roofs, destroy healthy woodlands, and force people to stay in place, often foregoing their employment or shopping. Water infrastructure can be inundated so public health could be in question without treatment. Invasive species will move to newer, more suitable habitat land and water which can push out the native species as the weather changes their original habitat.

Energy

“Energy consciousness is a factor in development decisions that reduce energy consumption, improve energy efficiency and encourage renewable energy. The region’s communities have sufficient funding and resources to pursue local and cooperative energy projects.”

Planning efforts that are sensitive to energy issues can encourage settlement patterns that reduce transportation infrastructure, conserve energy and promote open space protection. Energy issues are often beyond the influence of local decisions yet the planning process and the work of volunteer boards play an important role in energy efficiency.

Energy is part of the planning and land use landscape and is closely linked to the Housing, Transportation, Environment, and Economic Chapters of this plan. Energy Efficiency is as much a part of the region’s resources as our rivers, natural habitats, open space, wildlife, agriculture and forestry. Efficient use and management of our energy resources can lead to an improved quality of life for the region’s residents and a future where resources are used in a sustainable manner.



OVERVIEW: ONE PLAN – SIX KEY TOPICS

While the work that went into developing this Regional Plan can be considered a new initiative for CNHRPC, it is built on all the other past and present efforts and projects that have taken place not only at the regional level but in partnership with communities. Some topics, such as energy and weather hazards, are being introduced for the first time; others cover topics that have long been a focus in the region - transportation, natural resources, housing and economic development. Each of these six topics has a series of implementation/action items that are summarized in this Chapter and can also be found in the individual chapters.

PLANNING/OUTREACH PROCESS

The planning process provided many opportunities for the public to participate and be heard prior to the drafting of the overall Plan and the action items identified in this Chapter. Five important opportunities included a survey, individual comment cards, regional meetings, community events, and the project's website. Public workshops were held throughout the planning process to share information and gather input to shape the vision, principles, and strategies that frame this Plan. A review of local master plans not only helped to craft the vision but provided a check on the action items found in this Chapter. Throughout the entire process, CNHRPC also had the advice and assistance of the Regional Plan Advisory Committee (RPAC) comprised of local commissioners, non-profit representatives, and other local officials in the region. This approach ensures that the Plan's strategies and implementation priorities are responsive to local needs and priorities and are comprehensive and aligned with what we heard and identified from our research throughout this project.

ADOPTION OF THE PLAN

According to RSA 36:47, a planning commission shall prepare a regional plan ("a comprehensive master plan") and shall make careful studies of the infrastructure, resources, identified issues/concerns and needs of its communities. As such a commission, the CNHRPC has overall responsibility to adopt the plan and to address any comments received on the draft. The Commission, comprised of representatives from the 20 CNHRPC municipalities, has discussed aspects of plan development at regular meetings during this project and worked with the RPAC and full Commission throughout the entire process. What gives life to the Regional Plan after adoption is its usefulness to communities and the value and implementation of the action items. CNHRPC will continue to work with local communities to be sure that any implementation activities continue to be responsive to current needs in the region.

IMPLEMENTATION

Plans by their very nature are long range and need to leave room for discretion on how the Plan will be implemented. The Regional Plan contains numerous strategies, some of which are longer-term, needing some resourced and planning to implement; others are already underway or can be implemented immediately. This is not a regulatory document but rather a source of information with the main

purpose of recommending strategies/action items that will benefit the municipalities in the region. The intent of the action items in this Chapter is not to be prescriptive but rather advisory and subject to change, depending on existing or emerging conditions and needs in the region. Priorities change, new opportunities arise, policies get revised and funding evolves. The implementation or action items for all six elements of the Regional Plan are contained in a separate matrix at the end of this Chapter but these action items can also be found at the end of each Plan's Chapter. The implementation matrix is really an administrative document that will serve three functions:

- A framework for working on priorities and identifying potential partners.
- A tracking mechanism to record progress or revise priorities; and
- A planning tool to help CNHRPC and other partners pull out certain strategies or action items to pursue in one or three-year timeframes to help focus efforts and achieve results.

If needed, these action items can be reviewed and prioritized on an annual basis with CNHRPC staff and its partner communities. Some of the action items are ambitious and require significant commitment of staff and resources. The true success of this overall Plan will be in the progress on the agreed upon action items and the ongoing communication between CNHRPC and communities in the region.

The action items will also inform the annual work program of the CNHRPC as staff resources could be directed towards those items deemed a high priority by the region's communities and public outreach process. CNHRPC will be available to serve as a facilitator of regional dialogue on matters of regional importance identified in this plan. CNHRPC will also continue to work closely with the region's communities and will use this Plan to guide future work and to keep its current programs on target and responsive to community needs. Seeking funding resources to implement certain projects/tasks will be needed. CNHRPC's current programs and initiatives that communities in the region value and support will be maintained and can be enhanced by the work in the Plan. Some areas of particular emphasis include:

Community Planning: Continuing to provide direct assistance to communities on master plans, subdivision/site plan review regulations and development reviews is a long standing, important service offered by CNHRPC to those communities requesting such assistance. Being able to factor in some of the specific knowledge gained from the public outreach and research on particular topic areas for this Plan will enhance CNHRPC's ability to provide well informed, targeted assistance.

Grant Writing and Assistance: CNHRPC has traditionally been available to assist communities with grant writing and management that support a wide range of planning activities. With the additional knowledge gained from research into funding opportunities in areas such as energy efficiency and renewables, weather hazards, and economic development, CNHRPC will be well positioned to provide additional resources and knowledge on programs/initiatives if needed.

Training: Providing opportunities for communities to build knowledge and expertise on specific topics is one component of CNHRPC's overall annual work program. One of the more successful outcomes of this Plan is the ability to expand and improve in this area by focusing on topics identified in the Plan as priorities. Whether the topic be broadband access, large scale renewable energy projects, watershed planning, hazard mitigation planning or economic development planning. CNHRPC will strive to facilitate opportunities to keep the region's communities up to date and informed on emerging issues and potential solutions.

GIS and Data: CNHRPC has long held an important role in the region’s GIS mapping of data for use in master plans, transportation planning and other analyses. As an affiliate of the U.S. Census Bureau, CNHRPC is also involved in population estimates and projection work and acts in an advisory capacity to the Office of Energy and Planning (OEP) on data review and analysis of Census and state generated data.

These services will continue and be enhanced and informed by the Regional Plan. For example, creating new datasets and improving the CNHRPC website to keep current on policies and initiatives in new areas such as energy efficiency, renewables, hazard mitigation and/or economic development planning can be pursued.

Regional Initiatives: CNHRPC will continue to pursue opportunities that are of value to its 20 municipalities that focus on regional issues and resources. Examples of new areas include roundtables for broadband, local energy committees and conservation commissions. The Regional Plan will inform and provide additional opportunities to focus efforts on regional work and may lead to new opportunities to broaden existing initiatives.

Transportation Initiatives: CNHRPC will continue to support the Transportation Advisory Committee (TAC), provide transportation planning assistance to its 20 municipalities, and continue to undertake regional transportation planning activities such as the preparation of the regional Transportation Improvement Program (TIP). Issues and challenges identified within the Regional Plan will assist in the development of the Commission’s biennial Unified Planning Work Program.

IMPLEMENTATION/ACTION ITEMS

The following section describes different levels of detail on implementation/action items. The first is a summary of implementation findings that have their roots in the themes developed as part of the regional story. These four themes were used to tell the story of the future direction for the region and influenced the overall vision and guiding principles found in the Vision Chapter. Here, they serve as a framework to highlight not only key implementation/action items but those that are common throughout all of the six topic chapters. The implementation matrix at the end of this section describes in detail the action items from each chapter, along with potential partners.

1. CONNECT

Connection was a dominant topic throughout the public outreach process and is an important guiding principle throughout most of the chapter topics. A region where people have more choices on how they connect to the places where they live, work and recreate was reported as highly desirable and an important principle identified in many of the Plan’s chapters. The term “connect” is used in its broadest sense here as it addresses connections for the transportation system, schools, recreation access and broadband. Action items in every chapter have some elements of the role connections play in what needs to be accomplished. Some action items that support the role of connections are:

- Identifying opportunities to develop regional dialogue on economic development and energy efficiency and renewables.
- Supporting conservation efforts that connect wildlife corridors across municipal borders;
- Finding opportunities to bring residents to the outdoors closer to home; and

- Promoting an expanded and faster broadband and telecommunications infrastructure.
- Working on establishing a regional complete streets policy that can be incorporated into local master plans.

2. INVEST

The lack of a regional identity and how to develop economically in ways that are both strategic and focused on what already works in this region is an important guiding principle that lays the foundation for implementation strategies. Certainly the region's quality of life is an asset that can attract and retain workers, employers and visitors. Capitalizing on this asset and investing in what is currently valued is important as businesses want to operate in an area that has a readily available, talented workforce.

It is important to look towards fostering a climate that is attractive to investment and opportunity. There are many ways to market the region that are explored in the Economic Development Chapter and the following matrix. Key principles include:

- **"Growing our own"** by focusing on retention, expansion and fostering a climate of investment and economic opportunity in the region;
- Encouraging economic development that is a "good fit" for the region and fosters a prosperous quality of life that provides opportunity and supports the needs of the region; and
- Promoting and developing new and existing businesses.

Specific projects that implement these principles are identified in the implementation matrix below and are tied to recommendations in the Comprehensive Economic Development Strategy (CEDS).

3. PARTNER

There is a strong history of successful partnerships in the region and the outreach process confirmed that this trend should be continued and improved in the future as funding and staff resources continue to be limited. Many communities are over burdened with the day to day management of municipal affairs and administration and lack sufficient time and resources to address issues of concern and of interest. Strengthening existing partnerships and seeking new partners is a key principle that is common throughout all of the six topic area chapters.

Many opportunities for projects/initiatives require outside funding and some type of leverage or match. Working in partnership with communities and other groups is often needed in order to be strategic in how funding is pursued. Common to all six chapters is the constraints on funding and staff time to pursue projects and other initiatives. Reaching out to communities to strategically identify funding opportunities and to avoid competing for the same funding source and encourage a regional grant application is key.

Some of the action items that support these principles include:

- Addressing regional issues such as watershed management in a collaborative partnership with the region's communities, CNHRPC and state agencies;

- Identifying grant opportunities and incentives by working with local and regional governments, non-profits, and state agencies to identify the most appropriate funding sources for projects and programs; and
- Fostering partnerships on responses to hazardous events, including weather related disasters.

4. SUSTAIN

The theme of sustainability has its roots in the public outreach throughout the planning process and the impact of demographic trends such as an aging population. Given the current trend and projected population growth, revisiting how services are provided at the local and regional level needs a closer look. Trying to find ways to ways to engage/recruit younger volunteers for many of our local land use boards and committees is also of concern given these trends.

The region today is already a special space for residents and highly valued for its quality of life. Key principles common to all chapters focus on working hard to maintain a healthy lifestyle that includes clean water, a diverse housing supply, stable energy costs and a safe, multi-modal transportation network. These principles are further refined as action items in the matrix below and include:

- Maintaining access to a local food supply in the region;
- Encouraging/maintaining a strong volunteer base in our communities;
- Reducing energy consumption in order to sustain a healthy environment;
- Preserving our natural and built environment;
- Being strategic and efficient in fiscal expenditures; and
- Stewardship of our natural resources so that future generations are able to enjoy the same amenities we experience today.

Chapter 4: Housing

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Support the development of workforce housing ordinances that allow for a mix of market rate and workforce housing in the same development within close proximity to employment centers.		●		○					Municipal, building industry, CNHRPC
Support senior housing ordinances within close proximity (walking/bus) to services and amenities (medical; food stores, etc.) and employment centers.	○	●		○					Municipal, building industry, senior groups, CNHRPC
Support zoning ordinances that allow for opportunities to locate housing for assisted living facilities within close proximity to services, amenities and employment centers.	○	●		○					Municipal boards and committees, staff, CNHRPC
Support accessory apartment ordinances for senior housing and housing for young people.		●		○					Municipal boards and committees, staff, CNHRPC
Monitor demographic changes occurring in the region and the effects it may have on their communities and the local economy by monitoring Census and other data sources as well as conducting surveys and focus groups within the community.								●	CNHRPC, municipal boards and committees, staff
Support zoning ordinances that allow for opportunities for group housing within close proximity to services, amenities and employers.	○	●	○	○					Municipal boards and committees, staff, CNHRPC
Support zoning ordinances allow for home occupations, including day-care in each community.		●		○					Municipal boards and committees

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Support infill ordinances where they may be beneficial.	○	●		○					Municipal board and committees, CNHRPC
Support strategies and ordinances that can encourage the development of housing near services, amenities and job centers with as little reliance on cars as possible (i.e. walkable; public transit, etc.).	○	●		○					Municipal boards and committees, CNHRPC
Support strategies to ensure adequate broadband access to rural residential areas and areas where home occupations are permitted/encouraged.		○		●					Municipal, broadband advocacy groups, CNHRPC, State Legislature
Support the development of a cluster ordinance, or “open space development” ordinance.		●			○				Municipal boards and committees, staff, CNHRPC
Support the adoption of RSA 79E and use it to encourage the development of various housing types in more dense areas (assisted living, workforce, senior, etc.).	○	○		●					Municipal boards and committees, staff, CNHRPC
Ensure an adequate variety and choice of housing and neighborhood types within communities.	●	●							Municipal boards and committees, staff, CNHRPC
Support local housing entities such as CATCH in the development of permanent affordable housing.	○	●	○	○					Municipal boards, staff, CNHRPC, housing nonprofits

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Chapter 5: Economic Development									
Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Facilitate the expansion and upkeep of infrastructure, including but not limited to water, sewer, transportation, and energy related projects as identified in the region’s CEDS Priority Project list (see Table 5.1).			○	●			○	○	Municipalities, CNHRPC, CEDS Strategy Committee, CNHRPC Transportation Advisory Committee
Encourage efforts to clarify local governmental processes to foster a business friendly environment. Make various additional development information available online including property listings, demographic data, economic data, transportation data, etc.			○	●				○	Municipalities, CNHRPC
Encourage and provide support to communities to establish local economic development committees.				●				○	Municipalities, CNHRPC, EDCs
Explore Regional Economic Development District (EDD) feasibility and possibilities.				●				○	Municipalities, CEDS Strategy Committee, CNHRPC, SNHPC
Develop a regional brand.				●				○	Municipalities, Greater Concord Chamber of Commerce, Municipalities, CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas							Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	
Reinforce and strengthen regional industry clusters and industries of local importance, including the development of strategies for the expansion of complementary businesses and services.				●			○	CEDS Strategy Committee, Municipalities, CNHRPC, CRDC, DRED
Expand telecommunications, broadband services and other information technologies throughout the region. Encourage communities to work together to address broadband needs on a regional or sub-regional basis.				●				Municipalities, CNHRPC, Regional or sub-regional Broadband Advisory Groups
Encourage the assessment and cleanup of brownfield sites throughout the Central NH Region for reuse or redevelopment.				●	○			Municipalities, CNHRPC, DES, EPA, CRDC
Encourage home business expansion and development.		○		●				Municipalities, CNHRPC,
Support the development of a strong, local workforce, including quality education.				●			○	CEDS Strategy Committee, CNHRPC, Municipalities, NHTI

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Encourage municipalities to identify and certify properties for use/reuse.				●					Municipalities, CNHRPC, SNHPC, CEDS Strategy Committee
Expand business technical assistance and development assistance services.				●				○	CEDS Strategy Committee, Municipalities, CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Chapter 6: Transportation									
Strategy	Functional Areas							Potential Partners	
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy		Engagement
Continue to support the Bow-Concord I-93 Improvements through assistance to the consultant team and outreach to CNHRPC member communities.			●	○			○		FHWA, DOT, CNHRPC, City of Concord town of Bow, Consultants
Continue to support regional transit and volunteer driver services.			●	○		○	○		DOT, CNHRPC, Municipalities, NGOs
Increase safety for all users of the transportation system at the Regional & Local levels in partnership with State & Federal Initiatives such as the Highway Safety Improvement Program (HSIP)			●	○					FHWA, DOT, CNHRPC, Municipalities
Continue to support improvements to state-maintained regional highways in the CNHRPC region through existing advocacy avenues such as the CNHRPC Transportation Advisory Committee (TAC)			●					●	DOT, CNHRPC, Municipalities
Work with the City of Concord and DOT to explore alternative options for funding projects located within the Urban Compact.			●					○	DOT, CNHRPC, city of Concord
Encourage municipal participation in transportation asset management practices.			●					○	DOT, CNHRPC, Municipalities, UNH
Continue to enhance Regional Planning Commission Transportation Advisory Committee membership to extend beyond municipal representation and include private sector and legislative representation.			●					●	DOT, CNHRPC, Municipalities, private business, state and local representatives

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Encourage future development in the region to take place at locations where the primary road function is appropriate for the type of development proposed.	○		●	●					CNHRPC, Municipalities, private business
Establish a regional complete streets policy that can be incorporated into municipal master plans.	○		●	○			○		CNHRPC, Municipalities
To assist communities in the development of corridor plans and implementation of access management practices.			●	○				○	Local Planning Boards with assistance from CNHRPC or other planning professionals
To assist communities in the consideration of biking and walking components in the design of transportation infrastructure.				●			●		DOT, CNHRPC, Municipalities,
To continue to evaluate the cost benefit outcomes of various rail and bus options for the Capitol Corridor.			●	○			●		DOT, CNHRPC, City of Concord town of Bow, Consultants, private businesses

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Chapter 7: Natural Resources									
Strategy	Functional Areas							Potential Partners	
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy		
Encourage best practices in stewardship of conservation lands in the region.					●			○	Municipal conservation commissions, non-profits CNHRPC
Partner with communities on efforts to engage more volunteers and to promote stewardship opportunities with all age groups in the community.					○			●	Municipal board and committees, CNHRPC
Provide opportunities for round-table conversation and peer to peer learning for conservation commissions to discuss conservation priorities at a regional level.					●	○		○	Municipal conservation commissions, CNHRPC
Encourage partnership and improve coordination between communities to protect contiguous land for conservation across municipal boundaries.	○				●			○	Municipal conservation commissions, CNHRPC
Encourage communication between agricultural and conservation commissions, and local land use boards on municipal issues, regulations, and local affairs related to agriculture and conservation.					●			○	Municipal conservation and agricultural commissions, CNHRPC
Assist interested communities in reviewing regulations to ensure that new development will support land use patterns that protect large un-fragmented blocks of land.	●				○	○			Municipal boards and committees, CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Work with interested communities on prioritizing open space conservation toward larger connected blocks of conserved land, including wildlife habitat identified by NH Fish & Game's Wildlife Action Plan, to provide wildlife corridors, habitat diversity and ecological sustainability.					●	○			Municipal boards and committees, CNHRPC
Support efforts to seek funding for conservation acquisitions.				○	●				Municipal boards and committees, CNHRPC
Encourage a watershed management approach to water quality to address the cumulative impacts of non-point source pollution and other pollutants.	○			○	●				Municipal boards and committees, CNHRPC
Provide educational opportunities and resources to communities on the importance of protecting wetlands, groundwater and drinking water by providing information on tools such as overlay districts as well as permanent land conservation techniques.				○	●			○	Municipal boards and committees, CNHRPC
Support stormwater management on a watershed scale through education of the public and municipal employees, including road agents, by utilizing the New Hampshire Homeowner's Guide to Stormwater Management by DES and Green SnowPro Certification available through UNH.					●			○	Municipal staff, state agencies, CNHRPC
Support any municipal efforts to incorporate low impact development as well as sedimentation/stormwater controls in local regulations.					●				Municipal boards and committees, CNHRPC
Encourage communities to develop Asset Management Plans of drinking water and wastewater infrastructure by inventorying characteristics of facilities such as age, size, and condition (e.g. transmission lines, intakes) for addressing future challenges and required upgrades.					●				Municipal staff, CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Encourage communities to set aside annual Capital Reserve Funds for water or wastewater infrastructure emergency improvement funding and to place upgrades to water or sewer lines or facilities into Capital Improvements Programs.					●				Municipal staff, boards and committees, CNHRPC
Encourage municipalities to develop or continue local agriculture commissions to promote farming presence in municipalities.				○	●				Municipal boards and committees, CNHRPC
Ensure that the region is represented in any statewide initiative or legislation regarding agriculture and right to farm issues.					●				Municipal boards, CNHRPC
Support maintenance and improvement to recreation opportunities, including access to water resources, lakes and rivers, for all users and age groups in the community and seek funding opportunities for developing improved recreation opportunities.								●	Municipal boards, state agencies, nonprofits, CNHRPC
Help interested communities in the region to improve and develop trails and access points with a focus on connectivity between trails systems and across municipal borders.	○				●				Municipal boards and committees, state agencies, land trusts, CNHRPC
Provide information on public open space on CNHRPC's website or on a regional web portal site to promote the region's available public parks and recreation areas. Also encourage municipalities to include local information on their website, in municipal offices and annual reports.								●	Municipal staff, boards and committees, state agencies CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Chapter 8: Weather Hazards

Strategy	Functional Areas							Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	
Consider completing a vulnerability assessment of critical community assets to include analysis, description, and/or maps of potential natural and other hazard threats and ascertain risk to the community.			○			●		Municipal staff and boards, CNHRPC
Consider revisions of zoning ordinances, land use regulations, building codes, and municipal policies to help mitigate extreme weather hazards, such as adopting a stricter floodplain ordinance, providing conservation subdivision incentives in high-risk areas, encouraging village center zoning, utilizing transfer of development rights, and focusing on open space and land preservation.	○				○	●		Municipal boards, staff, CNHRPC
Utilize fluvial erosion hazard (FEH) information to ascertain the most appropriate locations for new development by keeping new buildings out of flood-prone or fluvial erosion-prone areas.	○			○		●		Municipal boards, staff, CNHRPC
Incorporate elements of low impact development and green infrastructure site design into local Subdivision Regulations and Site Plan Review Regulations.					○	●	○	Municipal boards, staff, CNHRPC
Work to protect the lands serving as floodwater storage through permanent preservation to ensure the ability of the land to retain its current water volume is continued into perpetuity.					○	●		Municipal board and committees, CNHRPC, land trusts and nonprofits
Encourage placing the lands surrounding public water supplies into permanent conservation using funding sources such as DES Water Supply and Protection Fund Grant Program.					○	●		Municipal board and committees, CNHRPC, land trusts and nonprofits

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas							Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	
Encourage large public water systems to have back-up power for all critical infrastructures and ensure small water systems install a power transfer switch to readily accept a generator when necessary.						●	○	Municipal staff, state agencies, CNHRPC
Encourage municipal public works or highway department employees to complete the NH Department of Environmental Service's certified culvert maintainer program to provide easier maintenance and upgrading of local Class V road culverts.						●	○	Municipal staff, state agencies, CNHRPC
Develop municipal priority lists from the local Hazard Mitigation Plan, Asset Management Plan, Vulnerability Assessment, Energy Audit, Climate Adaptation Action Plan and Emergency Management Department needs and incorporate projects into the Capital Improvements Program.					○	●	○	Municipal staff, boards and committees, CNHRPC
Assist in the development of Asset Management Plans of municipal service facilities to track the age, condition, and cost, and anticipated replacement date of each item of equipment.				○		●		Municipal staff, boards, CNHRPC
Encourage communities to adopt long- range infrastructure investments and improvements such as water and sewer lines replacement, treatment facilities improvements, and transportation system reconstruction (upgrade roads, upsize culverts, replace bridges, enhance drainage systems, etc.) into Capital Improvements Programs (CIPs) and maintenance plans.			○	○		●		Municipal staff, boards, CNHRPC
Identify the locations of all water crossings in the community, such as bridges and culverts, and record the dimensional, infrastructure, and waterflow characteristics, with the use of GPS technology and take photographs of upstream and downstream features to maintain in a geodatabase.			○		○	●		Municipal staff, boards, CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas							Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	
Encourage partnership with local businesses to help them develop disaster recovery plans to help businesses quickly recover and reopen after floods or other extreme weather.				○		●		Municipal staff, boards, businesses, state agencies, CNHRPC
Support implementation of green infrastructure at municipal facilities to help reduce runoff and stormwater flows that may otherwise exceed system capacity (examples include bio-retention areas/rain gardens, low impact development methods, pervious pavement, green roofs, swales, and the use of vegetation or pervious materials instead of impervious surfaces).					○	●	○	Municipal staff and boards, CNHRPC
Encourage cooperative agreements among municipalities to reduce costs for services and to share resources, such as for water and sewer services, equipment and inspection staff/consultants, shared municipal services, and for more integrated transportation, land use and environment planning.			○	○		●		Municipal boards and committees, CNHRPC
Identify potential recommendations for severe weather adaptation actions within local and regional policy, planning, and regulatory sectors (i.e. Master Plan, Open Space Plans, Hazard Mitigation Plans, Zoning Ordinances and Land Development Regulations).					○	●	○	Municipal boards and committees, state agencies, CNHRPC
Locate funding sources to assist municipalities with achieving any climate adaptation goals, including municipal energy efficiency projects, culvert upgrading, residential home efficiency, revision of ordinances and regulations for resource conservation, etc.			○		○	●	○	Municipal staff, boards, CNHRPC

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Chapter 9: Energy									
Strategy	Functional Areas							Potential Partners	
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy Engagement		
Reconvene Regional Roundtable of Local Energy Committees (LECs) to provide ongoing support and coordination to energy efficiency work in the Region; encourage the emergence of LECs in other communities throughout the Region.							●	○	CNHRPC, Municipal boards and committees (LECs)
Establish program area on CNHRPCs website that serves as a clearinghouse for energy related activities /initiatives in the Region.						○	●	○	CNHRPC, State agencies, utilities, energy related organizations
Coordinate and provide ongoing forums for local and regional projects and programs that showcase best practices in energy efficiency/ renewables.							●	○	CNHRPC, Municipal boards and committees (LECs), State agencies, energy related organizations
Conduct regulatory reviews for interested communities that identify any barriers to effectively reviewing and regulating renewable energy applications.		○		○			●		CNHRPC, Municipal boards and committees, (planning boards)

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas							Potential Partners	
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy		Engagement
Pursue customized training opportunities for local code enforcement officials to expand understanding and compliance with the state’s energy code.		○					●		CNHRPC, Municipal employees, boards and committees, NH Building Code Collaborative
Provide guidance and technical assistance to communities on the preparation of an energy chapter in master plans.	○	○	○	○	○	○	●	○	CNHRPC, Municipal boards and committees (planning boards)
Encourage and provide guidance to communities on the use of energy audits as the first step in identifying opportunities to improve energy efficiency and reducing municipal energy use.							●		CNHRPC, Municipal boards and committees (LECs), municipal employees
Work with other partners on addressing financial and other barriers to successfully implementing energy efficiency initiatives/projects.				○			●	○	CNHRPC, Municipal boards and committees, PUC, lending institutions, energy organizations

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected

Strategy	Functional Areas								Potential Partners
	Settlement Patterns	Housing	Transportation	Economic	Natural Resources	Climate	Energy	Engagement	
Expand awareness and understanding of rebate and loan programs that can support municipal and regional efforts on energy conservation and efficiency.							●	○	CNHRPC, Municipal employees, boards and committees (LECs), State agencies and commissions
Work with communities to encourage the use of land use principles that include strategies to create connectivity to recreation and services, utilize existing infrastructure and integrate green building measures into project design.	○	○	○				●		CNHRPC, Municipal boards and committees (planning boards)
Forge partnerships with schools to integrate energy related topics into the curriculum and raise awareness of energy use and conservation.							●	○	CNHRPC, Municipal boards and committees (LECs, school board), schools
Ensure that the region is represented in any efforts to address energy efficiency measures and reduce greenhouse gas emissions at the regional and state level.	○		○				●		CNHRPC, NH DES, NH OEP, other State agencies, utilities and energy organizations
Keep up on emerging technology for renewable energy sources and evaluate viability for applicability in the Region.							●		CNHRPC, Municipal boards and committees

Key:

- Primary functional area(s) affected
- Secondary Functional Area(s) affected



INTRODUCTION

This Housing Chapter identifies housing needs and issues in the region in order to help municipalities develop strategies to address housing challenges. First, it “tells the story” of the region and those factors influencing housing. These factors include: demographics and the economy, as well as barriers to housing. This portion of the Chapter also explores those segments of the population for whom these challenges may be even more pronounced, including the elderly and the region’s growing refugee population. Second, the Chapter includes a “housing needs projection model” that generates a numeric representation of units needed in the region and for each community. The intent is to provide data, information and potential ideas for municipalities regarding the challenges related to housing and, to create a resource to assist local communities as they see fit.

PURPOSE OF FAIR HOUSING EQUITY ASSESSMENT AND HOUSING NEEDS ASSESSMENT

Two distinct studies were completed in support of this Chapter: a Housing Needs Assessment (HNA) and a Fair Housing Equity Assessment (FHEA).

The HNA was completed in an effort to identify housing needs within the region (i.e. a basic projection of units needed). The HNA can serve to inform communities as to whether or not there is adequate housing available for residents. Collectively, the FHEA and HNA can help communities plan accordingly for housing needs and impacts.

The FHEA was completed to explore other factors that may be barriers to housing access (such as cost or transportation constraints). This analysis allows communities to better assess housing needs and impacts at a deeper level than what the basic HNA can provide. It provides further analysis in order to better describe the factors that might be barring people from access to adequate housing in the region. This can assist communities in developing more comprehensive local development strategies if they wish.

DESCRIPTION OF THE REGION & GEOGRAPHIC AREA OF ANALYSIS

The Central NH Region is made up of twenty communities in and around Concord. For the HNA, analysis was done first at the county level, then broken down to the community level. For the FHEA, a census tract level was analyzed. Eighteen out of the twenty communities were represented by one census tract individually, while Bow consisted of two and Concord twelve census tracts.

OUTLINE & COMPONENTS OF THE HOUSING NEEDS ASSESSMENT & FAIR HOUSING EQUITY ASSESSMENT

2014 Housing Needs Assessment

The Housing Needs Assessment (HNA) draws on U.S. Census data and considers demographic changes and projections and their potential impact on housing need. This information can then be used to help communities better plan for housing demand.

The HNA begins with a base year (2010) analysis using U.S. Census data for the number of renters over and under the age of 65 years, as well as the number of home owners of the same age. Ratios were then established between the number of people per household and the number of households in each of the four groupings (renters under 65, renters over 65; owners under 65, owners over 65). Using the ratios and population growth projections from the New Hampshire Office of Energy and Planning, an estimated number of needed owner and renter housing units in 2015, 2020, and 2025 were identified.

Fair Housing Equity Assessment

The Fair Housing Equity Assessment (FHEA) draws on U.S. Census data (1990, 2000, 2010) as well as the American Community Survey (5-Year Estimates, 2000 - 2005 and 2006 - 2010) to identify certain demographic concentrations. The intent was to assess whether or not various segments of the population experienced greater concentrations geographically than the rest of the region's residents. Such concentrations may suggest that there are factors - barriers - that limit where these residents may live.

The FHEA also sought to explore the impact of the housing market on refugees, veterans and youth but the data was not available for individual communities or neighborhoods. Despite this, anecdotal information collected during various visioning sessions and outreach efforts included these groups in the process.

U.S. Census American Community Survey data for each factor was collected for each community (and the census tracts in Bow and Concord) and a standard deviation was computed, as was a concentration threshold and a margin of error. The final step was to review the data and determine if there was a concentration within each geography among the various factors.

EXISTING CONDITIONS: DEMOGRAPHICS & HOUSING ECONOMICS

OVERVIEW

This section presents baseline information on existing housing pressures, challenges and opportunities within the region. The baseline data can be broken into two sections: demographic data and housing economic data. Demographic information presented in this section represents a summary of the data as can be found in Appendix B as well as other Chapters such as Regional Story, Vision, Economic Development and Appendix A, Existing Conditions.

SUMMARY FINDINGS

Overall, the region has seen several demographic and housing economic changes over the last decade. The region's growth has slowed. It is slightly more diverse than ten years ago, but still remains

overwhelmingly white. In terms of income, the region's median household income is greater than the state or the nation as a whole. There are some areas where the population faces challenges in obtaining quality housing, in particular due to income, and among some populations of interest. Lastly, the average household size is decreasing.

The housing market itself has slowed as well. Building permits for new residential construction are down: in 2010 the number of building permits issued in the region was only 35% of the number of permits issued in 2000. In fact, of all the permits issued between 2000 and 2010, 73% were issued between 2000 and 2005. With regard to cost, both owner and rental housing are more affordable as the region is less expensive than the state and many other regions of the state, but a segment of the population has affordability problems. There are also segments among the populations of interest where there is not enough housing units or options. In some cases, seniors, refugees and mentally disabled populations are competing for the same housing. Transportation continues to be an issue for segments of the population: commute times are increasing and there are few options to driving a car.

There is a need for more housing options for many segments of the population. Choices, affordability for those on modest or fixed incomes, and the opportunity for seniors to “downsize” and age in place are key issues.

Chapter Connections

Economics, demographics and transportation networks can drive housing needs, which, in turn drives economics and transportation in a “push/pull” relationship. As businesses expand they create employment opportunities which attracts new residents. Population growth leads to an expansion of the transportation network and to more business development. As businesses and transportation infrastructure expand, more people move to the area creating housing demand and starting the cycle all over again.

DEMOGRAPHIC DATA

An analysis of demographic information provides the foundation upon which a housing needs assessment is built. Before the region can know “what” and “how much” housing is needed, it needs to know “for whom.” Such an analysis needs to look at many layers of demographic data, including the general population and various “populations of interest.” Demographic information comes primarily from U.S. Census and American Community Survey, while others are from state and/or local data sources.

2010 DEMOGRAPHIC SNAPSHOT

Central NH Region is older and less diverse than both the state and the nation, as 13 of the 20 communities have a median age that is greater than that of the state. Only one community, Henniker, has a median age younger than the national average, primarily due to the presence of New England College. In terms of income, 12 out of the 20 communities have median household incomes greater than that of the state.

Group quarters include residents of nursing homes, other long-term residential care facilities, dormitories, fraternities and sororities, prisons and other correctional facilities, universities, housing for religious groups, and group homes providing a variety of support services. About 3.6% of the region's total population lived in group quarters in 2010 per the U.S. Census, with the communities of Boscawen, Concord, Epsom, Henniker, Hillsborough and Warner home to most of the facilities. Facilities included the County Prison, the County Nursing Home in Boscawen; the state Prison, New Hampshire Technical Institute and several long-term care facilities in Concord; New England College in Henniker; Hillsborough

House in Hillsborough; and Magdalen College and Pine Rock Manor in Warner according to the New Hampshire Office of Energy and Planning's 2014 Group Quarters Survey. It should be noted that the data is based upon information provided by group quarter facilities licensed by the State and reported to the New Hampshire Office of Energy and Planning. As such, group quarter numbers are an approximation based upon information reported by facilities.

With regard to household size, the regional average was 2.55 residents in 2010 per U.S. Census. This average is slightly smaller than the state and slightly larger than the nation. Most communities in the region are within 0.13 people of that number - meaning they are very close to the average of 2.55. Concord has the lowest average household size with 2.26 and Bow has the largest with 2.78.

Table 4.1: 2010 Demographic Data

Geography	Population	Median Age	Median Household Income	Number of Households	Average Household Size	% White	Group Quarters
Allenstown	4,322	38.6	\$58,159	1,742	2.45	95.84%	0
Boscawen	3,965	40.9	\$61,368	1,391	2.50	97.43%	518
Bow	7,519	44.2	\$106,593	2,710	2.78	97.22%	0
Bradford	1,650	49.4	\$63,750	573	2.47	97.45%	0
Canterbury	2,352	44.2	\$79,453	966	2.56	97.53%	0
Chichester	2,523	43.9	\$76,917	932	2.74	98.81%	7
Concord	42,695	39.0	\$54,163	18,239	2.26	91.83%	2,934
Deering	1,912	41.4	\$66,250	801	2.49	97.02%	0
Dunbarton	2,758	41.7	\$99,190	996	2.72	97.43%	0
Epsom	4,566	39.6	\$73,092	1,566	2.62	97.88%	95
Henniker	4,836	34.2	\$70,417	1,649	2.41	95.72%	540
Hillsborough	6,011	37.0	\$54,386	2,136	2.51	96.37%	33
Hopkinton	5,589	44.7	\$84,042	2,278	2.54	97.67%	0
Loudon	5,317	42.7	\$77,903	1,884	2.70	98.29%	0
Pembroke	7,115	39.7	\$64,575	3,027	2.61	96.75%	0
Pittsfield	4,106	37.5	\$58,302	1,522	2.57	96.86%	0
Salisbury	1,382	42.9	\$68,387	460	2.69	96.89%	0
Sutton	1,837	45.2	\$71,146	653	2.43	96.46%	0
Warner	2,833	43.6	\$58,221	1,076	2.44	97.92%	107
Webster	1,872	43.7	\$67,105	722	2.53	98.02%	0
Regional Total	115,160	Not Computed	Not Computed	45,323	2.55	95.19%	4,234
U.S.	308,745,538	37.0	\$61,989	513,804	2.46	72.40%	7,987,323
NH	1,316,470	40.8	\$65,269	114,235,996	2.58	93.90%	40,104

Source: U.S. Census 2010; ACS 3 Year; ACS 5 Year

2010 POPULATIONS OF INTEREST SNAPSHOT

Certain segments of the population are subject to unique challenges with regard to housing choice. It is important to understand to what extent those living in the region may make up these groups. These "populations of interest," for lack of a better term, include:

- Seniors
- Minorities
- Those in Poverty
- Foreign Born
- Refugees
- Veterans
- Those under 20
- Those under 15
- Single Parents
- Those for Whom English is a Second Language
- Disabled Persons

These groups are represented to a varying degree within the region. Seniors, those under 20 years of age and the disabled represent the largest share of the populations of interest. In terms of comparison to the state and the nation, the region is similar to both in terms of seniors. Minorities, those in poverty, foreign born, veterans, and those for whom English is a second language make up a smaller share within the region than they do in the state and the nation as a whole. Single parents, refugees, and those with disabilities make up a greater share within the region than they do of the state but are comparable with the national average. It is important to note that many of these groups are subsets of other groups, including veterans, those under 20 and under 15 years of age are part of all of these groups.

Table 4.2: 2010 Populations of Interest

Geography	65+	Minority	Those in Poverty	Foreign Born	Refugees 2002-2013	Veterans	Under 20	Under 15	Single Parents	English as a 2nd Language	Disabled
Allenstown	12.1%	4.2%	7.2%	5.6%	0.2%	9.9%	23.9%	17.5%	10.6%	0.5%	11.8%
Boscawen	18.2%	2.6%	11.2%	0.9%	1.4%	8.1%	22.0%	15.7%	10.3%	0%	13.4%
Bow	13.3%	2.8%	1.9%	2.1%	0.0%	10.1%	28.8%	19.3%	6.0%	0.16%	9.0%
Bradford	13.2%	2.6%	3.5%	1.1%	0.0%	8.4%	22.5%	14.4%	7.2%	0.8%	12.2%
Canterbury	14.2%	2.5%	5.1%	3.7%	0.0%	13.6%	22.9%	16.1%	6.0%	0.7%	8.0%
Chichester	11.3%	1.2%	5.9%	3.4%	0.0%	9.3%	26.0%	18.1%	6.0%	0%	10.0%
Concord	13.7%	8.2%	9.5%	4.3%	4.0%	9.3%	23.1%	16.7%	10.4%	1.0%	14.0%
Deering	13.5%	3.0%	8.9%	2.1%	0.0%	12.8%	21.5%	15.6%	8.4%	0%	13.3%
Dunbarton	9.0%	2.6%	6.2%	3.3%	0.0%	9.3%	26.4%	20.2%	7.0%	0%	8.2%
Epsom	5.4%	2.1%	3.8%	3.4%	0.0%	9.0%	25.2%	18.4%	9.3%	0.8%	14.3%
Henniker	9.0%	4.3%	2.1%	1.9%	0.1%	8.2%	26.1%	14.8%	9.0%	0.3%	10.1%
Hillsborough	11.0%	3.6%	10.9%	3.4%	0.1%	9.3%	27.1%	20.9%	12.0%	0%	13.2%
Hopkinton	16.2%	2.3%	2.2%	2.5%	0.0%	12.3%	25.3%	18.5%	7.0%	0%	11.0%
Loudon	11.2%	1.7%	4.7%	1.6%	0.0%	11.9%	25.4%	18.4%	8.0%	0%	10.2%
Pembroke	10.7%	3.3%	9.2%	3.0%	0.0%	10.7%	26.5%	19.4%	11.4%	0%	12.0%
Pittsfield	11.5%	3.1%	15.5%	0.4%	0.0%	10.3%	25.7%	19.5%	11.1%	2%	19.0%
Salisbury	13.7%	3.1%	3.3%	1.3%	0.0%	9.2%	26.0%	20.4%	7.0%	0.2%	12.4%
Sutton	16.2%	3.5%	2.8%	3.7%	0.0%	10.3%	23.2%	17.3%	6.1%	0.2%	9.0%
Warner	15.0%	2.1%	4.2%	1.8%	0.1%	10.0%	23.2%	15.4%	7.0%	0.3%	13.3%
Webster	12.2%	2.0%	5.8%	2.0%	0.0%	11.3%	23.0%	17.6%	8.2%	0.2%	8.4%
Region	12.7%	4.8%	7.4%	3.2%	1.5%	9.8%	24.5%	17.6%	9.3%	0.6%	12.1%
U.S.	13.2%	27.6%	14.9%	12.9%	NA	9.3%	27.0%	19.8%	10.0%	20.5%	12.0%
NH	13.7%	6.1%	8.4%	5.3%	0.54%	11.2%	24.7%	17.6%	7.90%	7.90%	11.30%

Source: U.S. Census 2010; ACS 3 Year; ACS 5 Year; NH Office of Energy and Planning Refugee Data

DEMOGRAPHIC CHANGE: 1990 TO 2000 & 2000 TO 2010

The first half of the decade between 2000 and 2010 saw growth concentrated among those communities with the most access to jobs, with Concord and Bow leading the way. The second half of the decade saw growth rates spread out more evenly within the region with 11 of the 20 communities with comparable growth rates, Bow included. Other trends include:

- Regional Population (1990, 2000, 2010): Total population from 1990, through 2000 and into 2010 saw varying degrees of growth and change. Economic change, an aging population, fewer children born and other factors have all contributed to these trends. In general, the region grew faster between 1990 and 2000 (12% growth rate), the growth rate declined dramatically between 2000 and 2010 (6% growth rate).
- Population by Municipality: Concord accounted for 41% of the region's population growth between 1990 and 2010 and 33% between 2000 and 2010. Bow was responsible for 14% and 6% of the regional growth during the two decades, respectively. Allenstown was the only community that actually saw a decline in population – 11% – between 2000 and 2010.
- Total Group Quarters: There was a notable increase in the group quarters population between 1990 and 2000 (23%). As a share of the population as a whole, there was minimal decline between 2000 and 2010: 4.3% to 3.9% respectively. The end result is that about 4% of the region's population continues to be located in group quarters.
- Race: The Central NH Region, like much of the state as a whole, is primarily white at about 95.1%. Concord contains the largest non-white population in the region at 8%.
- Age Groups: In 2000, the 35 to 44 age group represented the largest age cohort. By 2010 the largest cohort was the 45 to 54 group. There was a decline in the number of people aged 14 and under. The number of people aged 55 and older increased from about 21% of the population to nearly 27%. The region is getting older and there has been a decrease in school-aged children. Similar shifts occurred for both the state and nation during this period as well.

A second observation is that the 55 and older population for both the state and the region has grown slightly more than has that of the nation as a whole. By 2010 about 27% of the region and the state was 55 or older as compared to the national average of 25%.

- Population Within Households: Within the region, household sizes have decreased between 2000 and 2010. According to U.S. Census data, the average household size of 2.6 for the region has declined to 2.5; the state, meanwhile, has decreased from 2.5 to 2.4. Nationally, the average household size remains at 2.6 resulting in the state and region slightly behind the national average household size. Within the region, Salisbury and Deering retain the largest average household size at 2.7 (also larger than the region, state and Nation) while Concord's is the smallest at 2.2 (smaller than the region, state and nation).
- Overall Number of Households Within the Region: Regionally, the number of households have increased over the decade – significantly more than the state or nation. Within the region, increases in the number of households range from about 2% to about 29%, with the exception of Allenstown, which saw an 8.4% decrease in the number of households. This trend can be attributed to population growth over the decade (albeit slower in the second half of the decade) coupled with the factors that are contributing to a smaller average household size.

- Households by Age Group and Tenure: In 2000, about 67% of the households in the region were owner-occupied; by 2010 this increased to about 70%. Additionally, the share of owner-occupied households owned by persons under the age of 45 decreased by about 13% while owner-occupied households owned by those 45 and older increased by about 29%.

For renter-occupied households, the regional share decreased from about 33% to about 30%. The share of households occupied by renters under the age of 45 decreased by about 5.7% while renter-occupied households inhabited by those 45 and older increased by about 16.5%.

- According to the National Home Builders Association, the northeast saw a 3% increase in the median square footage of new home construction.

HOUSING STOCK, ECONOMIC

Whereas demographics is one factor driving housing demand, economics and transportation are others. Economics - in terms of affordability and employment - coupled with commute times will influence where people chose to live. Data pertaining to these factors include:

- Type of Housing: Between 2000 and 2010, the Central NH Region saw its owner occupied stock increase slightly from 68% to 70% of its total housing supply. Renter housing stock changed correspondingly. Despite this, the region did not see as much change in more ownership when compared to the state of New Hampshire: 70% in 2000 versus 85% in 2010.
- Age of Housing: Twenty eight percent of the region's housing stock was built before 1940. Nine communities have between 30% and 43% of their housing stock built before 1940 with Warner having the greatest share of pre-1940 housing in the region at 43%. Bow had the least amount of housing built before 1940 at 8%, followed by Loudon and Webster at 11% and 13% respectively.
- Building Permit Trends: Number of Units Authorized by Building Permit - single family, multifamily, and manufactured housing. With regard to building permits, the numbers issued have decreased significantly in every community in the region as well as the state since 2000. The region is fairly similar to that of the state, with the towns of Pittsfield, Henniker, and Bow experiencing the greatest decrease in permits issued (-89%, -83% & -80% respectively).
- Housing Vacancy Rates: Housing vacancy rates can illustrate the supply vs. demand component of housing which can drive both cost as well as depict need. For the region, there was a 5.5% housing vacancy rate in 2010. The state experienced a 5.8% rate the same year. Pittsfield and Hillsborough saw vacancy rates that were significantly greater than the region or the state (9.4% and 8% respectively) which suggests that the demand for housing in those communities

Key Housing and Demographic Link

Recalling that the region is aging and that a key "population of interest" is seniors, and that one of the concentrations explored in the FHEA was those that are 75 and older, it is important to note what percentage of future housing units will be needed for this population. Of the units needed by 2015, about 71% would be owner-occupied with the remaining 29% as rental. About 20% of the 6,280 units would need to be for those ages 55 to 64, and another 20% would need to be for those aged 65 to 74. This means that about 40% of the projected units needed in 2015 would need to be for those aged 55 to 74. This factor alone should be considered by communities when planning for housing need, as well as economic development and the volunteer base (on-call and volunteer fire fighters for example).

may not be as high as the rest of the region. This also means that the cost of housing should be lower and there should be less residential development pressures. Conversely, Dunbarton and Bow had the lowest vacancy rates in the region (2.6% and 3%) suggesting a greater need and demand for housing and housing that is more affordable.

- Housing Price for owners and renters 2010: According to ACS Census Data, the average purchase price for a single family home in the region was about 8% less than that of the state (about \$179,900 versus \$194,037). Five of the nine planning commissions have average home prices that exceed the region's average home price. In terms of rents, the region had the third lowest among the nine RPCs and was slightly less than the state average. It should be noted that despite these lower prices, the Fair Housing Equity Assessment identified costs as an issue for some suggesting that there are pockets of unaffordability.
- Housing Affordability: Despite lower costs of the region's housing compared to the state, and a review of U.S. Census data, there are affordability issues in the region. In 50% of the communities in the region, rent costs are more than 1/3 of the renter's median household income (a common measure of affordability). With regard to owner-occupied housing, costs are greater than 1/3 of the homeowner median household income in every community. This suggests that housing costs - both rental and owner - continue to be expensive despite the favorable comparison to state data.
- Municipal Tax Rates: Municipal Equalized Property Tax Rates (1990, 2000, 2010): Tax rates in the region have increased over the past three census periods. This is significant in that it has a direct impact on housing affordability given that New Hampshire municipalities rely primarily on property taxes for the overwhelming majority of their revenue. One group impacted significantly by this are seniors. Senior homeowners are often on fixed incomes and increased property taxes can have a significant impact on their ability to afford housing. With the exception of Bradford and Concord, most communities in the region have seen an increase in their tax rates.

HOUSING NEEDS PROJECTION MODEL & HOUSING PROJECTIONS

HOUSING NEEDS ASSESSMENT AND HOUSING PROJECTIONS

This section summarizes a projection of regional housing supply needs for the periods 2015 through 2040 in five-year increments. This forecast of housing needs is designed to inform communities about the expected regional demand for housing in the future. This section includes projections of the needs for both owner and renter housing in the region. It should be noted that the further out the projects go, the less reliable they may be. Historical data for population projections by age were available from the NH Office of Energy and Planning.

The following housing forecast is based upon the Population Headship Tenure Model included in *The Evolving Environment and Housing's Future* produced by the NH Center for Public Policy Studies for NH Housing as part of the state's Housing Needs Assessment (2014). The model estimates the future need for housing using anticipated changes in household size, tenure, and age group. Headship is defined as the ratio of the number of household heads relative to the total population. For this model the headship ratio is computed for each population cohort and the total population. The projections are based upon headship rates by age group.

The aging population has come to account for a greater share of all households in the region and state and a resultant decrease in household sizes. Decreased fertility rates have further reduced household sizes with fewer children per household, and young families represent a smaller share of all households than they have historically. This model accounts for these trends in household formation and home ownership trends dependent on the age of the head of household and thus presents a more accurate reflection of future housing production needs to meet demand of a changing demographic. As a result there is a projected need for as many as an additional 6,280 units to meet demand by 2020 from the 2010 base year. However, it should be noted that new units do not necessarily equal new structures. For example, the opportunity to add a small apartment or accessory unit with a single family home. Highlights of the HNA include: a need for about a 6% increase in housing every five years between 2010 and 2025; about a 70/30 split, respectively, between owner-occupied and rental housing in 2015; and, about 47% of the rental housing needed by 2015 would be for those under 35 years of age or over 74 years of age.

Interpreting the Housing Needs Assessment

The Housing Needs Assessment should be the starting point for a dialogue in the community on:

- Who can or cannot afford to live in our community?
- Can our children afford to stay or return to the community as they mature?
- Are populations with special housing needs given sufficient housing options?
- Do our elderly residents have sufficient alternatives to remain in the community if they chose to?
- Does our existing housing stock currently attract economic development? Do we want it to?

Table 4.3: Overall Housing Need Projections

Municipality	Total 1980 Housing Units	Total 2010 Housing Units	1980-2010 Numeric Change	1980-2010 Average 5 year net Δ	Housing Units Projected - Average hist. 5 year numeric change held constant in projected years					
					2015	2020	2025	2030	2035	2040
Allenstown	1,592	1,881	289	48	1,929	1,977	2,026	2,074	2,122	2,170
Boscawen	1,114	1,453	339	57	1,510	1,566	1,623	1,679	1,736	1,792
Bow	1,284	2,807	1,523	254	3,061	3,315	3,569	3,822	4,076	4,330
Bradford	696	917	221	37	954	991	1,028	1,064	1,101	1,138
Canterbury	583	1,002	419	70	1,072	1,142	1,212	1,281	1,351	1,421
Chichester	526	963	437	73	1,036	1,109	1,182	1,254	1,327	1,400
Concord	12,126	18,852	6,726	1,121	19,973	21,094	22,215	23,336	24,457	25,578
Deering	461	932	471	79	1,011	1,089	1,168	1,246	1,325	1,403
Dunbarton	431	1,077	646	108	1,185	1,292	1,400	1,508	1,615	1,723
Epsom	1,074	1,839	765	128	1,967	2,094	2,222	2,349	2,477	2,604
Henniker	1,181	1,928	747	125	2,053	2,177	2,302	2,426	2,551	2,675
Hillsborough	1,828	2,896	1,068	178	3,074	3,252	3,430	3,608	3,786	3,964
Hopkinton	1,480	2,381	901	150	2,531	2,681	2,832	2,982	3,132	3,282
Loudon	880	2,081	1,201	200	2,281	2,481	2,682	2,882	3,082	3,282
Pembroke	1,788	2,872	1,084	181	3,053	3,233	3,414	3,595	3,775	3,956
Pittsfield	1,197	1,769	572	95	1,864	1,960	2,055	2,150	2,246	2,341

Table 4.3: Overall Housing Need Projections (Cont.)

Municipality	Total 1980 Housing Units	Total 2010 Housing Units	1980-2010 Numeric Change	1980-2010 Average 5 year net Δ	Housing Units Projected - Average hist. 5 year numeric change held constant in projected years					
					2015	2020	2025	2030	2035	2040
Salisbury	355	598	243	41	639	679	720	760	801	841
Sutton	660	985	325	54	1,039	1,093	1,148	1,202	1,256	1,310
Warner	899	1,358	459	77	1,435	1,511	1,588	1,664	1,741	1,817
Webster	444	849	405	68	917	984	1,052	1,119	1,187	1,254
TOTAL - CNHRPC	30,599	49,440	18,841	3,140	52,580*	55,720	58,861	62,001	65,141	68,281

Source: U.S. Census 1980 & 2010; NH Center for Policy Studies analysis.

* Slight variation in overall number due to households vs. housing units.

Table 4.4: Housing Need Projections by Age and Tenure, 2015

Age Group	Total Population	Total Households by Age of Head (2015)	Housing needs projection Ratio	Ownership Tenure	Rental Tenure	%Own	%Rent
Under 15	18,307	---	---	---	---	---	---
15 to 24	13,749	1,411	0.1026	201	1,210	14.20%	85.80%
25 to 34	13,745	5,863	0.4266	2,721	3,142	46.40%	53.60%
35 to 44	15,607	7,931	0.5082	5,559	2,373	70.10%	29.90%
45 to 54	14,344	7,938	0.5534	6,124	1,814	77.10%	22.90%
55 to 64	17,773	10,509	0.5913	8,629	1,880	82.10%	17.90%
65 to 74	16,822	10,323	0.6137	8,309	2,014	80.50%	19.50%
75 to 84	9,244	6,003	0.6493	4,193	1,810	69.90%	30.10%
85 & older	3,427	2,035	0.5938	971	1,064	47.70%	52.30%
Total	123,016	52,013*	0.4228	36,706	15,307	70.60%	29.40%

Source: U.S. Census 1980 & 2010; NH Center for Policy Studies analysis.

* Slight variation in overall number due to households vs. housing units.

FAIR HOUSING EQUITY ASSESSMENT & BARRIERS TO HOUSING

Barriers to housing can vary in their complexity. This section seeks to assess various barriers for communities to consider as they plan for housing needs. Coupling the degree to which various groups are “concentrated” within the region and exploring the actual barriers can help shed light on some of the challenges that certain groups are experiencing with regard to housing.

SUMMARY OF FINDINGS

Barriers have been explored for several groups in this Chapter, including the various populations of interest described in the Demographic section, but also for those subject to other variables. To explore impacts to these groups, an assessment was done to determine if there were significant geographic concentrations within the region. The following groups experienced significant concentrations.

- Those 75 years of age or older.
- Those paying 50% or more of household income in rent.
- Minority Populations.
- Single Parents.
- Households without access to a vehicle.
- Persons below the poverty level.
- Disabled persons.

Barriers identified, based upon research through various reports and public outreach, have been identified as the following:

- There is demand for group housing or other housing for residents with special needs assisted living facilities near job centers and services.
- There is demand for more housing units for seniors.
- Local land use regulations can make it difficult to develop workforce housing.
- Low-income families and seniors without access to a vehicle can have significant challenges.
- Several groups end up competing for a limited supply of housing.
- Isolation can be a problem for those in the more rural areas without vehicle access, including mobile home park residents.

Addressing these barriers will undoubtedly improve the quality of life and housing issues for those mentioned above and for those populations of interest in the region. The vision section of this Chapter contains strategies for addressing these barriers while the rest of this section explores barriers in more detail.

Interpreting the Fair Housing Equity Assessment (FHEA)

There are many ways to interpret the FHEA and some of the questions communities should ask include:

- Are there other indicators that should be measured to make the assessment more applicable to our community?
- Should any of these measures be weighted to reflect a more detailed picture of our community?
- The FHEA does not propose solutions; it only suggest some pressure points that a community may want to address.

FAIR HOUSING EQUITY ASSESSMENT (FHEA)

The Fair Housing Equity Assessment, or FHEA, is a statistical analysis tool developed by the U.S. Department of Housing and Urban Development that can be used to identify underlying challenges with regards to housing for various vulnerable groups. At its most basic level, it assesses whether or not there are statistically significant concentrations of particular groups in certain parts of the region. This information can be used by local municipalities as they update their master plans to help identify issues or factors that they should take into account with regard to dealing with the challenges associated with housing. For instance, there may be a concentration of those who do not have access to a vehicle in a portion of the region that is greater than other communities and this may suggest that transportation is impacting where people are able to live, and could be a barrier. With regard to the FHEA it is important to understand: 1) which factors are being assessed; and, 2) how the assessment was done. The concentrations that were explored included:

- Those who are 75 years of age or older. This group is key given the changing demographics and the aging population.
- Minorities.

- Single parents.
- Those without access to a vehicle. Given the reliance on single-occupancy vehicles, this issue can be vital to where/how people choose housing.
- Those below the poverty level
- Those with limited English proficiency. Given the refugee population in the region, this issue is important to consider.
- Renters paying more than 50% of their income for rent
- Disabled persons.

The assessment was completed using Census and ACS data, and performing a statistical analysis to identify concentrations that are greater than the rest of the region. This was done by calculating the percentage shares of the various at the Census Block Group level (CBG). With the exception of Bow and Concord, each community was its own CBG. Bow was made up of two CBGs, while Concord was made up of 12.

The Findings: the FHEA identified several significant concentrations of the aforementioned groups. Some communities had one group while other communities had several. A summary of the results can be found below in Table 4.5.

Table 4.5: Concentrations

Geography	75 and Older	Those paying more than 50% of Income for Rent	Minorities	Single Parents	No Access to a Vehicle	Persons in Poverty	Disabled Persons	Limited English
Allenstown								
Boscawen	X							
Bow, 310.01								
Bow, 310.02		X						
Bradford								
Canterbury								
Chichester								
Concord, 321								
Concord, 322			X	X	X			
Concord, 323					X	X	X	
Concord, 324					X		X	
Concord, 325	X							
Concord, 326			X	X				
Concord, 327.01								
Concord, 327.06				X				
Concord, 328		X						
Concord, 329	X		X	X	X	X	X	X
Concord, 441	X	X	X			X	X	
Concord, 443								
Deering								
Dunbarton								
Epsom								
Henniker								

Table 4.5: Concentrations (Cont.)

Geography	75 and Older	Those paying more than 50% of Income for Rent	Minorities	Single Parents	No Access to a Vehicle	Persons in Poverty	Disabled Persons	Limited English
Hillsborough				X				
Hopkinton								
Loudon								
Pembroke		X						
Pittsfield		X				X	X	
Salisbury		X						
Sutton								
Warner								
Webster								

Source: CNHRPC Fair Housing Equity Assessment, 2014

Notes: 1) Group quarters facilities may impact some of the concentration numbers in Boscawen and Concord. Available data does not depict what share of each concentration is due to group quarters. 2) Concord tracts 441 and 443 include other communities and the portions in Concord contain small populations.

SEGREGATION & RACIAL CONCENTRATIONS OF POVERTY

Segregation is, by definition, a situation where groups are racially segregated and separated geographically. This can be a byproduct of cultural preferences, or economic, land use and other local policies and it can be another barrier to housing. To assess segregation, a significant population of a particular group needs to be concentrated geographically. An “isolation index” can then be used to measure segregation. The minimum value is 0 and the maximum value is 1.00. New Hampshire has a very homogeneous racial makeup (white), as does the Central NH Region. Though region contains a very small minority population, it has become slightly more diverse over the past Census period with a growing refugee population. With isolation indices ranging from 0.02 to 0.04, the analysis suggests region does not contain any significant areas of racial segregation.

As portrayed in [Map 4.1](#), the majority of the region’s minority population is located within Concord. Suncook Village also appears to contain a significant portion of the region’s minorities, and, beyond that, there seems to be a fairly even distribution throughout the rest of the region.

Racial concentrations of poverty are the result of segregation correlating to poverty. As the region is extremely homogeneous and lacks any significant racial segregation, it also lacks racial or ethnic concentrations of poverty.

As evident by [Map 4.2](#), the most concentrated areas of poverty include Pittsfield and portions of Concord, followed by Pembroke, Boscawen and Hillsborough. Most of the concentrations are located in urban areas and other town centers.

ACCESS TO OPPORTUNITY

Access to opportunity based upon race can be assessed in a statistical manner as well. Such an analysis was conducted as part of assembling and analyzing data for this Chapter. Again, the purpose of this analysis is to provide information to the municipalities of the region to use as they see fit during the development of their own local master plans. Access to opportunity - jobs and education in particular - can have an impact on the concentration of poverty. There does not appear to be a disparity of access to opportunity among racial and ethnic groups in the region. The lack of racial and ethnic concentration is likely the reason for this.

AIDED/ASSISTED LIVING FACILITIES NEAR JOB CENTERS

Poverty and various types of disabilities can often correlate. As such, ensuring that there are adequate and appropriate employment opportunities nearby for those in group housing or housing for special needs populations is a vital priority as it provides the chance to earn an income. The close proximity to jobs and these facilities are crucial as transportation is often a challenge. **Map 4.3** tracks the locations of the 54 assisted living facilities in relation to the region's major employers. Black dots represent assisted living facility locations while the green dots represent a concentration of employers. In the region, these facilities are clustered around the job centers. Anecdotally however, people have indicated there is a greater need for more housing in these locations (competition among groups was an issue in Concord, for example). Another factor to consider is to ensure that these facilities are located within close proximity to support services.

LAND USE REGULATIONS

In New Hampshire, local land use controls, primarily in the form of zoning ordinances and other land use regulations, can create impediments to the development of affordable housing. As mentioned below, the state, both in the courts and the legislature, have attempted to address these issues in the past. The excerpt below is from the New Hampshire Housing Finance Authority's 2010 Analysis of Impediments (AI) captured the essence of the problem succinctly:

... As identified in the last AI report, municipal land use regulations – zoning, growth controls, and impact fees – place significant obstacles in front of those who wish to develop affordable housing for lower income families. Municipalities control some of the costs of housing development and higher costs lead to higher-priced housing. In particular, unreasonable restrictions on the creation of multifamily housing, strong incentives for the development of multi-unit “housing for older persons” (rather than for families with children), and large lot requirements continue to have the effect of restricting housing options for lower income families...

To the degree that lower priced or affordable housing is not available because of unnecessarily high municipal fees and costs and other unreasonable restrictions mentioned above, municipalities may be exposing themselves to liability, including under the federal Fair Housing Act.

[T]he [2012] “Workforce Housing Law” (WHL), RSA 674: 58-61... specifically requires that: 1) municipalities allow workforce housing to be located in a majority of their land area in which residential development is permitted; 2) density and lot size requirements be reasonable; 3) reasonable and realistic opportunities be provided for the development of multifamily rental housing; 4) at least 50% of the units in a workforce development must have two or more bedrooms, and 5) no more than 20% of the units in a workforce housing development may be housing for older persons as defined by HUD... [T]he new law provides an aggrieved workforce housing developer with a right to an expedited hearing in the Superior Court, at which he can seek permission to build a workforce housing development...¹

With regard to the Central NH Region in particular, every community has a zoning ordinance in place while four have workforce housing ordinances in place.

TRANSPORTATION IMPACTS

¹ New Hampshire Housing Finance Authority, 2010: http://www.nhhfa.org/data-planning/planning/impediments/AI2010_pt4.pdf

Road improvements, transit, trails, bike/pedestrian infrastructure, and other investments can address barriers to housing. Infrastructure can have a significant impact on the affordability of housing. Low-income families as well as seniors are impacted by the reliance on the automobile as the primary transportation method, and, given the reliance on, and the cost of operating a car, this can be a significant barrier to where people are able to live, and therefore, their cost of housing and quality of life.

It is clear that the region is dependent upon the single-occupancy vehicle for mobility, especially in the more rural, outer-lying areas. Within and around Concord, the public transit service and the pedestrian infrastructure are relied upon to meet the growing need among low-income families, refugees and the aging population. Furthermore, as mentioned elsewhere, there is a significant concentration of poverty among those who have limited access to a single-occupancy vehicle. Results from the various sources of data include:

- Fair Housing and Equity Assessment (FHEA) included in this Chapter shows that there is a concentration among those who do not have access to a vehicle in four out of eleven of Concord's census tracts. A majority of these tracts are either within walkable distances to employment, shopping and services, and/or served by public transit.
- Senior citizens in the outer areas of the region need additional options to the single-occupancy vehicle.
- Senior citizens rely on pedestrian amenities in the more urban area of the region and components like interconnectivity, sidewalks and plowing all are solutions to adequate pedestrian infrastructure.
- Seniors need the ability to "age in place."
- Community gardens and entry-level jobs are desired near public transportation and other services.
- Many young adults are looking to spend less time in their cars commuting, resulting in a greater desire for housing and employment opportunities to be nearby.
- Housing should be near services and there is a need for various transportation options.
- Jobs, housing, services and retail stores should be located closer together to decrease reliance upon the single-occupancy vehicle. There is need for more bus service in Concord, especially on nights and weekends.
- The Mid-state Regional Coordinating Council's Volunteer Driver Program is helping to address issues in rural areas, but more options are needed, especially for the non-elderly, non-disabled transit dependent population.
- For some, the option to move closer to downtown centers is not possible due to the cost of relocation in these areas. Mobility is an increasing problem for the aging population.
- Eighty percent of the region's residents drive to work alone and spend, on average, 22.1 minutes in the car (ACS 2007-2011).

For many living within the region with limited financial means, including the refugee community, those in poverty, and seniors, the link between transportation and housing choice is a significant one. With limited transportation options in the region, residents with lower incomes who, for one reason or another, cannot rely on driving, find their housing choices limited.

STATE OF NH ANALYSIS OF IMPACTS TO FAIR HOUSING (SURVEY & CONCORD FOCUS GROUP)

In 2010 the New Hampshire Housing Finance Authority conducted an Analysis of Impacts to Fair Housing (AI), state-wide, and included a survey². It also contained a refugee focus group meeting in Concord with Burundi and Bhutanese refugees. Though the AI includes state-wide as well as local information, it can identify additional barriers. Further, it can verify findings within the FHEA. The survey indicated that single parents had trouble finding housing - echoing the FHEA. Also, it identified that non-English speaking individuals didn't necessarily have difficulty finding housing due to language issues; something else that was identified in the FHEA (though language issues were often a barrier to employment opportunity). An additional issue identified in the AI but not in the FHEA was that women and victims of domestic violence often experienced discrimination. Finally, though not reported, some minorities and refugees felt there was some discrimination and that the refugees had a desire to "stick together" and maintain cultural norms. Specific findings from the state AI included:

From the Survey

- Victims of domestic violence as well as the disabled were more likely to perceive discrimination
- Single parents with kids were more likely to have difficulty finding suitable and affordable housing
- Minorities reported more instance of perceived discrimination.
- Non-English speaking individuals were LESS likely to perceive discrimination.
- Women were more likely than men to:
 - Be denied a mortgage
 - Be evicted for reasons OTHER than non-payment of rent
 - Have difficulty finding suitable and affordable housing

From the Focus Group (Bhutanese & Burundi)

- Occupancy policies at housing complexes is a problem for larger families as they like to stay together (families are split up)
- Concern about retaining cultural norms

Anecdotal Information Regarding Barriers

During the Regional Plan development outreach process, CNHRPC staff engaged various members of the community about numerous topics, one of which was housing and barriers to housing. The outreach included "traditional" outreach and visioning sessions, but CNHRPC staff also met with many that are not typically engaged in the planning process. The purpose of this effort was to cast a wider reach with regard to public involvement, and, more importantly, to make sure that the plan has as much public input as possible. Some of these groups included senior citizen groups, refugees, mobile home parks, soup kitchen (the Friendly Kitchen in Concord), and developmentally disabled individuals. The full details of these efforts can be found in the Regional Story Chapter as well as Appendix A, Existing Chapter, but some anecdotes from these efforts include:

- Refugees and the mentally disabled are often competing for the same limited amount of housing.

² <http://www.nhhfa.org/data-planning/planning/impediments/AI2010.pdf>

- Seniors have indicated that there is not enough housing; also, there can be long waits at the most desirable facilities.
- Isolation can be a problem for some living in mobile home parks, especially seniors due to: 1) fixed incomes; 2) transportation issues (driving). Obtaining services and groceries are often a challenge.

PERSPECTIVE ON HOUSING: LOCAL MASTER PLANS

In general the local master plans in the region all have similar perspectives on housing. The action items within this Chapter are consistent with, and influenced by the objectives found in the local master plans. Two of them are also consistent with other Chapters in this plan as well. Objectives for open space developments and traditional neighborhoods are consistent with the Natural Resources Chapter while the objective for encouraging energy conservation is consistent with the Energy Chapter. The complete list of local master plan housing objectives include:

- Provide housing opportunities for a range of residents, including the elderly and those who need more affordable housing.
- Ensure that adequate, safe, and sanitary housing is available.
- Use cluster, open-space, or traditional neighborhood residential development.
- Develop assessment methodology and monitor housing needs and trends.
- Preserve and improve existing housing and encourage energy conservation methods.

Table 4.6: Local Master Plan Perspectives on Housing

COMMUNITY:	Provide housing opportunities for a range, including elderly and affordable.	Ensure that adequate, safe, and sanitary housing is available.	Use cluster, open-space, or traditional neighborhood residential development.	Develop assessments and monitor housing needs and inventory for maintaining growth rate.	Preserve and improve existing housing and encourage energy-conservation methods.
Allenstown	X			X	
Boscawen	X	X		X	
Bow	X		X		
Bradford	X		X		
Canterbury	X				
Chichester	X			X	
Concord	X	X	X	X	X
Deering	X			X	
Dunbarton	X			X	
Epsom	X	X	X		
Henniker	X	X			
Hillsborough	X				
Hopkinton	X	X	X	X	

Table 4.6: Local Master Plan Perspectives on Housing (Cont.)

COMMUNITY:	Provide housing opportunities for a range, including elderly and affordable.	Ensure that adequate, safe, and sanitary housing is available.	Use cluster, open-space, or traditional neighborhood residential development.	Develop assessments and monitor housing needs and inventory for maintaining growth rate.	Preserve and improve existing housing and encourage energy-conservation methods.
Loudon	X		X	X	X
Pembroke	X				
Pittsfield	X			X	X
Salisbury	X		X	X	X
Sutton	X		X		
Warner	X		X		
Webster	X				X

Source: CNHRPC Review of Current Local Master Plans

PUBLIC INPUT AND OUTREACH

Public outreach was a vital component of the development of this Chapter. CNHRPC staff distributed suggestion boxes in locations across the region, attended community events, and led neighborhood discussions with various groups to hear about what people value about their community and what they would like to see improved. Details about outreach can be found in the Regional Story Chapter. Feedback from the region's residents suggested that there is an interest in downsizing and that housing costs are a concern for many of the communities of interest; the availability of public transportation is also a concern.

IMPLICATIONS FOR LOCAL/REGIONAL PLANNING: CHALLENGES AND OPPORTUNITIES

The demographics, housing economics and housing demand issues described in this Chapter present communities with challenges when addressing housing needs. The intent of this section is to summarize these findings and issues and present municipalities with potential solutions.

The region's growth rate has slowed substantially since 2000. It has also seen its population age and become slightly more diverse. It is expected that this trend of slow population growth will continue into the future.

Building permits for new residential construction have decreased since 2007. The average household size has declined since 2000. In terms of cost, the average rent and average home price in the region is less than that of the state and many of the other regions.

Despite slowing residential growth and lower associated housing costs, there are still groups within the larger population for whom housing cost and choice are challenging due to several factors discussed below.

With regard to housing, slowing population growth along with lower rent and home ownership costs would suggest that, on the surface, the housing needs are generally being met. Public input has

suggested that there are barriers and challenges to finding housing for some of our communities of interest:

- Transportation issues given the rural nature of the region and dependency upon the single occupancy vehicle.
- The availability of smaller dwelling units for seniors to downsize.
- The cost of housing for seniors on fixed incomes, disabled persons, refugees and single parents.

These issues present municipalities with challenges to plan for in the future as well as opportunities to manage change within the community.

CNHRPC's Housing Needs Assessment (HNA) found that, overall, about 30% of all of the housing needed in 2015 is projected as rental housing with about 70% as owner-occupied.

CHALLENGES AND OPPORTUNITIES

Challenges

The main challenges associated with housing, in addition to meeting changing demographic and economic needs are outlined below.

Populations with Special Housing Needs

Several segments of the population that have a greater difficulty finding housing include:

- Those 75 years of age or older
- Those paying 50% + in rent
- Minority Populations
- Single Parents
- Households without access to a vehicle
- Persons below the poverty level
- Disabled persons

Barriers, based upon research through various reports and public outreach have been identified as the following:

- Lack of flexibility in local land use regulations and ordinances can make it difficult to develop workforce housing.
- Low-income families, those in group housing facilities, and seniors without access to a vehicle can face significant challenges meeting housing needs.
- Populations with special housing needs end up competing for a limited supply of low cost/more affordable housing.
- Isolation can be a problem for those in the more rural areas without vehicle access, especially seniors living in mobile home parks.

Housing Needs Assessment

A primary function of this Chapter is to assess the future housing needs of the region and each community. The Housing Needs Assessment predicts a need for about a 6% increase in units from 2015 to 2020 and a 5.6% increase during the next five-year period. Most communities are within 2.5 percentage points of that range, though Dunbarton and Loudon needing slightly more and Allenstown needing slightly less. This could be due to a decrease in Allenstown's population and average household

size (population projections for Allentown aren't comparable to the region's until 2015), Dunbarton's smaller vacancy rate compared to the region (2.6% to 5.5%), and the combination of Loudon's projected population and vacancy rate (vacancy is 4% to the region's 5.5%; projected population growth exceeds region's by about 5% between 2015 and 2025). A summary of the needs for each community and the region for 2015, 2020 and 2025:

Table 4.7: Summary Housing Need Projections

Geography	2010 Housing Units	2015	2020	2025	% Change: '15 to '20	% Change: '20 to '25
Allentown	1,881	1,929	1,977	2,026	2.5%	2.4%
Boscawen	1,453	1,510	1,566	1,623	3.7%	3.6%
Bow	2,807	3,061	3,315	3,569	8.3%	7.7%
Bradford	917	954	991	1,028	3.9%	3.7%
Canterbury	1,002	1,072	1,142	1,212	6.5%	6.1%
Chichester	963	1,036	1,109	1,182	7.0%	6.6%
Concord	18,852	19,973	21,094	22,215	5.6%	5.3%
Deering	932	1,011	1,089	1,168	7.8%	7.2%
Dunbarton	1,077	1,185	1,292	1,400	9.1%	8.3%
Epsom	1,839	1,967	2,094	2,222	6.5%	6.1%
Henniker	1,928	2,053	2,177	2,302	6.1%	5.7%
Hillsborough	2,896	3,074	3,252	3,430	5.8%	5.5%
Hopkinton	2,381	2,531	2,681	2,832	5.9%	5.6%
Loudon	2,081	2,281	2,481	2,682	8.8%	8.1%
Pembroke	2,872	3,053	3,233	3,414	5.9%	5.6%
Pittsfield	1,769	1,864	1,960	2,055	5.1%	4.9%
Salisbury	598	639	679	720	6.3%	6.0%
Sutton	985	1,039	1,093	1,148	5.2%	5.0%
Warner	1,358	1,435	1,511	1,588	5.3%	5.1%
Webster	849	917	984	1,052	7.4%	6.9%
TOTAL - CNHRPC	49,440	52,580	55,720	58,861	6.0%	5.6%

Source: U.S. Census 1980 & 2010; NRPC & CNHRPC Calculations

Opportunities

Despite the challenges to meeting housing needs, there are several opportunities, in addition to zoning provisions, that exist to support the development of new workforce and affordable housing. The provisions of RSA 674:58-61, known as the "Workforce Housing Law" not only codifies the legal requirements for meeting housing needs but also suggests ways to meet these needs; RSA 79E, provides certain tax relief for qualifying property developments in downtowns, including housing; and, Tax Increment Financing Districts (TIF) which can be used to fund the development of relevant infrastructure. Zoning changes and suggestions from the state of New Hampshire's Consolidated Plan present opportunities as well. Each item is described in more detail below.

State of New Hampshire Consolidated Plan

The state of New Hampshire Consolidated Plan 2011 - 2015 has identified several other priorities and potential outcomes to address access to housing³:

- Develop and preserve affordable rental housing for low and very low income families.
- Develop housing for several groups including very low income seniors and special needs populations.
- Prevention of homelessness.
- Increase supply of permanent affordable housing.
- Economic Development by creating jobs.
- Water facilities to support a greater density of housing.
- Sewer facilities to support a greater density of housing.
- Childcare facilities to support the needs of the workforce.
- Increase the supply of transitional housing facilities.
- Regional Economic Development capacity building.
- Develop and preserve affordable rental housing for moderate income families.
- Provide for winter emergency shelter needs.
- Neighborhood Facilities/Community Centers.
- Other Public Facilities.
- Removal of Architectural Barriers.

RSA 674:58-61: The “Workforce Housing” Law

RSA 674: 58- 61, as in Britton, alludes to three ways in which a community may comply with the law⁴:

- Ensure that the land use regulatory framework, including the zoning ordinance, site plan and subdivision regulations, master plan, impact fees and any other regulatory document or provision is, individually and cumulatively, inclusive. In practical terms this means, for example, there is a mix of lot sizes throughout the residentially zoned portions of town and there are no undue restrictions on various housing types.
- The second way for a community to comply is by adopting a “Workforce Housing Ordinance.” In essence, this provides density bonuses, expedited permitting waiver opportunities and other incentives for declared workforce housing projects. This can be done in a particular part of town or town-wide.

Britton Vs. The Town of Chester

Workforce housing in New Hampshire can be traced back, in part, to Britton vs. the Town of Chester, 134 NH, 434, 595 A.2d 492 (1991). Britton found, among other things, that “zoning regulations which either directly or by reason of their application, wrongfully excluded persons of low and moderate income from a municipality would be found invalid.”¹ Additionally, Britton established that zoning must not only promote the general welfare of the individual municipality but also the region in which it is located. The end result of Britton is that each municipality must provide a reasonable and realistic opportunity for low- and moderate-income housing in the community.

³ State of New Hampshire Consolidated Plan 2011-2015: http://www.nhhfa.org/data-planning/planning/conplan/CONPLAN_2011-2015_FINAL_v_6-3-11.pdf

⁴ RSA 674: 58- 61 et al.

- The third and final way for a community to be in compliance is by demonstrating that a community has its “fair share” of workforce housing.

Economic Opportunities

The state of New Hampshire provides a number of opportunities for communities to encourage development that can be used for a variety of purposes, including the development of affordable housing. A Tax Increment Financing District (TIF) can be used to fund public infrastructure to support housing, and RSA 79E where a downtown property owner can enjoy delays in increases in taxes due to improvements if those improvements further a community goal (like economic development or workforce housing). Around the region, Concord, Hillsborough, Hopkinton and Pittsfield have adopted 79E, while Bradford, Concord and Pembroke have TIF Districts in place. More details on both RSA 79E and TIF districts can be found in the Economic Development Chapter.

Zoning:

Zoning ordinances represent one tool by which a community affects change and growth. A range of housing types should be available in the community, including rental units and single family homes as well senior housing and workforce housing. Strategies such as accessory apartments and home occupations could address several factors at once such as commute times, vehicle access, downsizing and affordability. Another factor is locating higher density housing near community centers, jobs, services and transportation networks. Rental units, senior housing units and assisted living facilities should be considered in these areas. Workforce housing could be an effective strategy for some communities in meeting labor force needs for local employers and affordability concerns. Lastly, zoning for key services such as day care and medical facilities also impact housing (as well as economic growth) and should be taken into consideration. Above all, zoning in any community should consider its unique needs and its community character when developing strategies that “fit” locally.

CENTRAL NH VISION - HOUSING

In summary, this Housing Chapter looks at existing housing stock, includes a housing needs assessment and presents projections for the future demand for housing through 2025. It does not propose any new requirements or mandates that communities must comply with (beyond what may already be required by state Law). The regional vision is:

“Traditional settlement patterns are maintained while there are sufficient housing options that meet a range of needs from single adults, young families to older residents.”

GUIDING PRINCIPLES

The guiding principles listed below are consistent with, and echo the feedback received during the public outreach process as well as the objectives of local master plans.

- Continue to foster community connections within neighborhoods, towns and the Central NH Region.

- Creatively encourage a housing supply that responds to regional and local housing needs.
- Support protection of open space and conservation lands, including farmland, to protect natural resources and provide easily accessible recreation opportunities in the region for all.
- Strengthen the ability at the regional level to serve as a responsive resource to needs and planning issues at the local level.
- Support engagement of citizens in local and regional planning efforts for meaningful public participation in working towards a successful future for the region.
- Support a steady, sustainable increase in permanently affordable housing units.

ACTION ITEMS

Action items, or strategies, are based upon the analysis contained within this Chapter and are also incorporated in the Implementation Chapter. These recommendations are designed to provide local planning boards with guidance and potential strategies for dealing with housing issues. The recommendations are not intended to be a “one size fits all” solution for every community. Each planning board should use each strategy as they see fit. Recommendations include:

- Support the development of workforce housing ordinances that allow for a mix of market rate and workforce housing in the same development within close proximity to employment centers.
- Support local housing entities such as CATCH in the development of permanently affordable housing.
- Support senior housing ordinances within close proximity (walking/bus) to services and amenities (medical; food stores, etc.) and employment centers.
- Support zoning ordinances that allow for opportunities to locate housing for group housing within close proximity to services, amenities and employment centers.
- Support accessory apartment ordinances for senior housing and housing for young people.
- Monitor demographic changes occurring in the region and the effects it may have on communities and the local economy by reviewing Census and other data sources as well as conducting surveys and focus groups within the community.
- Support zoning ordinances that allow for home occupations, including daycare, in each community.
- Support areas of the region where infill ordinances may be beneficial.
- Support strategies and ordinances that can encourage the development of housing near services, amenities and job centers with as little reliance on cars as possible (i.e. walkable; public transit, etc.).
- Support adequate broadband access to rural residential areas and areas where home occupations are permitted/encouraged.

- Support the development of a cluster ordinances, or “open space development” ordinances.
- Support the adoption of RSA 79E and use it to encourage the development of various housing types in more dense areas (assisted living, workforce, senior, etc.).
- Support an adequate variety and choice of housing and neighborhood types within communities.

POTENTIAL HOUSING STRATEGIES

It is important for each community to develop strategies that fit their own needs, community character and challenges. Overall, providing options and setting an environment to ensure that options are possible are key outcomes. In an effort to assist communities with this effort, the Potential Housing Strategies Menu below was created to detail the various tools discussed above, what they do and how they can be used.

Table 4.8: Potential Housing Strategies Menu

Strategy	What it Does	How to Implement	How it Can Be Used	Notes
Mixed Use Zoning	Provides for a mix of uses in denser areas of a community	Assess local zoning districts for uses allowed, utilities available and transportation networks available. Update zoning to allow for multiple uses to capitalize on these locations, including residential.	Can be used to allow for a variety of housing types and close proximity to jobs and services and also decrease reliability on automobiles.	Utilities (sewer and water) are needed; use in conjunction with infill zones and RSA 79E.
"Infill" zones	Allows for more development or redevelopment in more dense areas.	Assess zoning for lot sizes and update zoning to allow for smaller lot sizes, relaxed setback and other standards allow for more development, or redevelopment, in denser areas/downtown cores.	Working with mixed use zoning, it can help create a variety of housing types in close proximity to jobs and services and also decrease reliability on automobiles.	Use in conjunction with mixed use zoning and RSA 79E.
Workforce Housing Ordinance	Provides density and other incentives to allow for the clustering of housing that is more affordable.	Assess zoning, adopt an ordinance combines various incentives, namely density, along with permanent affordability.	To comply with the Workforce Housing Law and to facilitate the development of workforce housing. Can be mixed with market rate housing.	Permanent affordability is needed for it to be effective. NH Housing Finance Authority can assist.
Senior Housing Ordinance	Through clustering and other incentives, it encourages the development of housing for seniors. Also provides a place in the community for them to "downsize."	Assess the specific needs for seniors in the community to determine what type of housing is needed. Assess the ordinance for gaps, develop and adopt ordinance.	Senior housing can be in various forms from clusters to re-use of mills and schools. As long as the ordinance is tailored to the community it can facilitate reuse, keep seniors local as they downsize, and be affordable.	Consider permanent affordability for some or all units.

Table 4.8: Potential Housing Strategies Menu (Cont.)

Strategy	What it Does	How to Implement	How it Can Be Used	Notes
Zone for Accessory Apartments	Allows single family homes to develop a small apartment. Primarily for seniors or young adults/recent graduates. Can also provide housing for veterans returning home from active duty.	Assess gaps in the zoning ordinance, determine where best it could be located, develop and adopt ordinance.	Provides a way to provide smaller, more affordable housing for seniors, young adults starting out and possibly veterans returning from active duty.	
Mix of Lot sizes	A range of lot sizes can ensure a range of housing can be built. It can also have an effect on development costs.	Assess gaps in the zoning ordinance, determine where best it could be located, develop and adopt ordinance.	A range of lot sizes can ensure a range of housing can be built. It can also have an effect on development costs.	
Cluster Developments	Allows for the clustering of homes based upon density calculations. Also requires open space.	Assess gaps in the zoning ordinance, determine where best it could be located, develop and adopt ordinance.	A cluster ordinance can lower costs of housing and infrastructure. It can also protect open space.	
Adopt RSA 79E	Allows for rehabilitation or replacement of structures in a downtown to see a delay in any tax increases for up to five years.	Develop application materials and adopt the provisions of RSA 79E	79E can be used to encourage the rehabilitation or replacement of homes in the downtown.	Use in conjunction with mixed use zoning and infill zoning.
Tax Increment Financing (TIF) Districts	Uses a portion of future tax revenue from a district to pay for infrastructure improvements in that district.	Adopt a district and a TIF plan at Town Meeting	Used to put in sewer, water or roads.	Cannot be used to build housing. Can be used in conjunction with any other portion of this menu.
Home Occupations	Home occupations allow certain low-impact commercial activities to take place in a home or on a residential property	Assess gaps in the zoning ordinance, determine where best it could be located, develop and adopt ordinance.	This allows people to work and live on the same property. Effect would be to limit costs for traveling and doing business	Can be used in conjunction with any other portion of this menu.
Support Local Housing Entities like CATCH	Allow for, or encourage housing development.	Work with CATCH and other such organizations to identify additional local housing needs and develop local areas where housing can or should be located.	To better target the housing needs of a community at the local level.	

RESOURCES

New Hampshire Housing Finance Authority's 2010 Analysis of Impediments, 2010:

http://www.nhhfa.org/data-planning/planning/impediments/AI2010_pt4.pdf

State of New Hampshire Consolidated Plan 2011-2015: [http://www.nhhfa.org/data-](http://www.nhhfa.org/data-planning/planning/conplan/CONPLAN_2011-2015_FINAL_v_6-3-11.pdf)

[planning/planning/conplan/CONPLAN_2011-2015_FINAL_v_6-3-11.pdf](http://www.nhhfa.org/data-planning/planning/conplan/CONPLAN_2011-2015_FINAL_v_6-3-11.pdf)

RSA 674: 58- 61: <http://www.gencourt.state.nh.us/rsa/html/LXIV/674/674-59.htm>



INTRODUCTION

As described in the Regional Story and elsewhere throughout the Central NH Regional Plan, the region's natural resources and high quality of life are a key competitive advantage. At the same time, there are a number of overall demographic trends that have and will continue to affect Central New Hampshire. The aging population that impacts the available future workforce will be a key issue as many in the workforce reach retirement age over the next few years. The attraction and retention of young professionals will also likely continue to be an issue as younger workers are often attracted to more metropolitan areas. Each of these factors lead to a concern regarding the potential loss of human capital and a skilled labor force.

Infrastructure needs are another challenge. In addition to those issues described in the Transportation chapter, a number of other regional infrastructure needs related to broadband, water, sewer and energy have been identified as major local and regional economic development issues.

While economic development is often viewed as exclusively a local issue in light of each community's reliance on property tax revenues, there are many state and regional trends and opportunities that can influence, inform and assist local economic development efforts. The recently completed Central/Southern NH Comprehensive Economic Development Strategy (CEDS) is a good example of a regional economic development effort, and much of this Chapter is based upon the results of that process.

This Chapter reviews the CEDS process and results, provides an overview of recent economic trends, provides a summary of the public input received during the Central NH Plan development process related to the economy, and outlines a number of economic development related action items.

THE CENTRAL/SOUTHERN NH COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY (CEDS)

The 2014 Central /Southern NH Comprehensive Economic Development Strategy (CEDS) was prepared in coordination with the Southern NH Planning Commission (SNHPC). The CEDS represents a significant in-depth analysis of the regional economy and the development of regional economic development strategies for the area that includes all 20 CNHRPC communities as well as five communities (Bedford, Goffstown, Hooksett, New Boston, and Weare) from the SNHPC.

The "CEDS" or Comprehensive Economic Development Strategy makes up the majority of this Chapter.

The Central/Southern NH CEDS region includes all CNHRPC communities as well as five communities from the Southern NH Planning Commission area.

Staff from the two regional planning commissions worked closely with the CEDS Strategy Committee consisting of public and private sectors representatives from many of the 25 communities to complete the project, and the results of the CEDS were used extensively during the preparation of this Chapter of the Central NH Plan.

The major tasks completed during the CEDS process included:

- Preparation of an industry cluster analysis,
- Preparation of a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis,
- Development of a regional economic vision statement, goals and measurable five-year objectives by the Strategy Committee, and
- Development of a plan of action and priority project and activity lists by the Strategy Committee.

It is important to note that an approved CEDS is a key requirement of the US Department of Commerce, Economic Development Administration (EDA) that enables municipalities and counties to qualify for EDA funding under EDA's current public works, economic adjustment and planning grant programs. A CEDS is also an important prerequisite for a region to be designated by EDA as an Economic Development District (EDD).

CEDS INDUSTRY CLUSTER ANALYSIS

A cluster analysis seeks to identify existing concentrations and any interdependent relationships of key regional industries and attempts to identify clusters that may grow in the future. While the Central/Southern CEDS included a cluster analysis that merged studies of the two planning regions, for the purposes of this chapter only the results of the 2011 *Central NH Region Industry Cluster Analysis* prepared by Camoin Associates were used.

The cluster analysis identified government, health care and retail as the region's key sectors of employment, and further noted that although manufacturing employment has declined, there is an existing base of technology companies in the region. Although the cluster analysis did not identify any strong relationships among industries in the region, Business and Financial Services, Medical Services, Arts and Entertainment, and Information Technology were noted as potential clusters on which the region could concentrate its future economic development efforts. The cluster analysis also highlighted the region's quality of life as a major draw for entrepreneurs and a reason why the Arts and Entertainment sector was identified as having a high potential for growth in the future. These industries represent sectors on which to target economic development efforts.

CEDS STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (SWOT) ANALYSIS

Another key step in the CEDS process was the preparation of the *Central/Southern RPC Economic Development Strengths, Weakness, Opportunity and Threat (SWOT) analysis*. The SWOT was integral to the eventual identification of the CEDS Priority Projects (see Table 5.1). It essentially identifies what the region can potentially capitalize on and what challenges need to be addressed.

The SWOT analysis was prepared by Arnett Development Group, LLC in coordination with Don Zizzi, Boston University Professor of Urban and Regional Economics. It involved a survey of local business and

industry representatives, local officials, regional business leaders and the regional planning commissions, and sought to assess the region regarding the factors that typically influence business location decision making such as local permitting, the availability of suitable labor, development costs, the local business environment and operating costs, transportation, information access and the quality of life. Using the results of the survey, the consultant team compared the region with similar areas and developed a list of key strengths, opportunities, and recommendations.

The results of the SWOT identify multiple reasons for confidence in the Central NH Region's future. Regional strengths that highlight the natural environment, a good location with highway access and high educational attainment were noted, as well as the opportunities that could be better exploited such as providing more development related information online, including the identification of available commercial sites. While some local communities offer a great deal of information online, there remains a number of smaller communities that do not contain information that developers or those interested in the region may seek. It was also noted that the region's strong local schools offer an opportunity for businesses regarding future workforce development. Finally, the consultant team stressed the viability of home-grown economic development through improved community connections with local entrepreneurs.

Regional weaknesses that were identified include a lack of consistent telecommunications coverage (both cellular and broadband internet), the lack of close access to a research university, less access to public transit through the region, and fewer amenities that might be found in a more urbanized area. Again, the SWOT compared the region with other similar regions in an effort to apply factors that impact business location decisions.

Recommendations found in the SWOT are closely connected to many of the CEDS priority projects and can be found in the Implementation Chapter as well. Of note are some common themes between the cluster analysis and SWOT results, notably the region's quality of life and the opportunity to engage local entrepreneurs. A summary of the results and recommendations of the SWOT analysis is as follows:

Regional Strengths:

Labor Availability
Well Educated Population
Highway Access
Business Friendly Environment
Business Costs (real estate, wage rates)
Critical Mass of Firms (health, finance, trade)
High % of Self-employed & Work-at-home
Natural Environment / Outdoor Activities

Opportunities:

Local Schools Involvement
Local Business Involvement
Cross Marketing (towns, firms, brokers)
Available Sites Inventory
Entrepreneur Relations
Access to Development Information
Website Development & Improvement

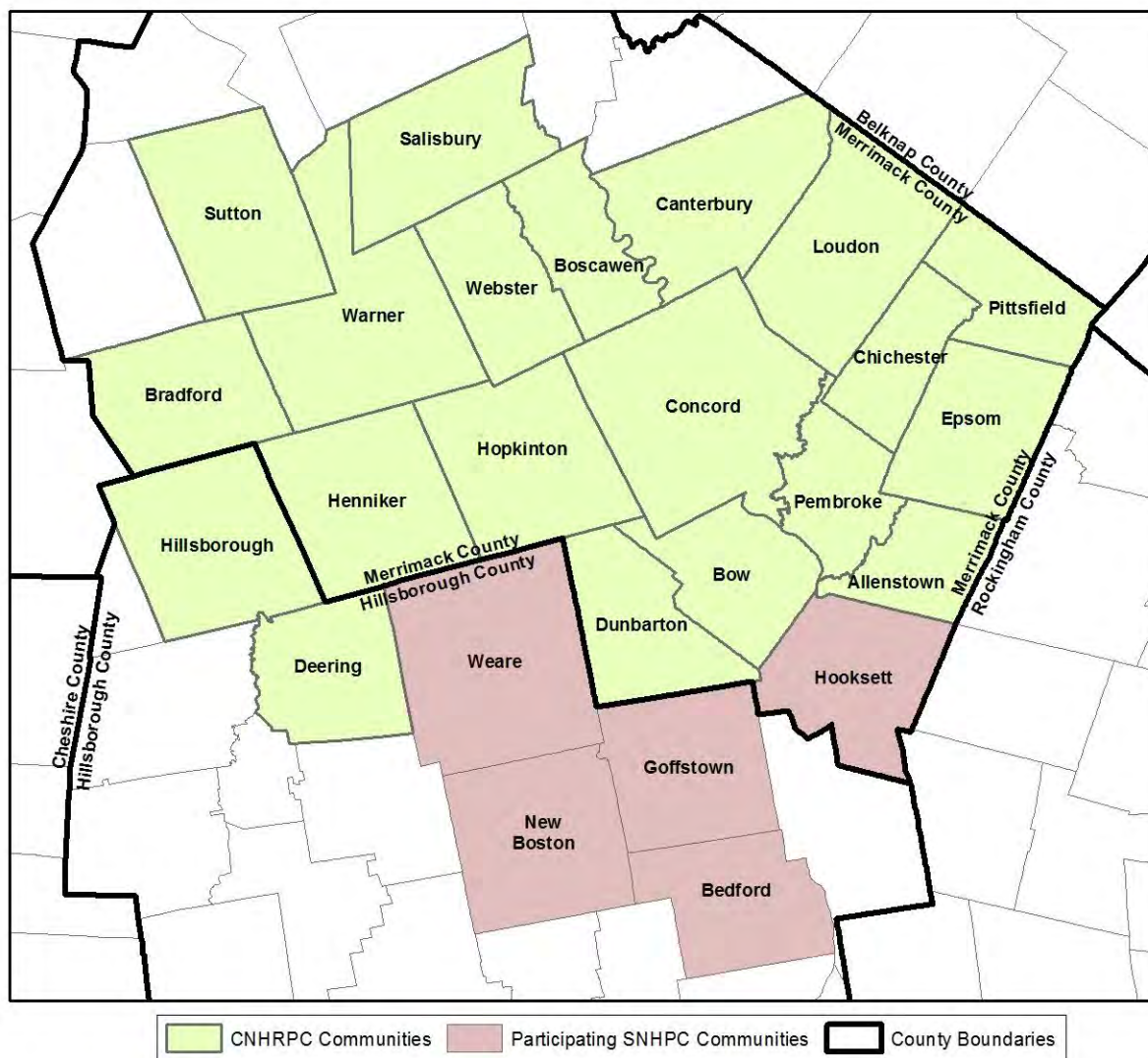
Regional Weaknesses/Threats:

Communication / Information Bandwidth
No Research University
Few Nearby Amenities
Little Public Transit
Physical Infrastructure Limitations
Community - Entrepreneur Connection

Recommendations:

Don't Chase (Employers/Businesses from outside the region); Grow Your Own
Engage Local Entrepreneurs & Investors
Support & Incubate
Emphasis on Streamlining Local Processes
Emphasis on Skills Training & Work Readiness
Pursue Broadband & Cellular Upgrades
Improve Website(s) Utility & Content
Increase Business Development Services & Technical Assistance
View through a Regional Lens
Take Regional Approach... Create Regional Brand

Figure 5.1: Central/Southern NH CEDS Area



Source: *Central/Southern NH Comprehensive Economic Development Strategy, 2014*

CEDS PRIORITY PROJECTS

The selection of priority projects began with the development of criteria. The CEDS Strategy Committee established criteria that were to be both simple and tied to the goals and objectives. Additionally, the Committee wanted to get a feel for how “ready” each project was. To that end, the established selection criteria that each project sponsor had to meet were tied to one or more of the six goals and indicate the project’s readiness. An application form and cover letter were developed and sent to key stakeholders including municipalities, businesses and not-for-profits across the region. The projects were then scored and ranked in eight categories: Education, Energy, Sewer/Water, Studies, Municipal, Recreation and Other. The CEDS document included a total of 39 projects, covering the entire 25 community CEDS area. Table 5.1 contains only those projects within the Central NH Region.

Table 5.1: CEDS Projects located within the CNHRPC Region by Community

Community	Project	Location	Project Description
Bow	Extend Water along Rt. 3A (Bow Junction)	Route 3A/Hall Street to intersection of NH 3A Bridge	Extend Water along RT 3A/Hall Street to intersection of NH 3A Bridge
Bow	Sewer Pump Station and Mains River Road/NH3A	River Road/NH3A	Complete construction of sewer pump station and transport mains to commence sewer service in the business development area
Bow	Update Town Development Strategy	Bow	Update Development Strategy to update the strategic direction for the Town's business development efforts
Bradford	Establish Solar Panels on Town Property	Bradford	Establish solar panels on town-owned property to provide electricity to Town-owned properties, selling excess power to the grid
Bradford	Reclaim Lot for Business Use - along length of East Main (Naughton Property)	North of East Main Street	Reclaim lot to salable standards for development
Bradford	Reclaim Lot for Business Use - Rt. 114/Jones Rd	Corner of Route 114 and Jones Road	Reclaim lot to salable standards for business location/expansion and build a steel building.
Bradford	Post Office Relocation	Intersection of Route 114 and Route 103	Relocate building and create parking
Bradford	Create a Town Business Incubator	Portion of the 25 acre recycling center and transfer station	Prepare a master plan/feasibility study to create a business incubator on the current site of the recycling center
Canterbury	Broadband Planning	Canterbury	Explore options for the development of broadband in Canterbury
CNHRPC region	CEDS Region Website	CEDS Region	Develop regional web portal
CNHRPC region	Regional Broadband Internet Access	Sutton, Salisbury, Bradford, Warner, Webster	Feasibility analysis to examine options for providing broadband internet access
Concord	15 Mile Paved Merrimack River Greenway Trail	Adjacent to Merrimack River	Develop a 15 mile paved trail along Merrimack River for a recreation/non-motorized trail
Concord	Storrs Street Expansion	Storrs Street	Property acquisition and expansion of Storrs street to link downtown to I-393
Concord	Whitney Rd/Hoit Rd Intersection Improvements	Intersection of Hoit Road/Whitney Road	Reconstruction of Hoit Road/Whitney Road intersection
Concord	New Airport Terminal Building	Concord Airport	Construction of a new airport terminal building
Concord	Upgrade Manchester Street (US3)	Merrimack River to Town of Pembroke	Rebuilding/expanding/upgrading Manchester Street
Epsom	Study & Install New Water Lines in District	Epsom traffic circle to: west to Chichester; north to Chichester; south to Pembroke	Feasibility study, engineering and construction of new water lines to expand municipal water services

Table 5.1 CEDS Projects located within the CNHRPC Region by Community (Cont.)

Community	Project	Location	Project Description
Henniker	Upgrade Downtown Sidewalk Network	Downtown Henniker	Upgrade sidewalk network downtown per 2012 Henniker Safe Routes to School Travel Plan
Henniker	Create a New Water District	Old Concord Rd near NH Route 202/9	Create new water district to serve the area near Old Concord Road near NH Route 202/9.
Henniker	Intersection Improvements with Rte 202 (Old Concord Rd)	Old Concord Rd near NH Route 202/9	Upgrade intersection
Hillsborough area	Mobile/Regional Technology Program	Antrim, Bradford, Deering, Henniker, Hillsborough, Stoddard, Washington, Weare, Windsor	A mobile, regional technology outreach program for schools, businesses and nonprofits
Hillsborough	Woods Woolen Mill Hazardous Waste Cleanup	Near Downtown Hillsborough	Assessment and cleanup activities for abandoned mill
Hillsborough	Hillsborough Downtown Revitalization	Downtown Hillsborough	Downtown cleanup, revitalization and building reuse analysis
Hillsborough	Upgrade Downtown Sidewalks	Downtown Hillsborough	Upgrade downtown sidewalks that are damaged, expand current sidewalk system, expand needed right-of-way
Hillsborough	Create a Community Center	Downtown Hillsborough	Create a community Center to provide the greater Hillsborough area with a facility for health and wellness of all ages and a gathering place.
Hillsborough	Water and Sewer Improvements Downtown	Downtown Hillsborough	Build out sewer and water infrastructure in Downtown Hillsborough
Hopkinton	Reconstruct Fair Grandstand	Hopkinton State Fair Grounds	Reconstruct Fair Grandstand currently in disrepair for the Hopkinton State Fair
Pembroke	Extend Loop Road	Cooperative Drive in vicinity of Associated Grocers	Extend loop road (Cooperative Drive) in the vicinity of Associated Grocers.
Pittsfield	Establish Welding School	Pittsfield	Establish a welding school creating a regional school for various entry - level welding skills (tube, structural and pipe)
Sutton	I-89 Exit 10 Gateway	Vicinity of Exit 10 in Sutton	Conduct a feasibility study to explore creating commercial gateway at Exit 10
Warner	Upgrade Sewer/Water Route 103 and I-89 Exit 9	Vicinity of Route 103 and I-89 Exit 9	Improve sewer and water service in the vicinity of Rt 103 and I-89 Exit 9.

Source: *Central Southern NH Comprehensive Economic Development Strategy, 2014*

The CEDS effort identified a wide range of needs, from key regional transportation projects to necessary water and sewer improvements in Bow, Epsom and Warner. Also included were key local economic development projects such as the proposed reclamation of empty lots for commercial uses in Bradford to the expansion of Storrs Street in Concord. The recommendations found in both the industry cluster analysis and SWOT include projects related to broadband improvements, education and the development of a regional web portal that would assist in making online business development information more widely available throughout the region.

SNAPSHOT OF THE ECONOMY

REGIONAL DEMOGRAPHICS AND TRENDS

While the region's main demographic trends are described in both the Regional Story chapter and Appendix A: Existing Conditions, the following data tables depict trends related to the regional economy. Local economic indicators, population projections, employment data, and information related to the workforce are provided in an effort to describe the region's economic base.

The Regional Workforce – An Opportunity

The regions' workforce is both older and highly educated. Those 45 years old and older account for nearly 50% of the regional workforce. The availability of a large, well-educated and potentially flexible workforce offers local employers a way to meet its needs in a non-traditional manner.

Median household incomes vary dramatically. Led by the towns of Bow and Dunbarton, 12 communities had household incomes, as estimated by the American Community Survey in 2012, that exceeded the State of New Hampshire's median household income of \$64,925. For comparison, the U.S. median household income over the same period was \$53,046.

Table 5.2: Regional Economic Indicators

	Population Estimate (2012)	Median Household Income (2012)	Individuals Below Poverty Level (2012)	2013 Labor Force	Unemployment Rate	
					2012	2013
Allenstown	4,307	\$53,103	7.3%	2,496	6.2%	6.1%
Boscawen	3,961	\$52,171	13.4%	1,963	5.6%	5.3%
Bow	7,603	\$104,315	1.9%	4,088	4.2%	4.2%
Bradford	1,652	\$63,162	4.5%	936	5.1%	4.8%
Canterbury	2,369	\$86,136	4.3%	1,411	3.8%	3.8%
Chichester	2,552	\$79,844	5.8%	1,502	4.3%	4.4%
Concord	42,630	\$53,567	10.9%	22,141	4.8%	4.8%
Deering	1,909	\$66,875	10.7%	942	5.8%	5.4%
Dunbarton	2,787	\$98,482	7.4%	1,719	4.1%	4.4%
Epsom	4,608	\$74,602	4.8%	2,537	5.4%	5.1%
Henniker	4,837	\$65,429	4.2%	2,405	5.4%	5.2%
Hillsborough	6,000	\$55,077	13.5%	2,800	5.9%	5.7%
Hopkinton	5,597	\$84,911	4.2%	2,942	4.2%	4.1%
Loudon	5,332	\$74,643	6.3%	3,083	4.3%	4.4%
Pembroke	7,129	\$62,099	9.5%	4,231	5.2%	5.1%
Pittsfield	4,094	\$56,019	18.4%	2,262	5.7%	5.4%
Salisbury	1,394	\$68,438	4.1%	844	4.8%	4.6%
Sutton	1,843	\$62,596	4.0%	999	3.5%	3.3%
Warner	2,841	\$65,288	6.0%	1,471	5.6%	4.7%
Webster	1,876	\$66,655	6.3%	1,089	4.5%	4.5%

Sources: *New Hampshire Economic and Labor Market Information Bureau, U.S. Census Bureau, NHOEP Population Estimates*

Another key economic indicator is the number of individuals in a community that are estimated to live below the poverty line. As estimated in 2012, Bow had the lowest poverty rate at 1.9%. In contrast, five

communities had estimated poverty rates in excess of 10% in 2012: Deering (10.7%), Concord (10.9%), Boscawen (13.4%), Hillsborough (13.5%) and Pittsfield (18.4%).

Modeling the Economic Impact of a Retiring Workforce

The Central New Hampshire Region is heavily reliant on an experienced workforce, especially in government jobs and public administration. Many of these experienced workers are age 55 or older, and the region's ability to replace this skilled workforce as they retire will have implications for region's economy.

An impact analysis was conducted using the Economic and Labor Market Information Bureau's New Hampshire Econometric Model – a REMI Policy Insight + [®] model. The scenario was developed to highlight the issue of an experienced workforce that is beginning to retire at a high rate, and how that rate of retirements may impact the regional economy.

There were 2,289 workers aged 55 to 64 in public administration in Merrimack County in 2012. This analysis evaluates two possible scenarios: one where the region is able to replace retiring workers and most of the retirees stay in the region, and another scenario that shows some of the impacts that could occur if these workers retire and they are not replaced by new workers.

In the first scenario, the region is able to replace this workforce and all of the economic benefits associated with it, and also adds the additional retirees, 75% who are assumed to stay in the region and continue to contribute to the economy through their income from retirement savings, pensions, and social security. This scenario shows a small economic gain from retirees who continue to live in the region, although these gains become smaller over time.

In the second scenario, 2,289 workers are removed from the Public Administration sector over a ten-year period, modeling the impact of these skilled workers not being replaced. These jobs being lost produce a multiplier effect of 1.3 to 1.4 jobs (including the job originally removed). Besides the primary loss in public administration jobs, the secondary impact of these job losses would be felt in all industry sectors, but particularly in Construction, Retail trade, Wholesale trade, and Healthcare and Social Assistance.

Measure	Scenario 1: Economic gains from retirees added to the economy, and their jobs filled by new workers	Scenario 2: Negative economic impact of losing jobs to retirement
Jobs	452 jobs gained by 2023	3,053 jobs lost by 2023
Economic impact	\$25.4 million above baseline economy (.29%)	\$189.2 million below baseline economy (2.1%)
Personal income	\$166 per capita	-\$245 per capita
Population	Gain of 1,521 residents	Loss of 1,641 residents

Source: [Economic Impact of an Aging State Government Workforce and Implications for the CNHRPC Region](#)

There is a negative economic impact for the loss of jobs through retirement. Any positive impact from retaining retirees is not enough to overcome the job loss. This highlights the importance of attracting and retaining a younger skilled workforce who will be able to replace the skilled workers lost through retirement.

Additional economic indicators identified in Table 5.2 are related to the region's labor force and recent unemployment rates. Unemployment rates for both 2012 and 2013 were compiled in order to portray recent trends, with the overall regional trend improving. In fact, 13 of the 20 Central NH Region communities experienced a decline in the unemployment rate between 2012 and 2013, led by the town

of Warner with a drop from 5.7% to 4.6%.

Population projections, based upon current trends, as prepared by the NH Office of Energy and Planning in coordination with the NH Regional Planning Commissions are also of interest when examining the region's economy. While the region is expected to grow through 2040, rates are not expected to equal past growth rates. Demographic trends such as rising median ages, fewer school-age children, and decreased in-migration have resulted in the lower projected increases.

Table 5.3: Population Projections, 2015-2040

Community	2015	2020	2025	2030	2035	2040
Central NH Region Communities						
Allenstown	3,922	3,536	3,623	3,697	3,741	3,752
Boscawen	4,017	4,097	4,198	4,283	4,334	4,347
Bow	7,523	7,576	7,762	7,920	8,015	8,038
Bradford	1,712	1,787	1,831	1,868	1,890	1,896
Canterbury	2,491	2,651	2,716	2,771	2,804	2,812
Chichester	2,611	2,718	2,785	2,842	2,876	2,884
Concord	42,633	42,847	43,900	44,793	45,329	45,462
Deering	1,903	1,914	1,955	1,985	2,001	2,002
Dunbarton	2,973	3,213	3,292	3,359	3,399	3,409
Epsom	4,739	4,947	5,069	5,172	5,234	5,249
Henniker	4,924	5,047	5,171	5,277	5,340	5,355
Hillsborough	6,499	7,069	7,219	7,332	7,392	7,394
Hopkinton	5,541	5,528	5,664	5,779	5,849	5,866
Loudon	5,628	5,984	6,131	6,256	6,330	6,349
Pembroke	7,041	7,011	7,184	7,330	7,417	7,439
Pittsfield	4,090	4,101	4,201	4,287	4,338	4,351
Salisbury	1,478	1,586	1,625	1,658	1,678	1,683
Sutton	1,947	2,072	2,123	2,166	2,192	2,198
Warner	2,796	2,776	2,845	2,903	2,937	2,946
Webster	1,981	2,105	2,157	2,201	2,227	2,234

Source: NH Office of Energy and Planning, NH Regional Planning Commissions

Table 5.4: Age Distribution of CNHRPC's Workforce 2000 & 2010

	% of Total CNHRPC Work Force in Age Category	
Age Category	2000	2011
16-24	14.3%	12.9%
25-34	19.0%	16.6%
35-44	28.6%	20.6%
45-54	24.1%	26.5%
55-64	10.7%	18.8%
65 & Older	3.4%	4.5%

Source: US Census 2008-2012 American Community Survey

The overall aging of the region's workforce is outlined in Table 5.4. Since 2000, the percentage of the workforce aged 45 and above has increased significantly, to nearly 50% of the overall workforce. The decline in the percentage of the younger workforce is consistent with concerns during the Plan's public input process regarding the loss of young workers to more metropolitan areas, and the combined increase in those 55 and older is notable.

The region compares favorably with both the state and nation with regards to educational attainment, specifically the percentage of those between the ages of 25 and 64 with a bachelors degree or higher.

Table 5.5: Educational Attainment Comparison, 2012

Age Category	CNHRPC		New Hampshire		United States	
	% High School Graduate or Higher	% Bachelor's Degree of Higher	% High School Graduate or Higher	% Bachelor's Degree of Higher	% High School Graduate or Higher	% Bachelor's Degree of Higher
18-24	75.0%	10.3%	76.2%	9.2%	74.5%	9.3%
25-34	87.1%	33.2%	91.0%	32.0%	87.5%	31.6%
35-44	95.7%	35.9%	92.2%	34.2%	87.5%	31.8%
45-64	94.0%	34.8%	92.3%	34.3%	87.8%	28.8%
65 & Older	86.4%	27.3%	83.7%	31.3%	77.9%	21.5%

Source: *US Census 2008-2012 American Community Survey*

Employment trends since 2005 reflect national trends and detail the impact of the recession on the economy, with overall regional employment approximately the same in 2013 as it was in 2005 as the recovery has been underway for several years. Employment in the goods producing sector (manufacturing, construction, agriculture, mining) was significantly higher in 2005 than in 2013, although the sector has slowly gained ground since 2010 (more detailed information regarding manufacturing trends can be found in Table 5.8). The services sector has also increased since 2010, although it did not decline as dramatically due to the recession. Overall, service sector employment increased by more than 1,500 employees over the period.

While overall government sector employment in 2013 was almost the same as in 2005, government employment has actually dropped by 761 since 2008, almost entirely the result of the decrease in state government employment in the region. Regional unemployment trends also mirror the overall economy, although the Central NH Region has had a consistently lower unemployment rate than the state of New Hampshire since 2005.

Table 5.6: CNHRPC Labor Force and Unemployment, 2005 through 2013

Year	Employment				Unemployment Rate		
	Goods Producing	Services Providing	Government	Total Employed	Unemployed	Unemployment Rate	
						CNHRPC	NH
2005	7,897	36,251	14,722	58,870	1,954	3.2%	3.6%
2006	7,553	37,248	14,983	59,784	1,993	3.2%	3.5%
2007	7,037	37,659	15,107	59,803	2,114	3.3%	3.5%
2008	6,862	37,482	15,302	59,646	2,304	3.6%	3.9%
2009	6,170	36,989	15,257	58,416	3,569	5.6%	6.2%
2010	6,172	36,885	15,279	58,336	3,525	5.6%	6.2%
2011	6,389	36,892	14,980	58,261	3,140	5.0%	5.5%
2012	6,477	37,548	14,730	58,755	3,064	4.9%	5.5%
2013	6,503	37,777	14,541	58,821	2,983	4.8%	5.3%

Source: *NHnetwork, NHES Economic and Labor Market Information Bureau*

The decrease in the number of manufacturing jobs in the region is depicted below in Table 5.7. It is estimated by the NH Employment Security Economic and Labor Market Information Bureau that the region lost nearly 1,500 manufacturing jobs between 2005 and 2010, from 5,420 to 3,921, and since that time has had a slight increase to just over 4,000 manufacturing jobs in the 20 community area.

Table 5.7: CNHRPC Manufacturing Employment, 2005 to 2012

Year	Number of Job Sites	# Change	% Change	# of Jobs	# Change	% Change
2005	174	-	-	5,420	-	
2006	171	-3	-1.7%	4,989	-431	-8.0
2007	168	-3	-1.8%	4,647	-342	-6.9%
2008	164	-4	-2.4%	4,520	-127	-2.7%
2009	155	-9	-5.5%	4,040	-480	-10.6%
2010	156	1	0.6%	3,921	-119	-2.9%
2011	156	0	0%	4,081	160	4.1%
2012	158	2	1.3%	4,119	38	0.9%
2013	156	-2	-1.3%	4,081	-38	-0.9%

Source: *NH Employment Security Economic and Labor Market Information Bureau, Covered Employment & Wages - Annual Averages*

A comparison of annual weekly wages by sector for the region and the State of New Hampshire also reflects the impact of the recession, especially related to wages in the goods producing sector that remained relatively static since 2007. While the evidence of the recovery can be seen, weekly wages in the Central NH Region are still behind the state averages for both the good producing and service providing sectors.

Table 5.8: CNHRPC and State of New Hampshire Annual Weekly Wages, 2005 through 2013

Year	CNHRPC Region			State of New Hampshire		
	Total (Private and Government)	Goods-Producing Industries	Service-Providing Industries	Total (Private and Government)	Goods-Producing Industries	Service-Providing Industries
2005	\$710.94	\$839.89	\$680.41	\$771.84	\$958.48	\$744.15
2006	\$741.40	\$874.30	\$711.67	\$816.30	\$1,013.11	\$780.04
2007	\$779.40	\$961.08	\$740.60	\$843.46	\$1,054.16	\$802.65
2008	\$800.88	\$961.30	\$758.28	\$863.66	\$1,074.60	\$821.93
2009	\$820.92	\$935.59	\$766.66	\$864.05	\$1,066.42	\$823.81
2010	\$829.03	\$971.17	\$780.06	\$883.88	\$1,119.47	\$841.75
2011	\$845.89	\$985.23	\$798.98	\$909.31	\$1,140.95	\$868.65
2012	\$858.51	\$1,004.99	\$816.82	\$928.33	\$1,152.07	\$893.72
2013	\$870.26	\$1,021.94	\$827.22	\$941.75	\$1,173.11	\$905.20

Source: *NHES Economic and Labor Market Information Bureau, Quarterly Census of Employment and Wages (QCEW) Program*

PROJECTED EMPLOYMENT

The NH Economic and Labor Market Information Bureau periodically prepares economic projections at the state, county level and regional planning commission levels. The most recent projections were developed through 2020 and are found below in Table 5.9. Overall, employment is expected to increase by approximately 10% over the ten year period, with the highest rate of increase expected in health

care, retail, government and services. It is interesting to relate the projections by industry classification to the potential clusters identified in the CEDS Industry Cluster Analysis, which again identified Business and Financial Services, Medical Services, Arts and Entertainment, and Information Technology as potential growth clusters, reinforcing the importance of targeting these industries. It is also important to note the projected increase in construction employment and the moderate expected increase in manufacturing has already been exceeded according to 2013 estimates.

Table 5.9: CNHRPC Employment Projections 2010 to 2020

Industry	Estimated 2010	Projected 2020	2010-2020 Change	
			Numeric	Percent
Goods-Producing Industries	7,139	7,665	526	7.4%
Agriculture, Forestry, Fishing and Hunting	1,320	1,346	26	2.0%
Mining	78	76	-2	-2.6%
Construction	1,820	2,249	429	23.6%
Manufacturing	3,921	3,994	73	1.9%
Subtotal (Goods-Producing Industries)	7,139	7,665	526	7.4%
Service-Providing Industries	53,399	59,429	6,030	11.3%
Utilities	275	257	-18	-6.5%
Wholesale Trade	2,833	3,154	321	11.3%
Retail Trade	7,360	8,002	642	8.7%
Transportation and Warehousing	1,034	1,034	-161	-15.6%
Information	429	450	21	4.9%
Finance and Insurance	2,585	2,748	163	6.3%
Real Estate and Rental and Leasing	577	654	77	13.3%
Professional, Scientific, and Technical Services	2,295	2,679	384	16.7%
Management of Companies and Enterprises	336	354	18	5.4%
Administrative and Support and Waste Mgt. Services	1,387	1,663	276	19.9%
Educational Services	5,577	5,902	325	5.8%
Health Care and Social Assistance	10,567	13,247	2,680	25.4%
Arts, Entertainment, and Recreation	919	1,072	153	16.6%
Accommodation and Food Services	3,615	3,853	238	6.6%
Other Services (Except Government)	3,263	3,671	408	12.5%
Government	10,347	10,850	503	4.9%
Subtotal (Services-Providing Industries)	53,399	59,429	6,030	11.3%
Self-employed and Unpaid Family Workers	5,267	5,530	263	5.0%
Total Employment	65,805	72,774	6,819	10.4%

Source: *New Hampshire Employment Security, Economic & Labor Market Information Bureau, June 2013*

ECONOMIC DEVELOPMENT EFFORTS IN THE REGION'S COMMUNITIES

While this Chapter has emphasized the regional economy and CEDS priority projects, economic development is truly a local issue. The following summarizes local economic development efforts and outlines several tools that have already been utilized by area communities.

LOCAL MASTER PLANS

Local master plans have a number of opportunities that can set the stage for economic development. The majority of the community master plans in the region have one or more goals or individual chapters that address the role of the economy in their community. Fourteen master plans (70%) in the region have goals that focus on providing economic opportunities and/or ensuring that such development does not detract from the community's identity or rural character. The region and its communities have a strong, local ethic when it comes to attracting small business that are in keeping with community character. Thirteen plans (65%) mention a balance between economic development and the current land use patterns in their goals. Twelve (60%) specifically identify the promotion of economic development in the master plan. Nine communities in the region have included all of these goals in their master plans.

Examples of provisions related to economic development throughout the region include:

To increase the diversity in the type of businesses within the downtown (Pittsfield),

To establish an Economic Development Committee to advise, implement, and coordinate economic development efforts (Warner),

To explore potential changes to the zoning and building code to allow more opportunities for business development (Pembroke),

To encourage businesses and a post office to locate to the Village area (Loudon),

To ensure that commercial and retail development has a positive impact on the environment, historic character, social character, and existing development patterns within the Town (Henniker),

To encourage tax revenue-generating businesses which retain community character (Deering), and

To focus the City's economic development efforts primarily on redevelopment of previously developed parcels (Concord).

LOCAL ECONOMIC DEVELOPMENT COMMITTEES

Approximately 50% of the region's communities have formed local economic development committees. General duties and mission statements vary by community, but generally relate to the promotion of economic prosperity, creating and retaining jobs, diversifying and expanding the tax base, and providing advice to boards of selectmen (or city council) on matters related to economic Development.

Some of the activities an Economic Development Committee (EDC) can undertake are as follows:

Concord Downtown Complete Streets Improvement Project

The Concord Main Street Project, scheduled to be completed in late 2016, is a transportation improvement/economic vitality project designed to convert Main Street from four lanes to two lanes while at the same time improving pedestrian amenities and the streetscape. The total cost of the project is estimated to be approximately \$11.5 million with \$4,710,000 of the project funded through a federal TIGER (Transportation Investment Generating Economic Recovery) discretionary grant. The project also includes improvements to other adjacent city spaces to promote Main Street as "a destination for residents and visitors alike."

Source: www.concordmainstreetproject.com

- Provide economic development support to boards and commissions. The EDC can comment on development applications pending before the planning board, zoning board of adjustment, and governing body of the community.
- Assist in the creation of an Economic Revitalization Zone (ERZ) administered by the New Hampshire Department of Resources and Economic Development. ERZ's can provide short-term, tax credits against business profits and business enterprise taxes for new and expanded business development, which creates new jobs.
- Coordinate with utilities on access to natural gas, telecommunications, and electricity for the business development areas.
- Participate actively in NH Department of Transportation projects to ensure that local economic development issues are addressed.
- Meet with land owners to identify available sites for development and to help market suitable sites.
- Establish an ongoing program to visit existing businesses to improve the climate for business growth.

Available Local Economic Development Tools

There are a number of tools available to local communities to assist in local economic development efforts, notably Tax Increment Financing (TIF) and the Community Revitalization Tax Relief Incentive (RSA 79-E). To date, three Central NH Region communities have developed TIF districts (Bradford, Concord and Pembroke), while four have adopted provisions of RSA 79E (Concord, Hillsborough, Hopkinton and Pittsfield).

Tax Increment Financing (TIF)

A TIF is used to finance public improvements with the incremental taxes created by new construction, expansion or renovation of property within a defined portion (district) of the community. After the TIF is established, a portion of the taxes generated from new incremental assessed value would be dedicated for use within the TIF district instead of being distributed to the general fund. Because 100% of the funds can be made available, a bond can be paid off much quicker than if general funds were used.

A TIF is a tool used to pay for improvements that can foster community development. Revenue generated will be used to overcome an obstacle to development (roads, utilities, etc.) for the benefit of the community. A TIF is most effective when new private development won't take place without the completion of certain public improvements.

The "rules" of a TIF include:

- Funds raised within a TIF must be expended within that same TIF district.
- A District may be enlarged.
- There is no limit to the number of TIFs in town.
- A TIF cannot have more than eight percent of the community's assessed value or more than five percent of the land area.
- All TIFs in a municipality combined cannot make up more than ten percent of the community's land area.

A TIF must be timed right, demonstrate value for the community, and have as many safeguards as possible (commitments from developers, etc.). It is important not to rush the process. The community need to know what the money will be spent on and how it will benefit the community before establishing the district, developing a plan, and bonding.

Steps for establishing a TIF district:

- Adopt the provisions of RSA 162-K (this gives the community the power to establish a district).
- Establish the district (RSA-K:5). This establishes the actual district.
- Adopt a Development Program and TIF Plan.
- Once these are established, bonding and construction can then take place.

RSA 79E: Community Revitalization Tax Relief Incentive

The adoption of the provisions of RSA 79E encourages investment in central business districts, neighborhood business districts, downtowns, and village centers. Its goal is to encourage the rehabilitation, replacement and active reuse of under-utilized buildings and, in so doing, to promote strong local economies and, promote smart, sustainable growth, as an alternative to sprawl, in accordance with the purpose and objectives of RSA 9-B (State Economic Growth, Resource Protection, and Planning Policy).

How RSA 79E works:

- In a municipality that has adopted this enabling legislation, a property owner who wants to substantially rehabilitate a building located in a designated district may apply to the local governing body for a period of temporary tax relief.
- The temporary tax relief, if granted, would consist of a finite period of time during which the property tax on the structure would not increase as a result of its substantial rehabilitation or replacement. In exchange for the relief, the property owner grants a covenant ensuring there is a public benefit to the rehabilitation or replacement.
- Following expiration of the finite tax relief period, the structure would be taxed at its full market value taking into account the rehabilitation or replacement.

The legislation requires a strong public process and grants communities substantial discretion:

- Any city or town may adopt this program with the majority vote of its legislative body.
- Applications by property owners are made to the governing body and are accompanied by a public notice and public hearing.
- The governing body may grant tax relief if the application meets the guidelines and public benefit test.
- The governing body may deny the application in its discretion: “such denial shall be deemed discretionary and shall not be set aside by the board or tax and land appeals or the superior court except for bad faith or discrimination.” (79-E:4 V)

A property owner can apply for the tax relief only if:

- The building is located in the community's downtown district (or equivalent neighborhood business district)
- The rehabilitation or replacement costs at least 15% of the building's pre-rehab assessed value, or \$75,000, whichever is less, and
- The rehabilitation or replacement is consistent with the municipality's master plan or development regulations.

PUBLIC SENTIMENT REGARDING THE LOCAL ECONOMY

CNHRPC staff attended numerous local events such as local farmers markets and festivals and hosted a number of sub-regional forums during the Central NH Plan's development process to seek input and identify resident's values and needs. The state of the economy was often a major topic of discussion during these sessions and in comments included in comment cards distributed during the process.

REGIONAL PERSPECTIVES FROM COMMENT CARDS AND REGIONAL INPUT SESSIONS

Responses on the comment cards were often related to the region's economic vitality, from the perspective of what residents like best about the area as well as what could be improved.

What Works?

Economic vitality, or aspects of economic activity, is the third most frequent response to "What do you like best about the area?"

- Enjoy downtown centers of commercial activity
- Support small, local businesses
- Business and job opportunities are available
- Diversity of the economy

Needs Improvement?

Economic vitality (or economic development) is the most frequent response to "What could make this area better?"

- More retail, restaurant, downtown business
- Economic and job opportunity
- Desire for controlled growth
- Lower taxes and balanced tax base
- More industry and business development

During the regional input sessions held in Bow, Hillsborough and Pittsfield, participants expressed an appreciation for the region's quality of life and noted that the area's natural resources and good schools can be used to promote the region and its identity. The theme of demographic change and how to attract and retain young people and families was also discussed, with the need for more job opportunities and a variety of housing choices emphasized.

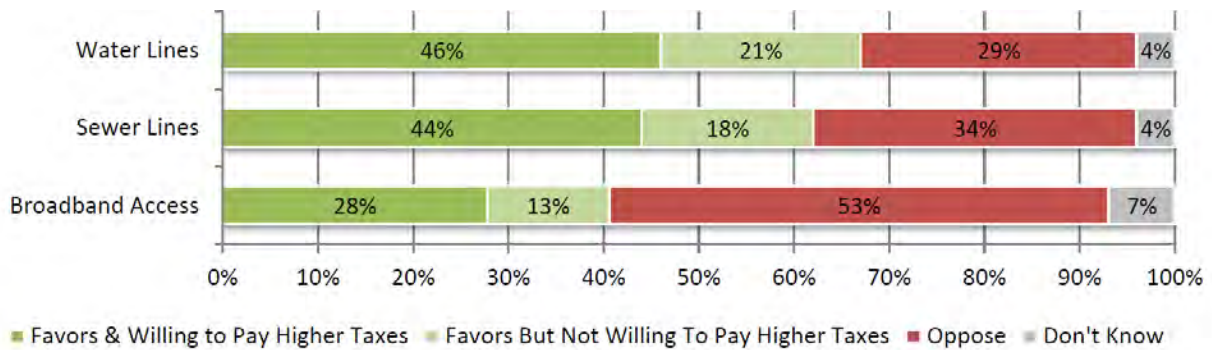
The availability of adequate broadband throughout the region was also identified as a key economic development issue, as was the idea that the region's downtown areas merit attention and are a reason for confidence as both younger workers and seniors are often attracted to more urbanized areas that are close to services, jobs and entertainment choices.

REGIONAL SURVEY

A 2013 telephone survey conducted by the University of New Hampshire Survey Center for the nine Regional Planning Commissions gauged residents opinions on a range of issues, including economic development. For statistical significance, residents in the Central and Lakes Regions were combined.

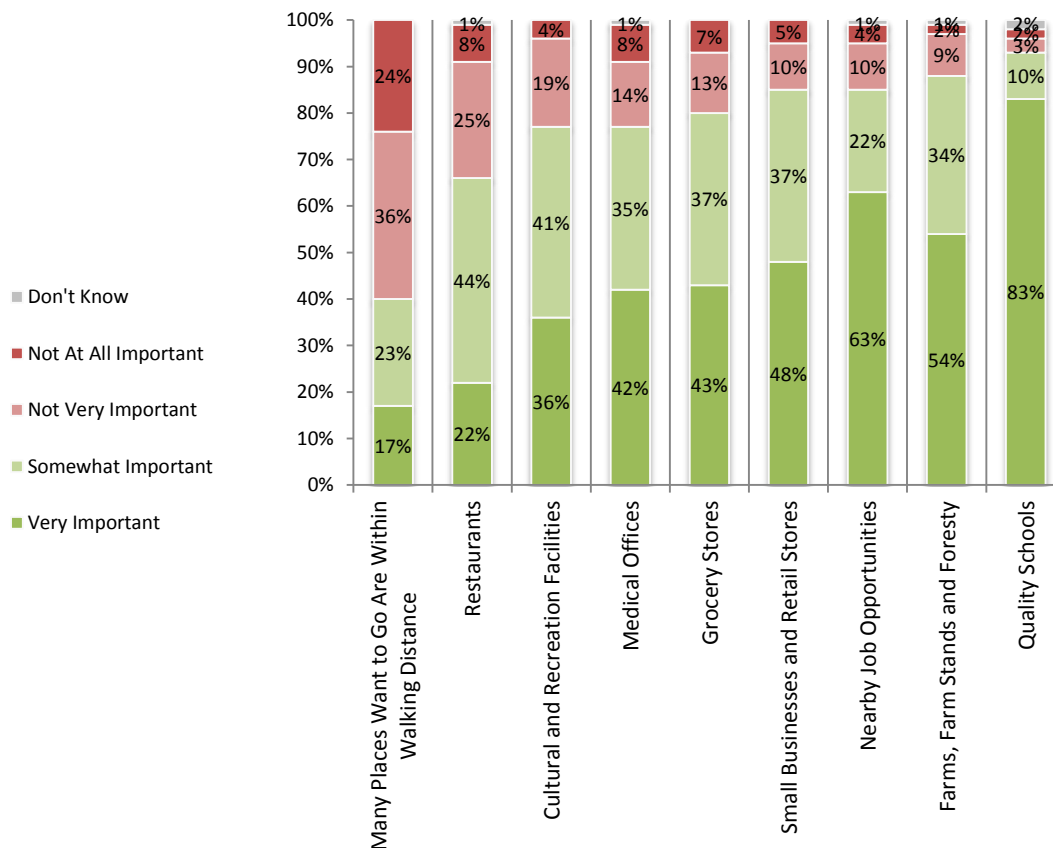
A key question included in the survey asked “What should be actively encouraged in your community?” Among the survey respondents, 84% identified “Expanding or Promoting Current Businesses,” and 77% selected “Attracting more non-polluting light industry.” As also described in the Natural Resources Chapter, two out of three residents favor using municipal funds to provide water lines to existing and potential development, followed by sewer lines and broadband access. Out of the 67% prioritizing water lines as the highest, only 46% are willing to pay higher taxes for it.

Figure 5.2: Favor or Oppose Using Municipal Funds to Provide Utilities for Development



Source: New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013

Figure 5.3: How Important is it to have in your Community?



Source: New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013

Finally, residents were asked their opinion on what was important to have in their community. Quality schools, nearby job opportunities, small businesses and retail stores were noted to be either very important or somewhat important to at least 80% of the respondents.

IMPLICATIONS FOR LOCAL/REGIONAL PLANNING: CHALLENGES AND OPPORTUNITIES

While the region has a number of inherent advantages beginning with quality of life, location and an educated workforce, there are also a number of challenges. The need to attract and retain a skilled workforce in light of demographic changes and the trend for younger workers to look elsewhere for education and employment, infrastructure needs including improved broadband in many areas, improved promotion of the region, and the clarification of public permitting processes were all identified as challenges and opportunities for the future.

CHALLENGES AND OPPORTUNITIES

Regional Broadband Needs

The Central NH Region is similar to other areas in the United States with a mix of rural and urbanized areas, a land use pattern that directly affects the availability of adequate broadband coverage. In much of the region, residents and businesses have a variety of choices regarding their broadband services to meet their current requirements. While those areas are served adequately, there are many smaller areas and neighborhoods throughout the Region that are underserved or unserved with regard to broadband, notably the communities in the region's northwest including Bradford, Salisbury, Sutton, Warner and Webster. In addition, there are areas of lower density throughout much of the remainder of the region that have inadequate broadband coverage as well.

While not the case in every instance, the typical set of circumstances that signify the inability to access adequate broadband services are based upon location, specifically the rural nature of a community, and the identity of the broadband service provider in a given area. Many Central NH communities have access to cable broadband or DSL provided by a variety of providers. At the time of the development of the Central NH Plan, areas in a number of communities will soon have access to fiber to the home (FTTH)

Brownfield sites in the Central NH Region

Brownfield sites are defined by the United States Environmental Protection Agency (EPA) as “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”

New Hampshire developed a Brownfields Program in an effort to encourage the voluntary identification of abandoned or run down sites known to be contaminated so to be addressed and remediated if needed. The Program allows owners of these sites to seek remediation funding assistance and other support by providing the ability to apply for federal grant money through the EPA's Brownfields State Response Program to help offset the costs for cleanup. The Capital Region Development Council (CRDC) maintains a cleanup revolving loan fund as well.

The EPA provides grants to municipalities and “regional councils” for the purpose of assessing assumed sites. The city of Concord has received assessment and cleanup funding in the past, and CNHRPC will pursue this funding in the future. If funded, municipalities could suggest local sites in need of assessment.

services. At the same time, many areas must still rely on mobile broadband services that are more expensive and generally not as reliable.

The lack of available or adequate broadband was a common theme during the Central NH Regional Plan public input process, and was discussed as a key economic development issue as well as a factor for young professionals and for home purchase decisions.

The improvement of broadband services in the region's rural areas is not an easy task. The issue of return of investment for a broadband service provider is often valid, so in some cases a more proactive approach on the part of a community (or group of communities) may be necessary in order to move forward with improved service. Beginning with the process to update cable franchise agreements where the provision of continued buildout in unserved rural neighborhoods may be discussed, communities can also investigate and promote the use of other technologies such as wireless broadband in order to better cover all areas of a community. CNHRPC is committed to supporting the work of local or sub-regional broadband advocacy groups to further the development of broadband services throughout the region.

Annual CEDS Update

Following the initial preparation of a regional CEDS, the document should be reviewed and updated on an annual basis. The process is designed to allow for annual updates of the priority project list and to evaluate the plan's implementation. The proposed addition of the City of Manchester to the existing 25 community CEDS area will be a fundamental issue to be discussed during the update. The City of Manchester currently has a stand-alone CEDS in place.

Potential Economic Development District Designation

Regions that have a Comprehensive Economic Development Strategy (CEDS) in place can apply to the US Economic Development Administration (EDA) for designation as an Economic Development District (EDD). The potential designation of an EDD covering the Central/Southern NH CEDS region represents an opportunity to provide a variety of services to both stimulate and support local economic growth. The designation, if granted, would provide several benefits that directly encourage economic growth:

- Technical Assistance and Training: An EDD can provide business training services for entrepreneurs.
- CEDS Annual Update: EDD's may receive funding directly from the EDA to periodically update the CEDS. This would ensure that it remains current and relevant.
- Infrastructure Assistance: An EDD can assist communities in developing financial packages and can assist in project management for infrastructure improvements.
- Regional Economic Advocacy: Advocating for the region and its economy is a key focus of many EDDs. From a regional website to "branding" the region, an EDD can provide an economic development voice for its communities.

With a board comprised of local citizens and members of the business community to guide its direction and economic development professionals on staff, an EDD represents a real opportunity to provide economic development assistance to local communities.

Clarification of the local planning/permitting process

The clarification of the public planning/permitting process was identified during the CEDS SWOT analysis. While this relates to the recommendation of improving online access to business development

information for the region's smaller communities, a key recommendation relates to identifying areas within local planning processes and regulations that could be clarified or streamlined.

A common example in the Central NH Region is the minor site plan review process. With the prevalence of home-based businesses in the region, the threshold for deciding if a proposal merits site plan review is a common point of discussion. The clarification of thresholds for planning board review, and options for waivers of plan requirements for minor site plan proposals are important elements of a straightforward and predictable plan review process.

The Regional Workforce

Although the lack of a research university in close proximity to the region is identified as a regional weakness in the CEDS SWOT analysis, the region's schools are clearly a regional strength and an opportunity for the future. In addition, an educated pool of older workers provides a major source of experienced labor for the region's employers.

A strong, available local workforce is another element of a region's competitive advantage. The close proximity of NHTI and the emphasis on 21st Century Skills in programs such as the recent efforts by the Pittsfield School District offer a great opportunity to grow the workforce from within.

New Hampshire Motor Speedway

Any discussion of the regional economy must include the impact of the 93,521 seat New Hampshire Motor Speedway (NHMS) in Loudon. Beyond the NASCAR Sprint Cup series held annually in July and September, NHMS hosts a variety of races and other events throughout the year. NHMS is a major draw for visitors and has a major economic impact on the region and the state of New Hampshire overall.

Regional Promotion/Web portal

The development of a regional brand and creation of a regional web portal as recommended in the CEDS process are two elements of a strategy designed to better promote the region. The region's natural resources and strong quality of life are opportunities to capitalize on, but it must be understood that the Central NH Region is competing with other similar regions for potential economic development opportunities. Beyond branding and the web portal, the promotion of the region's available commercial sites can also be enhanced through the development of a "certified sites program", similar to the *ReadySetGo!* Program developed by the Southern NH Planning Commission. The program essentially moves a site partially through the planning process in an effort to pre-certify commercial sites and assist in their marketing.

CENTRAL NH VISION – ECONOMIC DEVELOPMENT

A combination of what we heard from the surveys and public outreach sessions and what we know from research and data analysis/ trends and the work of the CEDS Strategy Committee during the preparation of the Central/Southern NH CEDS was used to develop the following vision for the region's economy.

"The Region has a diverse and thriving economy that takes advantage of the region's strong natural and cultural assets and builds on existing businesses while encouraging entrepreneurial opportunities and innovation"

The guiding principles that follow are focused on the refinement of this vision and build the foundation for the action items that are identified at the conclusion of this Chapter. These principles were formulated during the CEDS development process and are based upon the CEDS Goals and Objectives.

GUIDING PRINCIPLES

- Encourage economic development that is a “good fit” for the region and fosters a prosperous quality of life that provides opportunity and supports the needs of the region.
- Connect communities to a global economy with expanded and faster broadband and telecommunications.
- “Grow our own” by focusing on retention, expansion and fostering a climate of investment and economic opportunity in the region.
- Position and protect the quality of life as an asset of the region that can attract and retain employees, employers and visitors.
- Promote and develop new and existing businesses.
- Strengthen the regional identity as a good place for business, residents and tourism.
- Support and strengthen key regional industry clusters.

These guiding principles translate into the following actions items that also can be found in the Plan’s Implementation Chapter.

ACTION ITEMS

- Facilitate the expansion and upkeep of infrastructure, including but not limited to water, sewer, transportation, and energy related projects as identified in the region’s CEDS Priority Project list (see Table 5.1).
- Encourage efforts to clarify local governmental processes to foster a business friendly environment. Make various additional development information available online including property listings, demographic data, economic data, transportation data, etc.
- Encourage and provide support to communities to establish local economic development committees.
- Explore Regional Economic Development District (EDD) feasibility and possibilities.
- Develop a regional brand.
- Reinforce and strengthen regional industry clusters and industries of local importance, including the development of strategies for the expansion of complementary businesses and services.
- Expand telecommunications, broadband services and other information technologies throughout the region. Encourage communities to work together to address broadband needs on a regional or sub-regional basis.
- Encourage the assessment and cleanup of brownfield sites throughout the Central NH Region for reuse or redevelopment.
- Encourage home business expansion and development.

- Support the development of a strong, local workforce, including quality education.
- Encourage municipalities to identify and certify properties for use/reuse.
- Expand business technical assistance and development assistance services.

RESOURCES

CNHRPC/SNHPC (2014). *Central/Southern NH Comprehensive Economic Development Strategy (CEDS)*

Camoin Associates (2011). *Central NH Region Industry Cluster Analysis*

Arnett Development Group, LLC (2013). *Central/Southern RPC Economic Development Strengths, Weakness, Opportunity and Threat (SWOT) analysis*



INTRODUCTION

The Transportation Chapter's purpose is to provide a vision of the future and serve as a source of information related to local and regional transportation matters. This Chapter is based on an evaluation of the region's existing plans, transportation data, current challenges and an understanding of the potential for future growth and change in the region. This Chapter is based on the following important transportation principles:

- ➔ An integrated approach to transportation throughout the Central New Hampshire (NH) Region with particular attention given to transportation efficiency, safety, competitiveness, social inclusion and environmental sustainability;
- ➔ The region's principal transportation assets and strategically important travel corridors should be maintained, preserved and enhanced;
- ➔ Investment in the region's transportation infrastructure should be made in a sustainable and efficient manner in order to promote the economic well-being of the region and its populations;
- ➔ Future provision for transportation and infrastructure should involve regional coordination and be firmly integrated with multi-modal connections as well as the region's overall land use strategies.

CNHRPC Unified Planning Work Program

The Unified Planning Work Program (UPWP) is the agreement between CNHRPC and the New Hampshire Department of Transportation (DOT) that serves as a guide for transportation planning activities undertaken by the Commission over a two year period. The UPWP contains the outline of current CNHRPC activities related to the support of the CNHRPC Transportation Advisory Committee (TAC), the development of the regional transportation improvement program, the collection of traffic data, local and regional technical assistance, as well as participation in regional and statewide initiatives such as Commute Green NH and the NH Capitol Corridor Study.

EXISTING CONDITIONS

The regional transportation system is made up of an interconnection of roads, highways, bridges, rail, public transit, non-motorized pedestrian and bicycle facilities as well as airports. This extensive system provides residents, visitors and businesses with a high level of mobility. The transportation system forms the backbone that supports the region's economy. The surface transportation system enables the region's residents and visitors to travel to work and school, and frequent tourist and recreation attractions while providing its businesses with reliable access to customers, materials, suppliers and employees.

CONDITION OF THE REGION'S HIGHWAYS AND ROADS

The life cycle of the region's roads and highways is greatly affected by each municipality's road maintenance schedule and the DOT's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. Pavement condition measuring, reporting, and monitoring on state highways are based upon the Ride Comfort Index and additional pavement condition data. The 5.0-point scale Ride Comfort Index, or RCI, measures the roughness of a road traveled by a motorist. It has been used by the DOT since 1995.

"Good" is the equivalent of a score greater than 3.5 and requires no work; "Fair" is between 3.5 and 2.5 and requires some work; and "Poor" is defined as less than 2.5 and requires major work. Throughout the region, almost a third of state-maintained roads and highways have deficient pavements (see [Figures 6.1-6.4](#)). Currently 37% of New Hampshire's state-maintained roads and highways have pavement rated in poor condition. Another 44% of New Hampshire's state-maintained roadways are rated in fair condition, while regionally this percentage stands at 31% (See [Table 6.1](#))

Table 6.1: Central NH Region Pavement Conditions

Condition	CNHRPC	Statewide
Good	167 Miles (39% of Regional Network)	828 Miles (19% of State Network)
Fair	136.4 Miles (31% of Regional Network)	1,867 Miles (44% of State Network)
Poor	130 Miles (30% of Regional Network)	1,565 Miles (37% of State Network)

Source: DOT 2012 Pavement Condition Data

Roads rated poor show signs of deterioration, including rutting, extensive cracking and potholes. In some cases, poor roads can be resurfaced but often are too deteriorated and must be reconstructed. Roads rated in fair condition may show signs of significant wear and may also have some visible pavement distress. Most pavements in fair condition can be restored to good condition by resurfacing, but some may need rehabilitation or reconstruction to return them to good condition.

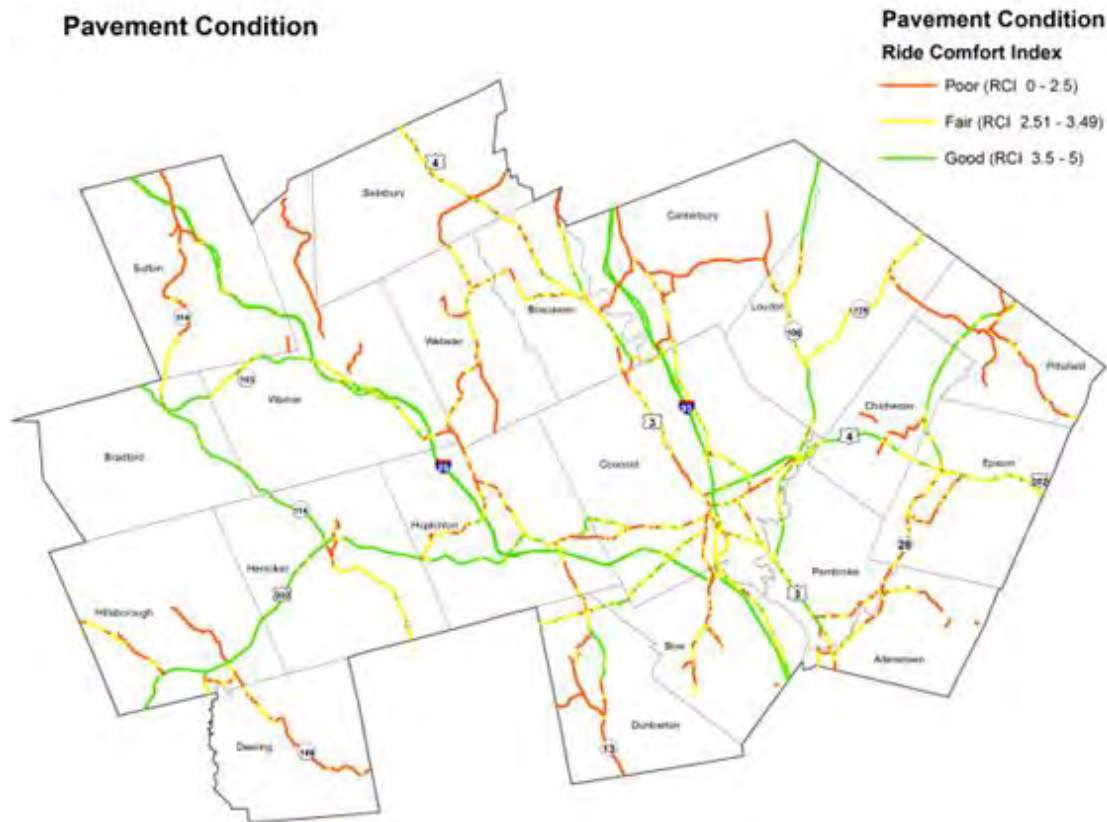
Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into the pavement and the crushed gravel that forms the road's foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them. This is why roads in relatively good condition are often resurfaced to keep them from deteriorating.

Figure 6.1: Poor Surface Condition – NH Route 127



Source: CNHRPC

Figure 6.2: DOT Pavement Condition Map



Source: DOT 2012 Pavement Condition Data

Figure 6.3 and Figure 6.4: NH Route 114 (Sutton) Winter & Summer Conditions



Source: Emilio Cancio-Bello (Town of Sutton)

The Road Information Program (TRIP), a national transportation research group, calculated that the additional operating costs borne by New Hampshire motorists as a result of poor road conditions is \$333 million annually, or \$323 per motorist per year. When roads are in poor condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear.

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs.

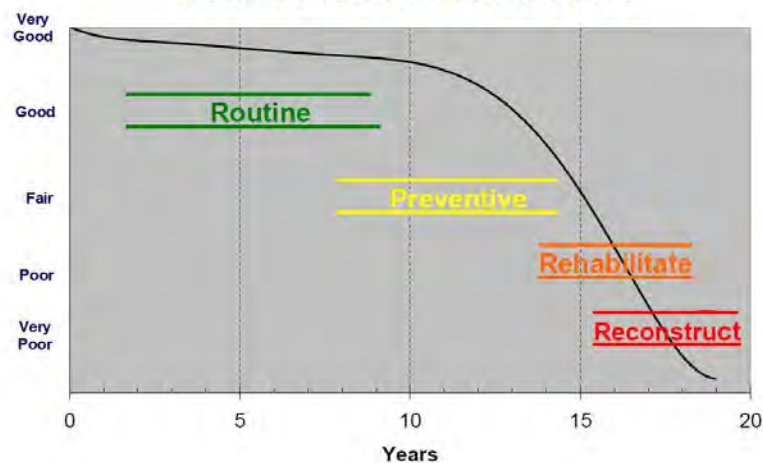
The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

Road Surface Management System

The Road Surface Management System (RSMS) is a methodology intended to provide an overview and estimate of a road system's condition and the approximate costs for future improvements. RSMS provides a systematic approach for local officials to answer basic questions about their road system, to gauge current network conditions and to guide future improvement and investment in line with municipal Capital Improvement Programs.

The RSMS system is based on the Road Condition Decline Curve below, which illustrates that roads in good condition cost less to maintain than those in poor condition. Routine maintenance on roadways in generally good condition is often the most important strategy to consider. According to the American Association of State Highway and Transportation Officials (AASHTO), every \$1 spent to keep a road in good condition avoids \$6-14 needed later to rebuild the same road once it has deteriorated significantly. Investing too little on road repair increases these future liabilities.

Figure 6.5: Road Condition Decline Curve
Road Condition Decline Curve



Source: RSMS 11

CNHRPC partners with member communities to put Road Surface Management Systems into action by providing training and assistance with data collection and database support. CNHRPC also works to integrate RSMS programs with the development and maintenance of Capital Improvement Programs which provide municipalities with a short-range planning schedule and financing plan.

BRIDGE CONDITIONS IN THE CNHRPC REGION

The region's state and municipally maintained bridges form key links in the state's highway system, again providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles.

Table 6.2 shows that five percent (5%) of the DOT owned and 22% of municipally maintained bridges in the region are red listed (See **figure 6.6**). DOT defines the Red List as bridges that require more frequent inspections due to known structural deficiencies, poor structural conditions, weight restrictions, or the type of construction.

Table 6.2: CNHRPC Region Bridge Network (10 foot span or greater)

	Statewide DOT Owned	CNHRPC Region DOT Owned	CNHRPC Region Municipally Owned
Total # of Bridges	2,138	242	168
Red Listed Bridges	147	12	38
% of Red Listed Bridges	6.9%	5.0%	22%

Source: 2014 DOT Bridge Summary

Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Currently there are eight (8) municipally owned bridges closed in the Central NH Region (See **figure 6.7**). Redirected trips generated by closed and restricted bridges can lengthen travel time, waste fuel and reduce the efficiency of the local economy.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, insuring that a facility has good drainage and replacing deteriorating components. But most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

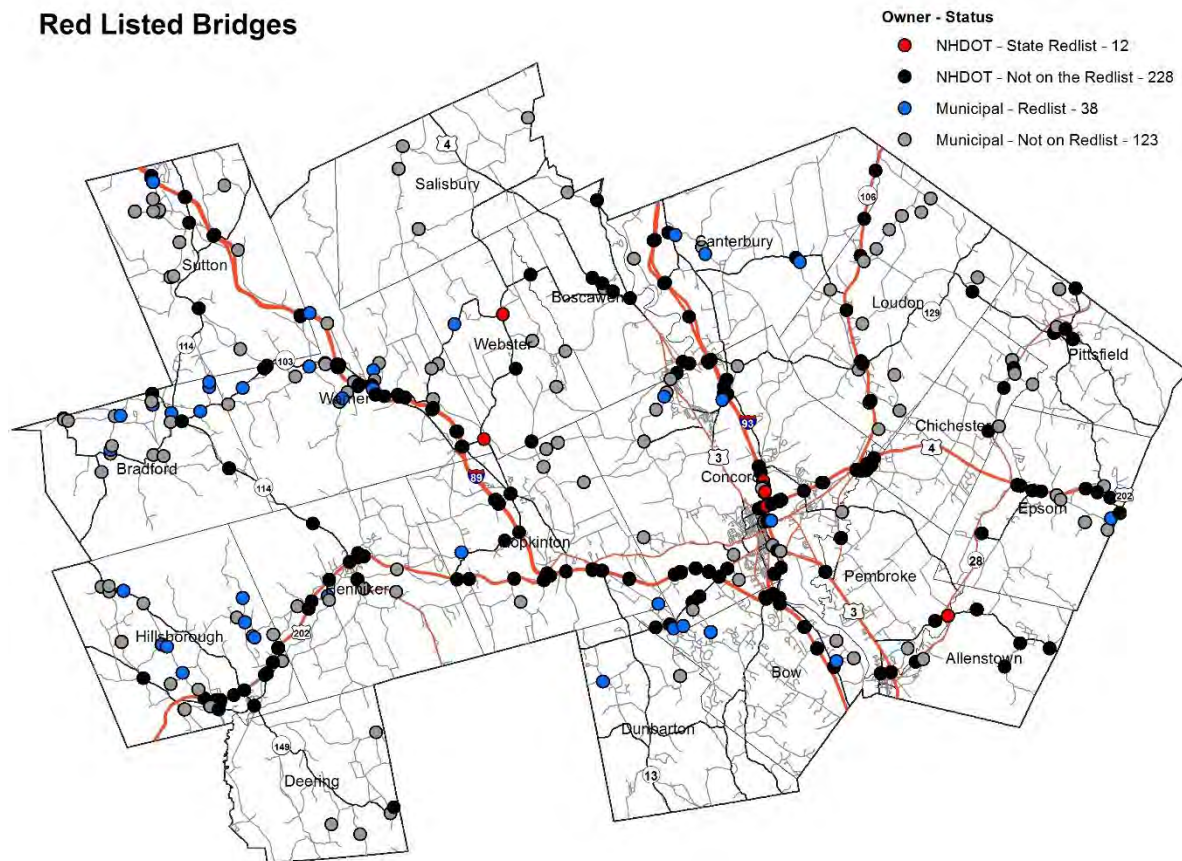
In 2012, the DOT identified 261 state owned bridges and 275 municipally owned bridges that were near red list status. The DOT estimates that each year more bridges will be added to the Red List than removed. Red list bridges see an average wait time of 8 years for repair, where previously it was 5 years. Those three additional years increase the cost of repair substantially. Funding constraints limit the amount of work that can be completed each year (see **Table 6.3**). At current funding levels, the number of structurally deficient, state maintained bridges is expected to increase by 15 percent by 2016.

Table 6.3: State Owned Red List Progress Chart

Year	Year Start Total	Number Added	Number Removed	Year End Total
2004	153	10	17	146
2005	146	7	13	140
2006	140	15	18	137
2007	137	9	9	137
2008	137	19	17	139
2009	139	26	23	142
2010	142	25	19	148
2011	148	17	25	140
2012	140	27	22	145
2013	145	23	21	147

Source: 2014 DOT Bridge Summary

Figure 6.6: CNHRPC Region Bridge Network



Source: DOT Bureau of Bridge Design

Figure 6.7: Closed Bridge, Western Avenue, Town of Henniker



Source: CNHRPC

VEHICLE MILES TRAVELLED

One of the principal factors in determining Vehicle Miles Traveled (VMT) is the number of vehicles on the roads. DOT has 11 permanent traffic recording stations in the Central NH Region and 62 throughout the state. Looking at the past twenty years, the data suggests traffic is increasing at about 1.0% per year. In the same twenty year period, traffic in the Central NH Region has grown at a rate of about 1.25% per year. However, in the past ten years the traffic volumes have decreased statewide at a rate of 0.45% and regionally at a rate of 0.15%.

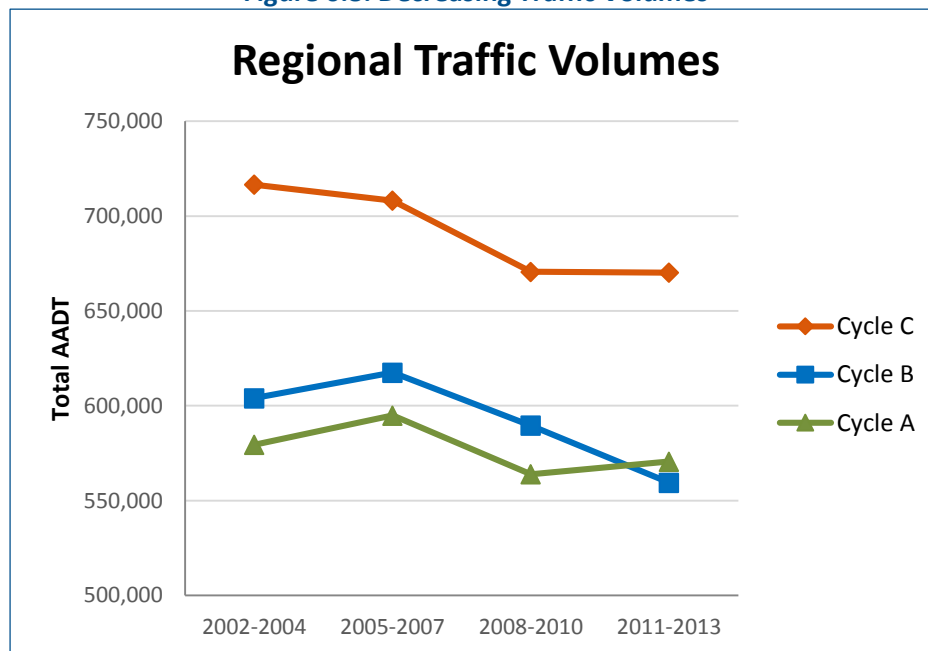
CNHRPC also conducts counts with automatic traffic recorders at over 350 locations on a three year cycle as part of the State's Highway Performance Monitoring System (HPMS). Looking at the total Average Annual Daily Traffic (AADT) between 2002 and 2013 the data shows an overall decrease in daily traffic throughout the region. The following table and graph display the total AADT from 2002 to 2013.

Table 6.4: AADT Totals and % Changes for HPMS Locations

Cycle A	2002	2005	2008	2011
AADT Total	579,443	594,867	563,885	570,597
%Change		2.59%	-5.49%	1.18%
Cycle B	2003	2006	2009	2012
AADT Total	603,976	617,526	589,537	559,420
%Change		2.19%	-4.75%	-5.38%
Cycle C	2004	2007	2010	2013
AADT Total	716,597	708,170	670,640	670,242
%Change		-1.19%	-5.60%	-0.06%

Source: DOT Traffic Volume Reports 2002-2013

Figure 6.8: Decreasing Traffic Volumes



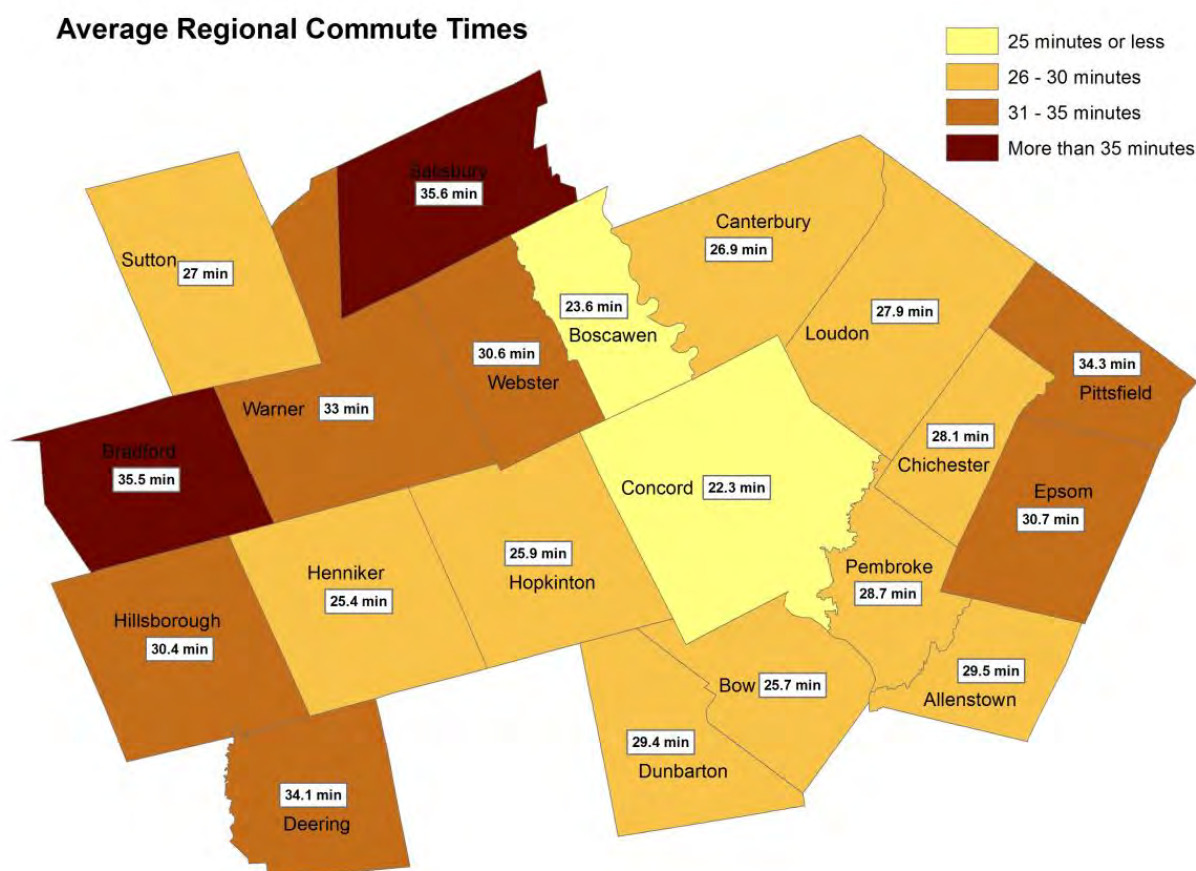
Source: DOT Traffic Volume Reports 2002-2013

Some of the underlying reasons for a decrease in traffic volumes over the past ten years include the change in driving patterns due to changing demographics, the price of fuel, a wavering economy and technologic advances that allow people to work and shop from home. With the economy recovering and population predicted to grow, albeit at a lower rate than in previous decades, it is possible VMT will rise over the next decade.

Based on 2010 data available from the U.S. Energy Information Agency (EIA), transportation makes up 26% of the total energy consumption in NH. 66% of the oil in NH goes to transportation and supplies 95% of the total energy used for transportation. The other 5% of energy consumed by the transportation sector comes from Natural Gas and Renewables. Automobiles are a significant contributor to air pollution and about 27% of greenhouse gas emissions in the US are attributed to the transportation sector.

The majority of Central NH Region residents make daily trips to work by car, and this percentage has increased in the most recent decades. Average growth of gasoline consumption per decade in NH is 35% while 80.3% of the region's residents drove alone to work (*American Community Survey 2007-2011*).

Figure 6.9: Average Regional Commute Times



Source: *American Community Survey 2007-2011*

REGIONAL TRAFFIC SAFETY

As seen in [Table 6.5](#) there were a total of 161 fatalities from motor vehicle crashes on the region's roads and highways from 2002 through 2012, an average of 14.6 fatalities per year.

Table 6.5: Motor Vehicle Fatalities by Year

Year	Central NH Fatalities	NH Fatalities
2002	23	127
2003	20	127
2004	20	171
2005	15	166
2006	8	127
2007	10	129
2008	13	138
2009	11	110
2010	16	128
2011	15	90
2012	10	109
Average	14.6	129.3

Source: *NH Department of Public Safety, Department of Motor Vehicles Crash Reports 2002-2012*

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. Roads with poor geometry, with insufficient sight distances, without turn lanes, having inadequate shoulders for the posted speed limits, or poorly laid out intersections or interchanges, pose risks to motorists, pedestrians and bicyclists.

At the state level, DOT has instituted a program entitled "Driving Toward Zero" in an attempt to reduce the number of traffic-related deaths in NH. Eliminating deaths on New Hampshire roadways is an important goal and the driving force behind the New Hampshire Driving Toward Zero campaign. The mission of Driving Toward Zero is to create a safety culture where even one roadway fatality is too many. It is also an important vision for all who travel on the region's roadways – by car, motorcycle, truck, bicycle and on foot – day and night, under all types of weather conditions. As part of the Driving Toward Zero campaign the state completed the *New Hampshire Strategic Highway Safety Plan 2012 – 2016*. The following nine (9) critical emphasis areas were identified in the plan:

- Impaired Driving
- Distracted Driving
- Speeding
- Vehicle Occupant Protection
- Adolescent Drivers
- Older Drivers
- Crash Locations
- Motorcycles and Vulnerable Roadway Users
- Comprehensive Safety Data Improvement

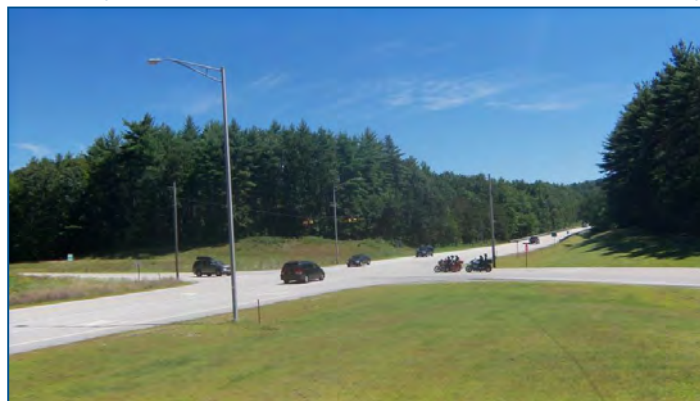
Highway Safety Improvement Program (HSIP)

CNHRPC is currently actively assisting member communities in obtaining Highway Safety Improvement Program (HSIP) funding for safety related roadway and intersection improvements in the region. HSIP primarily deals with the Crash Location emphasis area of the *New Hampshire Strategic Highway Safety Plan 2012 – 2016*. CNHRPC fully supports the following HSIP objectives for safety on the region's roadways:

- Reduce the number of traffic fatalities and serious injuries
- Reduce the number and severity of crashes
- Decrease the potential for incapacitating and fatal injuries

The process for which a project receives funding from HSIP for a roadway segment or intersection is highly dependent on data. If data warrants further examination a Road Safety Audit (RSA) is typically the next step. The RSA is a collaborative approach to review safety issues and make recommendations for improvements. A cost/benefit analysis is used to determine the best solution for improving safety at the road segment or intersection.

Figure 6.10: US202/NH9 & Old Concord Road Intersection Henniker/Hopkinton



Source: CNHRPC

The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, such as adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, widening and paving shoulders, adding rumble strips, improving intersection layout, and providing better road markings and upgrading or installing traffic signals.

NON-MOTORIZED TRANSPORTATION

Non-motorized transportation, including bicycling and walking, is increasingly being seen as a vital component to a transportation system and to healthy communities. The infrastructure, the presence and behavior of motor vehicle traffic, and the land use contribute to how conducive an area is to walking or biking. In the Central NH Region, sidewalks are primarily limited to town centers and villages where the land use is more favorable to walking for transportation. In New Hampshire, bicycles typically share the roadways with motor vehicles, and in some cases widened shoulders or bicycle lanes are provided. Most bicycling and walking infrastructure is funded by municipalities, or through federal transportation grants such as the Transportation Alternatives Program (TAP).

Although the private automobile is the predominantly used transportation choice in the region, CNHRPC continues to partner with many organizations from local Safe Routes to School (SRTS) committees to larger organizations like the NH Bike Walk Alliance to enhance bikeability and walkability in the Central NH Region. In line with the National SRTS organization, CNHRPC looks beyond just improvements to infrastructure by considering the 5 E's approach:

- Education - Teaching children and adults safe walking and bicycling habits
- Encouragement - Promoting events and activities based around safe walking and bicycling
- Evaluation - Collecting before and after data
- Enforcement - Partnering with local law enforcement to ensure safe roads for all users
- Engineering - Planning safe and convenient places to walk and bike

NH Obesity Prevention Program

According to the NH Obesity Prevention Program's 2011 Municipality Survey Report most residents don't have safe access to biking and walking infrastructure.

- Residents with sidewalks in their neighborhoods are 47% more likely to get regular physical activity.
- Nearly two out of three NH adults are overweight or obese
- One out of four NH high school students are overweight or obese

Safe Routes to School

In 2007 a community coalition led by Concord Hospital and supported by Concord School District assisted Conant Elementary and Rundlett Middle School to become the first schools in NH to receive a federal Safe Routes to School (SRTS) grant through the New Hampshire Department of Transportation to improve bicycle and pedestrian safety around the schools. Since then the federal SRTS program has awarded over 1 billion dollars around the country. New Hampshire alone received almost 10 million dollars for infrastructure projects dedicated to improving biking and walking for students accessing schools.

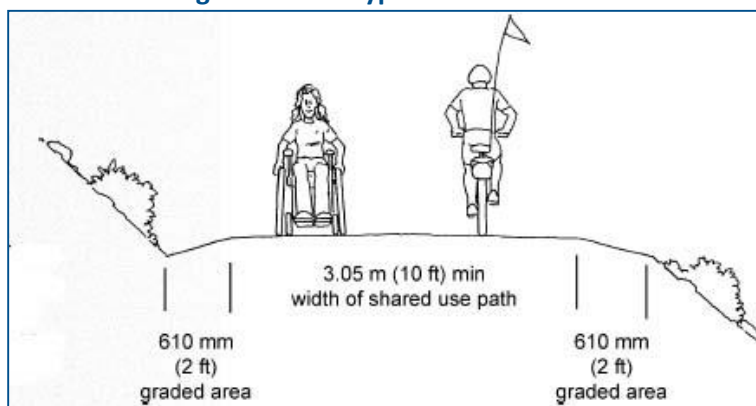
CNHRPC has worked with eleven of its communities to successfully administer SRTS grants ranging from small planning grants to the larger infrastructure grants. Local SRTS Task Forces comprised of school faculty, local officials, parents, business owners, emergency responders and supported by CNHRPC staff continue to educate, encourage and enforce safe walking and biking. Student, parent and teacher participation in walk and bike to school days has grown immensely in most of these towns. Several towns including Allenstown, Boscawen, Concord, Henniker, Hillsborough, Hopkinton, Pembroke, Pittsfield and Warner were awarded significant grants to improve pedestrian and bicycle infrastructure.

Rails to Trails and Shared Use Paths

In the Central NH region, shared use paths and rails to trails have become an increasingly sought after form of non-motorized transportation and recreation. Shared-use paths, typically 10 or 12 feet wide, with a paved or smooth hard packed gravel surface, are beneficial for safe bicycling and walking for people of all ages and abilities. Key characteristics include gentle grades, high accessibility (often Americans with Disabilities Act (ADA) compatible), and most importantly, separated from motor vehicle traffic. This expands the number of potential non-motorized transportation users by eliminating many of

the barriers to biking and walking. These facilities may also benefit economic development, health, and tourism.

Figure 6.11: A Typical Cross Section



Source: *CNHRPC & SNHRPC 2012 Regional Trails Plan*

Existing examples of shared use paths in the region include the Northern Rail Trail, which currently ends in Boscawen, the Warner Rail Trail, which is being completed in sections along the long-abandoned Concord to Claremont railroad, and a few short paths in Concord and Bow. Other projects in the region are in various planning and fund-raising stages. More details on the planned network of shared-use paths and rail to trails can be found in the “Regional Trails Plan 2012”, developed jointly by the CNHRPC and the Southern New Hampshire Planning Commission (SNHPC) and adopted by the Regional Trails Coordinating Council.

Figure 6.12: The Warner Rail Trail near Bagley Field



Source: *Joe Herr*

PUBLIC TRANSPORTATION

Public transportation plays an important and growing role in addressing the mobility, accessibility, traffic congestion, and air quality issues facing the region. Ridership on all forms of transit has seen significant growth in response to rising fuel prices and growing transit dependent populations. Still, the majority of the twenty communities in the region are not served by regular public transportation, and significant challenges exist to expanding services, including funding availability, and low density development patterns making fixed route service inefficient in many towns.

Concord Area Transit

Local public transit services are provided by Concord Area Transit (CAT), the City's local public transportation operator. CAT operates a combination of fixed-route and demand-responsive services locally within Concord. Demand response service also extends to local communities outside of the Concord city limits. Among these services, CAT operates three fixed routes on weekdays that are scheduled according to a downtown pulse model, wherein all three routes intersect at the State House/Eagle Square stop in the middle of downtown. As seen in [Table 6.6](#), even with a reduction in routes, the overall ridership for the CAT fixed route system has increased 2% over the last eleven years.

Table 6.6: CAT Ridership FY 2004 - 2014

Fiscal Year	Total Rides	% Change from Previous Year
2004	103,397	N/A
2005	93,831	-10.19%
2006	102,985	8.89%
2007	93,810	-9.78%
2008	99,612	5.82%
2009	102,489	2.81%
2010	88,286*	-16.09%*
2011	92,590	4.65%
2012	100,637	8%
2013	94,128	-6.92%
2014	105,610	10.87%

Source: [Concord Area Transit](#)

*Elimination of the trolley service and shift from four to three route service.

Specialized transportation services are also available to specific population groups, including seniors and persons with disabilities. CAT operates two specialized transportation services:

- *Concord Senior Transit (CST)* provides specialized service to the City's senior citizens. This service is intended to provide on demand accessible transportation to and from medical appointments, shopping, social activities, and employment and education opportunities. CST operates Monday through Friday from 7:30 am to 3:30 pm. The regular fare for CST services is \$1.00 per ride.
- *Special Transit Service (STS)* provides specialized service to persons with disabilities. It serves as the complementary American Disability Act component for the fixed route system providing demand-response service anywhere within $\frac{3}{4}$ of a mile of the CAT fixed route system. The fare for this service is \$2.50 per ride.

Figure 6:13: Regional Transportation Services

Source: [Concord Area Transit](#)

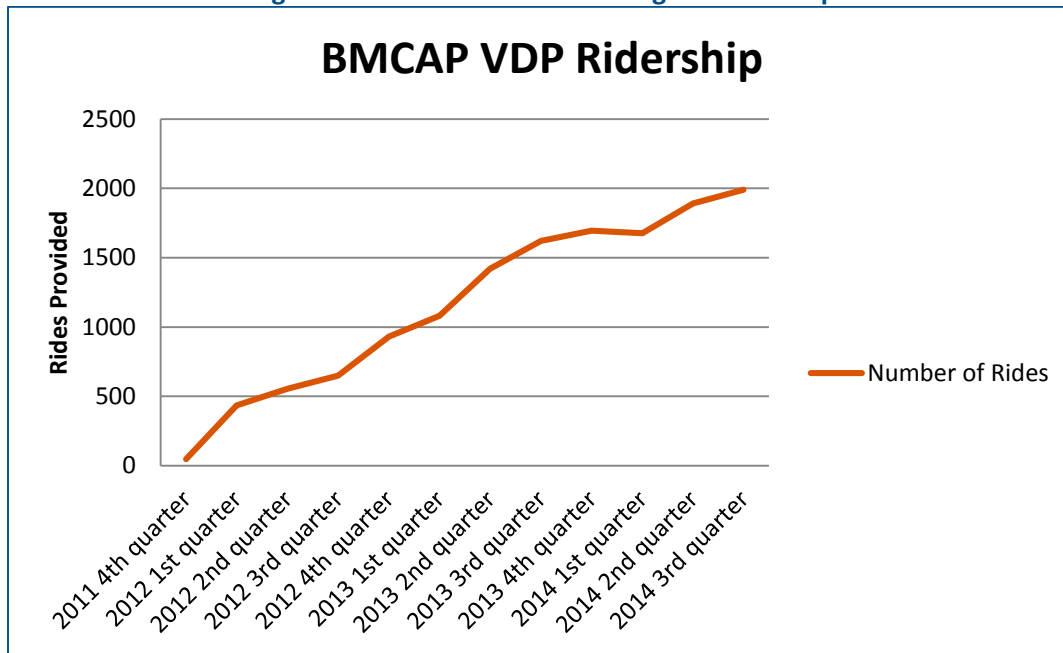
In addition to services provided directly by CAT, a number of community human service transportation providers also serve the Central NH Region. These services generally serve specific subsets of the general population, or offer services for certain trip purposes only, for example trips to and from essential social and human services. The need to provide transportation services to people who do not have access to reliable transportation options due to age, disability, income or other reasons has been identified as an issue in central New Hampshire for many years. In response to these issues, a Coordinated Transit & Human Services Transportation Plan was developed by the region's stakeholders in early 2010 with assistance from staff members from the CNHRPC.

This plan led to the formation of the Mid-State Regional Coordinating Council (RCC) for Community Transportation in 2010. One of the key roles served by the RCC is to increase coordination between transportation providers and users in the region. This coordination process is used to increase transportation services by building new community transportation services in the region.

Mid-State Regional Coordinating Council Volunteer Driver Program

Currently, the RCC, working closely with Community Action Program for Belknap-Merrimack Counties (BMCAP), coordinates an enhanced Volunteer Driver Program (VDP) in the region. The VDP augments and works with existing volunteer driver programs operating in and through these two counties to provide more extensive access to transportation. Volunteer drivers provide door-to-door service as well as feeder service to public transportation services and routes in the region. Since its inception in 2010 the VDP has continued to expand its vital role in providing essential services to the region's most transportation dependent populations. In 2014 the BMCAP enhanced VDP averaged over 600 rides per month and continues to grow.

Figure 6.14: Volunteer Driver Program Ridership



Source: *Belknap-Merrimack Community Action Program, Inc.*

Regional and Inter-City Public Transportation

Several inter-city bus connections utilize the Stickney Avenue Station in Concord as a hub for transportation in the region. The Stickney Avenue station is a large multimodal facility with over 300 parking spaces that also serves multiple passenger bus operations.

- Concord Coach Lines operates inter-city buses with daily service between Concord and Boston (including South Station and Logan Airport), arriving/departing roughly every hour. Concord Coach Lines also operates two buses daily that connect Concord with northern New Hampshire cities and towns, including service to/from Berlin (via Conway and Meredith) and to/from Littleton via Plymouth.
- Boston Express coach bus line provides service connecting Concord with South Station and Logan Airport in Boston via North Londonderry and Salem. Service travels on I-93 and operates daily service to Concord with departures and arrivals.
- Peter Pan Lines/Greyhound operates inter-city buses to/from major cities in the northeast. There are few direct services from Concord, although many destinations can be accessed through the wider service network.
- Amtrak operates daily Thruway Bus services that connect Berlin, Concord, Manchester and Boston.

Concord Express

In 2013 Central NH and Southern NH Regional Planning Commissions with support from DOT initiated the *Concord - Manchester Transit Feasibility Study* prepared by Steadman Hill Consulting, Inc. The impetus for the study was long known by local and legislative leaders who recognized the potential transit market between Concord and Manchester. The purpose was to develop a plan for proposed services that would effectively and efficiently meet the transportation/transit needs for residents in both regions. Funding was identified by Manchester Transit Authority and DOT to begin a pilot service for one year that involved twelve trips between downtown Concord, downtown Manchester and the Manchester Boston Regional Airport (MBRA).

Ridership grew steadily from 695 passengers in the first operating month of July 2013 to over 1,100 passengers in October 2013. It was noted that about 66% of riders were traveling just between downtowns. In February 2014 the route was augmented to better serve both downtowns by eliminating the MBRA stop but still offering the connection through a transfer. The demand for the intercity connection was documented in the Feasibility Study and recognized in the one year pilot study. Following the pilot service a continued service was funded that serves seven Weekday trips and three Saturday trips.

A Look Ahead at Public Transportation

Several taxi companies also operate within the region offering an additional transportation option for residents. Taxis are often the most expensive option but provide a level of convenience most other options don't have, including 24/7 availability. The rapid growth for need of widely available on-demand transportation services has created an industry based on new information and communication technology known as ridesourcing. Companies such as Lyft, Sidecar and Uber have developed smartphone applications connecting riders with community drivers. The drivers are typically not commercially licensed and receive a portion of the fare which is often less than a conventional taxi. These services have recently begun operating in some NH cities. As a fairly new transportation option in New Hampshire, the effects of ridesourcing are yet to be determined.

A long term, sustainable transportation funding source for transportation infrastructure in the region is essential. Along with investment in traditional transportation infrastructure, investments in alternative travel modes and better coordination between transportation providers will be essential in the region moving forward. Nationally, New Hampshire ranks 42nd in state funding to public transportation while towns and cities have difficulty in raising the money required to match federal funds for transportation infrastructure.

AIR TRANSPORTATION

The City of Concord owns and operates the 614 acre Concord Municipal Airport. The Airport was established in 1920 and functions as a general aviation airport and as a base for the NH Army National Guard 1159th Medical Company Air Ambulance on a 26 acre leased parcel. The Airport also serves as a base for the NH State Police Aviation Unit, the NH Civil Air Patrol, and a number of private airport related businesses. The Airport does not receive scheduled commercial air service which is primarily being provided from the Manchester Airport, 20 miles to the south, and Logan International Airport in Boston, approximately 70 miles south-southeast.

The Airport is anticipated to remain a general aviation airport for the foreseeable future. Total Annual Operations were 62,300 in 2004 and are forecast to grow to 85,400 by 2023. In 2004, a total of 92 aircraft were based at the Airport (including military). Of this total, 71% were small private single engine aircraft. The amount of locally based aircraft is expected to grow by 48% with a corresponding demand for hanger space and aircraft tie downs. The peak uses at the Airport are associated with NASCAR race weekends at the Loudon International Speedway and events at St. Paul's School in Concord.

The Hawthorne-Feather Airpark is located approximately three miles south of the town center of Hillsboro in the town of Deering. It is a private owned public use airport and has a single runway of 3,260 feet. The airport is a non-primary airport which is unattended and has limited services consisting of hangers, tie downs and a self-service fueling facility. The draft 2014 NH State Airport System Plan notes the airport is primarily used by local pilots for recreational use. The Federal Aviation Administration's Airport lists a total of 10 based aircraft and approximately 3,600 operations per year.

EXISTING RAIL SERVICE AND RAIL CORRIDORS

Rail transportation has historically played an important role in regions transportation system. Freight railroads have transported goods to and from businesses for years and continue to do so today, albeit in smaller quantities. Historically, Concord was the hub of the northern New England passenger rail network, at the junction of lines heading to the Lakes Region, northern New Hampshire, Vermont, Boston, and Montreal. Rail continues to play an important role in the regional freight transportation system, primarily serving businesses in Bow and Concord. Rail in the region has the potential to play a larger role in freight and passenger transportation in the future.

The New Hampshire Main Line (NHML) extends from downtown Concord southward to Boston. The New Hampshire section of the NHML is 39 miles long, running between Concord and the Massachusetts state line, passing through Bow, Hooksett, Manchester, Merrimack, and Nashua. It is owned by the Boston & Maine Corporation and operated by the Springfield Terminal Railway Company and the New England Southern Railroad. Local freight service between Manchester and Concord is provided by the New England Southern Railroad. This segment of track is maintained to Federal Railroad Administration (FRA) Class 1 standards, which permits a maximum operating speed of 10 mph for freight trains and 15 mph for passenger trains. The condition of the track surface, ballast, and ties on the NHML in Concord appears to be fair.

The Concord-Lincoln Line extends from central Concord through Canterbury and northward to Lincoln, a distance of 73 miles. Two tourist services and one freight railroad operate over this line, which is owned by the State of New Hampshire. Sections of the line including bridges and track were rehabilitated in 1996 using both state and private funds. According to the New Hampshire State Rail Plan 2001, the condition of the track surface on the entire Concord-Lincoln Line was "Poor to Good," the condition of the drainage, ballast, and ties was "Fair to Good," and the condition of the undergrade bridges was "Good." This segment of track is maintained to Federal Railroad Administration (FRA) Class 1 standards, with some sections meeting FRA Class 2 standards (which permits a maximum operating speed of 25 mph for freight trains and 30 mph for passenger trains.)

The Northern Line extends from central Concord northwestward to West Lebanon, a distance of approximately 60 miles. A majority of the Northern Line is owned by the State of New Hampshire. The section from Boscawren to Lebanon is currently a multi-use path primarily for bicycling and walking, and was purchased from the Boston and Maine Corporation in 1995. Two short segments of the line are in operation: a three-mile segment in West Lebanon and a six-mile segment in Concord.

The six-mile section of the Northern Line in Concord runs from Penacook to the junction with the NHML and the Concord-Lincoln Line. This segment is owned by the Boston & Maine Corporation and operated by the New England Southern Railroad. New England Southern currently has no freight customers on the line, but it is still considered active because it has not been abandoned. This segment of track is maintained to Federal Railroad Administration (FRA) Class 1 standards. The condition of the track surface, ballast, and ties on the Northern Line in Concord is poor, with many locations overgrown with vegetation.

Capitol Corridor Rail and Transit Study

The New Hampshire Capitol Corridor Rail and Transit Study is defining and evaluating opportunities to address transportation needs and preferences that involve transit and rail options in the 73-mile corridor between Boston, MA and Concord, NH

While MBTA commuter rail service currently operates between Boston and Lowell, there has not been commuter rail passenger service north of Lowell since it was discontinued in 1967. A public-private partnership, supported by the State of New Hampshire, operates roughly 50 daily bus roundtrips within the corridor between New Hampshire and Boston; this service typically carries 1,800 passengers per day.

Increasing transportation demand and growing concerns about mobility, economic development and quality of life have led the citizens and officials in New Hampshire and Massachusetts to explore options to improve transit service along the northern end of the Capitol Corridor. The NH Capitol Corridor Study is evaluating a diverse set of rail and bus options for improving connectivity in the Capitol Corridor by leveraging existing transportation infrastructure, including Pan Am Railway, Route 3, and I-93.

HIGHWAY CLASSIFICATION AND TRANSPORTATION FUNDING

The Federal Functional classification system identifies roads by the type of service provided and by the role of each highway within the state system based on standards developed by the US Department of Transportation. It reflects a highway's balance between providing land access versus mobility. The State-Aid classification system is the primary basis for determining jurisdiction in New Hampshire. Both classification systems are important for determining eligibility for funding.

Recognition of the principal function that a highway, road, or street is intended to serve can reduce potential conflicts between land use activities and traffic movements. The need for direct access to residential properties causes numerous left turn and crossover movements as well as ingress/egress movements, all of which slow and/or interrupt the smooth flow of traffic, while substantially increasing the potential for accidents to both pedestrians and vehicles.

In general, roads are classified as urban or rural based on US Census data, then as arterials, collector roads or local roads, based on function. The functional classification of the region's highways, roads and streets impacts the apportionment of federal funds. Roadways that are located on a Federal-aid Highway or that are designated as being part of National Highway System (NHS) are eligible for federal funds. Roads functionally classified as local streets or rural minor collectors are not part of the Federal-aid Highway System and are not generally eligible for Surface Transportation Program (STP) or NHS

funds. The NHS includes the Interstate Highway System as well as other roads important to the region's economy, defense, and mobility. In the Central NH Region, Interstates 89 & 93 are at the focus of the regional transportation network. Other important regional corridors such as I-393, NH Route 3A, NH Route 106 and US Routes 3 & 4 are also part of the National Highway System. Projects funded through these programs are generally initiated through New Hampshire's Ten Year Plan Process.

The Ten Year Plan (TYP)

The New Hampshire Ten Year Plan identifies and prioritizes the critical transportation projects in New Hampshire in an ongoing effort to address transportation needs at the local, regional and statewide levels. The TYP is updated every two years – allowing transportation priorities to be revisited, existing projects to be removed as appropriate and allowing new projects including, roads, bridges, transit, rail and aviation projects to be added.

With the previous TYP as a starting point, the Plan process includes input from individual communities, development of regional Transportation Improvement Plans (TIPs) by the Regional Planning Commissions (RPCs), numerous public hearings by the Governor's Advisory Commission on Intermodal Transportation (GACIT) and review and approval by the Governor and Legislature before it is adopted.

Performance measures and conditions such as pavement condition, bridge ratings, congestion levels, safety issues, economic impacts, user surveys and available funding levels are considered in determining project need and prioritizing project implementation.

The process to prepare the Central NH Regional Transportation Improvement Plan (TIP) begins with the CNHRPC soliciting project requests from local communities, followed by an evaluation process by the Planning Commission's Transportation Advisory Committee (TAC) where new and existing projects are prioritized.

The Regional TIP update process gives a clear indication of the different transportation needs in the Central NH Region. Just as the TYP is established as the transportation project guide for the state,

Senate Bill 367: Highway Funding



On May 20th 2014, Governor Hassan signed into law Senate Bill 367 (SB 367), a bill that increased the road toll or "gas tax" by \$0.042 (4.2 cents) effective July 1, 2014. The increase will generate approximately \$32-\$33 million per year that will be dedicated to Block Grant Aid, State Aid Bridge, bond debt service payments for I-93 and Betterment funds for the states secondary roads.

The funds will be distributed approximately like this:

Fiscal Year 2015 additional funds

- \$12M for secondary road reconstruction (Betterment)
- \$13M for secondary road resurfacing (Betterment)
- \$7M for existing State Aid Bridge projects to advance

Fiscal Year 2016 additional funds

- 12% of SB 367 revenue (about \$3.8M) in Block Grant Aid (BGA) to communities as required by State law. BGA is based on prior year revenue, so that is why there is no increase in Block Grant in Year 1
- \$13M for secondary road reconstruction
- \$8M for secondary road resurfacing
- \$7M for State Aid Bridge projects

Fiscal Year 2017-2035 (or when bonds are paid off)

- 12% (about 3.8M) in Block Grant Aid to communities as required by State law
- Bond debt service payments for I-93
- \$7M for State Aid Bridge projects

CNHRPC will utilize this regional TIP to full effect to plan for current and future transportation needs in the Central NH Region.

NH Route 114, Sutton

The update to CNHRPC's Transportation Improvement Program (TIP) in accordance with the State's FY2013-2022 Ten year Plan (TYP) update began with a solicitation for projects throughout the region.

Each project was given a priority rank by the Transportation Advisory Committee (TAC) based on many factors. During this evaluation, NH Route 114, the main north-south thoroughfare through Bradford and Sutton, arose as the number one priority of all projects in the region. Due to its extremely poor condition and important role in the region, it remained the number one priority in the TIP's list of projects for inclusion in the TYP.

Due to the federal functional class of NH 114 through Sutton it was noted that the rehabilitation project was not eligible for Federal Aid funds, the main source of funds for projects in the TYP. The TAC continued to support its inclusion in the TYP and representatives from Sutton attended multiple Governor's Advisory Council on Intermodal Transportation (GACIT) hearings where testimony was provided. The result of this engagement between CNHRPC's TAC, DOT and GACIT did not result in the project being included in the FY2013-2022 TYP due to the highways functional classification. The activism did however raise awareness of the project and the increasing need for State Aid funds to complete similar projects on roads in dismal condition throughout the state. DOT District 2 responded to the regional concern by moving the project up on its paving schedule completing the worst sections of the roadway over the course of several years.

UNDERSTANDING TRANSPORTATION: CHALLENGES AND OPPORTUNITIES

The region is impacted by national and global issues such as the price of fuel, changes in vehicle efficiency, national priorities and funding changes which are beyond the ability of a regional transportation plan to influence. The CNHRPC works to monitor these changes and suggest policies and actions that the municipalities, DOT, and the New Hampshire Legislature can enact and undertake in response to the broader universe of transportation. This section identifies areas where communities in the region and the state can improve its transportation system. This section discusses Transportation Demand Management (TDM) and the growing concern with Single Occupancy Vehicles (SOV), the interrelationship between Transportation, Land Use and Access Management, Complete Streets, regional demographic changes, key transportation funding issues for communities in the region including Urban Compacts and Highway Block Grants.

TRANSPORTATION ADVISORY COMMITTEE (TAC)

The regional transportation planning process in the Central NH Region is driven by bottom-up community participation through the Planning Commission's Transportation Advisory Committee (TAC). The TAC is an advisory committee to CNHRPC and is comprised of representatives from all twenty (20) Central NH communities. TAC representatives vary from municipal staff, such as town planners and road agents, to municipal officials, such as planning board members and selectmen. CNHRPC and DOT

work collectively to inform all members of the TAC regarding transportation at the local, regional and state level. The members act as liaisons between CNHRPC, municipal and state officials as well as the general public.

TAC Members provide input on transportation related issues and the needs of the local and regional communities in Central New Hampshire. This is done partially by assisting CNHRPC staff with the development of transportation related plans and programs. CNHRPC staff also work with the TAC to solicit and provide guidance on local projects such as Road Surface Management Systems (Page 6.4) and Road Safety Audits (Page 6.10). A well informed, well represented Transportation Advisory Committee is essential in regional coordination and the success of CNHRPC transportation planning activities.

SINGLE OCCUPANCY VEHICLES/TRANSPORTATION DEMAND MANAGEMENT

The prevalence of single occupancy vehicles (SOVs) increases traffic volumes, and places a greater demand on road infrastructure as the population grows. This pattern also means that individuals without access to an automobile can encounter serious mobility problems. According to the 2006-2010 American Community Survey, 81.6% of New Hampshire residents drove alone to work and only 8.2% carpooled to work. Looking to the future, there are ways in which local communities can work to reduce vehicle miles travelled and single occupancy vehicles throughout the region. Some initiatives include sidewalks, bike lanes, public transportation, ridesharing programs, and park and ride lots. These initiatives are typically known as Transportation Demand Management (TDM).

Commute Green New Hampshire

Commute Green New Hampshire (CGNH) is a partnership between the state's regional planning commissions, specific transit agencies, and several state agencies. CGNH is dedicated to encouraging and assisting people who wish to choose transportation options in place of driving single occupancy vehicles (SOVs). CGNH seeks to actively support the development and provision of strategies and policies to reduce travel demand across the state, and the provision of consistent and seamless services in the state's various regions.

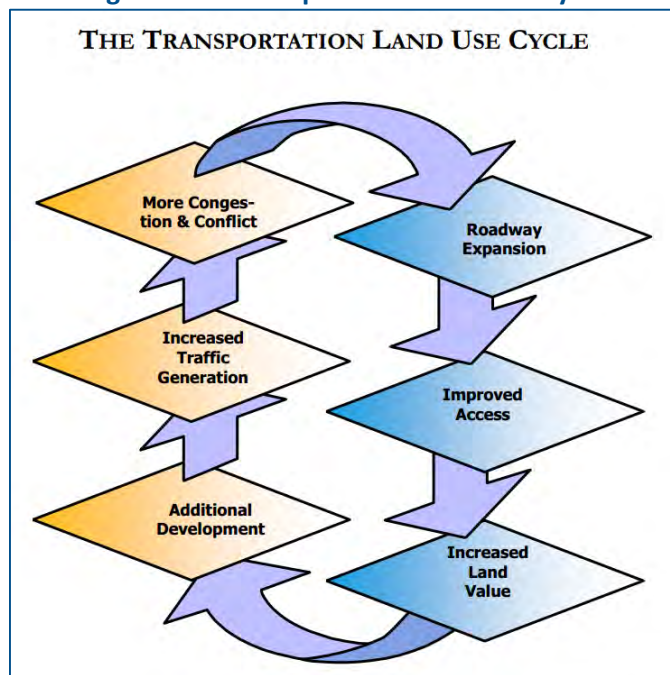
In 2013, CGNH received funding through the NH Charitable Foundation to undertake a strategic planning process. In addition to developing a model for working together to reduce the number of SOVs, priorities for the next couple of years were identified. These included assisting DOT with the management of its ride matching program and serving as a central source of information on TDM best practices and regional options. Additional TDM strategies can include vanpools, the development of bicycle related facilities such as bike storage areas, flexible work hours for larger employers and subsidizing the cost of transit fares.

More information on CGNH activities can be found at www.commutegreenNH.org.

LAND USE AND TRANSPORTATION

Transportation and land use are intimately linked. A transportation infrastructure project such as expansion of a highway can improve access, stimulating housing and employment growth in the communities it serves. As shown in [Figure 6.15](#), The Land Use Cycle, an increase in population or employment due to a land use change in a sparsely settled area can overwhelm the existing road system and require major investment in new or expanded infrastructure. Better coordination between land use and transportation can help communities develop while still achieving or maintaining their desired community character, and avoid unnecessary transportation costs.

Figure 6.15: Transportation Land Use Cycle



Source: NH Office of Energy and Planning

In the Central NH Region the introduction of heavy commercial or industrial facilities in areas with poor access to the main transportation corridors has resulted in heavy truck traffic on local roads that are not designed for the heavy loads. This has created maintenance problems and impacted residential neighborhoods. Communities must be prepared to ensure that development occurs in places that best fit the infrastructure and the community's needs.

Rapid growth and development is not one of the primary challenges facing the region at this time, but the land use and transportation connection should be kept in mind to ensure that the desired community character is achieved and maintained. If transportation and land use policies are not appropriately matched, there can be additional costs associated with expanding roads, costs of expanded utilities, traffic congestion, additional energy requirements, loss of open space, increased air pollution, and limited access for those who do not drive. A well balanced land use and transportation plan can support healthy communities and permit the types and scale of transportation modes and infrastructure that are desired.

ACCESS MANAGEMENT

Access management involves planning and coordination of the location, number, spacing and design of driveways and street connections from public roadways to adjacent land. Access Management programs can facilitate safe access for all users, reduce overall vehicle trips, preserve highway capacity, reduce travel delays and congestion, encourage compact development patterns, decrease energy consumption, improve access to adjacent land uses and preserve community character. In addition to aesthetics and environmental benefits, policies that encourage safer access to homes and businesses are more desirable to residents, costumers and business owners alike.

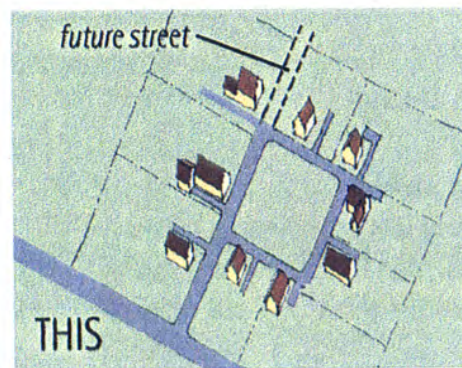
Subdivision regulations are an important step in creating a comprehensive access management strategy. Where the access management overlay district in a zoning ordinance may stipulate the minimum amount of frontage a parcel may have, the number of curb cuts a lot is entitled to, or the minimum

amount of acreage a lot must have, the subdivision regularity, where curb cuts will be located, and the configuration of the street network.

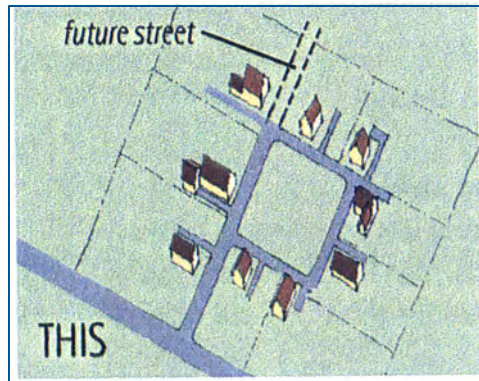
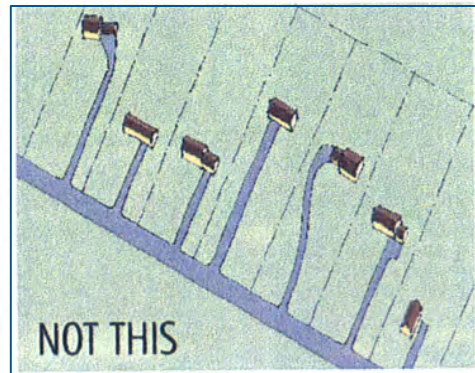
Access management principles that should be included in site plan regulations include provisions for:

- Shared / Common Driveways - Shared driveways reduce the number of access points, improving traffic flow and safety on the roadway.

Figure 6.16: Shared Driveways

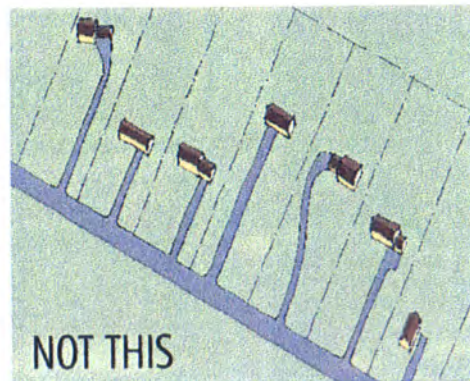


s for:



- Connect developments to the existing roadway network.
- On-site access management improvements.

Because access management is a critical part of site plan regulations, it is important to include provisions for:



from the *"Access Management Guidebook" 1996*

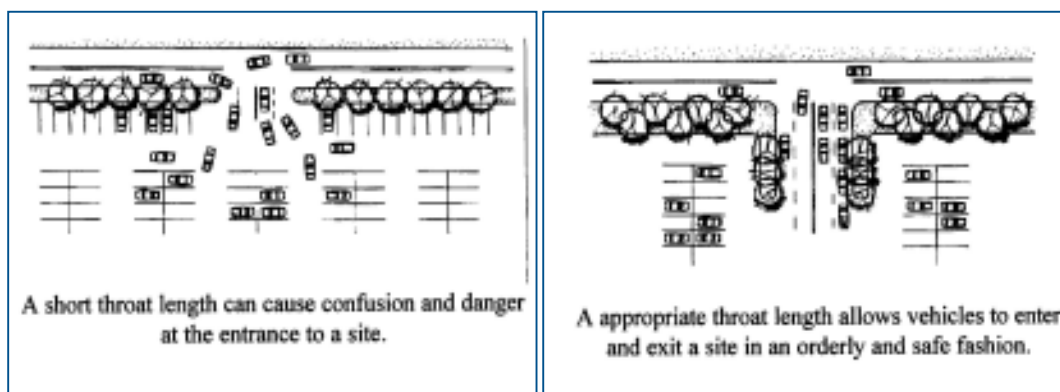
planners to make provisions to interconnect developments without accessing major roads.

Developments should provide all warranted right-of-way and other applicable roadway improvements to the impact of the proposed development.

Large multifamily or commercial developments, or the suburban development of such land uses, are a key.

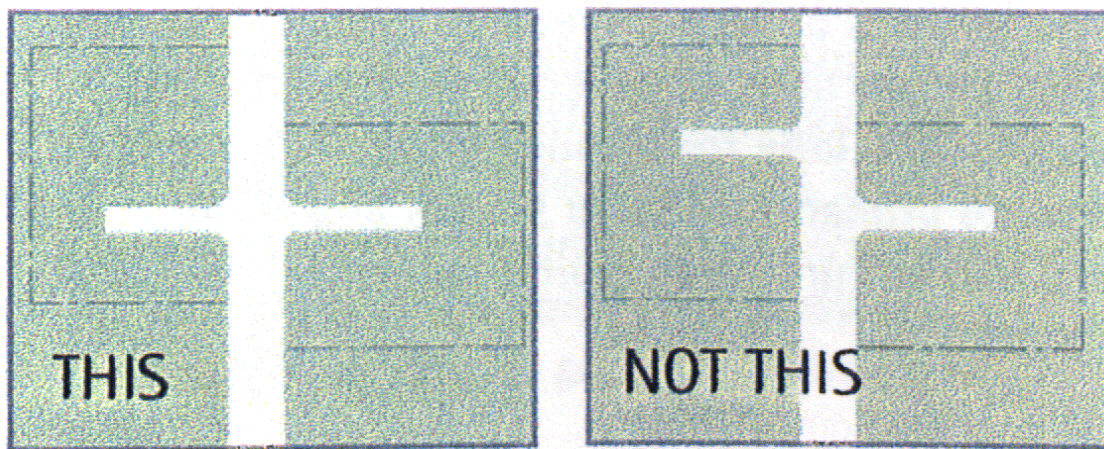
Access management principles that should be included in site plan regulations include provisions for:

- Shared Access Points - A simple strategy to reduce the number of driveways (curb cuts) along a roadway is to require abutting parcels to share access points.
- Interconnecting sites - Communities can require sites along major roads to provide rights-of-way or easements to interconnect sites thus serving to create parallel access roads
- Parking Lot Design - Locate parking on the sides or rear of the structure to improve the appearance of corridor. Planning board should consider environmental impacts as well as safety for pedestrians and cyclists when locating parking.
- Driveway Throat Lengths - It is important to define a minimum driveway throat length for commercial and large multifamily developments in order to help better define internal traffic movements

Figure 6.17: Driveway Throat Length

Source: *NH Route 16 Corridor Study*

- Medians and Turn Movement Restrictions - Medians and turn movement restrictions can help improve safety and reduce conflict by preventing vehicles from pulling out across multiple lanes of traffic.
- Corner Lots Access - By requiring properties located at intersections to access the road with a lower functional class, safety is enhanced and congestion and speed reductions associated with turning movements on the major roadway are reduced.
- Location and Spacing of Driveways - Communities should try to maximize safety and maintain traffic flow by using extensive spacing between curb cuts.
- Number of Curb Cuts per Lot - Communities should limit the number of driveways for parcels fronting major collector or arterial roadways.
- Sight Distance - Sight distance is crucial to ensure safe ingress and egress to properties fronting major roadways. Planning Boards should require the American Association of State Highway Transportation Officials (AASHTO) standards be applied for major driveway access.
- Driveway Alignment - Aligning driveways across from each other improves sight distance and reduces confusion. When alignment of driveways is not possible, then offset driveways at least 125 feet apart.

Figure 6.18: Driveway Alignment

Source: *Northwest Regional Planning Commission "Access Management Guidebook" 1996*

COMPLETE STREETS FOR ALL ROADWAY USERS

A Complete Street is a street that is designed, maintained, and operated to accommodate all users of the roadway, including drivers, service vehicles, transit vehicles and users, bicyclists, and pedestrians of all ages and abilities. This approach is especially well suited for the region's town centers, villages, and more densely developed areas.

It has historically been common practice for roadways to be designed primarily for the efficient movement of automobiles. This sole focus on automobile mobility created various issues, including increasing auto dependence, an environment not conducive to other modes of transportation, and a deteriorated sense of livability. By considering all users, streets are safer, more accessible, better for public health, and communities more livable. The approach can be used as a catalyst for economic development and business growth, especially in town-center areas.

Taking a complete streets approach can result in any number of roadway configurations that will vary depending on the character of the roadway, the land use and any additional constraints. The complete streets concept focuses not just on individual roads but on changing the decision-making and design process so that all users are routinely considered throughout the planning, design and construction phases as well as during maintenance and operations of roadways.

Figure 6.19: Fisherville Rd



Complete Streets, Fisherville Road (Rt. 3), Concord

Some of the key objectives of this road reconstruction project were to increase pedestrian and bicycle safety and access by updating existing and building new sidewalks while addressing safety concerns at key intersections. At the intersection with Sewalls Falls Rd. shown to the left, there is a bike lane as well as sidewalks with a crosswalk at the traffic signal. Other improvements to make Fisherville Road complete included adding bus stop pull offs along the road to accommodate transit, and five foot paved shoulders for bicycle travel. The success of this project contributed to the adoption of a city-wide complete streets policy in 2010, which helps guide the development and decision making of future transportation projects.

Source: [CNHRPC](#)

DEMOGRAPHIC CHANGE

The region's residents and businesses require a high level of personal and commercial mobility. To foster a high quality of life and spur economic development, it will be critical that the region, in concert with neighboring regions and statewide activities, provide a safe and modern transportation system that can accommodate future growth in population, tourism, recreation and vehicle travel for all users. The region's population grew to 115,160 residents in 2010, a 7.4% increase since 2000. While the population in Central New Hampshire is growing, the pace is expected to be much slower in future decades. However, there are specific demographic shifts within the existing population that will have a major impact on the region.

The Central NH Region, like the rest of New Hampshire, is aging at a faster rate than other regions across the nation. The rapid growth of the senior population over age 65 will have significant implications for

the transportation system. This growth in the senior population is projected to continue in the next two decades, driven by the aging of the baby boom generation. An implication for the transportation system is that, according to the American Association of Retired Persons (AARP), an estimated 20% of Americans over age 65 do not drive, and require transportation assistance.

Measured by miles traveled, seniors over age 70 are more likely to be involved in fatal crashes than most other age groups. This trend is particularly pronounced among seniors age 85 and over. According to the U.S. Department of Transportation's Fatality Analysis Reporting System (FARS), seniors age 85 and over are more than twice as likely to die in an automobile crash as younger demographics.

Surveys of seniors at the state and national levels indicate that a vast majority prefer to stay in their homes for as long as possible (one comprehensive survey administered by the American Association of Retired People (AARP) found that 88 percent of seniors preferred to age in place). This preference, particularly in the face of the region's fast-growing senior population and the dispersed nature of settlement patterns, will challenge policymakers to adequately meet the transportation needs of seniors over time so that they may maintain their quality of life.

KEY REGIONAL TRANSPORTATION PLANNING AND FUNDING MATTERS

As documented in the Regional Highways section of the TIP, the condition of a number of strategically important regional highways is of major concern. These roadways, typically falling outside of the classification for Federal Aid funding, are in extremely poor condition. Data on each of these roadways is readily available through DOT's Road Comfort Index as well as a number of Road Surface Condition Analysis completed by CNHRPC. Many communities are seriously impacted by the poor condition of the state's unnumbered state routes as well as sections of the states numbered routes such as NH 107, NH 114, NH 127, NH 132 and NH 149. Pavement conditions are extremely poor, and shoulders, in many areas, are non-existent.

Bow-Concord Interstate 93 Planning Study

The Bow Concord section of Interstate 93, from the interchange with Interstate 89 to Exit 16 off I-93, is marked by aging infrastructure and limited transportation options. The corridor is a vital link for statewide travel to the White Mountains and Lakes Region as well as an important local route within Concord and the Central NH Region. Currently the Bow-Concord I-93 Corridor neither meets the varied transportation and safety demands of interstate highway users, nor appropriately balances those demands with the interests of the Capitol Region communities.

The Bow-Concord I-93 Planning Study is a three phase study that aims to define existing problems, develop a range of alternatives for infrastructure improvements, prepare environmental documents, and design and construct the selected alternative. As part of Phase 2, CNHRPC is assisting Resource Systems Group with the development of a travel demand model using 2010 as a base year and developing transportation scenarios to compare to the "no build" alternative. This modeling effort extends beyond the I-93 corridor to cover the entire Central NH Region and will assist in the selection of the preferred alternative.

Highway Block Grant Aid

All communities in the Central NH Region are entitled to Highway Block Grant Aid funds. These funds are distributed by the State of New Hampshire on a yearly basis with partial disbursements made four times a year. The payments are made as follows: 30% in July, 30% in October, 20% in January and 20% in April with unused balances carrying over. The funds come from a portion of the total road toll and motor

vehicle registration fees collected by the State. The funds can only be used to fund or match funding for constructing, reconstructing or maintaining Class IV and V (town maintained) highways as well as equipment for maintaining local roads.

The funds are allocated from an annual apportionment of not less than twelve percent (12%) of the total highway revenues collected from the preceding year. Half of that total apportionment is distributed based on population and the other half is distributed based on Class IV and V road mileage. This comes out to approximately \$1,200 for each mile of Class IV and V highway and about \$11 for each person.

A second apportionment of funds is allocated from a sum of \$400,000. The formula for disbursement is based on the value of property and roadway miles. The formula is designed to give the greatest benefit to municipalities with low property values (on an equalized basis) and high road mileage.

To ensure each town receives the proper allotment it is crucial towns provide accurate information regarding Class IV and Class V road mileage. Highway Block Grant Aid distribution formulas do not take into consideration the condition of roads or the traffic on municipal roads.

Table 6.7: Highway Block Grant Aid Allotments

Town	FY12	FY13	FY14	FY15
Allenstown	\$ 98,000.50	\$ 76,842.83	\$ 77,185.42	\$ 77,754.91
Boscawen	\$ 83,939.91	\$ 73,283.93	\$ 73,364.39	\$ 73,679.73
Bow	\$ 217,036.75	\$ 185,999.03	\$ 188,115.42	\$ 189,662.50
Bradford	\$ 89,796.78	\$ 78,446.93	\$ 78,820.81	\$ 79,517.50
Canterbury	\$ 91,767.94	\$ 80,347.47	\$ 80,870.96	\$ 81,307.00
Chichester	\$ 89,634.48	\$ 77,564.18	\$ 78,285.71	\$ 78,797.71
Concord	\$ 858,256.71	\$ 750,129.30	\$ 752,607.48	\$ 757,385.02
Deering	\$ 96,117.87	\$ 81,467.77	\$ 82,117.54	\$ 82,617.75
Dunbarton	\$ 94,295.78	\$ 83,503.86	\$ 84,458.45	\$ 84,975.39
Epsom	\$ 126,514.53	\$ 108,573.97	\$ 110,728.57	\$ 111,641.17
Henniker	\$ 166,428.10	\$ 144,190.93	\$ 145,231.40	\$ 147,597.75
Hillsborough	\$ 170,730.32	\$ 149,560.75	\$ 150,437.55	\$ 150,855.11
Hopkinton	\$ 187,173.26	\$ 162,397.57	\$ 163,331.85	\$ 164,100.31
Loudon	\$ 168,604.45	\$ 146,429.16	\$ 147,183.49	\$ 148,971.39
Pembroke	\$ 166,211.58	\$ 141,835.66	\$ 142,321.65	\$ 143,173.27
Pittsfield	\$ 118,073.98	\$ 99,460.06	\$ 99,780.84	\$ 100,319.40
Salisbury	\$ 64,627.96	\$ 57,191.27	\$ 57,378.11	\$ 57,767.36
Sutton	\$ 108,648.62	\$ 94,108.97	\$ 94,595.25	\$ 95,235.94
Warner	\$ 128,259.64	\$ 110,107.73	\$ 111,038.24	\$ 111,657.54
Webster	\$ 69,330.67	\$ 61,810.52	\$ 61,463.41	\$ 61,803.74
Region Total	\$ 3,193,449.83	\$ 2,763,251.89	\$ 2,779,316.54	\$ 2,798,820.49
% Change		-15.57%	0.58%	0.70%

Source: *DOT Block Grant Aid Report*

As **Table 6.7** displays, a significant decrease in Highway Block Grant Aid has occurred in the region from Fiscal Year 2012 to Fiscal Year 2015. Although the funding dedicated to Highway Block Grant Aid will increase in the ensuing years due to Senate Bill 367 (Page 6.19).

Urban Compact

Sections of certain roads within the City of Concord are designed as “urban compact” roads by the DOT. NH RSA 229:5 V designates twenty-seven communities within the state with which the Commissioner may establish compacts, and within the CNHRPC region, only Concord is so designated. The Urban Compact agreements usually delegate responsibilities for the highway between the community and DOT, wherein the community is often responsible for snowplowing, street sweeping, and perhaps certain ordinary maintenance and the issuance of curb cuts for new driveways.

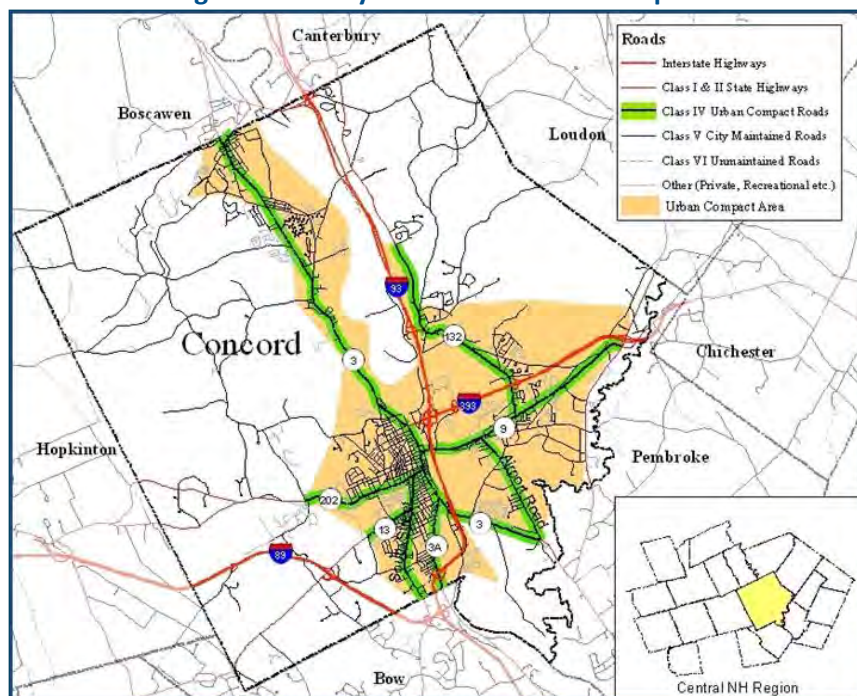
Currently, the City of Concord is responsible for maintenance of the following components of the National Highway System within the compact area:

- US Route 3
- US Route 3A
- NH Route 13
- NH Route 9
- NH Route 132
- US Route 202

Direct highway access to the NH State House, NH Office Park South and Hazen Drive are provided by the listed State and Federal Highways which are the responsibility of the City of Concord to maintain and improve. The City is also obligated to maintain access to State facilities on city streets including Storrs Street, Centre Street, Park Street, Capitol Street, Green Street, South Fruit Street, Airport Road, Pillsbury Street, Broadway and Liberty Street.

Projects within urban compacts are typically funded through the Municipal Urban Projects – Compact Areas (MUPCA) funds but may also be funded through other sources as best fits the project, such as CMAQ (Congestion Mitigation Air Quality improvement program), HSIP (Highway Safety Improvement Program) and Transportation Alternatives Program (TAP) being implemented through the Moving Ahead for Progress in the 21st Century (MAP-21) Federal Transportation legislation.

Figure 6.20: City of Concord Urban Compact



Source: *CNHRPC*

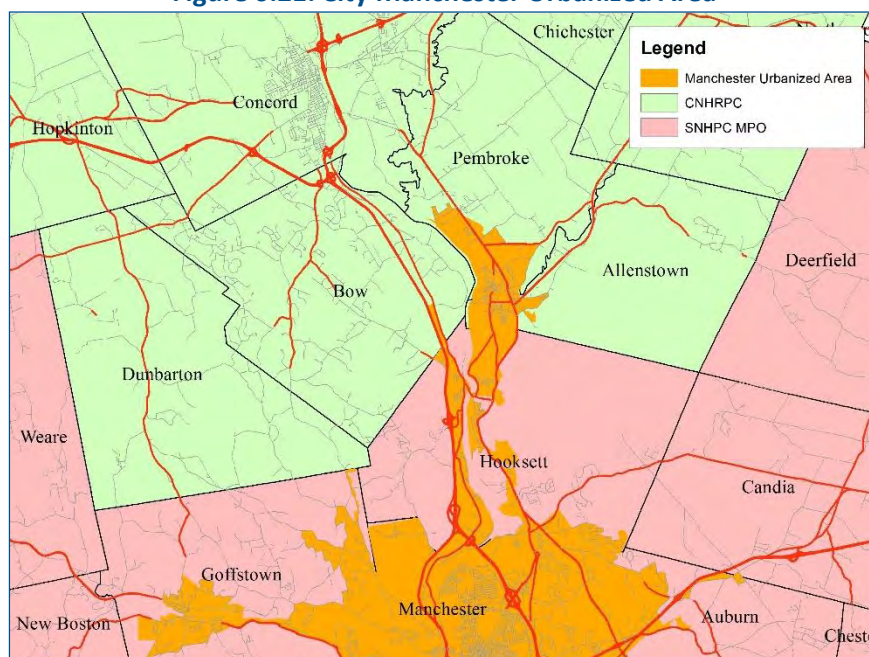
Due to their location within the urban compact, improvements to state and federal numbered routes are not eligible for Federal Aid funding through the State Ten Year Plan. When considered from a local, regional and statewide perspective these routes are a high priority and comparable efforts should be made to maintain and improve the functionality and performance of these roadways.

Manchester Urbanized Area

As a result of the 2010 US Census, the Manchester Urbanized Area (UZA) boundary was extended to include areas in the town of Bow along NH 3A and into the towns of Allenstown and Pembroke along the US3/NH 28 corridor. The inclusion of these areas within the CNHRPC region has resulted in the necessity to modify the Southern NH Planning Commission Metropolitan Planning Organization (MPO) boundary to include those areas. The following provides some background on the issue and outlines the approach that will be taken to meet federal requirements that have been triggered as a result of the modified UZA boundary.

- Participation in the Metropolitan Planning Organization – The Southern New Hampshire Planning Commission (SNHPC) is the designated MPO for the Manchester Urbanized Area and the Central New Hampshire Regional Planning Commission is the Regional Planning Commission for the towns of Allenstown, Bow and Pembroke.

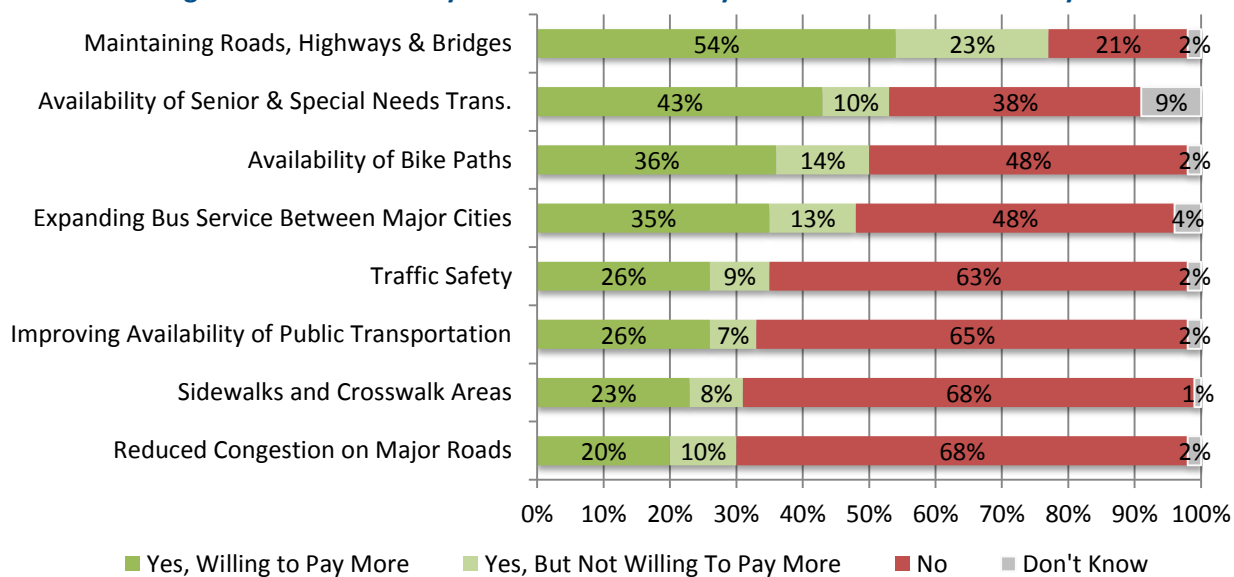
Allenstown, Bow and Pembroke are to be designated as voting members of the SNHPC MPO in order to ensure that they are allowed every opportunity to actively participate in a 3-C (continuing, cooperative and comprehensive) planning process for the Manchester UZA. In addition, the three communities will be invited to become voting members of the SNHPC TAC in order to actively participate in the MPO planning process for the Manchester UZA. CNHRPC will continue as a non-voting member of the SNHPC TAC.
- Coordination related to Plans and Projects – Federally funded transportation improvement projects or other regionally significant projects located in those portions of the towns of Allenstown, Bow and Pembroke within the Manchester UZA will appear in both the CNHRPC and SNHPC Transportation Improvement Programs (TIP) and long-range regional transportation plans. Staff from each agency will communicate regularly, share information, and meet as needed to achieve the required level of cooperation and coordination. Particular regard to this coordination should be carried out for projects, plans and programs within or including the portions of the Manchester UZA in the towns of Allenstown, Bow and Pembroke.
- Air Quality Planning – Portions of the Southern New Hampshire area were designated as non-attainment for ground level ozone by the US Environmental Protection Agency in April of 2004. The area was re-designated as “unclassifiable/attainment” in May of 2012 taking effect in July, 2013. SNHPC currently maintains a regional travel demand model which is used for air quality planning in the SNHPC MPO area. In order to continue to utilize the SNHPC regional travel demand model for air quality planning, the model will be updated to incorporate at a minimum the towns of Allenstown, Bow and Pembroke

Figure 6.21: City Manchester Urbanized Area

Source: CNHRPC

PUBLIC OPINION ON TRANSPORTATION IN THE CENTRAL NH REGION

A survey conducted by the University of New Hampshire Survey Center, published in July of 2013, surveyed a diverse group of almost 3,000 residents around the Central and Lakes Regions of New Hampshire. As seen in **Figure 6.22** more than three-fourths (77%) of respondents thought that policy makers should invest more money in maintaining roads, highways and bridges.

Figure 6.22: UNH Survey - Where Should Policy Makers Invest More Money

Source: UNH Survey Center

Key Findings:

- Households earning over \$90,000, households with children, those aged 30 to 39 and those who have completed postgraduate work are *more likely* to want investment in the availability of bike paths.
- Household with children and those aged 30 to 39 are *more likely* to want investment in sidewalks and crosswalk areas.
- Young people (18 to 29) are *less likely* to want investment in maintaining roads, highways and bridges and reducing congestion levels and improving senior and special needs transportation.
- 83% of residents support their community actively promoting safe places to walk or bike

LOCAL MASTER PLAN PERSPECTIVE

Each of the twenty municipalities in the Central NH Region have developed master plans with specific goals pertaining to transportation. The following transportation themes are prevalent throughout the region's master plans:

- Ensuring the community provides and maintains a transportation system that functions safely and efficiently
- To support non-motorized users through providing and maintaining safe walking and bicycling infrastructure
- To maintain and expand roads in such a way that the needs of the municipality are met yet do not detract from the character of the community
- To establish and maintain a program to review transportation infrastructure and to plan recommended improvements

A VISION FOR THE CENTRAL NH REGION TRANSPORTATION SYSTEM

The following vision for transportation is based on an extensive public outreach program involving the region's transportation users.

"A balanced, sustainable and diverse transportation system that is operated and maintained to ensure residents have safe, reliable choices for travel needs."

The challenges that the region faces – limited fiscal resources; changing weather patterns; the pursuit of greater economic stability and prosperity; mobility needs; an aging population and aging infrastructure; cultural and environmental resources at risk – require that transportation planning incorporate additional perspectives. Land use planning and regulation, public health, environmental protection, human service needs, and operation and maintenance approaches must be considered in the regional transportation planning process.

GUIDING PRINCIPLES

The following goals are based on the guiding principles that build the foundation for the action items that are identified at the conclusion of this Chapter. The goals were developed with assistance from the CNHRPC Transportation Advisory Committee.

General Regional Transportation Goals

- To assist in the development of a safe, efficient, accessible and coordinated multi-modal transportation system that provides for cost-effective movement of people and goods within and through the region.
- To contribute to the planning for a transportation system that promotes consistency between transportation improvements and state and local land-use, environmental and economic development initiatives.
- To promote long-range transportation improvements in the region while continuing to emphasize the importance of maintaining and preserving the existing transportation system.
- To assist CNHRPC member communities in identifying and providing access to available private and public sources of funding for transportation improvements while contributing to the achievement of regional transportation goals and objectives.
- To continue to explore and implement information and communication sharing technologies that help to maximize the efficiency of the transportation system.
- To encourage and facilitate public and private participation in the development of ridesharing, park and ride lots, Transportation Management Associations (TMAs) and other Transportation Demand Management (TDM) techniques.
- To continue to include stakeholders and interested parties in the transportation planning process by maintaining open and inclusive Public Involvement Procedures.
- To facilitate communication and coordination between communities both within and outside of the region regarding transportation related activities.

Regional Highway Transportation Goals

- To contribute to the development of an accessible and efficient system of streets and highways that provide for the safe, efficient and cost-effective movement of motorized and non-motorized users throughout the region.
- To maximize the efficiency and safety of the region's roadway infrastructure by encouraging and assisting member communities to establish and enforce access management strategies and policies.
- To continue long-range highway planning on a region-wide scale to provide the framework for transportation program priorities, scheduling and funding.
- To promote a multi-modal approach to transportation planning in the region.
- To emphasize the importance of balancing the needs of local neighborhoods/communities with future development and overall transportation needs.

- To promote cooperation across town boundaries, with other regions and with the state in the development of prioritized transportation corridors.
- To assist member communities in planning for an integrated highway network by encouraging the establishment and use of consistent functional highway classification systems.

Regional Public Transportation Goals

- To continue to support Concord Area Transit in its efforts to provide efficient and cost effective bus services in the City of Concord and surrounding area.
- To investigate opportunities for and promote the expansion of public transportation services on a regional scale.
- To promote mobility, accessibility and quality of life for an expanding transportation dependent population by identifying sources of funding for public transportation services and assisting in the establishment of adequate sources of funding for public transit.
- To improve the coordination and efficiency of Community Transportation resources through continued participation with the Mid-State Regional Coordinating Council, neighboring Regional Coordinating Councils, and with the State Coordinating Council.
- To assist member communities in pursuing opportunities for land uses conducive to transit as well as other practices to encourage transit use.
- To support the growth of rail transportation as a viable option for the movement of people and goods in New Hampshire.

Regional Bike and Pedestrian Goals

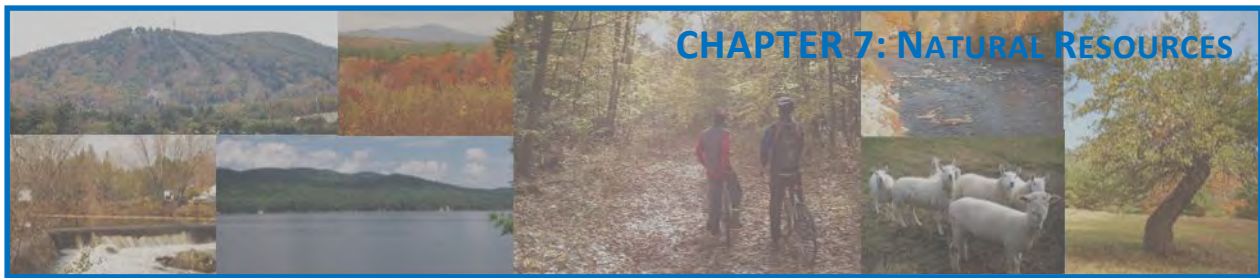
- To encourage biking and walking as a viable transportation option in a region.
- To ensure that pedestrian and bicycle transportation components are properly incorporated into the design of transportation infrastructure improvements. When applicable, a complete streets approach to transportation improvements should be pursued.
- To continue to support trails committees and promote rail trails as a sustainable component to the entire transportation network.
- To support investment in, and assist member communities in pursuing funding for bike and pedestrian projects.

These guiding principles translate into the following actions items that also can be found in the Plan's Implementation Chapter.

ACTION ITEMS

- Continue to enhance Regional Planning Commission Transportation Advisory Committee (TAC) membership to extend beyond municipal representation and include private sector and legislative representation.
- Increase safety for all users of the transportation system at the Regional & Local levels in partnership with State & Federal Initiatives such as the Highway Safety Improvement Program (HSIP).

- Continue to support improvements to state-maintained regional highways in the CNHRPC region through existing advocacy avenues such as the CNHRPC TAC.
- To assist communities in the consideration of biking and walking components in the design of transportation infrastructure.
- To continue to evaluate the cost benefit outcomes of various rail and bus options for the Capitol Corridor.
- To assist communities in the development of corridor plans and implementation of access management practices.
- Encourage future development in the region to take place at locations where the primary road function is appropriate for the type of development proposed.
- Continue to support the Bow-Concord I-93 Improvements through assistance to the consultant team and outreach to CNHRPC member communities.
- Continue to support regional transit and volunteer driver services.
- Work with the City of Concord and DOT to explore alternative options for funding projects located within the Urban Compact.



INTRODUCTION

Natural Resources are one of the most valued amenities in the Central New Hampshire (NH) Region and significantly contribute to the overall quality of life and the economy. The region's communities have an important role in the protection and management of natural resources and are key to maintaining and enhancing existing land use patterns, whether it be through development decisions by planning boards, stewardship by conservation commissions and agriculture commissions, or partnerships with area land trusts. There are times, however, when protecting and managing these resources reach beyond municipal borders and benefit from a regional and state connection for funding, management and technical support.

This Chapter focuses on the region's natural resources, water infrastructure, open spaces, recreation areas, and agricultural lands, all through the lens of keeping and enhancing what we have that is of such value to our residents. At a local and regional level, these topics are closely related to land use decisions by municipalities. Preserving natural resources often occurs by protecting resources from development through regulations, conservation easements and/or outright acquisition. High quality water resources are central to the quality of life in the region as is the importance of well-functioning water infrastructure. Open space land is often open to the public and accessible for recreation in the form of trails, athletic fields, boating access, and parks. Local agriculture and its ties to the rural economy and history is still prevalent in the region and there is strong interest in maintaining a thriving local food system. Keeping productive farmland in the Central NH Region requires having mechanisms in place for farms to easily transition to new ownership and to encourage new farming efforts. Throughout the Plan's public outreach process, residents ranked natural resources, rural quality, and access to recreation very high in value, all part of the deep appreciation for the region's quality of life.

This Chapter reviews existing conditions of natural resources, water infrastructure, open space, agriculture and recreation and highlights the challenges and threats to these resources. Although briefly discussed throughout the Chapter, challenges and ways to address them are more fully described after the existing conditions of all topic areas. The information in this Chapter is not meant to be an exhaustive inventory, but instead highlights the most critical information and issues in the region, without duplicating what is available through other sources. By first describing the current conditions of natural resources, water infrastructure, open space, agriculture and recreation in the regional landscape, there is a stronger foundation to then look for ways to balance the continued protection of natural resources with development at the local and regional level.

EXISTING CONDITIONS: WATER and LAND

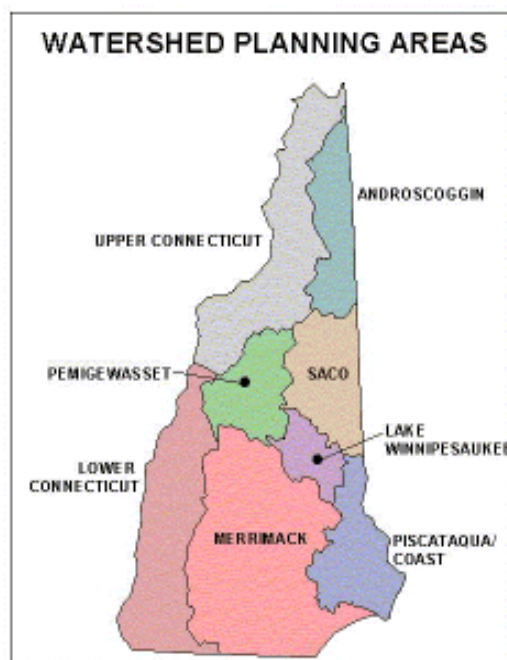
WATER RESOURCES

The Central NH Region is rich in water resources. The major rivers, lakes and ponds provide diverse opportunities for recreation and support the economy through tourism as well as being a key contributor to the quality of life in the region. Healthy wetlands and groundwater support vital natural environments and provide drinking water to support the region's communities and economy. This section addresses all things water, including watersheds, surface water, groundwater, and the systems that use water, drinking water, wastewater and dams that support communities and quality of life in the Central NH Region.

Watersheds

The DES New Hampshire Water Resources Primer describes five major watersheds that encompass the state, the Connecticut River, the Merrimack River, the Androscoggin River, the Piscataqua River, and the Saco River. The Central NH Region is located within the Merrimack River watershed which covers 5,010 square miles in New Hampshire and Massachusetts from the White Mountains to Newburyport, Massachusetts where the Merrimack River empties into the Atlantic Ocean. The Merrimack River watershed drains approximately 3,834 square miles in New Hampshire, equaling about 40% of the state. A watershed is a geographic area in which all water drains to a given stream, lake, wetland, or ocean. The landscape is made up of interconnected watersheds where many smaller watersheds exist within a larger watershed. For example, in [Figure 7.1](#) the Pemigewasset River watershed is categorized as the Merrimack River watershed when looking at a higher scale of the five major watersheds in New Hampshire.

Figure 7.1: Watershed Areas



Source: DES

Watersheds act as a catchment area for all the precipitation, surface water, and groundwater within an area. This includes wastewater discharges and non-source point pollutants from developed areas including from urban and agricultural runoff and stormwater from construction activities and roadways, including oil, bacteria, sediment, and metals that get into the surface water as it travels across the land. The quality of surface water and groundwater is affected by all the land, development, and communities within a watershed basin. As the DES Water Resources Primer describes, there is a need to address water resources on a watershed basis through close collaboration among various state and local organizations.

The Land Conservation Plan for the Merrimack River Watershed of New Hampshire and Massachusetts is an example of a watershed based approach to water quality and conservation (see side bar for more information). The plan resulted as a response to data reported from the US Forest Service in 2010 that a 3,275 square mile portion of the Merrimack River watershed was identified as the most threatened in the nation in terms of projected loss of private forest land over the next 20 years. Concerned about the adverse effects to the watershed, a partnership facilitated by the Society for the Protection of New

Hampshire Forests committed to an effort to develop a conservation plan that focused on accelerating land conservation in the Merrimack River watershed of New Hampshire and Massachusetts.

Major Rivers

In the Central NH Region, communities historically settled on rivers for economic purposes to power industry and irrigate fields. Today, rivers are valued as a natural resource for recreation, wildlife, and water supply. **Map 7.1** illustrates designated rivers and water resources in the region.

The following is a brief list of major rivers in the Central NH Region:

Merrimack River

The Merrimack River is the largest in the region and runs north-south. Categorized as the Upper Merrimack River in the municipalities of Boscaawen, Bow, Canterbury, Concord, Franklin and Northfield, the river flows approximately 30 miles beginning at the junction of the Pemigewasset and Winnepesaukee Rivers. The upper section of the Merrimack River acts as the political boundary between the towns of Boscaawen and Canterbury, and travels through the city of Concord before ending at Garvins Falls in the town of Bow. Considered the most prominent river in the region, the Merrimack River is part of the Rivers Management and Protection Program (RMPP) administered by DES, which has been protecting certain rivers in the state for their outstanding natural and cultural resources since 1990.

Soucook River

The Soucook River begins to form in northern Loudon, where it travels south and serves as the political boundary between Concord and Pembroke. It then converges with the Merrimack River in Bow. Members of the Soucook River Watershed Project, in alliance with the DES Volunteer River Assessment Program assessed water quality for the river beginning in 1999 and again in 2003. For more information on the Volunteer River Assessment Program administered by DES visit: www.des.nh.gov/organization/divisions/water/wmb/vrap/.

Suncook River

The Suncook River runs southerly from Pittsfield through Epsom and forms the political boundary of Pembroke and Allenstown before converging with the Merrimack River in Suncook Village in Allenstown. With an historic background and strong significance in the towns of Epsom, Pembroke and Allenstown, the river served as locations of settlement and now provides public water supply, recreational opportunities, and habitat for wildlife. In response to the 2006 avulsion of the Suncook River, New Hampshire state agencies, federal project partners, local stakeholders and river restoration engineers have developed plans to stabilize the river channels to provide long-term infrastructure and private

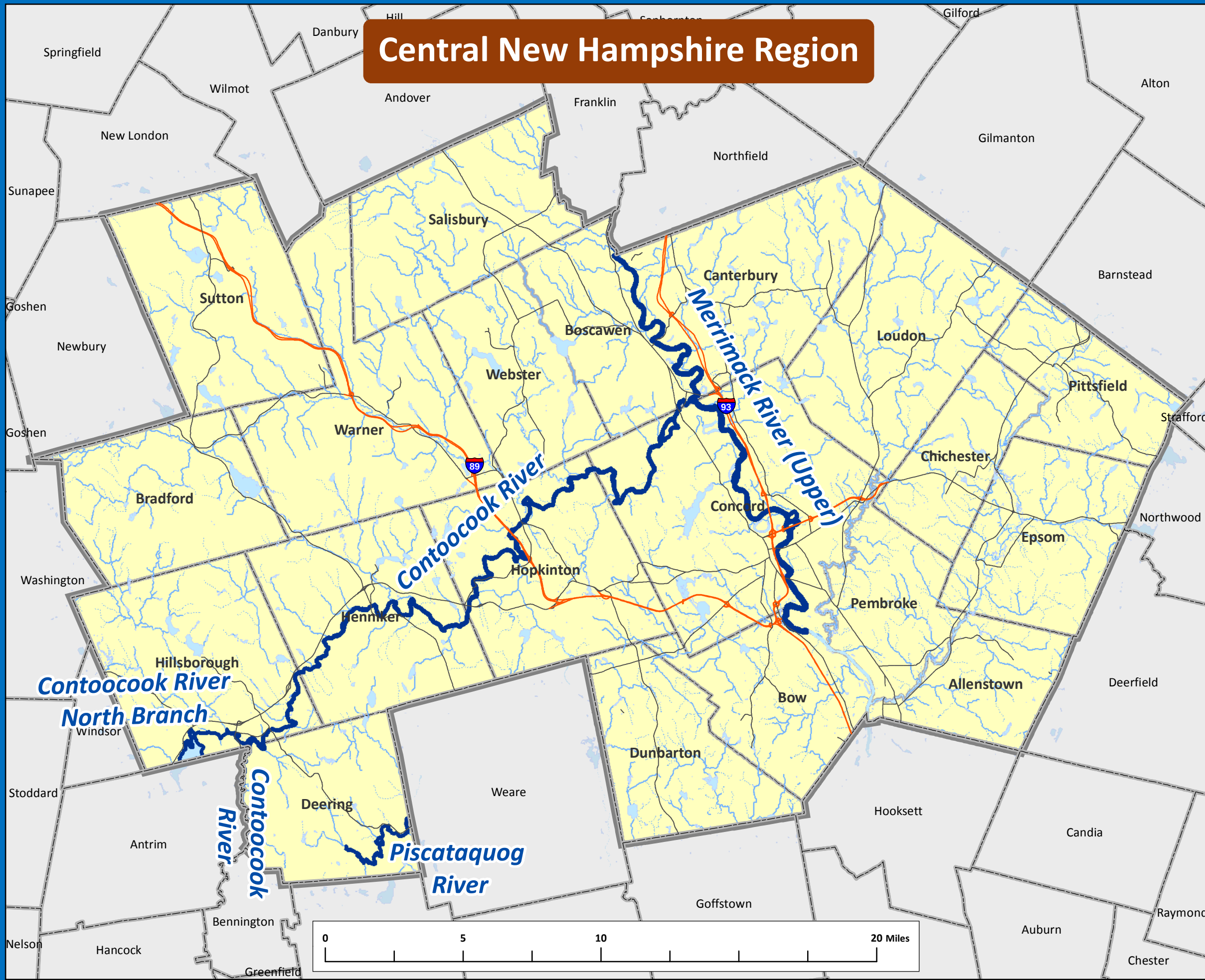
A Land Conservation Plan for the Merrimack River Watershed

The Merrimack Conservation Plan is the final product of a two year effort facilitated by the Society for the Protection of New Hampshire Forests, working with conservation and planning professionals representing 33 private organizations and public agencies in New Hampshire and Massachusetts. In 2012, this partnership initiated an effort to develop a conservation plan that would focus and prioritize land conservation in the Merrimack River watershed of New Hampshire and Massachusetts. Working together, the group developed a land conservation plan that integrates the best-available natural resource data with the expertise of its stakeholders to prioritize land protection that protects water quality (especially drinking water supplies), preserves aquatic and terrestrial ecosystems, conserves the region's working farms and forests, and provides recreational open space. For more information:

www.forestsociety.org/landconservation/merrimack-watershed/mvrcp_executive-

Central New Hampshire Region

Natural Resources Map 7.1 Designated Rivers



- Designated Rivers
- Rivers and Streams
- Intermittent Streams
- Surface Waters
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: A Designated River is managed and protected for its outstanding natural and cultural resources in accordance with RSA 483, the Rivers Management and Protection Act

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

Location Map

property protection against the ongoing river adjustments triggered by the avulsion. (See the Weather Hazards Chapter for a full discussion of this topic.)

Contoocook and North Branch Rivers

The Contoocook River flows from Rindge to Concord where it joins the Merrimack River. With a total elevation change of an estimated 700 feet, the Contoocook River has become known for its pristine whitewater boating and vast habitats of species. The North Branch River is a tributary of the Contoocook River, where it begins in Antrim and flows for 16 miles before joining the Contoocook River in Hillsborough. Both rivers joined the Rivers Management and Protection Program (RMPP) in 1991. See side bar for more information on the RMPP.

Figure 7.2: Contoocook River



Source: CNHRPC

Rivers Management and Protection Program

The New Hampshire Rivers Management and Protection Program (RMPP) was established in 1988 with the passage of RSA 483 to protect certain rivers in the state, called Designated Rivers, for their outstanding natural and cultural resources. Local communities, including municipal officials and residents, can develop a River Nomination to apply for designation. The Legislature ultimately approves the nomination, looking for a level of local support and presence of important river values. A volunteer Local River Management Advisory Committee (LAC) is formed to develop and implement a River Management Plan to protect the outstanding qualities of the river for future generations. DES administers and assists with the development and implementation of the management plan but ultimately this program is a partnership between state government and local citizens. In the Central NH Region, Designated Rivers include the Contoocook & North Branch River, Merrimack River, and Piscataquog River in Deering. For more information: www.des.nh.gov/organization/divisions/water/wmb/rivers/index.htm

Warner River

The Warner River is a tributary of the Contoocook River, flowing through Warner and Webster, and joining the Contoocook River in Hopkinton. Used primarily for scenic recreation and whitewater boating, the Warner River is part of the Merrimack River watershed.

Blackwater River

The Blackwater River is a tributary of the Contoocook River, flowing 14 miles through Salisbury and Webster. It then joins the Contoocook River in Hopkinton. The Blackwater Dam located in Webster is managed by the US Army Corps of Engineers and is used for flood control to protect downstream communities. The corresponding floodplains and Blackwater Reservoir are open to recreation.

Major Lakes and Ponds

Lakes and ponds in the region provide a source of scenic beauty, recreation, and contribute to the high quality of life for permanent and seasonal residents as well as visitors. The water quality of the region's lakes and ponds is important for residents' enjoyment and health as well as for the local economy and tourism.

The largest lakes and ponds are located to the west of the Merrimack River, including Lake Massasecum (403 acres) in Bradford and Long Pond (360 acres) in Concord. The largest body of water east of the Merrimack River is Turtle Pond (121 acres) in the eastern half of Concord. Many of the large water bodies are located in Bradford, Hillsborough, and Sutton.

The Volunteer Lake Association Program (VLAP) is a program administered by DES and illustrates the important role volunteers and local stewardship play in the monitoring and management of New Hampshire's lakes. The Program exists across the state, with 16 lakes in the Central NH Region participating. Annual VLAP reports compile water quality data from monitoring sites on participating lakes. For the majority of the region's lakes in the VLAP program, the reports recommend that educational information about stormwater management be provided to lakefront and area homeowners to improve or maintain the water quality. The DES New Hampshire Homeowner's Guide to Stormwater Management is an informative resource to property owners and communities to help reduce stormwater runoff. The guide is available at:

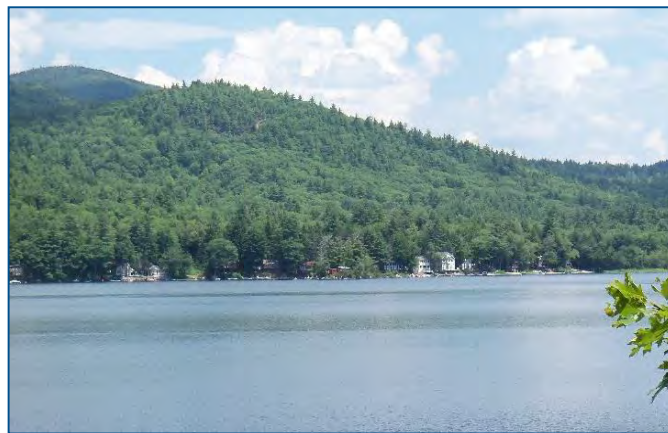
www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf.

The following is a brief overview of a sample of lakes and ponds in the region and their current conditions. **Map 7.2** identifies many of the major lakes and ponds in the region.

Lake Massasecum

Located in Bradford, Lake Massasecum covers 403 acres. With a maximum depth of 16.4 meters, the Lake discharges into numerous rivers, eventually leading into the Merrimack River. The Lake contains the aquatic invasive species, Variable Milfoil, which can grow and spread in the lake, potentially causing damage to the Lake's natural ecosystem. Variable Milfoil can be transported to other water bodies through its discharge or by boats. Water quality is stable, but increased rainfall from storms contributed to turbid conditions. VLAP recommends educating watershed residents on ways to reduce stormwater runoff by utilizing DES's Homeowner's Guide to Stormwater Management tool.

Figure 7.3: Lake Massasecum, Bradford



Source: CNHRPC

Winnepocket Lake

Located in the town of Webster, Winnepocket Lake covers 227 acres with depths up to 20.4 meters. Used primarily for recreational use, including fishing, kayaking and swimming, Winnepocket Lake retains a fairly wooded shoreline and wooded habitat in its immediate watershed. As reported by the VLAP program, the water quality trends have held stable, although some inlets showed fluctuating increases

Central New Hampshire Region

Natural Resources Map 7.2 Major Lakes and Ponds

-  Lakes and Ponds
-  Rivers and Streams
-  Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Shows a selection of lakes and ponds in the region as described in the Natural Resources chapter.

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

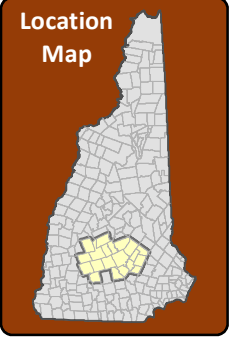
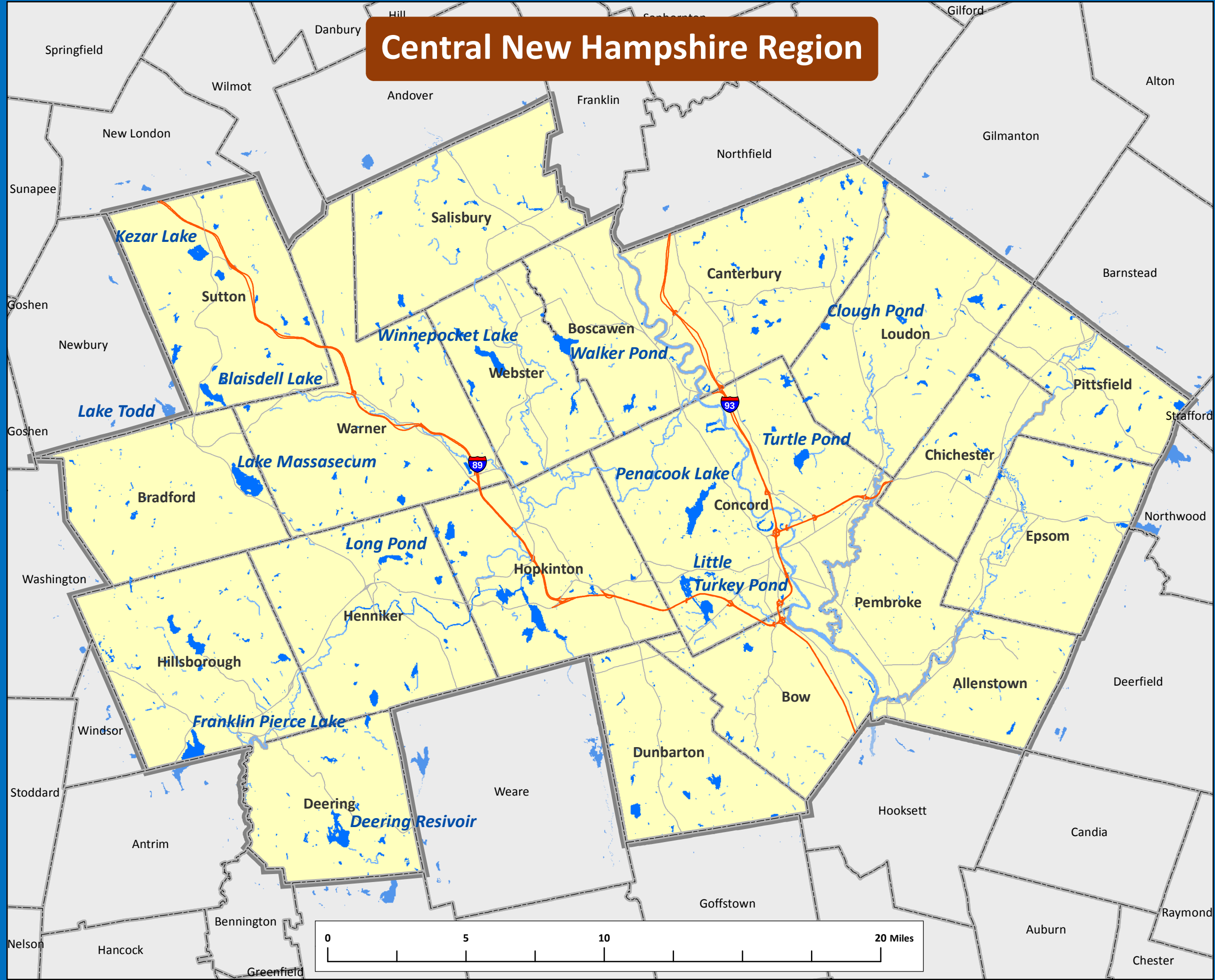
Central New Hampshire
Regional Planning
Commission

28 Commercial Street, Suite 3
Concord, NH 03301

603.226.6020
www.cnhrpc.org







of E.coli especially after rain events. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff from lakefront and watershed properties, dirt/gravel roads and steep slopes.

Kezar Lake

Located in the town of Sutton, Kezar Lake has an area of 182 acres with a maximum depth of 8.2 meters. Wadleigh State Park offers beach access to Kezar Lake and provides many recreational opportunities on and around the Lake. Both year-round and seasonal residences are located in the immediate surrounding area. Water quality trends are generally stable, although increased algae growth and decreased transparency in areas likely indicate that lakefront properties and roadways contribute to stormwater runoff especially after large rain events.

Blaisdell Lake

Located in Sutton, Blaisdell Lake covers 158 acres with depths up to 13 meters. Blaisdell Lake maintains its water level through an earthen dam, which is maintained through the Blaisdell Lake Protective Association with assistance from DES. The Association, established in 1950, also monitors water quality in the VLAP program. The Lake's shoreline is the footing for privately owned residences, as well as a summer camp owned and operated by the Girl Scouts. Water quality levels are stable, but increased tributary phosphorous levels especially after large storm events highlight the need to educate lakefront and watershed residents about the importance of managing stormwater runoff.

Clough Pond

Located in Loudon, Clough Pond covers 46 acres with depths up to 18.2 meters. An example of a smaller water body in the region, privately owned residences line the lake and it is widely used for recreational purposes by waterfront owners and the general public. A public use boat ramp provides access to Clough Pond and the pond is stocked for trout fishing. The Clough Pond Association participates in water quality programs including VLAP, Lake Host Program, Weed Watchers, and Get the Lead Out. Water quality data from 2013 recorded elevated algal growth and decreased transparency likely caused by high water levels and stormwater runoff from large rain events. The chlorophyll levels were higher than the state median and chloride levels show a historical worsening trend. Unlike many other data collection at other lake beaches, there is no specific E.coli data collected for Clough Pond Town Beach. E.coli data collection is an important indicator for monitoring water

Weed Watcher Program

The volunteer Weed Watcher program of DES has taken a proactive approach to exotic plant control. Variable Milfoil and other invasive exotic plants lead to diminished wildlife habitat, decreased recreation potential, water quality, and lowered property values. Although eradication is rarely possible, the best strategy is prevention and early detection to control new infestations. New Hampshire lake residents, lake associations, fishermen, and recreationists can get trained on how to conduct a weed survey, what to look for, and who to contact if exotic plants are found. For more information: www.des.nh.gov/organization/divisions/water/wmb/exoticspecies/weed_watchers.htm

Green SnowPro Certification

The University of New Hampshire offers a half day training course focused on efficient and environmentally friendly winter maintenance practices. The course offers basics of salt reduction and other environmentally conscious practices. Local road agents and winter maintenance crews can earn a NHDES Salt Applicator Certification per RSA 489-C. For more information: <http://t2.unh.edu/green-snowpro-training-and-certification>

quality and recreational use. VLAP recommends local road agents and winter maintenance crews obtain a New Hampshire Voluntary Salt Applicator License through the University of New Hampshire Technology Transfer Center's Green SnowPro Certification.

Franklin Pierce Lake

Located in the towns of Hillsborough and Antrim, Franklin Pierce Lake covers approximately 483 acres with depths up to 9.6 meters. Also known as Jackman Reservoir, this Lake was formed in 1926 when the Jackman Dam and Power Plant was constructed causing a section of the North Branch of the Contoocook River to flood. Roughly one third of the Lake is located in Antrim while the remainder is located in Hillsborough. The Lake is open to boating and the NH Fish and Game Department stocks rainbow and brown trout for fishing each year. The Lake is gradually lowered by roughly 20 feet each fall to prepare for the following spring's melt off and rain which typically brings it back to its normal depth by Memorial Day. No invasive plant species have been discovered in this Lake to date but it is a recognized risk. VLAP recommends more frequent summer monitoring near the North Branch tributary to make sure phosphorus levels do not become an issue.

Penacook Lake

Located in the City of Concord, Penacook Lake is 362 acres with an unknown depth. For over 100 years the Penacook Lake has been used as Concord's primary drinking water source. The quality of water in this Lake is considered good with risk factors lower than most wells. The Penacook Lake is not open to recreation due to its primary use as a drinking water source. The Lake serves as a tributary to the Merrimack River and water also flows to the City's water treatment plant.

Turkey Ponds

Located in the City of Concord, Turkey Pond covers an area of 332 acres with depths up to 4.6 meters. Though they are connected by a channel, Turkey Pond and Little Turkey Pond are often referred to separately. The water level for the ponds is controlled by a dam at the outlet of Little Turkey Pond. The pond has many recreation uses including fishing, kayaking/canoeing, and walking trails along the shore. In addition, Saint Paul's School in Concord uses the channel as a course for its crew team.

Deering Reservoir

Located in Deering, the Deering Reservoir is 323 acres with a maximum depth of 11.3 meters. The Reservoir is open to recreational use for fishing, boating, and beach access. Serving as a headwater for the Piscataquog River, the Deering reservoir is controlled by a dam that was constructed along with the Reservoir in 1940. VLAP reports elevated chloride and conductivity in Morotta Inlet and encourages local officials to obtain the NH Voluntary Sal Applicator Certification through UNH Technology Transfer Center's Green SnowPro Program.

Walker Pond

Located in Boscawen, Walker Pond covers 174 acres with depths up to 12.8 meters. The shoreline has limited development and a rich mixed forest habitat. Recreation on the pond is somewhat limited but still exists. An ice fishing tournament is held on the Pond each year and is open to the public for participation. VLAP recommends continued chloride monitoring to establish a baseline set of data.

Todd Lake

Located in the towns of Bradford and Newbury, Todd Lake spans 167 acres with a maximum depth of 6.1 meters. Todd Lake supports boating, fishing and swimming activities. According to VLAP average chlorophyll increased greatly in 2013 and was the highest measured since monitoring began. Stormwater runoff and high volume storm events is likely transporting excess sediments into the Lake. VLAP recommends the DES Homeowners Guide to Stormwater Management for establishing best practices in the area to reduce erosion.

Riparian Buffers

Riparian buffers, the undisturbed corridor of trees and/or shrubs and plants adjacent to a river, stream, wetland or water body, are one of the most effective protection tools for the region's surface and ground water. Having a healthy riparian buffer is a sign of effective management of water quality. Depending on surrounding land use, riparian buffers typically range anywhere from 25-200 feet wide. They reduce runoff, filter potential pollutants, stabilize stream banks and function as a transitional zone between adjacent land uses and aquatic habitat. These buffers often include floodplain zones and are an important protection to have in place during flooding events. Regulatory programs such as the New Hampshire Shoreland Water Quality Protection Act (SWQPA) and local shoreland protection ordinances generally focus on larger streams but it is just as important to protect the healthy functioning of smaller streams since all surface water feeds into downstream rivers and lakes in the watershed. According to DES, of the estimated 16,750 miles of rivers and streams in the state's water supply watersheds, only 5% are protected by local ordinances and 25% by permanent protection measures such as lands in state parks, wildlife management areas and permanent easements.

In the Central NH Region, shoreland protection buffers vary from community to community. The Shoreland Water Quality Protection Act includes limits on impervious surfaces, changes to vegetation requirements within the natural woodland and waterfront buffers, and new shoreland permit by notification process. Some communities solely rely on the DES Shoreland Program, which works to ensure compliance and provides waivers to SWQPA, while others have included additional shoreland protection in ordinances. For example, in Allenstown there is a required 40 foot minimum setback from any surface water if there is no state jurisdiction. In Concord there is a Shoreland Protection Overlay District that applies a setback of 250 feet from all public waters and great ponds and a 75 foot setback from all other non-public waters. Some communities have adopted Waterfront Development Ordinances that requires a buffer for specific water bodies; for example Hillsborough requires a 200 foot setback from Loon Pond.

Wetlands

Wetlands can be defined by three characteristics: standing water or water at or near the ground surface during some portion of growing season; soils with characteristics that show they are saturated for some time; and plants adapted to growing in saturated soils. In New Hampshire, wetlands can be found in the form of tidal marshes, mudflats, swamps, bogs, and wet meadows and form at the bases of rivers, lakes, and streams and are typically shallow, supporting a vast ecosystem with ample plant growth. Estimated by DES to be five to ten percent of New Hampshire's landscape, wetlands provide shelter and food for adjoining habitats but are often threatened by population growth and landscape changes.

Value of Wetlands

Wetlands provide many functions that benefit both the ecosystem and the human population. They include:

- *Flood Control:* Wetlands help control the volume of flooding by storing floodwater and moderating peak flows. This can be caused by snowmelt and/or heavy rains. As climate changes and development continues, wetlands can become especially important in preventing damage caused by flooding. Wetlands also contribute to maintaining water quality, preventing erosion, and enhancing biological and physical diversity.
- *Water Filtration:* Wetlands retain, remove, and transform nutrients and contaminants, thereby improving surface water in the surrounding area. As water moves through a wetland, 80 to 90 percent of unwanted nutrients and contaminants will be filtered out through the water column. This decreases the amount of contaminants that could affect water quality downstream, that could potentially be gathered and used as drinking water.
- *Water Storage and Recharge to Surface Water and Groundwater:* As water passes through wetlands, it slowly infiltrates the soil surface and recharges the surrounding groundwater and surface water. This is particularly critical in times of drought and when water supplies are low.
- *Wildlife Habitat and Aquatic Nurseries:* Besides a place of water storage, wetlands are home to numerous species, including 34 rare wetland dependents. Providing a place for food, water, and shelter, wetlands are common spawning and nursery habitats for many species in the ecosystem.
- *Economic:* DES states in their 2008 Water Resource Primer that wetlands increase surrounding property values by as much as 28 percent. They are also assumed to maintain a higher quality of life, as water quality and a healthy ecosystem are present in the surrounding area.

Protection

The DES Wetlands Bureau is the primary regulator of wetlands. If a project has a significant impact, based on either size or its impact on sensitive species, DES may require mitigation. It is important to keep in mind that while permitting is regulated at the state level, municipal conservation commissions are granted authority to comment on wetland permits and applications in a community. Some communities have gone beyond the state regulations and established local ordinances to protect wetlands by either setbacks or buffers.

Prime Wetlands

There are many forms of protection for wetlands currently in place. In 1979, New Hampshire modified its wetland law (RSA 482-A:15) to allow municipalities to provide greater protection for highly valued wetlands. These are known as prime wetlands and require additional evidence that any

Vernal Pools

Vernal pools can be found in almost every habitat and are found throughout the state. They are wetland depressions characterized by small size, and physically isolated from other wetlands, with periods of flooding and drying. Some unique wildlife species are dependent on vernal pools especially as breeding areas, including fairy shrimp, wood frog, and the blue-spotted salamander. Loss of vernal pool habitat due to development is a threat, as is degradation, filling, or altered hydrology of surrounding land. Vernal pools are vulnerable to being overlooked during certain seasons or drier years due to the seasonal nature of flooding and drying cycles. Because of this, data on vernal pools statewide can be challenging to collect. Identification tools and conservation strategies are available through NH Fish and Game Department. For information on wildlife and vernal pool documentation manual visit: www.wildlife.state.nh.us/Wildlife/Nongame/reptiles_amphibians.htm

project within these boundaries is not threatening or will not cause a major impact. Wetlands receive this designation usually due to the large size, pristine character and its potential to support or sustain populations of rare or threatened plant and animal species. Over 25 municipalities in New Hampshire have designated sites as prime wetlands, and have set a 100 foot buffer of special protection. In the Central NH Region, two communities have designated Prime Wetlands – Bow and Hillsborough.

Hydric Soils

Hydric soils are categorized by soils forming under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions within the upper part of the soil profile. Landscapes that have high water tables tend to be more likely to have wet and potentially hydric soils. The same is true for soils that are prone to flooding or ponding.

Floodplains that are seasonally flooded may contain hydric soils as well as depression areas that collect and store runoff water from surrounding land areas after rain events. The presence of hydric soils is one third of the criteria used to determine if an area is a wetland. The other two requirements are wetland hydrology and hydrophytic vegetation. Wetlands can include swamps, bogs, marshes, forested wetlands, wet meadows or vernal pools. Knowing how to recognize hydric soils is important for setting limitations on development locations of septic systems, and other infrastructure, and can be identified and delineated by a New Hampshire certified soil scientist. Familiarity with the soil mapping surveys conducted by Natural Resources Conservation Service is helpful for communities and it is important to note that in New Hampshire any determinations and delineations of wetlands must be conducted by wetland scientists licensed by the New Hampshire Board of Natural Scientists. More information on licensed Natural Scientists can be found at www.nh.gov/jtboard/ns.htm

Groundwater

Groundwater is considered to be the water beneath the surface of land where it resides within bedrock fractures as well as in soils, sediment and loose rocks sitting above the bedrock. In New Hampshire, similar to other New England states, groundwater is typically at shallower depths due to the region's geological profile. As New Hampshire's subgrade is comprised of mainly crystalline bedrock, glacial till, and rock fractures, water moves through voids within the subgrade in the downhill direction as it enters rivers, streams, reservoirs, and other water bodies.

An aquifer is defined as a subsurface area that is water bearing. The ability of groundwater to pass through an aquifer depends on the amount and size of voids present in the layers of soil and gravel found under the ground's surface. Aquifers reside beneath the surface of just about all of New Hampshire, and they directly affect how groundwater is stored, withdrawn, or moved in the state. There are two major aquifer types, bedrock and the high-yielding stratified drift aquifer. Stratified-drift aquifers underlie an estimated 14 percent of the land statewide. Concentrated most heavily under the city of Concord, the largest contiguous aquifer in the region occurs under the Merrimack River, Contoocook River, and Suncook River, while another large, contiguous aquifer occurs to the west

Bedrock and Stratified Drift Aquifers

Bedrock aquifers contain water-filled fractures and represent potentially significant sources of groundwater. Stratified drift aquifers consist primarily of sand and gravel that were deposited in layers as the glaciers were retreating and typically have large pore spaces that contain a lot of groundwater when saturated. The stratified-drift aquifer is known for high velocity and volume of groundwater and is typically used wherever possible for public water supply and wells. Most of the high capacity wells are located in stratified-drift materials.

Table 7.1: Wetland Buffers Throughout the Region

Municipality	Ordinance Title	Wetlands Buffer Details
Allenstown	No separate ordinance	A stormwater management plan is required for disturbances over 20,000 square feet – and requires a 50 foot buffer around wetlands as part of the plan.
Boscawen	Land Subdivision Regulations, not in Zoning Ordinance	A 100 foot buffer shall be maintained from all wetlands.
Bow	Wetlands Conservation Overlay District	Setbacks are: prime – 150 feet; surface waters, bogs, wetlands with poorly drained soils – 75 feet; vernal pools – 50 feet; other wetlands <0.25 acres – 30 feet, agriculture and logging allowed under certain conditions as well as other uses such as passive recreation; if construction, forestry or agricultural activities within 100 feet of any wetland, special care to avoid erosion and siltation, could require an erosion control plan.
Bradford	Wetlands Protection Ordinance	No building within 100 feet of very poorly drained soils; 50 feet for poorly drained soils. No structures or alteration of the surface by dredging or filling. No septic or leach field within 75 feet.
Canterbury	No separate ordinance	
Chichester	Section 3.16 Wetlands and Wetland Buffer	Buffer 100 feet from second and higher order streams or ponds; 50 feet from wetlands $\geq$ 0.25 acre; 25 feet from wetlands less than 0.25 acre. Permitted uses: Forestry / ag, wildlife / fire ponds, recreation, docks and beaches on private ponds, septic systems, leach field that meets DES subsurface rules allowed in wetland buffer.
Concord	Development Design Standards	Buffer 50 feet for wetlands greater than 3,000 square feet. Certain marshes and open water wetlands may be subject to Shoreland Protection Overlay District - public waters, great ponds 250 feet; All other non-public waters 75 foot buffer.
Deering	Article 3, Section 5: Wetlands	Buffer 50 feet from wetlands, no sub-surface water disposal systems within 75 feet.
Dunbarton	Wetlands Conservation District	Covers certain ponds and brooks and adjacent Group 1 soils. Setback 125 feet for structures, septic tanks and leach field; additions are allowed.
Epsom	Article II Zones and Districts	All buildings structures in all zones set back no less than 50 feet from wetlands.
Henniker	Article XXII: Wetlands Conservation	Any person who desires to obtain a building permit or driveway permit on land impacting a wetlands area shall first submit to the Building Inspector a completed copy of the DES wetlands permit.
Hillsborough	No separate ordinance	One municipally designated prime wetland includes a 100 foot buffer.
Hopkinton	Wetlands Conservation Overlay District	Buffer 75 feet from any wetlands - no septic, leach field, structures or alteration of natural surface configuration. Applies to wetlands $\geq$ one acre or any size if adjacent to surface waters.
Loudon	Article III Overlay Districts - Wetlands Conservation District	Buffer 75 feet for wetlands 2000 square feet or larger or if smaller wetland is determined to be of exceptional functional value as determined by certified New Hampshire soil scientist.
Pembroke	143.72 Wetlands Protection Overlay District	Buffer ranges from 20 to 50 feet depending on structure and no septic closer than 75 feet. Wetlands defined as any size adjacent to surface water, vernal pools over 500 square feet and other wetlands over 1000 square feet.
Pittsfield	No separate ordinance	
Salisbury	No separate ordinance	
Sutton	Article X: Wetlands Overlay District	Buffer ranges from 15 to 125 feet depending on structure type and wetland size/type.
Warner	No separate ordinance	
Webster	No separate ordinance	

Source: *Municipal Regulations Review by CNHRPC*

underlying the Blackwater River. Many smaller aquifers exist throughout the remainder of the region. **Map 7.3** includes the region's stratified drift aquifers.

Groundwater serves many purposes. It is estimated that groundwater supplies around 60% of New Hampshire's population with drinking water from bedrock aquifers and stratified drift aquifers. In addition to supplying drinking water, according to DES, an estimated 93.8 million gallons of groundwater per day is used for irrigation, manufacturing and domestic use in New Hampshire. Ongoing monitoring of groundwater quality as well as water levels is critical to protecting this resource. New Hampshire is a water rich state, especially when compared to other areas in the country. Groundwater depletion is not a major concern, but in times of drought it is an issue to be aware of. The availability of groundwater can be affected by land cover and land use change, as well as withdrawals of groundwater from wells or surface water withdrawals. Managing stormwater and finding ways to allow rain and snowmelt to naturally infiltrate the ground to recharge the groundwater supply is critical. For more information on stormwater refer to the land section in this chapter.

High quality groundwater requires protection at both the local and state levels to ensure that there is a safe, plentiful supply. While there are many state and federal programs that directly or indirectly protect groundwater, such as regulating business practices or industries that use large amounts of potential contaminants, like underground storage tanks or industrial solvents, many of the most effective protections require and originate from local involvement. Local measures to protect groundwater involve land conservation, management of land uses posing a threat to groundwater and public education around safe disposal of contaminants and hazardous waste. There are many groundwater protection tools available to local municipalities through land use decisions, zoning ordinances, site plan review and conservation easements that can address many issues that surround the relationship between development and ways to mitigate the impacts on groundwater.

One of the tools available to local municipalities is groundwater reclassification. Noting the importance to residents, agriculture and the environment, the New Hampshire legislature adopted the New Hampshire Groundwater Protection Act in 1991, authorizing DES to regulate large groundwater withdrawals and commercial discharges of wastewater, creating four classes of groundwater classifications, and establishing groundwater quality standards. Establishing the groundwater classifications allows local municipalities and public water suppliers to develop local groundwater protection programs by reclassifying groundwater areas to a higher classification that better protects the current or future water supply resources. Only wellhead protection areas, which represents land area that supplies water to an active public water supply well, can be reclassified to the highest groundwater classification level GAA (See **Table 7.2**). For more information about reclassification A Guide to Groundwater Reclassification is available from DES:

www.des.nh.gov/organization/commissioner/pjp/publications/wd/documents/wd-11-24.pdf

As discussed, a challenge is that land use change can impact long term groundwater availability by preventing or reducing water recharge after a rain event. According to DES, for each acre of impervious area that drains directly to surface water, approximately 250,000-550,000 gallons per year are lost. Stormwater management is a critical best practice. Aquifers and well-head protection ordinances are one method of protecting water supply sources, specifically for the use of drinking water.

Some communities in the Central NH Region have aquifer or groundwater protection districts to protect the quality of the groundwater and the aquifer. Most of these ordinances involve land use restrictions over high-yielding stratified-drift aquifers and have been adopted since the aquifers were first mapped over 30 years ago. **Map 7.4** illustrates wellhead and source groundwater protection areas.

Central New Hampshire Region

Natural Resources

Map 7.3

Stratified Drift Aquifers

-  Stratified Drift Aquifers
-  Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Stratified-drift aquifers are ground water holdings made up of layers of sand and gravel. These aquifers serve as valuable drinking water sources.

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire
Regional Planning
Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

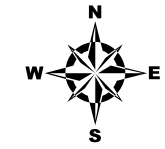
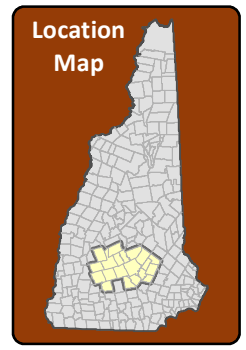
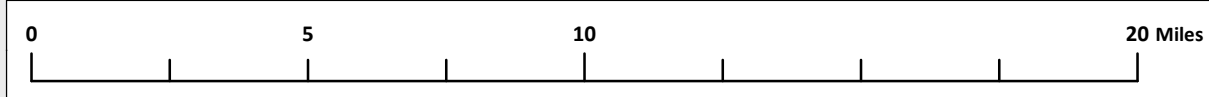


Table 7.2: Groundwater Classifications under RSA 485-C

Groundwater Classification	Classification Description and Protection Activities
GAA	Delineated Wellhead Protection Areas Prohibits new and monitors existing high-risk users, such as landfills. Authorizes active management of potential contamination sources (PCSs) on local level.
GA1	Groundwater of High Value for Present or Future Drinking Water No land use prohibitions. Authorizes active management of PCSs on local level.
GA2	Potentially Valuable Stratified Drift Aquifers. No active management.
GB	All Groundwater Not Assigned to a Higher Class. No active management.

Source: *A Guide to Groundwater Reclassification, DES, November 2011*

Some communities in the Central NH Region have aquifer or groundwater protection districts to protect the quality of the groundwater and the aquifer. Most of these ordinances involve land use restrictions over high-yielding stratified-drift aquifers and have been adopted since the aquifers were first mapped over 30 years ago. [Map 7.4](#) illustrates wellhead and source groundwater protection areas.

Table 7.3: Municipalities in the Central NH Region with Aquifer/Groundwater Ordinances

Municipality	Ordinance	Municipality	Ordinance	Municipality	Ordinance	Municipality	Ordinance
Allenstown	Yes	Chichester	No	Henniker	No	Pittsfield	No
Boscawen	No	Concord	Yes	Hillsborough	No	Salisbury	No
Bow	Yes	Deering	Yes	Hopkinton	No	Sutton	No
Bradford	No	Dunbarton	No	Loudon	No	Warner	No
Canterbury	Yes	Epsom	No	Pembroke	Yes	Webster	Yes

Source: DES, www.des.nh.gov

HOW WE USE OUR WATER

Public Drinking Water Supply

Public water supplies provide clean, reliable water to the more densely populated communities within the region. A public water system is defined by DES as “a system that provides water via piping or other constructed conveyances for human consumption to at least 15 service connections or serves an average of at least 25 people for at least 60 days each year.” There are three different types of public water systems; a Community Water System (CWS) serves a population year round, a Non-Transient Non-Community Water System (NTNCWS) serves a population at least six months out of the year, and a Transient Non-Community Water System (TNCWS) serves a population that does not remain in that location for an extended period of time. The most recent water supply and water withdrawal data available at the regional level is the 2005 USGS New Hampshire Water Use data. In the Central NH Region (51.9%) of the population uses community water

Water and Sewer Connections with the CEDS

The Central/Southern New Hampshire Comprehensive Economic Development Strategy (CEDS) comprises of 25 municipalities, 20 of which are within the Central NH Region. Developed in 2014, the CEDS can act as a “roadmap” for the region’s economic development, providing projects prioritized by a developed advisory committee.

Eight water and sewer projects were included in the CEDS, including installing new water lines in Epsom and extending the water line in Bow.

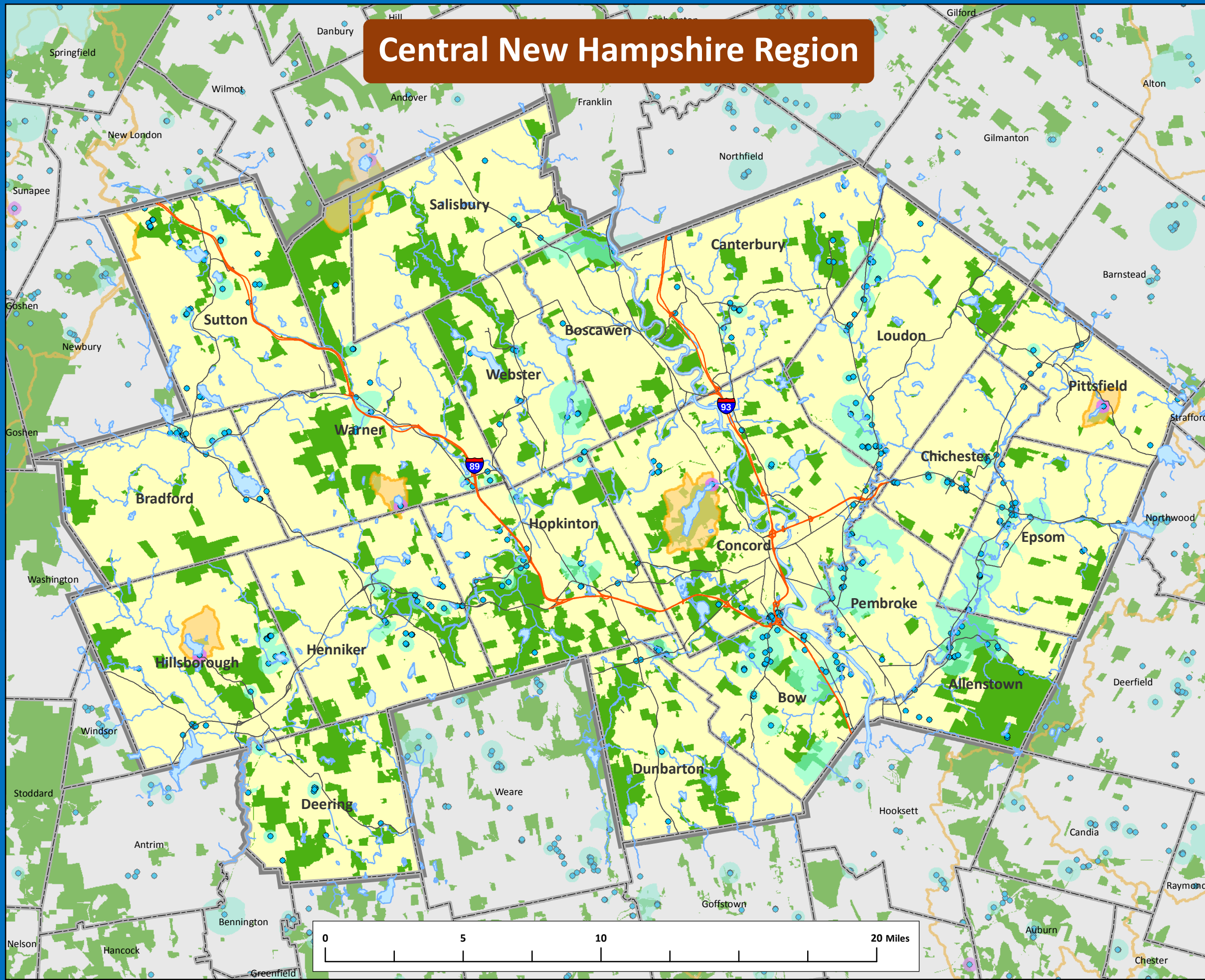
Please refer to the CEDS report for additional information available at Central NH Regional Planning Commission.

Central New Hampshire Region

Natural Resources

Map 7.4

Groundwater Supply Areas



- Public Water Supply Locations
- Water Supply Intake Protection Areas
- Wellhead Protection Areas
- Source Water Protection Area Boundaries
- Local Source Water Protection Areas
- Water Bodies
- Rivers and Streams
- Conserved Lands
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: This map displays various water resource areas and conservation lands. Public water supplies are defined as those that serve more than 25 people. The purpose of this map is to ascertain where wellhead protection areas are not under conservation easement.

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire
Regional Planning
Commission

28 Commercial Street, Suite 3
Concord, NH 03301

603.226.6020
www.cnhrpc.org



Location
Map



systems for their drinking water supply. Community water systems typically support densely settled areas while more rural neighborhoods and residences depend on private wells. See [Table 7.4](#) for details on the percentage of the population using community water systems or private wells for drinking water supply.

Drinking water withdrawals contribute to the overall total amount of water withdrawals from groundwater and surface water supplies. The 2005 USGS data also reports water withdrawal data. The City of Concord's community water system draws an estimated 5.3 million gallons of water per day from Penacook Lake, the drinking water reservoir for the public water system. As a contrast, there is no community water system in Dunbarton and residents rely solely on household wells, withdrawing an estimated 190,000 gallons of water per day from groundwater supply. Other contributors to water withdrawals include commercial, industrial, and hydroelectric power. The municipality of Bow withdraws an estimated 228 million gallons of water per day, 227 million gallons of which comes from surface water, resulting in the largest withdrawal per municipality in the region. This amount is largely contributed by Public Service of New Hampshire's fossil-steam generating station on the Merrimack River, which provides 433.5 megawatts of power. Concord had the second highest withdrawal of an average 6.5 million gallons per day. See [Table 7.5](#) for information on total water withdrawals and projections by municipality.

Public water systems support the growth of businesses, homes and community, and consequently need to be maintained and updated to continue supporting the population and any growth. As reported by the EPA in April of 2013 in the Drinking Water Infrastructure needs Survey and Assessment Fifth Report to Congress, New Hampshire requires an estimated \$834.9 million dollars in repairs to its public water supply systems over the next 20 years. From a baseline in 2005, the region is expected to increase its water withdrawal for supply systems by 1.768 million gallons per day in 2020. Age of the systems and increased use affects the performance of the collection and treatment systems, as well as the transmission pipes that carry the water to end users. Any upgrades to existing conditions directly affect the pattern of future development, and similarly, poor planning of future development can have direct, negative impact on future water supply.

Table 7.4: Population with Community Water Systems or Household Wells

Municipality	Population	% Population Using Community Water Systems	% Population Using Household Wells
Allenstown	4,905	74.5%	25.5%
Boscawen	3,848	78.0%	22.0%
Bow	7,808	9.8%	90.2%
Bradford	1,562	2.6%	97.4%
Canterbury	2,238	1.1%	98.9%
Chichester	2,476	0.8%	99.2%
Concord	42,199	80.5%	19.5%
Deering	2,046	15.5%	84.5%
Dunbarton	2,517	0.0%	100.0%
Epsom	4,506	31.2%	68.8%
Henniker	4,956	42.9%	57.1%
Hillsborough	5,667	59.2%	40.8%
Hopkinton	5,623	35.2%	64.8%
Loudon	5,054	12.7%	87.3%

Table 7.4: Population with Community Water Systems or Household Wells (Cont.)

Municipality	Population	% Population Using Community Water Systems	% Population Using Household Wells
Pembroke	7,345	68.3%	31.7%
Pittsfield	4,363	54.2%	45.8%
Salisbury	1,259	0.0%	100.0%
Sutton	1,763	0.0%	100.0%
Warner	2,943	22.8%	77.2%
Webster	1,758	17.0%	83.0%
Total	114,836	51.9%	48.1%

Source: USGS NH Water Use Data, 2005

Table 7.5: Past and Projected Water Withdrawal in Million Gallons per Day

Municipality	2005 Withdrawal	2020 Projected Withdrawal	Increase 2005-2020
Allenstown	.334	.376	.042
Boscawen	.699	.795	.096
Bow	227.966	228.2	.234
Bradford	.121	.151	.03
Canterbury	.234	.257	.023
Chichester	.193	.222	.029
Concord	6.481	7.190	.709
Deering	.154	.174	.02
Dunbarton	.190	.219	.029
Epsom	.402	.456	.054
Henniker	.579	.632	.053
Hillsborough	.514	.571	.057
Hopkinton	.351	.400	.049
Loudon	.670	.723	.053
Pembroke	.698	.784	.086
Pittsfield	.455	.514	.059
Salisbury	.095	.118	.023
Sutton	.164	.187	.023
Warner	.418	.487	.069
Webster	.134	.164	.03
Total	240.852	242.62	1.768

Source: USGS New Hampshire and Vermont Water Use Estimates for the Year 2005 and Projections for the Year 2020

Monitoring and protecting public water supply sources is essential for maintaining a clean, reliable public water supply system. Aquifers and reservoirs in the region that provide withdrawal sources are protected by the New Hampshire Public Drinking Water Program. Established under the federal Safe Drinking Water Act (SDWA), it enforces maximum contamination levels (MCLs) in drinking water, monitoring schedules, and water system inspections. It also allows the state of New Hampshire to be directly involved in the design, operation, and monitoring of public water systems, and provide protection of drinking water sources.

Other groups involved in water quality in New Hampshire are the New Hampshire Water Works Association and the Granite State Rural Water Association. Both groups focus on providing clean drinking water and protecting the drinking water sources in New Hampshire. Groundwater is also protected through the Groundwater Protection Act, passed in 1991, which provides best management practices (BMP's) to be followed and is described in the groundwater section of this Chapter. Further resources on water quality programs and initiatives can be found at the DES Drinking Water and Groundwater Bureau's website: www.des.nh.gov/organization/divisions/water/dwgb/index.htm.

Private On-Site Water Supply

Private on-site water supplies are found throughout the region, with the vast majority located where there is no public water supply available. A drilled well is the most common private water system, which is used and maintained by the site occupant or owner. There are two main types of private wells used in New Hampshire: bedrock wells, which are located deep beneath the ground surface, ranging from one hundred to seven hundred feet in depth, and dug wells, located at shallower depths, less than one hundred feet in depth below the ground surface. Each well system is determined by the site's soil characteristics and water availability. Bedrock wells are the most common in New Hampshire and ninety percent of all new wells are bedrock installations.

As displayed in **Table 7.4** above, the percent of the region's population using private wells for their water supply is broken down by community. The City of Concord has the largest population using private wells (8,230), but that contributes to approximately 20% of the population, while the other 80% use community well systems. Dunbarton, Salisbury, and Sutton all have 100% of residents using private wells for their water supply. Many of the region's municipalities have a high percentage of the population using private wells.

Private, on-site supply systems are susceptible to the same pollutants as public water supply; however, unlike public water supply protections and monitoring, there are no state requirements regulating the quality of the water gathered through private systems. Common, naturally occurring contaminants, such as arsenic, radon and iron, may be present in private water supplies through bedrock fractures and surrounding groundwater. A report published in 2013 on Water Supply Infrastructure and Protection by the DES estimates about 55% of private well systems exceed New Hampshire's radon limits and 20% exceed EPA's arsenic contamination levels in the state. Arsenic occurs naturally within areas of New Hampshire bedrock. Wells drilled into New Hampshire bedrock have a one in five probability of containing naturally occurring arsenic at levels above ten parts per billion, which is the EPA's allowable threshold for arsenic in water supplied by public water systems. For private wells the challenge is education and awareness about the importance of water quality testing. Arsenic in water has no color or odor even when present at elevated levels. Testing is the only way to determine arsenic levels as well as identifying many other contaminants. There are treatments available when contaminants are present, but awareness of the importance of water quality testing for private wells is necessary.

Arsenic in Drinking Water

A study from Dartmouth College published in 2014 estimates that if all arsenic contaminated wells were treated in New Hampshire as many as 650 cancers cases could be avoided. Chronic consumption of arsenic is associated with certain cancers and decreased IQ in children. Arsenic occurs naturally in bedrock and can be found at unsafe levels in domestic drinking water wells in New Hampshire. Arsenic can be treated in well water but public education and awareness is needed to encourage home-owners and renters to pursue water testing. For more information on water testing visit:

http://des.nh.gov/organization/divisions/water/dwgb/well_testing/documents/well_testing.pdf

Source: *New Hampshire Public Radio*. 2014.

Source water protection needs are heightened by the increasing extreme weather events and their frequencies. With population projected to increase, albeit at a slower rate than in the past, wells can be expected to expand their capture zones due to high supply, increasing the chance of capturing man-made contaminants due to increased development and stormwater runoff. Other sources of pollutants include on-site septic systems and man-made threats. It is recommended that wells should be tested every three to five years for the majority of pollutants both naturally occurring and man-made. Recommended well water tests can be found in **Table 7.6** below.

Table 7.6: Recommended Well Water Tests

Tested Every Year			
Bacteria	Nitrate		
Tested Every 3 to 5 Years			
Arsenic	Chloride	Copper	Fluoride
Hardness	Iron	Lead	Manganese
pH (Acidity)	Radon	Sodium	Uranium
Volatile Organic Compounds (VOC)			

Source: *Water Quality Testing for Private Wells in New Hampshire, DES.*

Wastewater Infrastructure

Similar to water supply systems, wastewater systems throughout the region allow communities to grow and develop in a way that would not be possible without a centralized wastewater system. Wastewater systems remove water through a sewer system and treat the water for harmful pathogens before being discharged back into the environment.

There are seven wastewater treatment facilities throughout the region and three additional collection systems connecting nearby municipalities. Summarized in the table below, Concord wastewater is the largest facility with design capacity of 10.1 million gallons per day and has the largest capacity for growth with 5.9 million gallons available until design capacity is reached.

All of the wastewater systems in the region have surpassed their twenty-year design life as many of the systems were implemented over 30 years ago, as seen in **Table 7.7**. Some repairs and updates have occurred over the years, however, funding is limited and most systems need to be repaired, upgraded or replaced in the near future to sustain current use and accommodate any increases. In 2013 the Wastewater Engineering Bureau at DES estimated that the region requires \$79.6 million dollars to have all systems in adequate condition, including treatment facilities and sewer collection.

Table 7.7: Wastewater Treatment Facilities in the Central NH Region

Facility	Municipalities Served	Original Construction (Year)	Average Flow (MGD)	Design Capacity (MGD)	Percent Capacity Used	Capacity Available for Growth (MGD)
Allenstown Wastewater	Allenstown Pembroke	1976	0.750	1.350	55.6%	0.600
Concord Wastewater	Concord Bow	1981	4.200	10.100	41.6%	5.900
Henniker Wastewater	Henniker	1976	0.200	0.510	39.2%	0.310
Hillsborough Wastewater	Hillsborough	1986	0.350	0.475	73.7%	0.125
Penacook Wastewater	Concord Boscawen	1973	0.500	2.370	21.1%	1.870

Table 7.7: Wastewater Treatment Facilities in the Central NH Region (Cont.)

Facility	Municipalities Served	Original Construction (Year)	Average Flow (MGD)	Design Capacity (MGD)	Percent Capacity Used	Capacity Available for Growth (MGD)
Pittsfield Wastewater	Pittsfield	1979	0.180	0.400	45.0%	0.220
Warner Village Wastewater	Warner	1975	0.061	0.110	55.5%	0.049
MGD = Million Gallons Daily						

Source: *Wastewater Treatment Facility Data Gathered for CNHRPC by DES, 2012*

Three collection systems reside in the region serving the towns of Boscawen, Bow, and Pembroke. Due to their aging infrastructure, these collection systems may also be experiencing unseen cracks in sewer lines, and leaking manholes, causing unnecessary water to infiltrate the sewer lines and increase the flow, putting the treatment facility closer to capacity and driving up costs to treat water that does not need to be treated. Flooding is an additional concern as severe storms become more frequent, and higher volumes of water are infiltrating through these cracks in and out, leaking untreated wastewater into the ground.

Table 7.8: Average Estimated Annual Sewer Charges, 2006-2011

	2006	2007	2008	2009	2010	2011
CNHRPC Average	\$493.57	\$507.20	\$522.48	\$517.01	\$567.44	\$593.97
State Average	\$468.95	\$512.14	\$518.79	\$540.30	\$575.36	\$595.72
Bench Mark	\$562.00	\$614.57	\$622.55	\$648.36	\$690.43	\$714.86

Source Data: des.nh.gov Compiled: CNHRPC

As seen above in **Table 7.8**, the average estimated annual sewer charge for the region and state increased over the six year period shown. With the exception of 2008, the region's average has been lower than the state's average and lower than the established bench mark for that year.

Asset management plans are commonly created to ensure proper operation of a facility and to achieve lowest financial costs over time, including mapping, equipment inventory, conditions assessment, preventive maintenance plans, critical infrastructure identification, desired level of service, capital budget based on replacement costs and life expectancy schedule, and rate design that covers life-cycle costs. Only one wastewater system in the region has developed an asset management plan, with four in development. There are numerous asset management software programs available to help develop plans. To learn more about asset management for New Hampshire wastewater treatment facilities visit: des.nh.gov/organization/commissioner/pip/factsheets/wwt/documents/web-22.pdf.

Table 7.9: Asset Management Plans in the Region

Site	Asset Management Plan
Allentown Wastewater	No
Concord Wastewater	In development
Henniker Wastewater	In development
Hillsborough Wastewater	No
Penacook Wastewater	In development
Pittsfield Wastewater	Yes
Warner Wastewater	In development

Source: *Wastewater Treatment Facility Data Compiled for CNHRPC by DES, 2012*

Privately Owned On-Site Wastewater Treatment

Private septic systems account for an estimated 66% of New Hampshire's wastewater treatment. The majority of septic systems treat single family homes in rural areas where no municipal system is present. Treatment of wastewater is important in rural settings and must be properly designed, installed and maintained as the treated discharge seeps into the surrounding groundwater, where if not adequately treated can pollute surrounding groundwater and surface water.

Properly installed and maintained septic systems adequately treat household wastewater and sewage. Septic systems have four main components: a pipe carrying wastewater from the home, a septic tank, a drain field, and soil. A septic system is designed to process waste so that liquids can be dispersed and percolated into the subsoil and soils stored. Microbes in the soil break down and remove contaminants from the waste before reaching groundwater. Inspection and maintenance is necessary to ensure safe, efficient septic systems. Systems should be inspected by septic professionals and DES recommends that septic tanks be pumped every two to three years. It is the homeowners' responsibility to maintain a properly functioning septic system.

Table 7.10: Population with Community Water Systems or Household Wells

Municipality	Population	% Population Using Wastewater Treatment Systems (Sewers)	% Population Using On-Site Disposal Systems
Allenstown	4,905	--	--
Boscawen	3,848	19.1%	80.9%
Bow	7,808	0.2%	99.8%
Bradford	1,562	0.0%	100.0%
Canterbury	2,238	0.0%	100.0%
Chichester	2,476	0.0%	100.0%
Concord	42,199	--	--
Deering	2,046	0.0%	100.0%
Dunbarton	2,517	0.0%	100.0%
Epsom	4,506	0.0%	100.0%
Henniker	4,956	31.5%	68.5%
Hillsborough	5,667	45.9%	54.1%
Hopkinton	5,623	11.2%	88.8%
Loudon	5,054	0.0%	100.0%
Pembroke	7,345	57.5%	42.5%
Pittsfield	4,363	41.8%	58.2%
Salisbury	1,259	0.0%	100.0%
Sutton	1,763	0.0%	100.0%
Warner	2,943	2.7%	97.3%
Webster	1,758	0.0%	100.0%
Total	114,836	--	--

Source: USGS NH Water Use Data, 2005

The Subsurface Bureau of DES is responsible for review and issuance of new septic design permits as well as inspections and licensing for designers and installers of septic systems. The Bureau reviews design plans and specifications for proposed septic systems to ensure proper siting, construction and operation of the systems, including minimum lot sizes to ensure setbacks from wells for the safety of

public health and the environment. Municipalities can adopt additional regulations to septic systems as they affect the local environment, especially groundwater contamination. For example, the town of Hopkinton has added special provisions under the Wetlands Conservation overlay district, that no septic tank or leach field be constructed or enlarged closer than seventy-five feet to any wetland. Additionally, several municipalities in the region, Bow, Bradford, Dunbarton, Epsom, Pembroke and Webster, as well as others elsewhere around the state, require local approval of septic systems prior to the required permitted from DES in RSA 485-A;32 I&II Sewage Disposal Systems. For more information on septic system guidelines and design visit DES Subsurface Systems Bureau at: www.des.nh.gov/organization/divisions/water/ssb.

Dams

Dams are located throughout the region, providing a vast array of benefits, including adding to the overall quality of life in the region. As many lakes are sustained by dams, these sites provide abundant natural resources and recreation potential, enhancing the overall tourism industry in New Hampshire and the region. The town of Bradford has the highest number of seasonal homes in the region, about 203 estimated from the 2010 Census, many of which are located on Lake Massasecum, and in locations within easy commute to ski areas such as Pat's Peak.

Similar to other water infrastructure components, dams throughout the region have the potential to support and protect development by providing emergency water supply storage and stormwater detention, both of which are critical as weather extremes become more common. A total of 301 dams have been documented in the region, of which 80% are owned privately, being the owner's responsibility for maintenance and repair. Nationally, New Hampshire is ranked third with the most dam deficiencies as stated in DES Water Resource Primer. Deficiency examples include overtopping, structural failure, and cracking caused by settling or inadequate maintenance. Many private dam owners have inadequate funding or knowledge of the dam's condition, causing potential harm downstream. Refer to **Map 7.5** Active Dams.

In New Hampshire, dams are placed into one of four categories, based on potential damage downstream if failure occurs. *High hazardous dams* are labeled if failure would inundate homes or other occupied structures downstream and likely cause loss of life, *significant hazard dams* are labeled if failure would cause major property damage downstream, *low hazardous dams* are labeled if failure would cause minor property damage downstream, such as damage to a town or city road and lastly, *non-menacing structures* are labeled if failure poses no threat to life or property. Hopkinton has the highest number of high hazard dams in the region with three.

The Central NH Region is home to two hydroelectric power plant dams which both provide 100 percent renewable energy through Public Service of New Hampshire (PSNH). The Jackman Hydro dam is located in Hillsborough and is fed by the Franklin Pierce reservoir. The Garvins Falls Hydro is located in Bow and is fed by the Merrimack River. Additional information on hydroelectric power can be found in **Chapter 9: Energy Chapter**.

Central New Hampshire Region

Natural Resources

Map 7.5

Active Dams

Active Dams

Hazard Level

- High Hazard
- Significant Hazard
- Low Hazard
- Non-Menacing Structure

- Surface Waters
- Rivers and Streams
- Intermittent Streams
- Municipal Boundaries

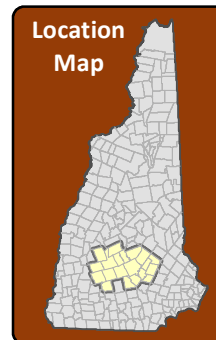
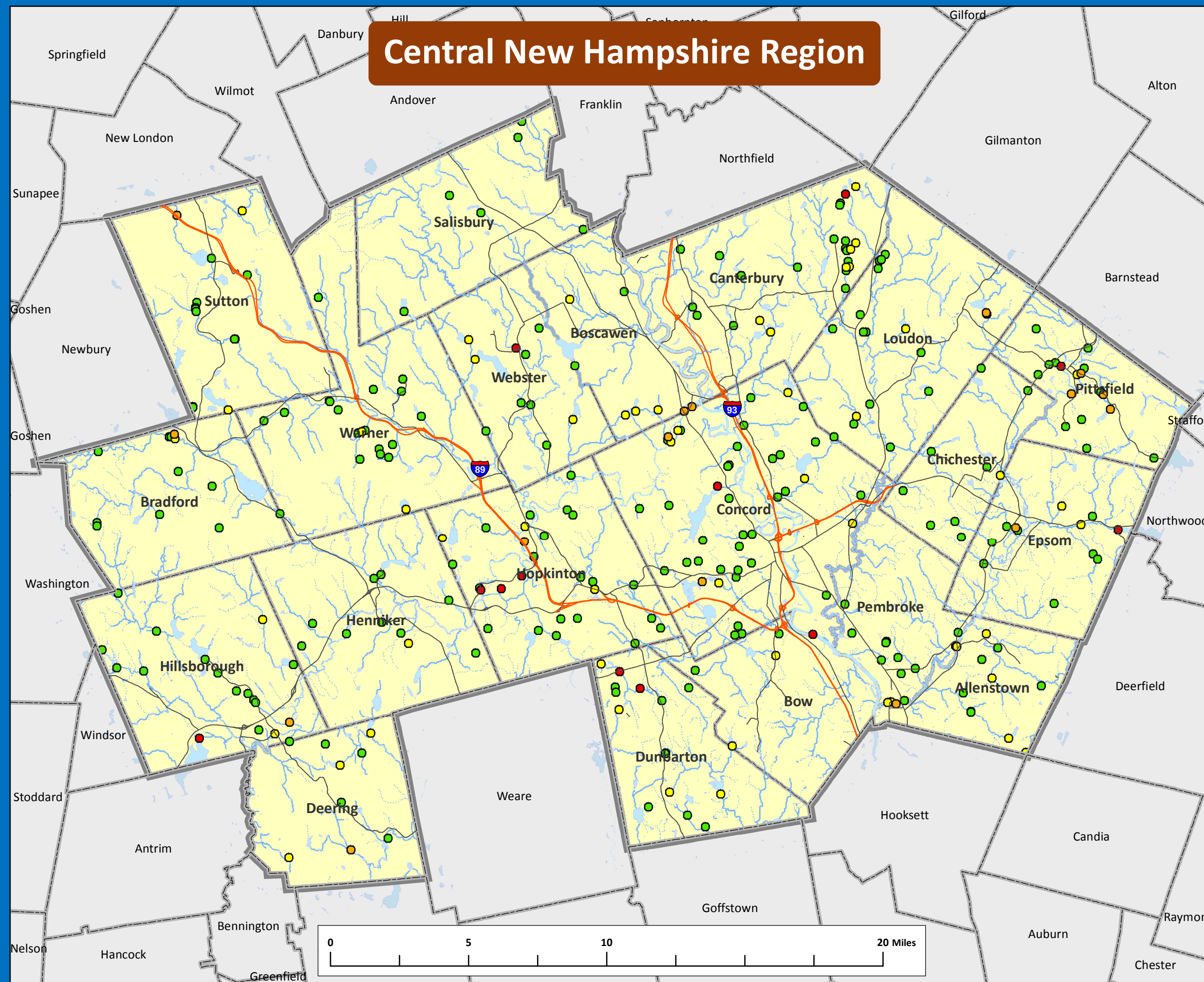
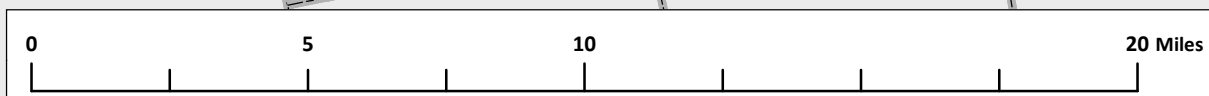
Note: For base layer legend, see Base Map 1.1.

Map Explanation: Shows all active dams in the region and their hazard level classification.

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire
Regional Planning
Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org



Hopkinton-Everett Lakes Flood Risk Management Project

Figure 7.4 Hopkinton Dam, Contoocook



Source: [CNHRPC](#)

Surrounded by the dam at Hopkinton Lake and the dam at Everett Lake, two canals provide flood management protection for the residential, commercial and industrial sites along the Contoocook and Piscataquog Rivers. These canals direct floodwater from the Contoocook River and Hopkinton Lake to flood storage behind Everett Lake in Weare.

After devastating flooding occurred in the Merrimack River Basin in March of 1936 leaving 24 dead, 77,000 people homeless, and causing \$36 million dollars of damage, the dams were constructed and the Merrimack River Valley Flood Control Commission was established in 1957. Today, the Hopkinton-Everett Reservoir area provides a place for swimming, boating, and fishing in addition to flood control and storage. Owned and managed by the Army Core of Engineers, 3,282 acres of land surrounding Hopkinton Lake has been designated by DRED to conduct a forestry, fish and wildlife management program, allowing multiple smaller water bodies to be fished and the land to be hunted.

Source: [New England District, US Army Corps of Engineers](#)

LAND – THE NATURAL LANDSCAPE

Floodplains

Flooding often occurs as a result of heavy spring rains, runoff, ice jams and strong coastal storms and hurricanes. Floodplain management should be part of the overall planning for land use protection and development within a community and it is critical if we are to reduce the risk to new and rebuilt structures and to protect damage to infrastructure and other facilities. Unfortunately, the Federal Emergency Management Agency (FEMA) has had a limited budget for mapping for many years, particularly in the Northeast, so it is often a challenge to accurately assess the risk in these areas.

For flood insurance purposes, FEMA defines the floodplain as “those lands subject to a one-percent or greater possibility of flooding in any given year” (designated as Zone A on the FEMA floodplain maps). Participation in the National Flood Insurance Program (NFIP) in New Hampshire is very high, with over 91% participation – 214 communities. All of the communities in the Central NH Region participate in the NFIP. Another way to view floodplains is to consider them as the area that has the potential to carry and store floodwater, also termed flood storage land. Preserving the floodplain’s ability to do just this is key to protecting surrounding land uses or those uses currently in the floodplain. [Map 7.6](#) displays lands with flood storage capacity that are also in conservation.

Central New Hampshire Region

Natural Resources

Map 7.6

Conserved Flood Storage Lands

-  Conserved Flood Storage Lands
-  Not Conserved Flood Storage Lands
-  Conservation Lands
-  Municipal Boundaries

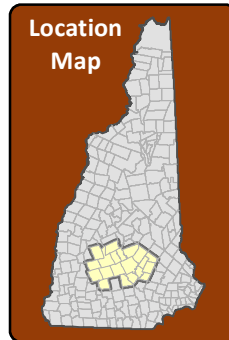
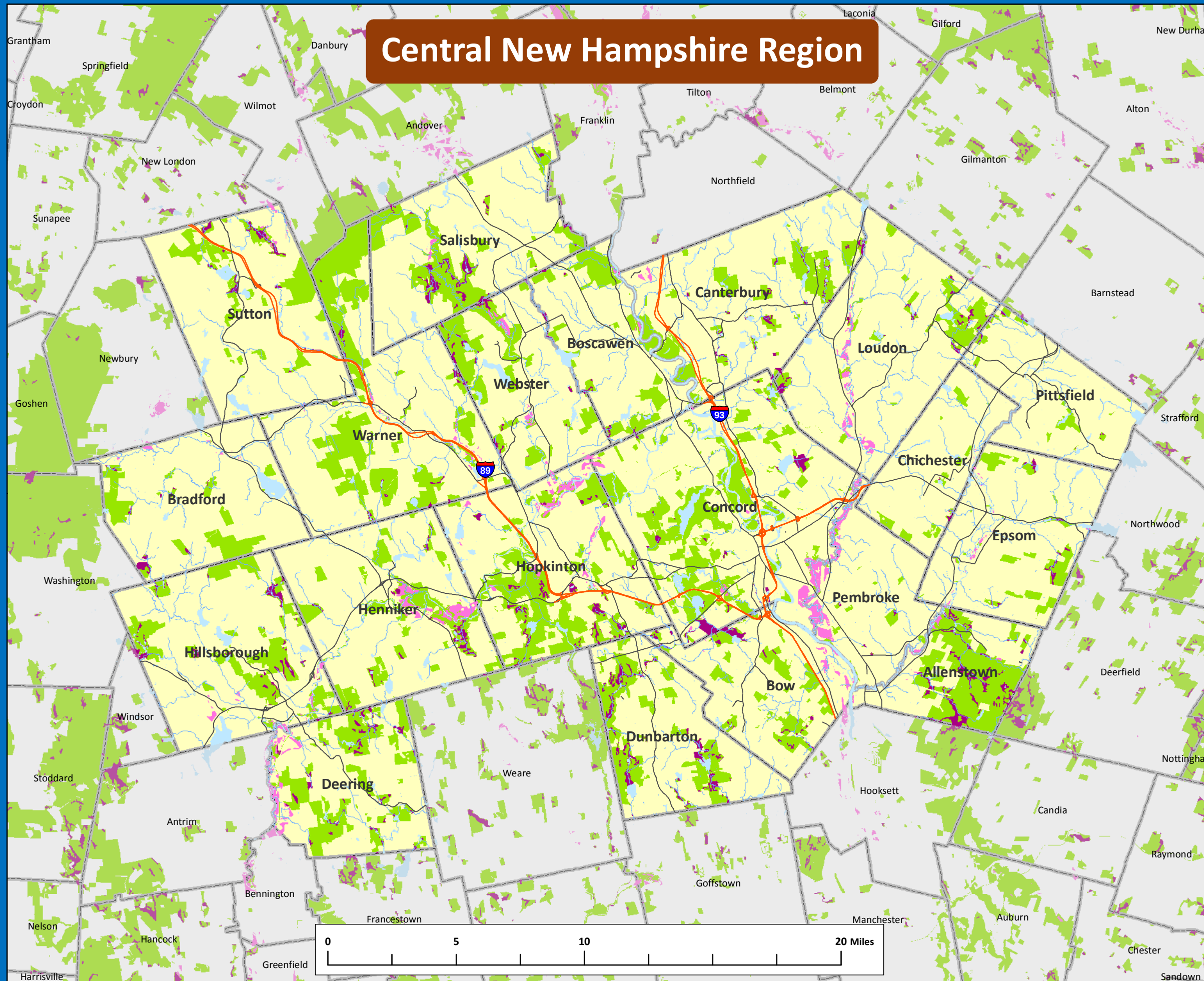
Note: For base layer legend, see Base Map 1.1.

Map Explanation: Flood storage lands are a valuable resource in that they help mitigate the negative impacts of flood events. Flood storage land areas on this map are areas of hydric soils in the Soil Survey Geographic database. The soils data was used to develop GSF metric 604, Conserved Flood Storage Land.

Data Sources: NH GRANIT, NHDOT, NHFGD, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire
Regional Planning
Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org



Some communities have gone beyond the minimum requirements set by FEMA to participate in the NFIP. In the Central NH Region, Concord regulates to a higher standard, using a “freeboard” that requires additional height above the base flood elevation (BFE); the restrictions are two feet within the Merrimack River floodplain and one foot in the remainder of the City’s floodplain areas. The City also restricts uses in the floodway and certain uses, including residential buildings, in the floodplain. Epsom also prohibits encroachments, including fill, new construction, substantial improvements and other development that results in any net increase of flood elevation. The town of Bow does not allow any building, impervious surface or stripping of topsoil within 25 feet of any pond or the top of any stream bank, or within 35 feet from the stream centerline, where a top of bank is not discernible. A greater setback could be required if there is evidence that these minimums do not afford sufficient protection of the natural functions of the area.

According to FEMA, the most surprising statistic in floodplain management is that more than 25% of claims filed for flood events occur in those areas outside of identified special flood hazard areas. It is important to realize that the NFIP only sets minimum requirements that often do not provide sufficient protection from all local flood hazards. While this can be the result of the quality of the maps, it can also be attributed to the changes in the nature and scale of storms in the last few years. It is important to look at the recent floods and plan accordingly, whether that be to assess the risks in a community and look at ways to avoid increasing risk as well as reducing the current risk. (See the Weather Hazards Chapter for more information on flooding and floodplains.)

The New Hampshire Office of Energy and Planning (OEP) provides assistance to communities and the public on floodplain management and helps to promote sound land use planning techniques that will reduce flood losses. For more information on OEP’s Floodplain Management Program visit: www.nh.gov/oep/planning/programs/fmp.

Topography

The Merrimack River running from north to south acts as a “natural” division in the region’s terrain. East of the Merrimack River is relatively flat, most noticeably in the towns of Pembroke and Chichester, while the more hilly terrain is found to the northwest in the towns of Warner, Bradford, and Sutton. Other hilly areas in the region include the towns of Epsom, Hillsborough, Henniker, and western Salisbury.

The three highest peaks in the region are found in the town of Warner and abutting towns. The highest peak is Mount Kearsarge, with an elevation of 2,937 feet, followed by Black Mountain (2,560 feet) in Warner and Sutton, and Little Mountain (2,360 feet). Located in Bradford, Durrell (Moon) Mountain also exceeds 2,000 feet in elevation at 2,096 feet. The mountains most noticeably used for various recreational opportunities in both summer and winter are Mount Kearsarge and the popular Pat’s Peak in Henniker (1,460 feet). Ragged Mountain in nearby Danbury is another popular ski resort with activities occurring throughout much of the year.

Pats Peak Recreation Site

Located in Henniker, Pats Peak Ski Resort has been the region's only ski resort since doors opened in 1963. Today, the resort has significant snow making capabilities and includes 28 trails, with an elevation of 1,460 feet and ski trains running up to one a half miles long. In non-winter months, Pats Peak is an event site for weddings and specialized events, such as the annual Mountain Bike Festival.

Pats Peak actively supports the Sustainable Slopes Environmental Chapter, created by the National Ski Areas Association. Since 2004, the resort has been making sustainable changes and upgrades increasing energy efficiency and lowering environmental impact. These updates include:

- Purchasing energy efficient snowmaking equipment;
- Water conservation methods within restrooms, cafes, and snowmaking;
- Insulation updates for heating efficiency in resort buildings.

Pats Peak is also actively involved in afterschool ski programs available to areas schools and municipal recreation departments. The program provides lessons or ski time for students aged six to seventeen, usually for a five week period. The ski resort plays a significant role in winter recreation in the region, especially for youth.

Figure 7.5: Pats Peak Ski Trail



Source: www.patspeak.com

Forests

New Hampshire is considered the second most forested state in the country, behind Maine, with 84% forested land. Protection of natural, forested lands is valued across the region for its benefits – clean water, preserved wildlife habitats, forest products and recreation. Finding ways to maintain working forests is also a critical partnership with private landowners to maintain forested land in the region.

Forest land continues to be lost each year to other uses, mostly due to development. According to Department of Resources and Economic Development (DRED) Assessment of New Hampshire Statewide Forest Resources, an additional 5% of forest land or 288,000 acres, will be lost due to development between 2010 and 2025. Merrimack County is estimated to lose 3% of forested land between 2001 and 2025. While development is necessary for the state and region, maintaining large tracts of forested land, 500+ acres of forest blocks, is key to protecting habitat for wide-ranging large animals such as moose and bear. Merrimack County has 50% of the county in 500+ acres of forested land, while Rockingham, Strafford and Hillsborough Counties have the lowest percentages.

There are many different species of trees in the region with the most common forest types described below.

Hemlock-Hardwood-Pine Forests

Hemlock-hardwood-pine forests are the predominant forest type in the region. Approximately 45% of New Hampshire's area is covered by hemlock-hardwood-pine forest, with the most extensive continuous forested area, or large forest blocks, located in Merrimack and Belknap counties. This forest type is home to a wide range of wildlife including American woodcock, bald eagle, eastern box turtle, marbled salamander, silver-haired bat, as well as larger game species including black bear, moose, wild turkey, and deer. Hemlock-Pine is one of New Hampshire's most at-risk habitats with challenging issues including human development, introduced species, and altered natural disturbance.

Appalachian Oak-Pine Forest

Approximately 90% of the Appalachian oak-pine forests are found in southeastern area of the state as well as along the Connecticut River. There are some smaller stands of Appalachian oak-pine forest throughout the Central NH Region which is home to similar species of wildlife such as the hemlock-hardwood-pine forests.

Table 7.11 and **Map 7.7** illustrate the current status of forest lands in the region. Several communities have developed initiatives to protect their forest resources, and as a result, approximately 25% of the region's forests are in conservation. **Table 7.11** highlights the percentage of forest land in conservation by municipality. In the table and corresponding map, the forest acreage is defined by NH Fish and Game's Wildlife Action Plan criteria for forested land and is not inclusive of all land that is forested. While much of the forest land in the region is in private lands and contributes to overall forest and environment health, the table and map provide an indicator of forest land that is protected from development.

Red Pine Scale in the Region

Red Pine Scale is a small insect which attacks red pine trees. As an invasive non-native species, the insect was first found in New Hampshire in 2012 in Bear Brook State Park in Allenstown. A sanitation harvest to manage the infestation was completed in spring 2014. As of September 2014 eight municipalities in the state have tested positive for red pine scale including five municipalities in the region; Allenstown, Chichester, Concord, Epsom and Loudon.

Figure 7.6: Bear Brook State Park

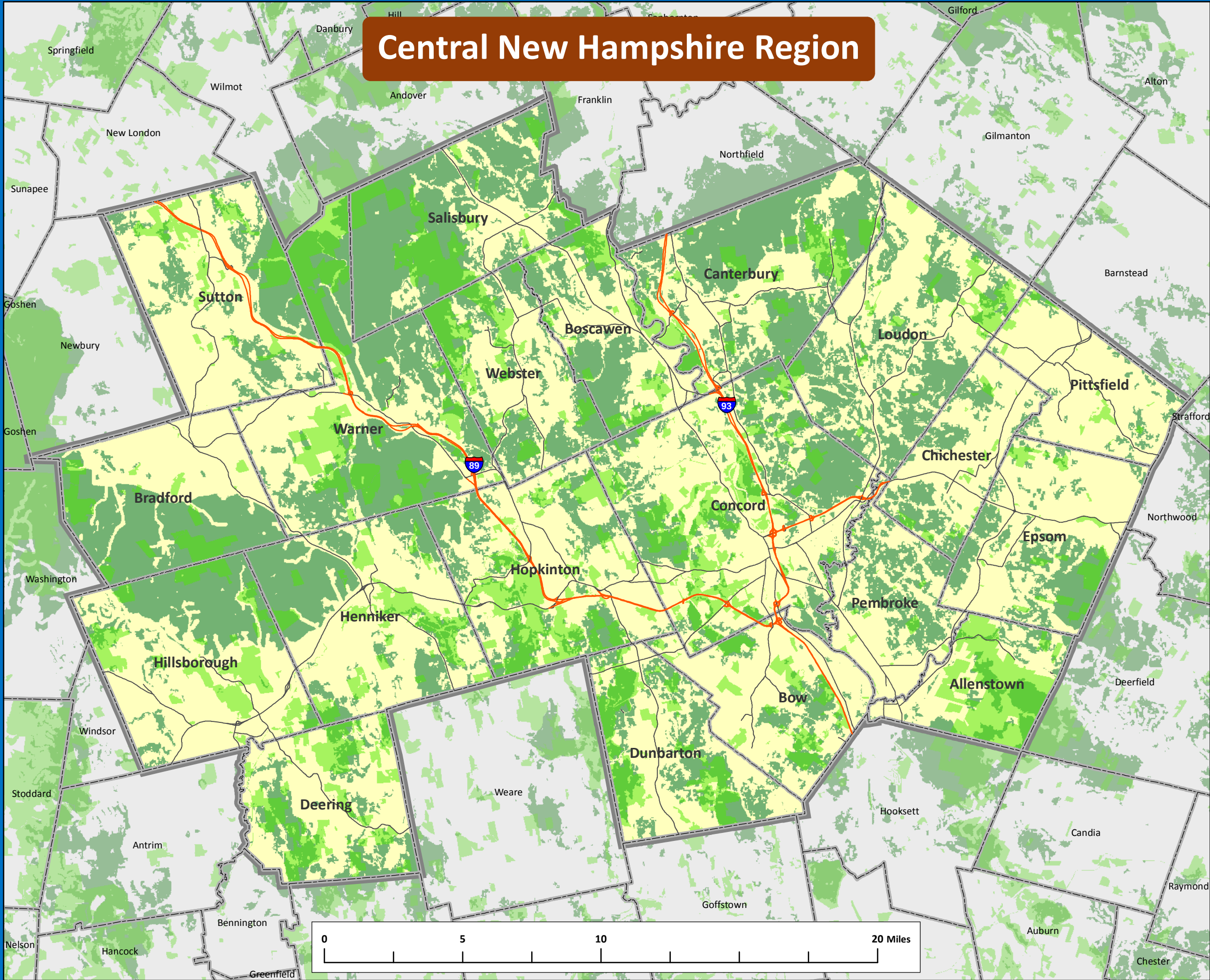


Source:

DRED, Division of Forest and Lands

Central New Hampshire Region

Natural Resources Map 7.7 Forest Lands



- Forest Lands
- Conservation Lands
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Forest Lands are derived from the NH Wildlife Action Plan 2010 dataset. Lands designated as priority 1 through 3 forest land are displayed as forest lands.

Data Sources: NH GRANIT, NHDOT, NHFGD, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org



Location Map

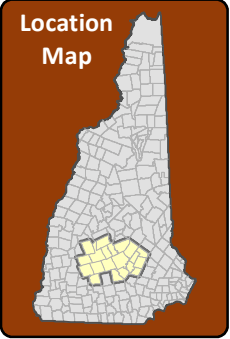


Table 7.11: Forested Land

Municipality	Municipal Acreage	Forest Acreage	Conserved Forest Acreage	% Conserved
Allenstown	13,167.4	3,551.0	2,296.3	64.7%
Boscawen	16,252.1	6,853.0	1,446.9	21.1%
Bow	18,269.3	3,553.9	1,323.3	37.2%
Bradford	22,993.7	12,263.5	2,373.9	19.4%
Canterbury	28,696.6	16,277.6	2,778.3	17.1%
Chichester	13,628.1	3,918.0	271.6	6.9%
Concord	42,999.8	14,615.0	4,215.1	28.8%
Deering	19,987.9	5,883.6	2,589.7	44.0%
Dunbarton	20,045.6	7,923.2	3,453.8	43.6%
Epsom	22,152.7	6,718.9	1,136.0	16.9%
Henniker	28,671.7	10,707.8	1,808.2	16.9%
Hillsborough	28,606.8	9,272.4	1,831.2	19.7%
Hopkinton	28,851.6	8,118.3	2,844.1	35.0%
Loudon	29,896.6	11,840.2	908.9	7.7%
Pembroke	14,597.2	5,127.2	184.2	3.6%
Pittsfield	15,558.7	1,454.7	159.2	10.9%
Salisbury	25,468.3	18,726.0	4,544.5	24.3%
Sutton	27,734.8	7,405.1	1,410.8	19.1%
Warner	35,502.0	19,994.4	6,312.1	31.6%
Webster	18,425.8	8,207.9	2,740.4	33.4%
Total	471,506.7	182,411.7	44,628.3	Average 25.1%

Source: *NH GRANIT, NHFGD, DRED*

Regional Forest Initiatives

Through the collaboration of many agencies, conservation organizations, public officials, and the general public, protection of many of the region's forests has been possible. Efforts such as providing education and training programs on the region's forests and its threats as well as field work monitoring trees and harmful diseases have all contributed to this positive trend. The following are a few of the conservation organization/programs in the state that are active in forest stewardship in the region.

Natural Resources Stewards Program

Formally the Community Tree Stewards Program, the Natural Resources Stewards Program operated by UNH Cooperative Extension provides public awareness, community networking, volunteerism, and education of natural resource professionals. The Program provides a ten week training program for volunteers who then use their training for education programs at local schools and community gatherings. The stewards provide a source of knowledge available to local communities about managing, conserving, and utilizing their forests. For more information on the Program visit:

www.extension.unh.edu/Volunteer/Natural-Resources-Stewards.

The Society for the Protection of New Hampshire Forests (SPNHF)

As a statewide non-profit organization with a long and influential history in New Hampshire, SPNHF or commonly referred to as the Forest Society, focuses on land protection, land management, land stewardship, advocacy, and education to protect forests and open space areas. Founded in 1901, SPNHF owns over 170 reservations, located on over 50,000 acres across New Hampshire. The properties are open to the public for many recreational uses, as well as hunting and fishing consistent with state law. In the Central NH Region, SPNHF owns 28 properties covering 4,929 acres, notably of which 10 properties and close to half of the total acres, 2,535 acres, are located in Deering. Other properties are located in Boscaawen, Canterbury, Concord, Dunbarton, Henniker, Hillsborough, Warner and Webster. More information about the Forest Society can be found at www.forestsociety.org.

New England Society of American Foresters – Granite State Division

The New England Society of American Foresters is a multi-state society of professional foresters, with a Granite State Division of New Hampshire professionals. A compilation of professionals and students, the society aims to ensure ecosystem health while continuing use of the forest resources. For more information visit: www.nesaf.org.

New Hampshire Timberland Owners Association (NHTOA)

The NHTOA works to conserve New Hampshire's working forests for future generations through public and industry education, advocacy, outreach, and cooperation within the forest community. Founded in 1911, the association is a statewide coalition of landowners, forest industry professionals, government officials, and supporters who work together to promote better forest management, conservation of working forests, and a strong forest products industry. NHTOA recognizes that well-managed forests and a strong New Hampshire forest economy relies on private landowners and industry to maintain working forests for the future. More information on NHTOA is available at www.nhtoa.org.

Forest Invasive Species

Forests throughout the region are threatened by a growing presence of invasive species. The Emerald Ash Borer (EAB) recently made its first appearance in the state and region in Concord and Bow. As a small beetle, adults average one to one and a half centimeters in length and are metallic green in color. Active May through August, they are primarily found in the bark of ash trees where they lay their eggs to live through the winter to emerge in May. Trees with infestations usually survive three to five years but can be treated if found early.

Once discovered, a survey of the surrounding area was initiated by DRED's Division of Forests and Lands which found the infested area ranging over twenty four square miles in the area of Concord and Bow. The trees will be peeled the winter of 2014-15 to look for EAB larvae, but no additional EAB has been found as of 2013.

The following [Table 7.12](#) reviews other invasive species monitored and surveyed throughout the region and the state.

Firewood Quarantine in Loudon

Two firewood quarantines were held at the NH Motor Speedway in Loudon in July and September of 2013. Overall, 195 notices were written with two summons.

Visitors to the track from out of state were asked if they had untreated firewood, and were directed for inspection. Firewood in violation was confiscated and burned so to prevent the spread of invasive species and harmful diseases. Restricting the movement of firewood from out of state helps to limit the spread of invasive species. Visitors to the state are encouraged to use local firewood.

Source:

Forest Health Highlights for the year 2013, NH Department of Resources & Economic Development Division of Forest and Lands.

Tree Farms

The American Tree Farm System (ATFS) is a national program that encourages private forest owners to actively manage their forests in a sustainable manner for many values such as wildlife habitat, recreation, and water quality. Launched in 1942, its mission is to promote the growing and harvesting of renewable forest resources while protecting the environment and increasing public understanding of all benefits of productive forestry. 10.6% of tree farms in the state are located in the Region, representing 8% of the total statewide acreage.

State of NH

14,362 Tree Farms

484,099 Acres



Central Region

144 Tree Farms

38,603 Acres

Source: Society for the Protection of NH Forests

Table 7.12: Invasive Species Threatening Forests

Name of Species	Place Found	Description
Hemlock Woolly Adelgid (HWA)	Concord, Epsom, Henniker, Deering, Weare	HWA is a small insect which feeds on a tree's stored starches, leading the tree to mortality in four to ten years. <i>(U.S. Dept. of Agriculture)</i>
Elongate Hemlock Scale (EHS)	Central NH Region	EHS is a small crawler which removes fluids from hemlock needles, causes foliage to drop prematurely. Mortality occurs in about ten years. <i>(U.S. Dept. of Agriculture)</i>
White Pine Blister Rust (WPBR)	Chichester, Concord, Deering, Epsom, Sutton	WPBR is a fungus that moves into branches, the trunk, causing portions of the tree to die. <i>(The American Psychopathological Society)</i>
Asian Longhorned Beetle (ALB)	Allenstown, Concord, Pembroke	ALB is a beetle that attacks and kills hardwood trees, including maple, elm, birch, ash, and many more. <i>(University of Vermont)</i>

Source: Forest Health Highlights for the year 2013, DRED Division of Forest & Lands

Wildlife and Habitat

Wildlife habitat is a value natural resource in New Hampshire. As part of a healthy ecosystem, wildlife is essential to New Hampshire forests, rivers, and fields and is a resource for hunting as well as a growing cultural resource for tourism. New Hampshire has strong connections to its land and natural features, including wildlife and its corresponding habitat. Wildlife habitat is considered a natural resource and falls within conservation priorities for the region.

Wildlife habitat loss often occurs when previously undeveloped land is developed. While development is and will continue to be a necessity for the economic well-being of the region, conserving key wildlife

habitat land is important for the many native species. A coordinated conservation strategy for conserving wildlife habitat is important for wildlife corridors - allowing for proper food and nesting sources and the ability for large animals to travel without interfering with highly dense communities. Along with conservation of open space for recreation, scenic quality, or natural features, wildlife habitat is an important consideration for communities when prioritizing conservation efforts.

NH Fish and Game Department worked with partners in the conservation community to create the state's first Wildlife Action Plan (WAP) released in 2005. The plan identifies New Hampshire's wildlife habitats and presents conservation strategies and tools for restoring and maintaining critical habitats and populations of the state's species of conservation and management concern. For purposes of prioritizing wildlife habitats for conservation across the state, the plan analyzes ecological data to determine three tiers of wildlife habitat. Tier 1 habitats are the highest priority habitats due to forest type or imperiled species and are considered of critical importance statewide. Since there are many diverse ecological areas in New Hampshire, Tier 2 habitats are identified as important wildlife habitats within the more localized, sub-regional areas if they were not already included in Tier 1. For a full description of the habitat ranking methodology refer to the WAP available at www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm.

In the Central NH Region, 91,737 acres (19.5%) of the region's total land area is identified as Tier 1 habitat, the most critical wildlife habitat. Thirty-two percent of this most critical wildlife habitat is conserved. The **Table 7.13** presents data of Tier 1 wildlife habitat in the region as identified by the WAP. **Map 7.8** Conserved Wildlife Habitat displays wildlife habitat (Tier 1 and 2) in the region. Approximately one third of the region is identified as important wildlife habitat (Tier 1 and 2). Of this, a little over a quarter of this total identified important wildlife habitat is conserved in the region. This leaves approximately 75% of important wildlife habitat vulnerable to development. The protection of wildlife habitat is an important variable for communities to consider when prioritizing conservation efforts.

Smith Pond Bog Wildlife Sanctuary

Figure 7.7: Smith Pond Bog Sign



Source: CNHRPC

Smith Pond Bog located in Hopkinton is a 59 acre wildlife sanctuary owned and managed by New Hampshire Audubon, a statewide non-profit organization. The pond itself covers almost eight acres and was named after James Smith who settled nearby in 1765. The sanctuary protects the wetland habitats surrounding Smith Pond, and boost maintained trails for walking and hiking year round.

Source: *Hopkinton Conservation Commission, 2012*

Central New Hampshire Region

Natural Resources

Map 7.8

Conserved Wildlife Habitat

- Conservation Lands
- Tier 1 Wildlife Habitat
- Tier 2 Wildlife Habitat
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Wildlife habitat is defined as tier 1 or tier 2 habitat in the NH Wildlife Action Plan 2010.

Data Sources: NH GRANIT, NHDOT, NHFGD, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire
Regional Planning
Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

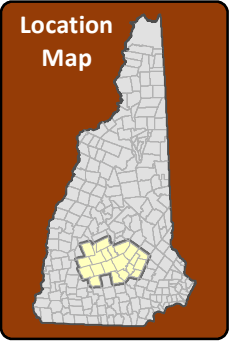
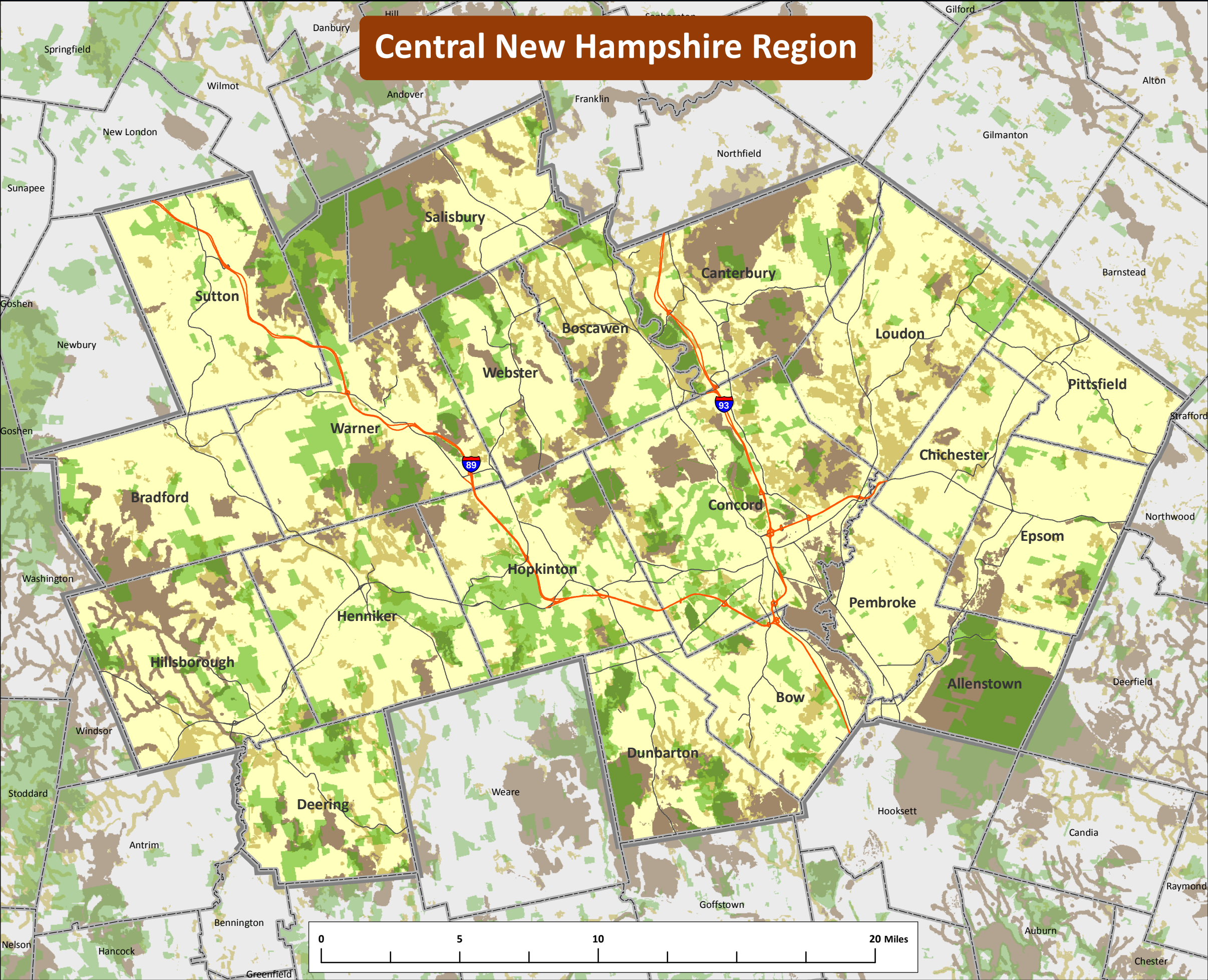


Table 7.13: Conserved Wildlife Habitat

Municipality	Wildlife Habitat Acres (Tier 1)	Wildlife Habitat Acres Conserved (Tier 1)	Percent Tier 1 Wildlife Habitat Conserved
Allenstown	9,088.2	6,700.0	73.7%
Boscawen	2,951.1	417.8	14.2%
Bow	1,110.2	173.0	15.6%
Bradford	4,121.6	483.1	11.7%
Canterbury	10,171.6	1,972.5	19.4%
Chichester	282.8	116.7	41.2%
Concord	8,675.5	2,000.9	23.1%
Deering	2,543.1	975.5	38.4%
Dunbarton	6,091.5	2,860.3	47.0%
Epsom	2,398.0	201.7	8.4%
Henniker	2,290.7	500.1	21.8%
Hillsborough	7,021.1	1,491.0	21.2%
Hopkinton	2,714.5	807.4	29.7%
Loudon	1,884.7	282.7	15.0%
Pembroke	1,291.0	72.6	5.6%
Pittsfield	52.7	26.0	49.3%
Salisbury	13,132.3	4,242.4	32.3%
Sutton	2,120.6	506.7	23.9%
Warner	9,732.4	4,314.9	44.3%
Webster	4,063.2	1,384.9	34.1%
Total	91,736.8	29,530.2	32.2%

Source: *GRANIT, NH F&G Department WAP*

Critical Wildlife Habitats in Central NH Region

The Central NH Region has several discrete wildlife habitats which are home to a diverse array of plants and wildlife. The Wildlife Action Plan describes the many habitats found in New Hampshire and below is a summary of the critical wildlife habitats in the region in addition to the forest habitats described in the forest section of this Chapter.

Grasslands

In New Hampshire, grasslands are created, managed, and maintained by human actions such as farm fields and airports that provide extensive fields. Grasslands are not described by the New Hampshire Natural Heritage Bureau as natural communities, but they provide unique habitat for migrating/wintering birds, Eastern hognose snake, horned lark, and Northern leopard frog. Grassland habitat is considered to be at least ten hectares (24.7 acres) in size. The largest proportion of grasslands occur in Grafton (20%), Merrimack (13%), and Coos (12%) Counties. In Merrimack County, 11% of grasslands are in conservation. The most challenging issue facing grasslands and species that use this habitat are development and certain agricultural practices, such as mowing during breeding seasons. Loss of grassland is most often due to a loss of active agricultural land, farm abandonment, development, or natural succession.

Floodplain Forests

Floodplain forests are widely distributed across the state and found in flood-prone areas along rivers contributing to flood control, water quality, and erosion control. In the region, floodplain forests are in proximity to the Merrimack River, Blackwater River, Contoocook and North Branch Rivers, Soucook

River, Suncook River, and the Warner River. The floodplain forests are home to cerulean warbler, eastern red bat, red shouldered hawk, and Canadian warbler among others; providing a diversity of wildlife to live together in one ecosystem. The most challenging issue facing floodplain forests is human development and developing transportation infrastructure occurring throughout the region.

HOW WE USE OUR LAND

Development shapes the landscape when we decide where and how to build our stores, houses, and roads, much of which has already been determined by economic needs and transportation patterns of generations ago. The infrastructure needed to support development needs to be carefully planned to minimize the impact on natural resources and ecosystems as well as quality of life for residents.

Stormwater Runoff

Stormwater runoff occurs when water from intense rain and snowmelt flows over land instead of soaking into the ground. When large amounts of rain and snowmelt occur in a small period of time, the ground is not able to infiltrate the water at the rate it accumulates, causing it to flow over land. As new and additional development occurs, stormwater runoff increases due to the larger area of impervious cover. The floodplain in the developed area also becomes larger and buildings that were once not affected by the 100-year storm may become affected as land use changes.

Increased stormwater runoff can transfer pollutants and contaminate surface waters of rivers, lakes and ponds resulting in loss of habitat and affecting recreational use. Additional impacts, such as effects on natural hydrologic patterns, aquatic life, and natural water quality from pollutants, including sediment, suspended solids, nutrients, heavy metals, pathogens, toxins, oxygen-demanding substances and floating materials, most of which are introduced through human activity. Common man-made sources picked up by stormwater include runoff of oil, gas, or antifreeze leaking from cars, fertilizer and pesticides from lawn care, leaking, poorly maintained septic systems, industrial waste, pet waste, deicing road salts and chemicals such as cleaning products. According to the DES Water Resource Primer, 83% of the water quality

Karner Blue Butterfly and Concord Pine Barrens Project

The unique Pine Barrens habitat is less than 1% of New Hampshire's area and are primarily located in Merrimack and Carroll counties. The 560 acres of remnant Concord Pine Barrens is protected through the Concord Municipal Airport Development and the Conservation Management Agreement established in 2000. Concord's Pine Barrens have the highest known density of rare plants and animals, including the Karner Blue Butterfly that disappeared from the Pine Barrens in 1991.

Beginning in 2001, New Hampshire Fish and Game began restoring the Karner Blue Butterfly population in a 28 acre conservation easement within the Pine Barrens located at the end of Chenell Drive.

Figure 7.8: Karner Blue Butterfly



Source: Merrimack River Wildlife Heritage Trail

To mimic the Pine Barren natural disturbances, controlled burns and brush cutting are routinely conducted to maintain natural vegetation. A controlled burn was performed on April 25, 2014. The burn prevents leaf litter, promotes sunny and sandy openings for native vegetation to grow, and restores nutrients to the soil.

Sources: NH Fish and Game, Karner Blue Butterfly and Concord Pine Barrens Project. Merrimack River Wildlife Heritage Trail, Karner Blue Butterfly Conservation Easement

impairments listed in DES's 2008 water quality assessment report were attributed to stormwater contaminants.

As polluted runoff flows to rivers and lakes, it greatly affects groundwater recharge, lessening the recharge of clean, unpolluted water. Water supply used for drinking water and everyday tasks is sourced from groundwater or surface water depending on location and topography in the area. A survey conducted by DES in the summer of 2013 concluded that almost fifty percent of community water systems that use surface water as a source indicated an increase in water quality impairments due to extreme weather events. As extreme weather events are projected to increase in frequency over the next 40 years, protecting water quality and drinking water supply becomes critical.

Increases in stormwater can increase flooding in the watershed creating new flooding patterns, channel erosion, and potentially causing harm to surrounding habitats. Flooding will also increase due to stormwater in developed areas, where impervious surface cover (i.e. roadways, parking lots, houses) is greater. Damage to buildings and property can become a greater risk from flooding and erosion, without proper management of the stormwater.

Stormwater Infrastructure

Stormwater infrastructure consists of a system of pipes and inlets, redirecting stormwater to nearby stream, river or main wastewater channels to be treated and released. Other techniques include settlement and detention ponds, retaining existing vegetation at development sites to allow infiltration, and proper surface grading and drainage design of roads and developments.

Many infrastructure pipes and culverts need to be updated as they reach the end of their design life and no longer function properly. Furthermore, a maintenance program needs to be implemented for future planning, including new equipment, such as street sweepers, to keep pollutants off of high stormwater runoff areas. Typically, stormwater updates, maintenance and inventory is done in conjunction with highway work, rarely on its own, which leads the public little general knowledge of the topic and little awareness of the harmful impacts.

Stormwater infrastructure is also threatened with predicted increases in rain and flooding over the next century. Culverts, ditches, and dams are becoming undersized as the volume and flow of runoff increases, and occurrence of extreme events becomes more frequent. Many undersized culverts begin to act similar to a dam, unable to pass the flow of water causing additional flooding around the culvert. Finally, stress on the infrastructure effects both performance and design life, requiring additional maintenance and upkeep which can be costly for communities.

In the region, Concord, with the largest population, requires the largest stormwater needs estimated at 11 million dollars by the Clean Watersheds Needs Survey. The same survey, including capital and non-capital costs, estimated the region as a whole requires an estimated 33.5 million dollars to reach water quality goals outlined in the Clean Water Act regarding stormwater management.

Under RSA 149-I, communities have the ability to raise funds for stormwater management through utility fees. Funds gathered would be placed in a stormwater utility fund that can accumulate from year to year. If adopted, the funds can be applied to stormwater treatment, conveyance, and discharge systems.



Soak Up the Rain New Hampshire is a voluntary program committed to reducing pollutants in the state's lakes, rivers and streams. Managed by DES, Soak Up the Rain New Hampshire (SOAK) allows local property owners to help out first hand by reducing stormwater runoff at their own homes. The SOAK program provides training, coordination, and assistance in installing stormwater reduction methods, such as rain gardens and rain barrels.

FACT: Over 90% of the water pollution problems in New Hampshire are caused by stormwater runoff!

One household in Chichester installed a rain barrel and infiltration trench to capture roof runoff which prevents 8,654 gallons of runoff from reaching the ground every year. This project was completed without DES funding and demonstrates the impact one household can have on reducing stormwater runoff in their own yard.

Source: www.soaknh.org and DES

National Pollutant Discharge Elimination System (NPDES) Permitting

For treatment facilities having stormwater discharges associated with industrial activity, an NPDES permit is required. The National Pollutant Discharge Elimination System (NPDES), regulates the volume of effluent discharged from a point source directly into a water body from treatment facilities through a permit process valid for five year increments. NPDES permits typically require updates to the facility to meet the new lower required limits. The permits limit the amount of nitrogen and phosphorous remaining in the discharge, causing less damaging impact on the aquatic ecosystem at the discharge site. Upgrades to meet nutrient limits can be extremely costly, and will undoubtedly need to be considered in the near future.

New Hampshire is one of four states in the country viewed as a non-authorized state, meaning all effluent discharge permits for the state must be directly issued by the EPA. The program consists of two phases, the first associated with large municipal separate storm sewer systems (MS4), industrial activity, and construction sites larger than five acres. The second phase (Phase II) is associated with small MS4s, municipally owned industrial sites, and construction sites larger than one acre. Both phases are regulated through the MS4 general permit, multi-sector general permit, and construction general permit.

Phase II regulations expand stormwater management requirements. Now, all construction sites over one acre in size must take steps to control construction site runoff. Designated MS4's in urban areas have five years to develop a stormwater management program. The program seeks to prevent illegal and illicit discharges into the storm sewer system. The program must include six minimum measures: education and outreach, public participation and involvement, illicit discharge controls, construction site runoff controls, post-construction runoff controls, and pollution prevention/good housekeeping. A comprehensive, effective, stormwater management program can help reduce future flood damages while reducing erosion, sedimentation and pollution transport. MS4s serving a population of less than 100,000 and located in an urbanized area or designated by the permitting authority are included in

Phase II. In Phase 1, only Medium (100,000–250,000) and Large MS4s (greater than 250,000) were included.

In addition to the regulation of municipal systems through the MS4 program, certain individual facilities are regulated through their own permits with the EPA. These facilities, as they have standards more specific to their industry and location, can be exempt from local enforcement ordinances. These industrial facilities include various manufacturing, transportation and materials processing facilities and EPA directly enforces the stormwater standards with these entities.

Erosion and Sedimentation

Erosion is a common cause of pollutants in the region's water, most commonly sourcing from stormwater runoff on construction sites where the vegetative cover has been disturbed or removed. The lack of vegetative cover allows causes a higher impact from rainfall, accelerating the speed of erosion and carrying high levels of nutrients and sediments to nearby water bodies.

Prevention of erosion is a common practice in the state, enforced under the New Hampshire Comprehensive Shoreland Protection Act which aims to protect lakes, ponds, rivers and estuaries. Enforced by DES the Act covers all excavation, earth moving and fillings within 250 feet of water edge must have appropriate erosion and sedimentation controls in accordance with the Alteration of Terrain Program.

When nutrients and sediments make their way into a water body, not only is the water body's ecosystem at risk, but poor water quality can lead to effects of lower property values, loss of tourism and local tax impacts.

**Figure 7.9: Rocks Used for Erosion Control
Blackwater Dam, Webster**



Source: [CNHRPC](#)

Point Source Pollution in the Region

Point Source Pollution is defined by the National Oceanic and Atmospheric Administration as “any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack,” including industrial factories, sewage treatment plants, oil refineries, pulp and paper mills, and automobile manufacturers.

Non-point sources of pollution are those that are not caused by a single identifiable source, for example excess fertilizers, oil and grease from urban runoff, salt from irrigation practices, and sediment from improperly managed construction sites.

Within the region, there are numerous point source pollution sources, monitored and controlled with US EPA National Pollutant Discharge Elimination System (NPDES) permits. The following are NPDES permits active in the region.

Table 7.14: Facilities with NPDES Permits

Municipality	Water Body	Facility Name	NPDES ID
Allenstown	Merrimack River	Allenstown Wastewater	NH0100447
Allenstown	Merrimack River	OXY USA, Inc.	NH0100447
Boscawen	Merrimack River	Merrimack County Complex	NH0020842
Bow	Merrimack River	PSNH – Garvin Falls	NH100013
Bow	Merrimack River	PSNH – Merrimack Station	NH100013/NH0001481/NH0022888/ NH0022870/NH0100153/NH0022756
Concord	Merrimack River	Concord Wastewater	NH0101257
Concord	Soucook River	Hobart Tafa Technologies, Inc.	NH0100544
Concord	Contoocook River	Thermal Technology, Inc.	NH0022438
Contoocook	Contoocook River	Hopkinton Wastewater	NH0021709
Epsom	Suncook River	Care Pharmacy Site	NH0100579
Henniker	Contoocook River	Henniker Wastewater	NHG250253
Hillsborough	Contoocook River	PSNH – Jackman Hydro	NH0100170
Hillsborough	Contoocook River	Hillsborough Wastewater	NH0100170
Hillsborough	Beards Brook	OSRAM Sylvania Products, Inc.	NH0100170
Hillsborough	Contoocook River	PSNH – Hillsborough District	NH0100676
Hillsborough	Trib to Bear Brook	Hillsborough Slow Sand Filter	NH0101371
Penacook	Merrimack River	Penacook Sewage	NH0021661
Penacook	Merrimack River & Burnham Brook	Wheelabrator Technology, Inc.	NH0022969/NH0022730
Penacook	Hoyt Brook	Beede Electrical Instrument Company	NH0022454
Pittsfield	Suncook River	Pittsfield Wastewater	NHG580935
Pittsfield	Suncook River	Suncook Leathers, Inc.	NH0022772

Source: *NPDES Data Gathered for CNHRPC by DES, 2012*

Solid Waste Management

Most of the communities (14 of 20) in the Central NH Region belong to the non-profit Concord Regional Solid Waste/Resource Recovery Cooperative, which provides solid waste disposal and recycling services for its participating communities. The Wheelabrator Concord waste-to-energy facility, operating since 1989, serves more than two dozen total communities in the southern and central NH area. Total municipal waste delivered to the facility averages around 6,400 tons per month.

The facility processes up to 500 tons per day of municipal solid waste and has a generating capacity of 14,000 kilowatts. Ash waste from the facility is trucked to the Co-op's landfill in Franklin, which typically receives around 85,000 tons of trash annually (2010 data). This landfill is in its last Phase and has remaining capacity through 2014. It is expected that the Co-op will apply to DES for further expansion.

The Central NH communities of Chichester, Epsom and Pittsfield belong to the Barnstead-Chichester-Epsom-Pittsfield Solid Waste District (BCEP) located in the town of Pittsfield. Since 1990, BCEP has required the mandatory separation of materials for recycling in order to use the District facility. Recycling at this facility is increasing every year with the total from 2013 now reaching approximately 1,400 tons, from 1,288 in 2010. The town of Sutton has a solid waste transfer station and recycling center with a storage capacity of 50 tons and is designed to receive 15 tons/day average. Some communities, like Warner, have solid waste ordinances that outline rules and procedures for using the transfer and recycling station and special provisions for mandatory recyclables.

The Hopkinton/Webster Municipal Solid Waste Facility operates independently, with over 2,700 tons of trash from these two communities shipped out to be disposed of in 2013. The facility uses Androscoggin Valley Regional Refuse Disposal District to handle any generated waste. Close to 700 tons of household trash were processed and shipped out for recycling.

According to DES, 52 communities statewide participate in some form of a pay-as-you-throw (PAYT) program. PAYT is one way of managing solid waste by paying for waste collection and disposal. In some communities it is based on a per bag/container charge while others base the fee on the weight of the trash. The philosophy behind this program is that there is renewed incentive to generate less trash and recycle more. In the Central NH Region, Chichester, Epsom and Pittsfield have a weight system and Concord, Canterbury and Hopkinton have the per bag fee system.

DES reports that all unlined landfills in the state are now closed except for two sites, one of which is in the Central NH Region - Boscawen Construction and Demolition Debris. DES works with many of the solid waste operators in the region and statewide through their unlined landfill program to ensure protection of groundwater resources.

Auto Salvage yards are regulated jointly by DES and municipalities (RSA 236:111-129). According to DES records, out of the approximately 150 licensed yards in NH, there are 23 yards in the Central NH Region. There is also the DES Green Yards Program that is designed to assist salvage yards with developing environmental practices that exceed the minimum requirements for compliance. DES has many guidance documents outlining best management practices ranging from topics such as floor drains, used oil, vehicle fuel tanks to lead acid batteries. There are five recognized Green Yards in the Central NH Region in the communities of Bow, Concord, Epsom, Webster and Pittsfield.

Hazardous Waste Generators

The EPA defines hazardous waste generators as any person or site whose processes and actions create hazardous waste that is dangerous or potentially harmful to our health or the environment. This can be liquids, solids, gases, or sludges. New Hampshire regulates all hazardous waste generated by commercial and industrial facilities, and are divided into two categories; small quantity generators and large quantity generators. There are a total estimated 644 hazardous waste generators in the region; Concord has the highest number at 282 (44% of total).

Requirements for storage, packaging/labeling/pre-transport, delivery, and generators of generators can be found at the DES Hazardous Waste Management Bureau available at www.des.nh.gov/organization/divisions/waste/hwcb/index.htm

Storage Tanks

Two main types of storage tanks, aboveground storage tanks and underground storage tanks, are used to hold various types of products, typically petroleum. Regulated by DES, both the aboveground storage tank program and underground storage tank program prevent release of oil and minimize contamination of the land and waters of the state. More information on above and below ground storage tanks can be found at the Waste Management Division of DES:

www.des.nh.gov/organization/divisions/waste/index.htm.

As noted in **Table 7.15**, there are numerous above and underground storage tanks in the region. In total, there are 327 underground tanks and 357 aboveground tanks, the largest number in Concord.

ONE LANDSCAPE – Using It Wisely

Open Space

Access to outdoor recreation is critical to the health and quality of life for residents. Protecting open space and ensuring public access, as well as providing information on recreation opportunities can be important for connecting people to the outdoors and promoting a healthy lifestyle. People across generations, both young and old, appreciate having access to the many recreation opportunities close to home. Recreation, scenic views, and appreciation of natural resources all play a role in the economy either through tourism or attracting the people who choose to live in this area for the quality of life, based on an appreciation of the connection to natural resources, environment, and recreation in the area.

There are many protected lands in the region, including parks, conservation lands, state parks, and waters. **Map 7.9** illustrates conserved open space and distance to open space in the region. Distance to open space is often not far but distance does not always equate an easy ability to access open spaces. Access points, such as trail heads and parking, as well as the means to get there, sidewalks and public transportation, affect whether or not conserved open spaces can be fully accessed by the public. As demographics continue to shift now and in the future, providing accessible outdoor recreation opportunities to older residents as they age in place becomes more important. This is also the case for residents of all ages who may rely on transportation methods besides the car.

For these open spaces to continue to be valued assets, stewardship and often volunteerism play an important role in the maintenance of easements, trails, and facilities of open spaces so that they can continue to be enjoyed by residents and visitors of the region.

Table 7.15: Storage Tanks in Central NH Region

Municipality	Above	Under
Allenstown	8	10
Boscawen	18	28
Bow	51	21
Bradford	4	0
Canterbury	3	0
Chichester	3	0
Concord	102	153
Deering	5	1
Dunbarton	4	14
Epsom	10	0
Henniker	44	25
Hillsborough	18	15
Hopkinton	32	16
Loudon	24	11
Pembroke	22	4
Pittsfield	0	18
Salisbury	0	11
Sutton	0	0
Warner	9	0
Webster	0	0
Total	357	327

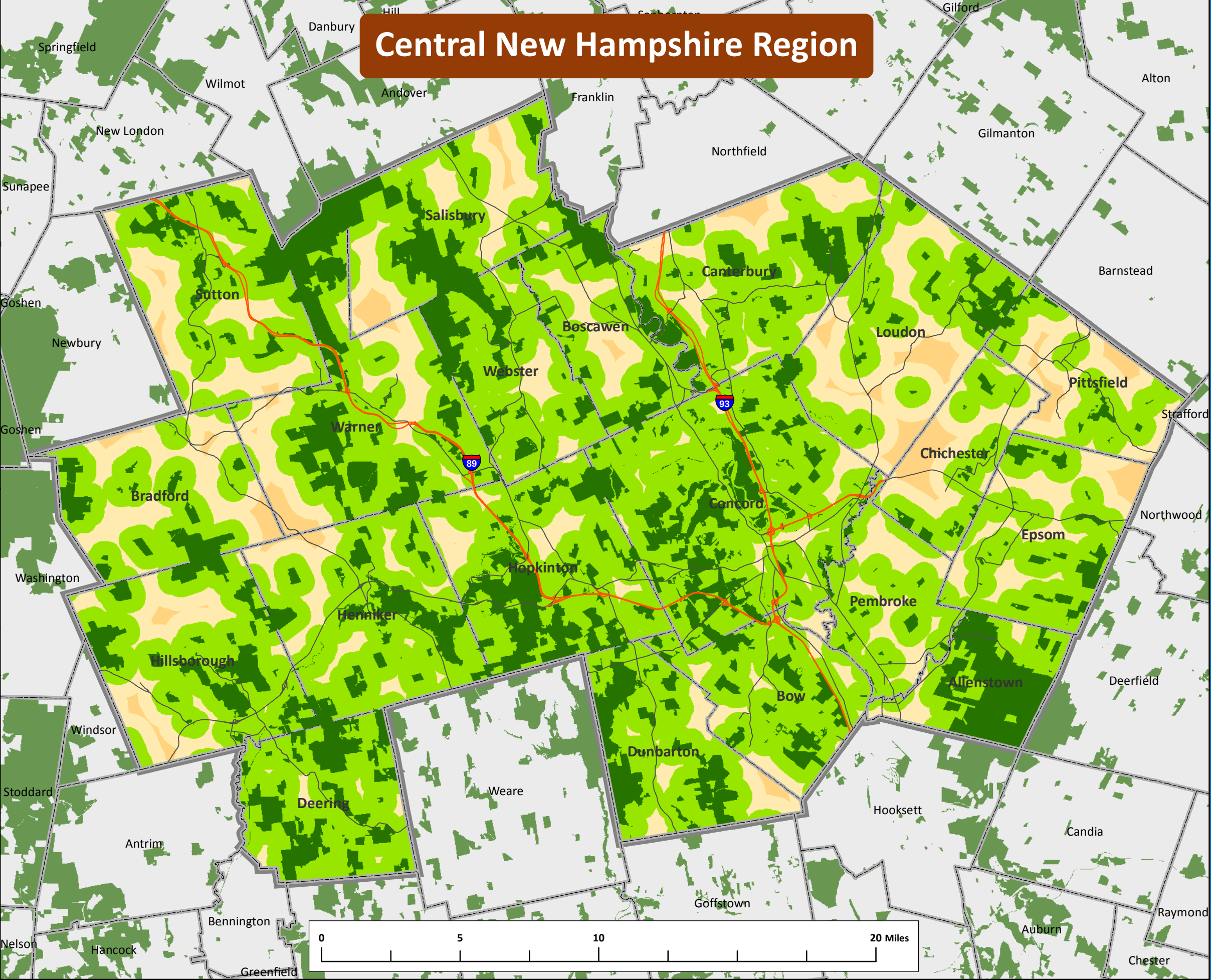
Source: *Underground and Aboveground Storage Tank Data Gathered for CNHRPC by DES, 2012*

Central New Hampshire Region

Natural Resources

Map 7.9

Distance To Open Space



- Open Space (Conservation Lands)
- Distance to Open Space**
 - Less than one half mile
 - One half to one mile
 - Greater than one mile
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Map defines opens space as conserved lands.

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

Location Map

Land Trusts and Land Protection

According to the Forest Society, there are close to 50 land trusts operating in New Hampshire that have protected more than 300,000 acres from development. Eight local land trusts currently operate within the Central NH Region, with the largest being the Five Rivers Conservation Trust (Blackwater, Contoocook, Merrimack, Soucook and Warner Rivers) which has protected over 2,500 acres. Others operating in the area include the Piscataquog Land Conservancy (Henniker and Deering), the Ausbon Sargent Land Preservation Trust (Warner, Sutton and Bradford), Bear- Paw Regional Greenways (Epsom and Allenstown), Bow Open Spaces, Inc., and the Turkey River Basin Trust (Bow, Concord, Dunbarton and Hopkinton). There are also ten statewide land trusts that include the Society for the Protection of New Hampshire Forests (SPNHF), Audubon Society, Nature Conservancy, Trust for Public Lands and the New Hampshire Preservation Alliance. Oftentimes, these local land trusts are run completely by volunteers and are a great resource for information on regional protection efforts.

Conservation Land Stewardship Program

The New Hampshire Office of Energy and Planning (OEP) manages the Conservation Land Stewardship Program (CLS). Its mission is to monitor and protect specific state-held conservation easements on behalf of state agencies, as well as the earlier properties acquired during the former Land Conservation Investment Program (LCIP). The Program serves as a resource for landowners and municipalities with CLF offering technical assistance, education, and field support on land stewardship. The CLS program manages over 100,000 acres consisting of over 370 state –held properties, most of which are conservation easements. The CLS Program’s responsibilities include assisting municipalities who are directly responsible for stewardship and monitoring of the 238 easements and fee owned parcels that are locally held. CLS assists municipalities and advises municipalities on any management issues that arise. Eleven of the Central NH Region municipalities have LCIP properties; Boscaawen, Canterbury, Chichester, Concord, Deering, Dunbarton, Epsom, Hopkinton, Loudon, Pembroke and Webster.

Figure 7.10: Central NH Region Open Space Land



Source: CNHRPC

Land and Community Heritage Investment Program

Authorized by its enabling legislation RSA 227: M, the Land and Community Heritage Investment Program (LCHIP) makes matching grants to New Hampshire communities and non-profits to conserve and preserve important natural, cultural and historical resources. LCHIP is a quasi-public authority of the state and is governed by a board of directors. Funded by a mix of registry fees and proceeds from the sale of conservation license plates, LCHIP has approximately \$4 million available for grants in Fiscal Years '14 and '15. Between the program’s inception in 2000 and 2014, 265 grants have been made protecting 140 historic structures and permanently conserving 260,000 acres. While the match requirement for a

LCHIP project is one-to-one, an investment of \$33 million in state funds has led to a total project investment of \$258 million dollars statewide.

Current Use Program

The Current Use Program is a tool that landowners can use to reduce the amount of property tax that they pay on open space within their property limits as an incentive to keep the land in its traditional use. Open space conservation is beneficial to the region as it preserves the land as well as maintains natural features and habitat. The Current Use value is the assessed valuation per acre of open space land based upon the income-producing capability of the land in its current use – not its real estate market value. This valuation shall be determined by the municipality’s assessor in accordance with the range of current use values established by the state’s Current Use Board (CUB) and in accordance with the class, type, grade, and location of land. Property owners can file for reduced property taxes through the Current Use Taxation program. For more information on Current Use, visit NH Department of Revenue Administration www.revenue.nh.gov/current-use/index.htm.

By allowing open space land to be classified as current use, it acts as an incentive for landowners not to develop property. Owners of parcels of land which are not anticipated to be used for a different type of use in the future can apply at municipal offices, and in accordance with RSA 79-A:2, the definitions of eligible land type are farm land, forest land, open space land, unproductive land and wetlands.

Further noted in RSA 79-A:7, when land is removed from Current Use, ten percent of the full and true value of the land, not the Current Use assessed value, must be paid as a Current Use Land Change Tax. It is important to understand that the Current Use classification can be placed on, or removed from, land at the landowner’s discretion which is why these lands vary from conservation lands. **Table 7.16** shows the Current Use acreage within the region. Warner has the highest acreage of Current Use classified land with about 23,400 acres. Deering has the highest percent of land within the region being classified as Current Use at 74.6% of Deering’s land acres.

“Good Stewardship is an Ounce of Prevention”

Stewardship is a necessary component of effective long-term land management. OEP’s Conservation Land Stewardship Program recommends that monitoring of easements should be scheduled at least annually. There should be good records of the visit, a detailed monitoring report, and a copy submitted to the municipality and the landowner. Conservation easements where a tax deduction was taken may be required by the IRS to be monitored annually. The cost of not monitoring can be very problematic if violations are found at a later date. If you really want to protect land, it is imperative you have an effective stewardship program in place and the long-term commitment and volunteer or financial resources to back it up.

Source: CLS Program,
www.nh.gov/oep/planning/programs/clsp/about.htm

Table 7.16: Current Use within the Region

Municipality	Total Land Acres	Acres in Current Use	% Total Acres in Current Use
Allenstown	13,097.91	3,296.42	25.2%
Boscawen	15,912.78	9,909.43	62.3%
Bow	18,029.70	4,710.37	26.1%
Bradford	22,549.14	16,186.17	71.8%
Canterbury	28,123.94	19,761.66	70.3%
Chichester	13,564.59	7,871.86	58.0%
Concord	40,933.68	16,023.00	39.1%
Deering	19,571.19	14,599.15	74.6%
Dunbarton	19,733.94	8,756.38	44.4%
Epsom	22,066.73	14,601.04	66.2%
Henniker	28,231.87	16,904.80	59.9%
Hillsborough	27,967.51	16,649.74	59.5%
Hopkinton	27,698.36	14,667.84	53.0%
Loudon	29,452.51	18,226.48	61.9%
Pembroke	14,486.99	8,319.00	57.4%
Pittsfield	15,440.25	10,055.42	65.1%
Salisbury	25,318.43	18,098.98	71.5%
Sutton	27,233.60	18,518.26	68.0%
Warner	35,352.29	23,397.94	66.2%
Webster	18,089.48	12,008.46	66.4%

Source: *NH Department of Revenue Administration, 2011*

CONNECTING RURAL CHARACTER WITH AGRICULTURE

Agriculture plays a significant role in the region's rural landscape, stewardship of natural resources, and its economic and cultural history. Working farms are valued by communities for providing access to local food and contributing to farmers markets, as well as for the scenic vistas of agricultural landscapes of fields and forests.

OVERVIEW

Historically, agriculture played an important role in New Hampshire and the local economy, and the Central NH Region is no exception. Over time, the role of agriculture was lessened as the economy shifted towards manufacturing and service based industries. Today, there is renewed and growing interest and appreciation for the contributions of agriculture over the past couple of decades. The state legislature, to ensure the protection of agricultural uses, added a section on agriculture in the planning and zoning statute, RSA 672-1, in the late 1980s and it has been amended many times to clarify language and respond to the changing role of agriculture over the years. The legislation states that: "Agricultural activities are a beneficial and worthwhile feature of the New Hampshire landscape and shall not be unreasonably limited by use of municipal planning and zoning powers or by the unreasonable interpretation of such powers." This statute is a tool to help protect agricultural lands from disappearing altogether as the population grows and the economic landscape changes.

Merrimack County has the highest agricultural sales in New Hampshire. A top commodity in the county is ornamental horticulture. Merrimack is the top county in the state for nursery, greenhouse, floriculture and sod. Dairy also plays a large role in the farming landscape and Merrimack County is the third highest dairy producing county in the state. Farming has evolved in the region, with fewer dairy farms, but with growth in size of some of the dairy farms that have continued in production. These farms typically have excellent soils, land base, and younger generations dedicated to farming. Diversification and number of vegetable, fruit and other livestock farms have increased in the region. Ornamental horticulture operations have flourished, contributing significantly to the local economy and jobs. Statewide, nursery or greenhouse-grown products for sale in 2012, including flowering and ornamental plants, were valued at nearly \$29.3 million. This category includes two of the nation's top greenhouse plant-propagators, Pleasant View Gardens and D.S. Cole, which are both located in the Central NH Region.

Hillsborough County ranks as the third-highest county for agricultural sales in New Hampshire, though it is number one in the state - and 27th among all 3,079 U.S. counties - for direct farm to consumer sales such as Community Supported Agriculture (CSA), farm stands and farmers' market sales. From 2007 to 2012, Hillsborough County experienced a 12% increase in the number of farms, and a 32% increase in sales. Hillsborough is the state's top producer of vegetables, fruits and berries.

With the renewed interest in locally grown food and other products, and appreciation for the value of the agricultural landscape, there is growing support for protecting farms and farmland and a desire for local agriculture to remain a viable force in the region. The Merrimack Valley boasts prime agricultural soils of national and statewide significance.

Figure 7.11: Agricultural Field in the Central NH Region



Source: [CNHRPC](#)

Although population growth and development have slowed in recent years and are not expected to accelerate greatly in the near future, prime farmlands will remain under pressure to be developed into alternative uses either in residential or commercial sectors. Given the goals of maintaining a rural landscape, protecting ground and surface water supply and quality and other natural resources, providing local healthy food options for residents, preserving the capacity for future generations to produce food and providing economic opportunity for current and future generations of farmers, agricultural soils and other resources should be viewed as assets to be protected.

Agriculture: Existing Conditions and Trends

The average size of farms between 2002 and 2007 for the counties of Merrimack and Hillsborough decreased 30% and 1% respectively, going from 158 to 111 acres in Merrimack and 83 to 82 acres in Hillsborough. However, the number of farms between 2002 and 2007 increased significantly in both counties; in Merrimack by 16% and in Hillsborough by 28%. Merrimack County saw an increase from 502 to 583 farms and Hillsborough County an increase from 481 to 615 farms.

These trends continued with the recently released 2012 Agricultural Census conducted by the U.S. Department of Agriculture's National Agricultural Statistics Service. (For more information see http://www.nass.usda.gov/Statistics_by_State/New_England/index.asp). Hillsborough saw another 12% rise in number of farms to 688. Average size of farms decreased another 16% to 69 acres. Merrimack lost just 3% in average farm size to 108 acres, and gained 3% in number of farms to 600.

Through the Regional Plan's surveys and public outreach, residents throughout the region expressed growing interest in having community gardens to grow their own produce. Several municipalities in the region have set aside plots of agricultural land for this purpose and sometimes provide workshops and subsidies for materials to qualifying residents such as those that receive food assistance. The marked increase in interest in community gardening in New Hampshire can be found across a range of communities from rural to urban. Some people want to connect with friends and neighbors, while others lack access to land on which to garden. Finally, more people are looking to improve their diets and reduce their grocery bills by growing food. UNH Cooperative Extension has created a handbook for community gardens, which can be found at http://extension.unh.edu/resources/files/Resource002173_Rep3203.pdf.

Local farmers' markets continue to gain popularity through both the summer and winter seasons. Some farmers markets in Hillsborough and Merrimack counties offer doubled Supplemental Nutrition Assistance Program (SNAP) benefits. In the Central NH Region, there are currently seven farmers markets during the growing season and there were six winter farmers markets in 2014. Farmers markets bring produce directly to consumers, increasing access to healthy locally produced foods and

NH Department of Agriculture, Markets & Food

Under RSA 431:33 the Department of Agriculture, Markets & Food is responsible for responding to complaints involving the mismanagement of manure, agricultural compost and chemical fertilizer. The Division of Regulatory Services coordinates inspections to sites where these materials are suspected of causing environmental contamination or nuisance problems. When merited, complaint resolution focuses on corrective measures in accordance with the Manual of Best Management Practices (BMPs) for Agriculture in New Hampshire, published by the Department in accordance with RSA 431:34. Cases are referred to DES and to the municipal health officer when water pollution problems are identified and not satisfactorily resolved. Information about the nutrient management program, including the complaint form, is available at www.agriculture.nh.gov/divisions/regulatory-services/nutrient-management. The Division also administers the Agricultural Nutrient Management (ANM) grants program to assist agricultural land and livestock owners with efforts to minimize adverse effects to waters of the state by better managing agricultural nutrients. The ANM grant program provides financial assistance with implementing Best Management Practices that prevent or mitigate water pollution, and often works in tandem with the USDA Natural Resources Conservation Service. The Division also maintains a Manure Exchange: A Directory of Pick-up & Receiving Services to assist livestock and poultry owners to connect with farmers who are seeking manure for fertilizer or composting.

other products, stimulating the local economy and enhancing the social and cultural life of the community. Many cities and towns have found that farmers' markets can help revitalize downtowns or municipal centers.

Agriculture: Threats and Challenges

Agriculture is a cornerstone of the rural character cherished by most of the region's communities, including the city of Concord. Yet farmers struggle at times with local regulatory processes and communication regarding certain farm enterprises. The public appreciates the rural quality of life, but may not understand the realities of working farms and woodlots — of the productive, resource-based rural economy, as opposed to the consumptive uses of land and natural resources found in a typical suburban community; working farms and rural character come with both pretty and gritty sides. Farms are businesses that may have some commercial and industrial aspects. Trucks deliver supplies, haul crops from field to barn, and produce to market. Along with peaceful cows or woolly sheep grazing in the meadows, odors may emanate from stored silage feeds, and from storing and applying manure in accordance with environmental standards. Best management practices (BMPs) help keep perceived nuisances to a minimum. UNH Cooperative Extension and the USDA Natural Resources Conservation Service offer technical assistance to farmers and communities to ensure BMPs are followed. The NH Department of Agriculture, Markets & Food investigates and handles concerns or complaints.

To help in maintaining the rural and visual character of the community, many farmers and local conservation commissions work together to help place public conservation easements on portions of the farmlands. Should agricultural lands fall out of use in their zoned agricultural purpose and/or the municipality is unable to attract farmers or farming industry to that area, there is often a focus to shift these lands into conservation land either in perpetuity or until such a time that a viable agricultural enterprise becomes interested in the land. This again goes to the protection and preservation of the municipalities' rural character and heritage. Moreover, should this occur, efforts are usually made to ensure this land is made available for public use and enjoyment as a part of conservation lands.

Out of the 25 agricultural commission established statewide, five of them are in the Central NH Region - Boscawen, Canterbury, Chichester, Loudon and Webster. These commissions, authorized in RSA 673:4-b, are charged with the purpose of protecting agricultural lands, preserving rural character, providing a voice for farmers, and encouraging agriculture-based businesses. Agricultural commissions serve a similar role for local agriculture as heritage commissions for historical resources, or the non-regulatory aspects of conservation commissions for natural resources. They are intended to provide a voice for agriculture to help inform municipal boards and officials, and can help to enhance understanding of agriculture in the community and reduce conflicts. Agricultural commissions promote, enhance and encourage the interests of farming, agricultural resources and rural aspects of community life. A guide to *Creating a Local Agricultural Commission in Your Hometown* can be found on the UNH Cooperative Extension website at www.extension.unh.edu/resources/files/Resource000021_Rep21.pdf.

Another valuable resource is the *Preserving Rural Character through Agriculture: Resource Kit for Planners*, created by the NH Coalition for Sustaining Agriculture and available on the UNH Cooperative Extension website at http://extension.unh.edu/resources/representation/Resource000023_Rep23.pdf.

Agriculture and Conservation Partnership Bohanan Farm, Hopkinton

The Bohanan Farm has been in operation since 1907 and is now being run by the family's fifth generation. It is a large, privately owned working dairy farm with over 440 acres and 230 milk cows. There is a conservation easement on the property that protects its valuable agricultural fields and working forests. In 2008, the family approached Hopkinton's Open Space Committee to investigate a conservation easement on portions of the property. The Town worked with the Five Rivers Conservation Trust, as well as a coalition of others including the Natural Resource Conservation Service, the state, and private donors, to purchase the conservation of 413 acres, excluding the area around the residence and the barns. It is interesting to note that the 2009 Special Town Meeting in Hopkinton to fund part of the purchase was the largest in Town history, with more than two thirds of the voters in favor of the easement acquisition.

Figure 7.12: Bohanan Farm, Hopkinton, NH



Source: Bob LaPree, Hopkinton Conservation Commission

The property includes four miles of frontage on three rivers – Contoocook, Blackwater and Warner Rivers. The property owners and farmers, the Bohanan/Robertson families, continue to welcome public use of their network of farm roads and river frontage. There are two marked trails, one through a forested area with views of the Blackwater River, and another across the open fields to the remnants of an old farmstead. The trails are two loops - the Blackwater loop is roughly 1.5 miles and the Corser Hill loop is around 2.5 miles and both are used in every season for hiking, walking, snowshoeing and cross country skiing. There is also a canoe/kayak access ramp on the conserved land that was installed by the Hopkinton Conservation Commission.

As a working dairy farm, there continues to be changes in how the family operates the business. In 2011, the Contoocook Creamery was launched as a new venture which offers several types of milk products in glass bottles that are returnable. The Creamery sells to many local stores and supermarket chains in the Hopkinton/Concord area.

Agriculture: Regional Goals and Guidelines

Most of the communities in the Central NH Region have agricultural goals directly in their respective master plans. Collectively, these goals and guidelines include:

- ➔ Preserve the traditional, rural, and visual character of the community by conserving nature, history, services, agriculture, forestry, and water resources.

- Retain larger unfragmented parcels of land, especially those conducive to forestry management.
- Create and improve incentives for landowners to keep land in active agriculture and forestry management.
- Promote more self-sufficiency of food supply in local communities.
- Create a farm-friendly atmosphere for food production and retail sales.
- Create a balance between economic growth and preservation of rural agricultural character.
- Encourage establishment of new or diversified agricultural enterprises.
- Provide infrastructure and opportunities to agricultural based companies and boost agricultural enterprises.
- Encourage agri-tourism enabling farmers to diversify and provide educational opportunities for consumers.
- Improve management processes to reduce nonpoint pollution, erosion, and runoff.
- Improved communication within municipalities between local agricultural/conservation commissions and the local officials.
- Support and encourage the establishment of local Agriculture Commissions.

RECREATION: CONNECTING PEOPLE TO THE LAND

New Hampshire is known for its natural resources and outdoor amenities. Its natural beauty and abundance of lakes and rivers, trails, and forested lands not only attract tourists who participate in a variety of active outdoor recreation pursuits, but also provide opportunities for close-to-home participation by residents. Open space lands that have been acquired or use public funds are generally open to public use for recreation use. In the Central NH Region, residents and visitors alike enjoy many recreation opportunities in the area, including skiing, mountain biking, boating, among many others. The region also benefits from being located on the way to many highly visited regions of the state, allowing communities to benefit from additional revenue from lodging, restaurants, and retail.

Access to natural resources, open space lands and outdoor recreation was identified through the Regional Plan's public outreach process as one of the most important valued aspects of living in the region. Outdoor recreation has a role to play in the economic and community vitality, and overall quality of life, in the region. The trends in the region show that as more people choose to age in place, and New Hampshire continues to be an attractive place for retirees, recreation opportunities close to home become more important.

EXISTING TRENDS

Outdoor recreation is a vital component of local, state, and national efforts to promote individual health and wellness, environmental sustainability, and economic vitality. Participation in outdoor recreation activities connects people to parks, trails, facilities and water resources, and contributes to healthy lifestyles and the economy. The trends that we are seeing include:

- **Accommodating Active Seniors:** Outdoor recreation opportunities must accommodate a growing active senior population who will become more interested in individual health and wellness, easy and safe access to recreation opportunities, and an increase in social and family activity experiences.

- **Changing Preferences:** Shifts in ethnicity and age will result in changes in outdoor recreation preferences relative to types of activities, frequency, style and location. Considering the increasing diversity in the Concord area it is important to understand barriers or constraints to recreation participation, such as perception of safety, income/age/ethnicity discrimination, and language barriers which is vital as New Hampshire's demographics shift.
- **Health Matters:** Both behavior and environment play a large role in determining the health of residents. As national and state trends continue to show a high percentage of an overweight and obese population, access to recreation opportunities in parks and open space will continue to be a high priority for the health of the Central NH Region and the state.

Recognizing the connections between the built environment and health, the New Hampshire Healthy Eating Active Living (HEAL) initiative works towards a vision of healthy people and healthy places. HEAL NH is supported by the Foundation for Healthy Communities and more information on the program can be found at www.healnh.org

The Connection between Recreation and Healthy Living

DRED's Statewide Comprehensive Outdoor Recreation Plan (SCORP) discusses the role of outdoor recreation in the state, in particular its role in providing a safe, accessible and well maintained resource for its users. Transportation and connectivity needs as well as policy changes requiring inclusive transportation and recreation planning can help reverse the trend toward increased rates of obesity and chronic disease while contributing to economic vitality.

Figure 7.13: Multi use trail in Central NH Region



Source: CNHRPC

It will be important to continue to provide access to outdoor recreation opportunities in open space, parks, and trails for keeping our children healthy. Being mindful of the diversity of the childhood population, especially in Concord where higher concentrations of minority children live, should also be a consideration as programs/facilities are being planned. In a state where diversity has historically been minimal, concentrations of minority children can represent a challenge to school districts, health care providers, and communities that must meet the need of these diverse groups.

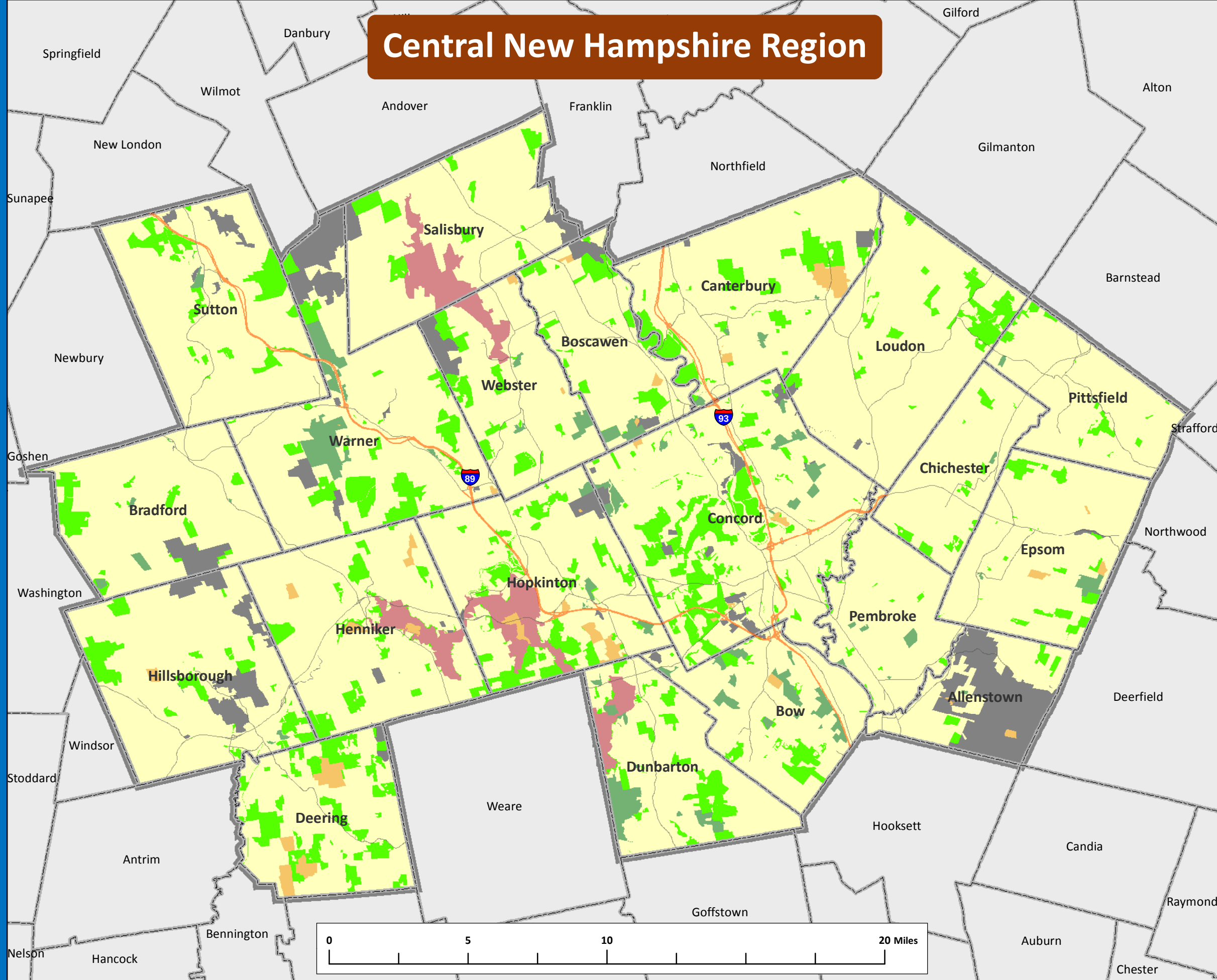
The **Map 7.10** Recreation Lands and **Map 7.11** Recreation Sites illustrates many of the recreation areas and access points for land and water recreation opportunities that exist in the region.

A LOOK INTO THE FUTURE:

- The state's amenities of natural resources and recreation are predicted to attract significant numbers of retirees in addition to the aging demographic of current residents. This is the case for Central NH Region as natural areas are accessible, yet still near the city of Concord, and Boston.

Central New Hampshire Region

Natural Resources Map 7.10 Recreational Lands



- Town Lands
- State Agency Lands
- Federal Agency lands
- Other Existing Open Space
- Other Conservation Lands
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

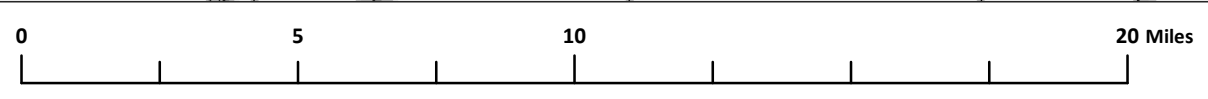
Map Explanation: Public lands used for various recreational purposes.

Data Sources: NH GRANIT, NHDOT, NHDES, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

Location Map



Central New Hampshire Region

Natural Resources Map 7.11 Recreation Sites

- Water Access Points
- Recreation Sites
- Rail Trails/Shared Use Paths
- Public Trails
- Conserved Lands
- Water Bodies
- Rivers and Streams
- Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Water Access includes public access to water bodies for fishing, swimming, boating, or other purposes. Recreation sites include camping, fishing, hiking, hunting, field sports, skiing, winter sports, and other recreation. Data are from the Statewide Comprehensive Outdoor Recreation Plan (SCORP), the Regional Trails Plan, and CNHRPC. This is not a comprehensive inventory of public trails.

Data Sources: NH GRANIT, NHDOT, NHDRED, CNHRPC.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

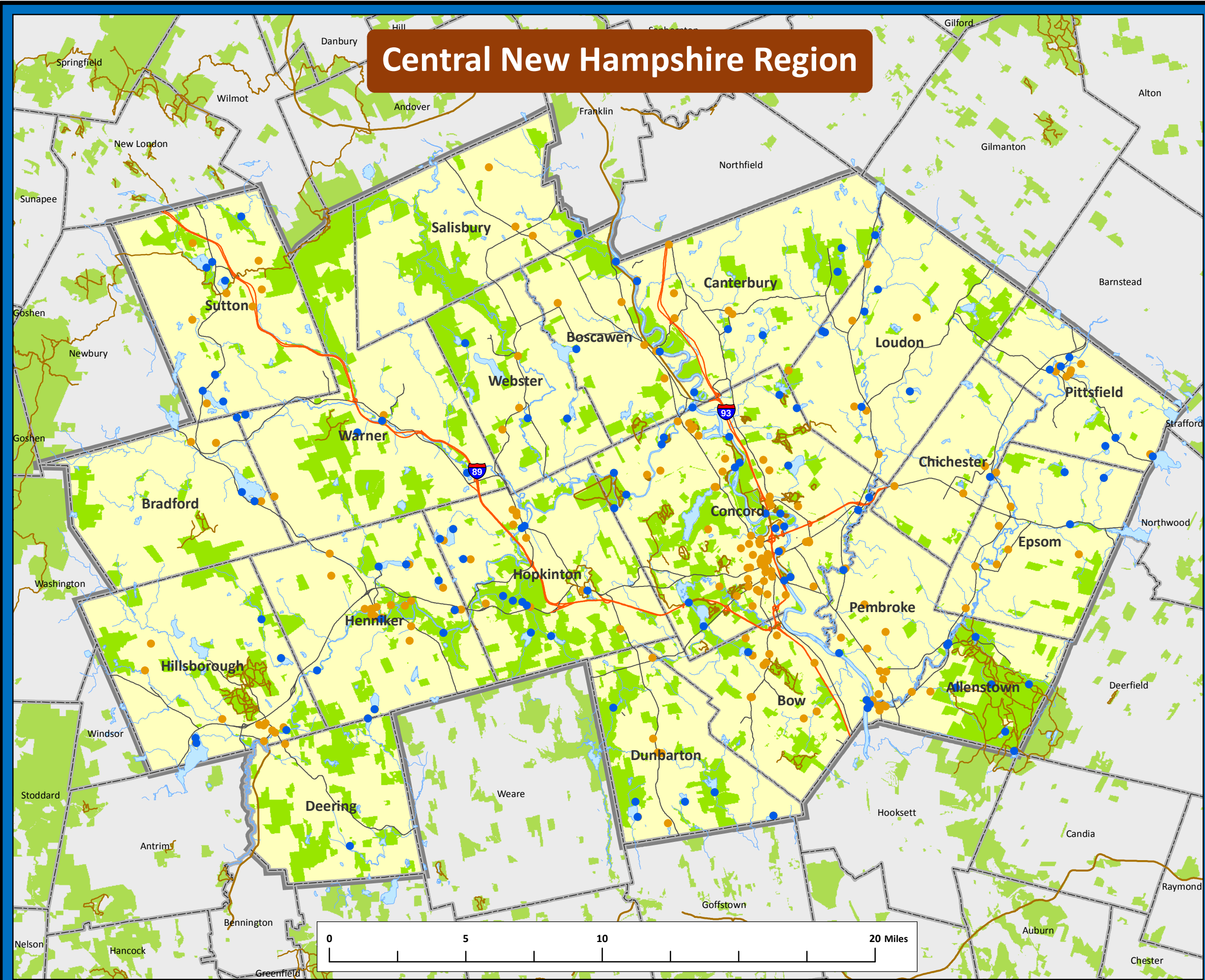
Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org



Location Map





- The impact of an older population on outdoor recreation includes the issue of community connectivity, particularly as middle-aged populations may choose to age in place and opportunities for recreation closer to home become more important.
- Overweight and obesity rates among children and adults continue to be alarming trends both nationally and in New Hampshire. Obesity and overweight increase the risk of developing chronic diseases, such as heart disease, diabetes, stroke, high blood pressure, and cancer. Nationally, childhood overweight and obesity rates have tripled since 1980. In New Hampshire, after several years of rising rates, there is indication of progress in addressing or slowing this trend in children. The 2013-14 school year survey conducted by the NH Department of Health and Human Services, Division of Public Health Services, shows a 30% decrease statewide in obesity prevalence in third graders compared to the previous survey conducted five years prior in 2009. Access to recreation opportunities, active transportation, and healthy foods help to combat negative health trends.

Recreation opportunities on open space lands play an important role in the quality of life in the region. Considering the existing trends and anticipation for the future, access to and connectivity of these recreation opportunities close to home will be key to maintaining and improving what many residents highly value. Access to parks, trails and open space can help to promote and provide opportunity for an active, healthy lifestyle and high quality of life that is valued in the region.

What We Heard!

Feedback gathered through outreach sessions and comment cards illustrated residents' appreciation of recreation opportunities in the region and the role that recreation plays in improving the region. Common responses from residents included the following categories:

What is best about this area?

- Access to outdoors
- Trails and hiking
- Playgrounds and parks
- Skiing and skating
- Water activities

What could make this area better?

- More trails and parks
- More facilities
- More events and activities
- Youth activities and events
- Indoor activities

Figure 14: Public Outreach Feedback Station



Source: CNHRPC

PERSPECTIVES FROM AROUND THE REGION

LOCAL MASTER PLANS

Over the past decade, all twenty communities in the region have included objectives related to the topics covered in this chapter in their local master plans. These objectives are summarized into the following themes:

- Preserving the community's natural resources and traditional rural character through protection of water bodies, forests, open space, wildlife, recreation sources and agricultural lands.
- To assess the present condition of the municipality's community facilities, equipment and services, anticipate future demands on community facilities in consideration of future population and growth.
- To raise awareness and education citizens of importance of protecting the community's natural resources and sustaining their quality of life.
- To effectively manage, conserve, and protect regional natural resources, including watershed, open space, and air quality.
- Providing recreations opportunities for all ages.
- To expand/enact recycling capabilities.
- To protect drinking water sources, including wells.
- To protect the shoreline of the community's lakes, streams, ponds, and rivers.

REGIONAL PERSPECTIVES FROM COMMENT CARDS AND REGIONAL INPUT SESSIONS

Comment cards gathered through listening boxes around the region were used to identify resident's values and needs. It was found that overall, natural resources were the second highest rating of what is best about this area with 43% of all responses mentioning an aspect of appreciating natural resources. Within the natural resources category, the rural landscape and scenic beauty was rated the highest, followed by forests, woods, trees and parks and open outdoor spaces. Additionally, recreation was rated overall number four behind community vitality, natural resources, and economic vitality, in what residents like best about the region, primarily mentioning aspects of recreation in terms of accessing outdoor activities, trails and hiking, and playgrounds and parks.

The comment cards also asked what could make this area better for residents. Some improvements in recreation and natural resources included increases in the number of trails and parks and an increase in conservation initiatives. Public input during the three regional input sessions held around the region recognized that natural resources played a large role in the quality of life of the region, including the scenic beauty of the natural resources as well as many of the recreation opportunities on open spaces lands.

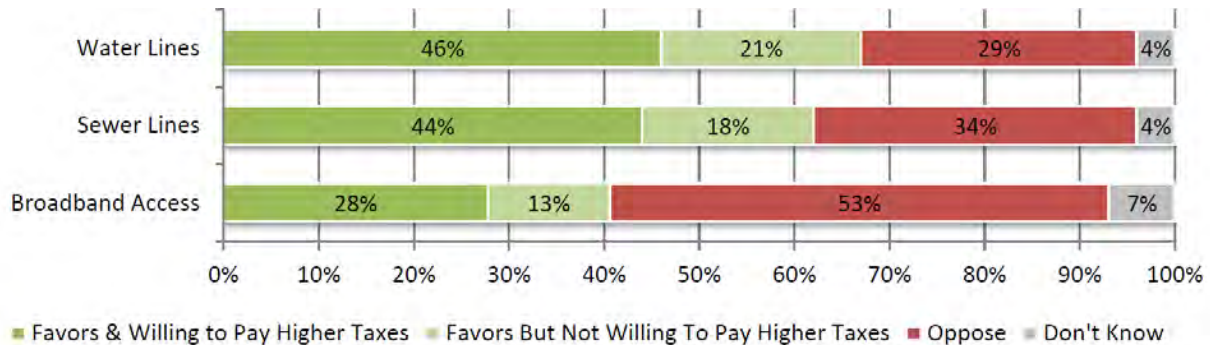
REGIONAL SURVEY

A 2013 telephone survey conducted by the University of New Hampshire Survey Center for the nine Regional Planning Commissions gauged residents opinions on a range of issues. For statistical significance, residents in the Central and Lakes Regions were combined. A major key finding from the survey is that residents believe that environmental protection and natural resource protection should be the top priority for investing public dollars. Nearly all residents view protecting water quality for drinking as a high priority for their community. Runners-up included protecting air quality, preserving farms and

agricultural land, and protecting aquatic and marine habitats. In contrast, the lowest ranked high priority issue was managing shoreland and waterfront development.

Two out of three residents favor using municipal funds to provide water lines to existing and potential development, followed by sewer lines and broadband access. Out of the 67% prioritizing water lines as the highest, only 46% are willing to pay higher taxes for it.

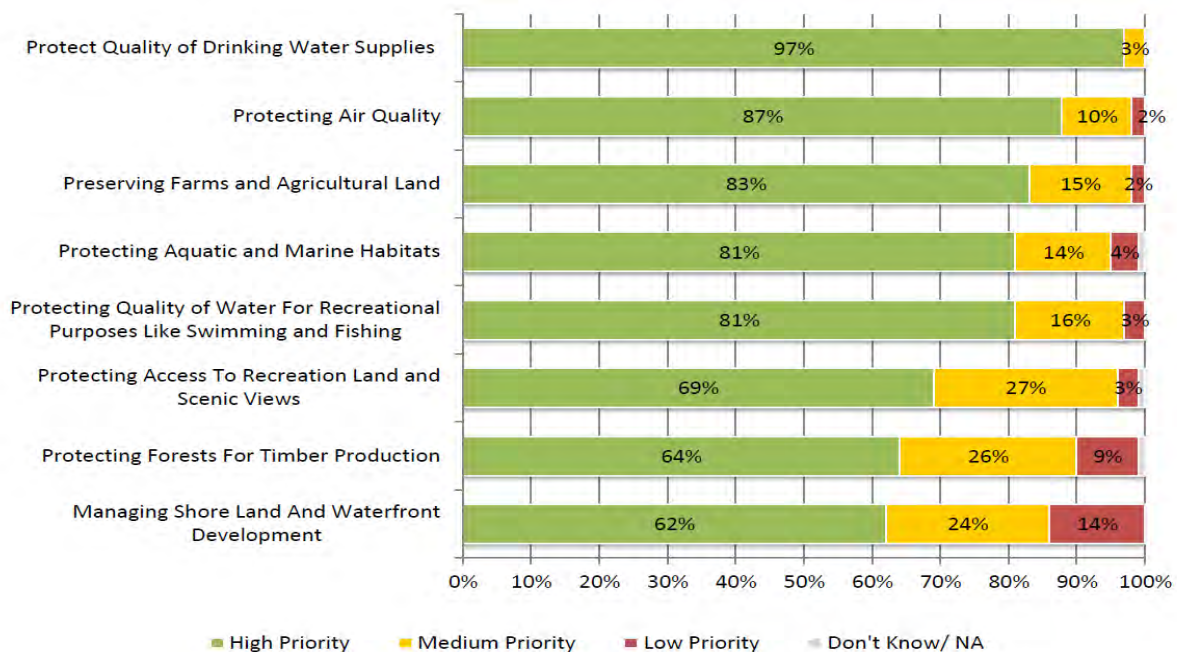
Figure 7.15: Favor or Oppose Using Municipal Funds to Provide Utilities for Development



Source: *New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013*

When considering what should be actively encouraged in communities, 93% of respondents prioritized promoting local agriculture as their first choice and protecting historic buildings and neighborhoods as their second with ninety percent. Other lower prioritized answers included promoting other recreational activities, increasing access to forest and trails, increasing access to ponds, lakes, and rivers, and expanding recreational fields, which could indicate satisfaction when the current level of recreation opportunities available.

Figure 7.16: Priority Placed on These Community Issues



Source: *New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013*

The UNH Survey results represent the Central and Lakes Planning Region of New Hampshire. Results from the same survey questions statewide are similar to the results presented here, concluding that priorities and views in the region are similar to those of the state as a whole.

IMPLICATIONS FOR LOCAL AND REGIONAL PLANNING: CHALLENGES and OPPORTUNITIES

The rural quality and scenic views of the Central NH Region are viewed as important amenities in the region. The quality of natural resources and access to recreation opportunities and open space, as well as agriculture, are valued aspects of the region. All of the communities in the Central NH Region identify protecting natural resources and maintaining rural or community quality as a goal in their master plans. While there are challenges in areas such as managing natural resources, funding for conserving open spaces, and maintaining agriculture in the region, there is opportunity to improve and plan for keeping the natural resource quality in the region. The efforts to address challenges most often stem from local decisions, but there is opportunity for collaboration or coordination between communities and the region as a whole.

CHALLENGES AND OPPORTUNITIES

Limited Resources

Limited Funding:

Financial sources are limited for land acquisitions and easements as grant funds become scarcer and municipal budgets are stretched to the limit. Some property owners are able to donate easements to the municipality or to land trusts which conserve open space land. Acquiring conservation lands by purchasing the land or through easements can be more challenging for a municipality when there are so many other competing interests and needs at the local level. Thinking creatively about funding sources and projects and working collaboratively with other municipalities or organizations can lead to increased opportunities in this limited funding environment. The Saving Special Places: Community Funding for Land Conservation, although published in 2002, remains a thorough resource for funding approaches and organizing tactics for seeking funds for land conservation. Find the document at www.forestsociety.org/pdf/savingplaces.pdf.

There is an unmet need for funding to improve water infrastructure systems as well, including wastewater systems and stormwater utilities. As municipal budgets face constraints each year, deferred maintenance becomes more critical as the high costs associated with major infrastructure projects is often prohibitive without outside funding. The challenges of water infrastructure are closely tied with economic development improvement in the region. Several communities in the region have submitted water infrastructure projects for the Comprehensive Economic Development Strategy (CEDS), including water and sewer improvement in downtown Hillsborough, extended water lines along Route 3 in Bow, and creating a new water district in Henniker. For a further discussion of the CEDS refer to the Economic Development Chapter.

Limited Volunteer Base:

Volunteers often carry out functions in local government such as preparing grant applications and providing stewardship for protected properties serving as local land use board members. As the pool of active volunteers shrinks, recruiting new members becomes a necessary priority. The need for more

volunteers is not unique to the region, but there is a need to find opportunities to engage more volunteers. Conservation Commissions and local land trusts depend on volunteers to pursue funding, monitor easements and maintain trails. The Volunteer Lake Assessment Program administered by DES is an example of an effective volunteer training and monitoring effort. However, with over 800 lakes around the state, many lakes go unmonitored despite the impressive number of current volunteers. Right now, 174 lakes are being monitored statewide through the VLAP efforts as well as the New Hampshire Lakes Lay Monitoring Program of UNH Cooperative Extension and UNH Center for Freshwater Biology. Not all volunteer programs share the level of volunteer involvement that citizen lake monitoring programs draw. More often local boards are looking for volunteers to serve on the conservation commissions and land use boards where many local land use decisions take place.

Data Needs:

In concert with the need for more volunteers, there is limited availability of data to accurately assess natural resources, such as the overall water quality in the region. Without volunteers, there is simply not enough staff resources at the state and local level to collect data and effectively inventory and monitor the status of our ecosystems and potential infrastructure needs. Volunteers are often relied on to collect information on the water quality of the region's lakes, ponds, and rivers. As mentioned earlier, the DES Volunteer Lake Assessment Program (VLAP), as well as the River Assessment Program, provide the most consistent assessments and historical data. DES notes that although water quality in the region is good overall, data is not available on every stream and pond. Collecting data and analyzing water quality at the watershed level is important for watershed management. An ongoing challenge for data collection of both water quality as well as water infrastructure is collecting the breadth of data needed and keeping it current. Water infrastructure data is important for maintaining working utilities and anticipating maintenance needs over time to avoid very costly overhauls of an aging infrastructure.

Regional Connectivity

Fragmentation / Connectivity:

Connected conservation lands not only benefit wildlife but also preserve water quality, ensure a more robust ecosystem, maintain economically viable working lands and create an opportunity for a more enjoyable recreational experience for biking, cross-country skiing and hiking. There are also opportunities for multiple communities to collaborate to connect conservation lands across municipal boundaries. Working towards the goal of land connectivity provides an opportunity to organize priorities with neighboring municipalities, search out linkages and build stronger support for seeking out funding sources from potential partners.

Regional Collaboration:

Watershed management is an approach that considers the watershed system rather than the limitation of individual rivers and streams in a specific community. As an example, FEMA is now updating its mapping to be watershed based and is moving away from the approach of only mapping floodplains in one community or county at a time. There is a considerable amount of regional collaboration that needs to take place if considering watershed management. Land protection ordinances can benefit from a watershed approach as water moves freely across boundaries and municipal lines. This could include wetlands ordinances, aquifer protection ordinances, and setbacks from water bodies. Adopting best practices for erosion control and winter road maintenance to minimize stormwater contamination would also benefit from a regional approach.

Healthy Ecosystems

Water Quality:

Water quality is affected by the cumulative impact of development in an area. While site specific conditions cause stormwater runoff, it is the cumulative impacts within a watershed that affect water quality. Impervious surfaces cause stormwater to be unable to recharge back into the ground as groundwater. Water quality of lakes and ponds is negatively affected after large rain events in part because stormwater contains contaminants such as lawn fertilizers and road salts can wash into water bodies. The VLAP program recommends that lake-side residents review the Homeowner's Guide to Stormwater Management available through DES. Low-impact development, such as permeable pavements, bioretention, and other design techniques help to recharge water back into the ground faster rather than adding to the stormwater runoff.

Invasive Species:

Invasive species are a threat to the region's forests, water bodies, and ecosystems. The focus on addressing invasive species is on education and awareness campaigns of prevention methods such as identification and reporting programs and also restricting commercial out-of-state untreated firewood. Early identification of invasive species is important to preventing long term damage. Invasive insects are already having an impact in the region. The Emerald Ash Borer (EAB) was found in Concord in March in 2013, in Canterbury and Loudon in the spring of 2014, and Salem and Hopkinton in the summer of 2014. As a non-native insect, EAB lacks predators and attacks ash trees and when infested the trees die within three to five years. A quarantine is in place to restrict ash wood from being transported out of the infected area. Opportunities for addressing invasive species can follow the established efforts to identify and eradicate invasive aquatic species. Resources for staffing are limited and education plays a large role in working with the public to raise awareness to put a stop to the spread of invasive species as well as to make early identification.

Forests:

Forests are a valued resource in communities for biodiversity, wildlife habitat, timber, recreation, soils, and water regeneration. Forest challenges also include land development pressures, fragmentation of forest lands and finding ways to develop a forest economy for forest landowners. Current Use plays a large role in providing incentives for land owners to keep their land as forests. The majority of forest lands are owned and managed by private landowners and these owners play a large role in protecting and maintaining the health of New Hampshire's forests. According to the U.S. Energy Information Administration, nearly 1 in 12 homes in New Hampshire now depend on wood products, such as cord wood and wood pellets, as a primary heat source. New demand for this biomass is helping to maintain a forest economy by providing a source of income for landowners.

Other challenges facing forests can be addressed with forest management plans and Best Management Practices (BMPs) for timber harvesting and other land management practices. To plan for best practices, there are many resources available to landowners including information and assistance from UNH Cooperative Extension, as well as private foresters and technical assistance experts.

Maintaining a Rural Landscape through Farming:

Economic sustainability is the greatest challenge to the sustainability of farms of all types. Farm businesses must be able to adapt and grow. The very small and small farms that predominate in New Hampshire are generally part-time or supplementary-income enterprises. Farms of any size may seek to

diversify by adding new enterprises or finding alternative sources of income. The history of agriculture in the region is a story of continual change and evolution, to meet the needs of farmers and the population - the market - of the region. To maintain a rural landscape through working farms, communities will need to review their ordinances to allow farm-friendly practices, such as road-side farm stands.

CENTRAL NH VISION – NATURAL RESOURCES

Natural resources and the working landscape, as well as open space and recreation, are all highly valued attributes to the region’s residents. Understanding and learning how the public values these resources was a major influence in the preparation of not only this Chapter but the overall Regional Plan. The region’s master plans, and these public outreach efforts served as a foundation for setting out the vision and guiding principles for natural resources and water infrastructure. The current conditions and trends inform the challenges and provide a basis for future strategies and vision.

The following vision, guiding principles, and action items for natural resources and water infrastructure are based on public input, the region’s master plans, and public outreach efforts:

“There is a sustainable balance between development and the protection of the region’s natural resources and working landscapes. Residents enjoy a high quality of life with easy access to a connected system of recreational opportunities, clean water and a healthy ecosystem that supports diverse habitats.”

The guiding principles that follow are focused on the refinement of this vision and build the foundation for the action items that are identified at the conclusion of this Chapter. These principles represent how CNHRPC can support the achievement of the vision.

GUIDING PRINCIPLES

- Support municipal efforts and promote inter-municipal cooperation on conservation, protection, and sound management of natural resources, open space and historic sites.
- Facilitate effective stewardship of conservation acquisitions and recreational areas.
- Foster development of local food systems.
- Encourage the management of growth that protects farmland, environmentally sensitive areas and important ecosystems.
- Support more recreation opportunities close to home for all to meet the changing needs of the region’s residents to promote active, healthy lifestyle, especially among youth and the older demographic.
- Support local efforts to conserve open space to preserve the region’s natural heritage and environmental health.

- Promote inter-municipal cooperation on protective strategies for river corridors and water recharge areas including wetlands.
- Plan for, coordinate, and support the management and protection of the region's water resources, recharge systems, and wetlands.
- Support expansion of water and sewer services where appropriate.

These guiding principles translate into the following actions items that also can be found in the Plan's Implementation Chapter.

ACTION ITEMS

- Encourage best practices in stewardship of conservation lands in the region.
- Partner with communities on efforts to engage more volunteers and to promote stewardship opportunities with all age groups in the community.
- Provide opportunities for roundtable conversation and peer to peer learning for conservation commissions to discuss conservation priorities at a regional level.
- Encourage partnership and improve coordination between communities to protect contiguous land for conservation across municipal boundaries.
- Encourage communication between agricultural and conservation commissions, and local land use boards on municipal issues, regulations, and local affairs related to agriculture and conservation.
- Assist interested communities in reviewing regulations to ensure that new development will support land use patterns that protect large un-fragmented blocks of land.
- Work with interested communities on prioritizing open space conservation toward larger connected blocks of conserved land, including wildlife habitat identified by NH Fish & Game's Wildlife Action Plan, to provide wildlife corridors, habitat diversity and ecological sustainability.
- Support efforts to seek funding for conservation acquisitions.
- Encourage a watershed management approach to water quality to address the cumulative impacts of non-point source pollution and other pollutants.
- Provide educational opportunities and resources to communities on the importance of protecting wetlands, groundwater and drinking water by providing information on tools such as overlay districts as well as permanent land conservation techniques.
- Support stormwater management on a watershed scale through education of the public and municipal employees, including road agents, by utilizing the New Hampshire Homeowner's Guide to Stormwater Management by DES and Green SnowPro Certification available through UNH.

- Support any municipal efforts to incorporate low impact development as well as sedimentation/stormwater controls in local regulations.
- Encourage communities to develop Asset Management Plans of drinking water and wastewater infrastructure by inventorying characteristics of facilities such as age, size, and condition (e.g. transmission lines, intakes) for addressing future challenges and required upgrades.
- Encourage communities to set aside annual Capital Reserve Funds for water or wastewater infrastructure emergency improvement funding and to place upgrades to water or sewer lines or facilities into Capital Improvements Programs.
- Encourage municipalities to develop or continue local agriculture commissions to promote farming presence in municipalities.
- Ensure that the region is represented in any statewide initiative or legislation regarding agriculture and right to farm issues.
- Support maintenance and improvement to recreation opportunities, including access to water resources, lakes and rivers, for all users and age groups in the community and seek funding opportunities for developing improved recreation opportunities.
- Help interested communities in the region to improve and develop trails and access points with a focus on connectivity between trails systems and across municipal borders.
- Provide information on public open space on CNHRPC's website or on a regional web portal to promote the region's available public parks and recreation areas. Also encourage municipalities to include local information on their website, in municipal offices and annual reports.

RESOURCES

- Blaisdell Lake Protective Association. (2014, July 7). Retrieved from Blaisdell Protective Association: <http://blpoa.org/index.html>.
- DES. (2008). *Environmental Fact Sheet: The Contoocook and North Branch Rivers*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/commissioner/pip/factsheets/rl/documents/rl-5.pdf>.
- DES. (2008). *New Hampshire Water Resources Primer*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/water/dwgb/wrpp/primer.htm>.
- DES. (Rev. 2008). *Guide to Groundwater Protection*. NH Department of Environmental Services, Water Division, Drinking Water and Groundwater Bureau <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-07-29.pdf>
- DES. (2012). *Classification of Dams in New Hampshire*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/water/dam/>
- DES. (2014). *Above Ground Storage Tank Program*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/waste/orcb/ocs/astp/categories/overview.htm>
- DES. (2014). *Hazardous Waste Certification Program*. Retrieved from New Hampshire Department of Environmental Services: http://des.nh.gov/organization/divisions/waste/hwcb/hwcs/sqgcp/documents/fqg_requirements.pdf
- DES. (2014, June 16). *Rivers Management and Protection Program*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/water/wmb/rivers/index.htm>
- DES. (2014). *Underground Storage Tank Program*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/waste/orcb/ocs/ustp/categories/overview.htm>
- EPA. (2013, April). *Drinking Water Infrastructure Needs Survey and Assessment*. Retrieved from EPA: http://water.epa.gov/grants_funding/dwsrf/upload/epa816r13006.pdf
- EPA. (2014, March). *National Pollutant Discharge Elimination Systems (NPDES) Permits Program*. Retrieved from EPA: <http://www.epa.gov/region6/water/npdes/index.htm>
- Fish & Game Department. (2005). *Wildlife Action Plan*. Retrieved from New Hampshire Fish & Game Department: http://www.wildnh.com/Wildlife/wildlife_plan.htm.
- NHDFL. (2010). *New Hampshire Statewide Forest Resources Assessment - 2010*. Retrieved from NH

DRED, Division of Forests and Land:

<http://www.nhdf.org/library/pdf/Planning/NH%20Statewide%20Assessment%202010%20update.pdf>

NH LAKES. (2014, April 1). *New Hampshire Lakes Association Lake Host Program 2014 Manual*. Retrieved from New Hampshire Lakes Association: <http://nhlakes.org/education/lake-host/>

Northeast Utilities. (2014, March). *Energy Choices*. Retrieved from Northeast Utilities: <http://www.nu.com/energy/stations/psnh.asp>.

SPNHF. (2002). *Saving Special Places: Community Funding For Land Conservation*. Retrieved from the Society for the Protection of New Hampshire Forests: <http://www.forestsociety.org/pdf/savingplaces.pdf>

SPNHF. (2010). *The New Hampshire Municipal Conservation Fund Guidebook*. Retrieved from the Society for the Protection of New Hampshire Forests: <http://forestsociety.org>.

SPNHF. (2014, April). *A Land Conservation Plan for the Merrimack River Watershed of New Hampshire and Massachusetts*. Retrieved from the Society for the Protection of New Hampshire Forests: <https://www.forestsociety.org/merrimack-river-watershed>.

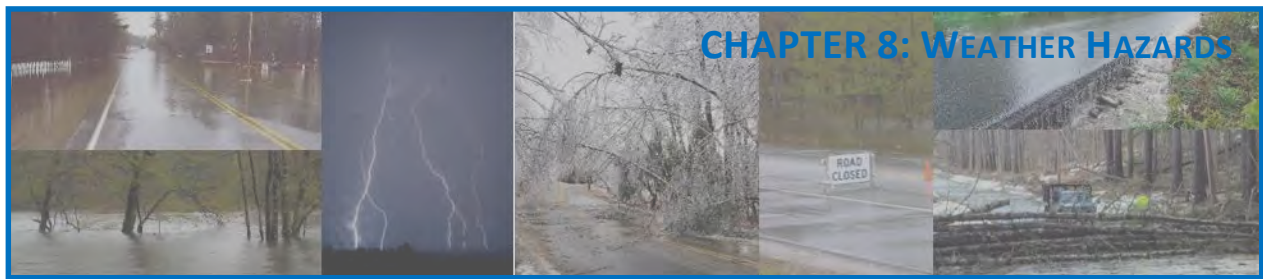
Suncook River. (2014). *Suncook River*. Retrieved from Suncook River: <http://suncookriver.org>.

UNH (2014, June). *Protecting Water Resources and Managing Stormwater*. Retrieved from University of New Hampshire Stormwater Center: <http://www.unh.edu/unhsc/pubs-specs-info>

USDA. (2014, June). *Census of Agriculture*. Retrieved from United States Department of Agriculture: <http://www.agcensus.usda.gov>.

USGS. (2014, June). *New Hampshire Water Use Estimates for 2005 and Projections for 2020*. Retrieved from United States Geological Survey: <http://vt.water.usgs.gov/projects/nhvtwateruse/nhdata.htm>

UMRLAC. (2014, June 16). *About UMRLAC*. Retrieved from Upper Merrimack River Local Advisory Committee: <http://merrimackriver.org/about/>



INTRODUCTION

Weather hazards are damaging infrastructure and property throughout the Central NH Region from a long series of unusual presidentially-major disaster declarations and emergency declarations. Some of these recent damages are displayed in [Map 8.1](#), derived from information provided by these municipalities.

To help prepare communities, the use of emergency preparedness planning, hazard mitigation planning and local funding of projects is more important than ever, as recent federal funding for mitigation projects becomes more competitive. The Central NH Region's smaller communities in particular face another challenge with the lack of both staffing and fiscal resources to mitigate identified problem areas and develop the appropriate planning programs to prepare for extreme weather or presidentially-declared disaster events.

Weather events, annual patterns of temperature, precipitation, and rain, and long-term climate trend information are readily available for the United States, the Northeast, New Hampshire, and for southern New Hampshire. A weather station is located in Concord so some localized data is available for the Central NH Region to enable this Chapter to better pertain to the unique geography and issues of the 20 communities here. Scientific resources on weather normals, records, trends, and patterns are accessible on a multitude internet websites, both public and private.

This Weather Hazards Chapter identifies action items to help the region's communities respond to the variable weather and extreme hazard events have been experienced in recent years. The greater problem to overcome is the enactment of such measures with the noted challenges of funding and staffing support.

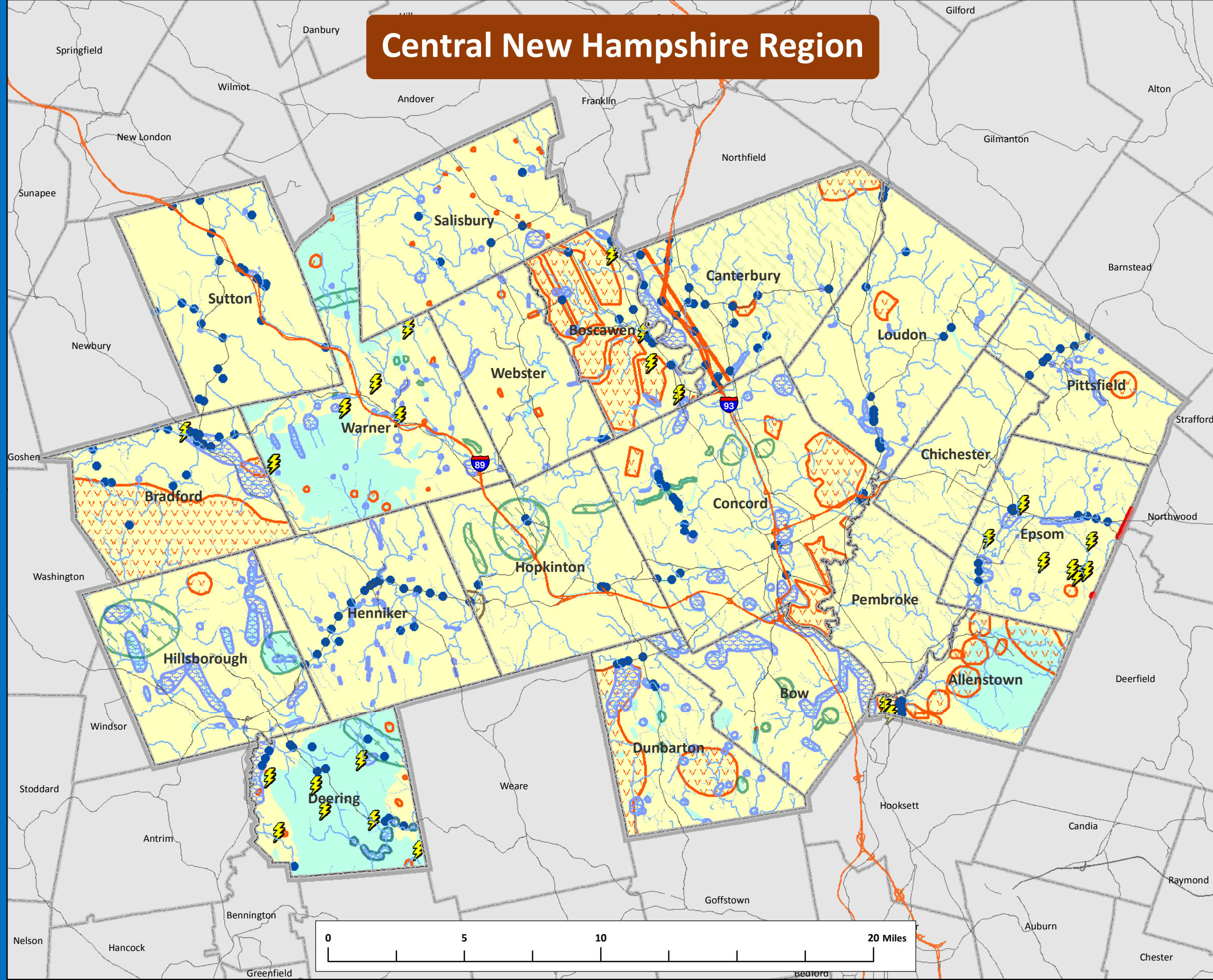
OVERALL US TRENDS OF WEATHER HAZARDS

From 1980 to 2013, the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA) cataloged 170 extreme weather disasters across the United States which exceeded \$1 billion in losses [Consumer Price Index (CPI) adjusted]. Seven (7) broad major extreme weather event types were identified to categorize the disasters – severe storms (65), tropical cyclones (34), drought (21), flooding (19), winter storm (12), wildfire (12), and freeze (7) events. New Hampshire withstood 14 of these 170 events. [Figure 8.1](#) displays which states had the greatest number of \$1 billion disaster events during this time span. Comparatively, New England was at the lower end of the spectrum and was spared from the worst damages.

Between federal fiscal years FY-2011 and FY-2013, taxpayer disaster relief was channeled mostly through the Departments of Homeland Security (over \$55 billion), Agriculture (over \$36 billion), Housing and Urban Development (over \$16 billion), and Transportation (over \$14 billion). The total spent to recover from extreme weather events over these three years cost over \$136 billion, averaging each US taxpayer more than \$400 each year.

Central New Hampshire Region

Weather Hazards Map 8.1 Community Past Hazard Impacts



Past Hazards

- Frequent Accident Locations
- ⚡ Lightning Strikes
- ⊗ Wind Damage
- ⊗ Flooding and Washouts
- ⊗ Earthquake Damage
- ⊗ Fire Damage
- ⊗ Tornado Damage
- ⊗ Ice & Snow Damage
- Rivers and Streams
- - - Intermittent Streams
- ▭ Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Past hazards indicated on this map are derived from local Hazard Mitigation Committees.

Note: No Past Hazard data available for Chichester or Pembroke.

Data Sources: Local Hazard Mitigation Committees, CNHRPC, NH GRANIT, NHDOT, CNHRPC, Local Hazard Mitigation Committees. Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire
Regional Planning
Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org

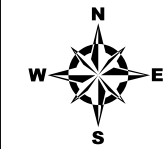
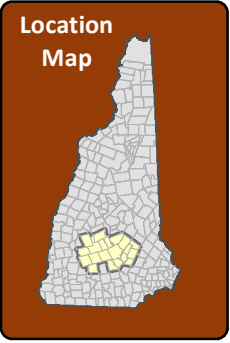
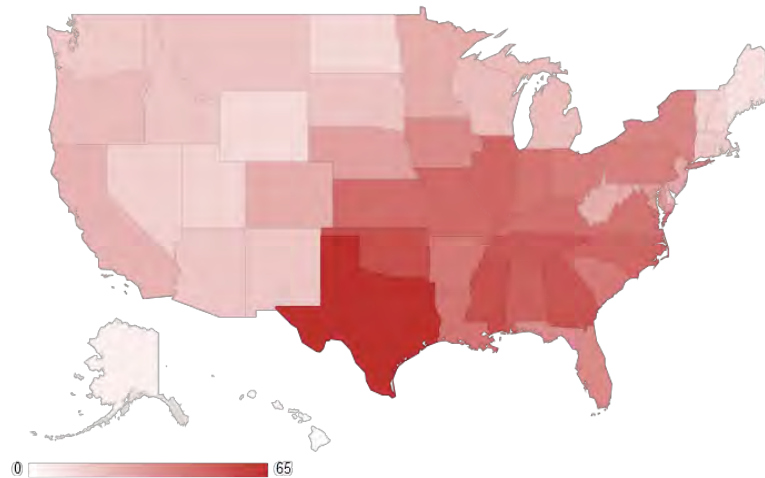


Figure 8.1: Billion Dollar Weather Declared Disasters Map, 1980-2013

Source: *National Climatic Data Center (NCDC) of NOAA*

Extreme Weather Records Broken in 2011 and 2012

The year 2011 had been considered an unrivaled year of extremes with 14 disastrous weather events resulting in over \$1 billion in property damage in the United States. In 2011, the number of extreme weather records broken totaled 3,251 across the US. Six (6) specific human health hazards are expected to increase with climate change – ozone smog pollution, heat waves, hurricanes, mosquito-borne infectious diseases, river flooding, and wildfires.

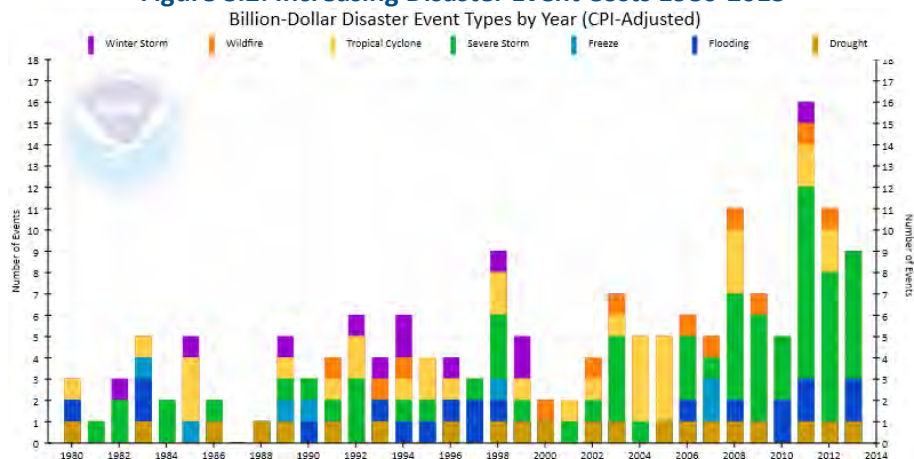
Then, the United States experienced 3,527 monthly weather records exceeded for heat, snow, and rain in 2012 – 276 records more than 2011. Some of the records broken had stood for 30 years or more. The worst drought in 50 years occurred in the American Mid-West, over 9.2 million acres were burned by wildfire with an average size of 165 acres per fire (surpassing the 2001-2010 average of 90 acres per fire), and Hurricane Sandy made landfall in the Northeast.

Seven Categories of \$1 Billion Dollar Extreme Weather Events

The 170 extreme weather disaster events exceeding \$1 billion in damages from 1980 to 2013 from [Figure 8.1](#) is alternately examined within [Figure 8.2](#) to display the categories of disaster that befell the United States. From above, the disasters were classified into seven (7) broad categories: severe storms (65), tropical cyclones (34), drought (21), flooding (19), winter storm (12), wildfire (12), and freeze (7) events. New Hampshire and the Central NH Region are vulnerable to all of these weather hazard types.

From [Figure 8.2](#), the year 2011 was the worst (and most expensive) the nation experienced, primarily with severe storm events. The second worst years were 2008 and 2012, also with severe storms. The third worst years were 1998 and 2013 again with severe storms the most prevalent; the fourth worst years were 2003 and 2009; the fifth worst were 1992 and 1994; and 2006 followed with severe storms. All of the most expensive extreme weather disaster events were classified as severe storms with the exception of 1994, which had more winter storms.

Since 1980, nearly without fail the most expensive and disastrous weather hazard events were clustered within the last 20 years. The greatest number of events were severe storms, usually a combination of both wind and water. New Hampshire experienced many of these events, sustaining damages from flooding and severe winds.

Figure 8.2: Increasing Disaster Event Costs 1980-2013

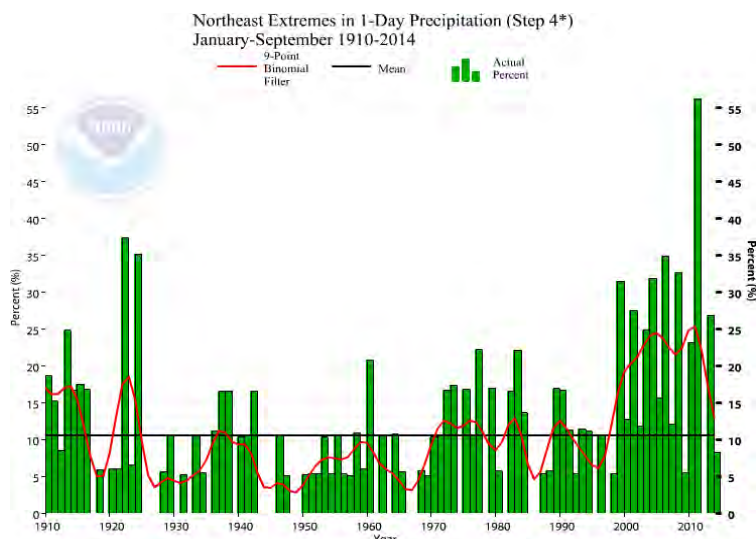
Source: *National Oceanic and Atmospheric Administration (NOAA)*

Northeast Precipitation Trends

The Northeast for climate observation purposes consists of Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. Within this region, extreme daily precipitation trends were measured between January and September of 1910 to 2014 in **Figure 8.3**.

According to **Figure 8.3**, the Northeast has experienced significant, decades-long increases in daily rain from the late 1970s, although the turn of the previous century (1900) experienced a few years higher than normal precipitation too. The largest amount of rainfall experienced in the Northeast since 1900 over an extended time period occurred beginning around 2004 to about 2013. Another pattern of extreme rainfall occurring for years at a time began in the early 1970s and lasted until the late 1980s.

These precipitation extremes coincide with those New Hampshire experienced and received federal disaster and recovery funding assistance from as a result. Extreme weather records around the country and the northeast have been surpassed, including those in New Hampshire.

Figure 8.3: Northeast Extremes in 1 Day Precipitation, 1910-2014

Source: *National Climatic Data Center (NCDC) of NOAA*

New Hampshire Extreme Weather Records Broken in 2011 and 2012

In 2011, New Hampshire attained 59 new weather records, with 12 heat, 27 rainfall, and 20 snowfall records broken.

More recently in 2012, in New Hampshire a total of 40 extreme weather records were broken. Within the 10 counties, 17 heat temperature (degrees Fahrenheit) records were exceeded, 12 snow records (inches per day) were exceeded, and 11 high precipitation (rain inches per day) records were exceeded according to the Natural Resources Defense Council which collects their records from the National Oceanic and Atmospheric Administration (NOAA) cited here in this Weather Hazards Chapter.

Of these 40 records, Merrimack County experienced 1 record of high heat. On March 23, 2012, the Franklin Falls Dam monitoring station reported a high temperature of 50°, surpassing the previous record of 46.9° on March 31, 1981 for the highest monthly minimum temperature.

In Hillsborough County, 6 weather records were broken. Also on March 23, 2012, the Massabesic Lake monitoring station reported a high temperature of 57.9°, surpassing the previous record of 52° on March 31, 1981 for the highest monthly minimum temperature. Three precipitation records were broken as reported by the Hudson 1 SSE monitoring station. The largest increase of the three was on October 30, 2012 when 2.46" of precipitation fell, shattering the previous record of 1.18" on October 12, 1950. Two (2) daily snowfall records were exceeded as reported by the same station. The greater record was 7.1" inches of snowfall on March 12, from the previous record of 1.8" on March 22, 2011.

ADVENT OF LOCAL HAZARD MITIGATION PLANS

The weather in the Central New Hampshire Region consists of four-seasons, each with its own economic and recreational virtues. The fall's beautiful foliage and hunting season, the winter's skiing and season, the spring's planting and maple sugar season, and the summer's swimming and hiking season all capture the essence of richly rewarding activities in the region. Concord is said to be a convenient "one hour's drive" from the Seacoast, White Mountains, the Lakes Region, and Boston, all of which offer additional seasonal opportunities. In part because of the changing seasons of this mostly rural area, people are greatly attracted to living within the Central NH Region.

Hazard mitigation plans for each community help municipalities offset the recurring seasonal variations and destructive weather hazards that New Hampshire has recently experienced and could likely continue to confront.

1998 ICE STORM MAJOR DISASTER

The 1998 Ice Storm, a presidentially-declared disaster in eight of the state's ten counties, generated more than 80 hours of freezing rain in Central and Northern New Hampshire. A significant number of trees fell onto powerlines, both of which fell onto roadways and blockaded travel routes. Residents were sequestered in their homes or were unable to reach their homes. The large amount of ice and the magnitude of the storm made the 1998 event the first storm to have tested the State's

Figure 8.4: Henniker Ice Storm, 2008



Source: Henniker Hazard Mitigation Plan 2007

modern capability to respond to an emergency weather crisis.

Because the storm occurred mostly in the top three-quarters of the state, which included the Central NH Region, the state's highest population centers were unaffected. Although only 67,500 customers were reported without electricity, thousands were without power for weeks, including hundreds within the most rural sections of the Central NH Region, as the efforts to bring in electrical response crews from the western and southern states continued. By later accounts, more than 800,000 acres of trees had been damaged (USDA Forest Service) and up to 500 rare plant populations and exemplary natural communities were destroyed (NH Heritage Inventory). This single event brought a new awareness to the necessity for coordinated emergency response and organization during disaster events.

THE DISASTER MITIGATION ACT AND HAZARD MITIGATION PLANS

With the 1998 Ice Storm a recent memory of New Hampshire residents, the US Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390) was enacted. The DMA found that natural disasters pose great danger to human life and property in the United States and established a national disaster hazard mitigation program to streamline disaster assistance and funding sources after a series of extreme natural disasters impacted sections of the country. The law requires pre-disaster mitigation planning for municipal eligibility to apply for mitigation project grant funding. With the DMA came a new, local recognition that severe weather had been impacting the entire country with greater frequency and gave the State of New Hampshire the ability to meet this changing weather patterns challenge through the development of natural hazard mitigation plans. The State has its own hazard mitigation plan which must be updated every three years.

The Federal Emergency Management Agency (FEMA), through the NH Department of Homeland Security and Emergency Management (HSEM) provides funding to the Central NH Regional Planning Commission (CNHRPC) to work with the region's communities and assist with the development of municipal Hazard Mitigation Plans. Warner's 2003 Plan was the first in the region to be awarded FEMA's formal approval. Since that time, CNHRPC has worked with 19 out of the region's 20 communities to develop and update their Hazard Mitigation Plans. Comprehensive updates to each municipal Plan are required every five years, and if not approved by FEMA by the Plan's expiration date, communities will lose eligibility for federal hazard mitigation and pre-disaster mitigation grant programs.

Currently, federal funding to update Hazard Mitigation Plans is in short supply but most of the communities in the region do not have the staff capability or knowledge of FEMA guidelines to update their own Plans. Without the federal financial assistance available to update the local Plans, the Plans will expire, rendering the municipalities ineligible for many grant programs. Within the next year or two, some communities might be unable to apply for federal funding once another natural disaster occurs.

NATURAL DISASTERS WITHIN THE CENTRAL NH REGION

Major Disasters are declared by the President after an appeal by the New Hampshire Governor. A governor's request could mean an infusion of federal funds, but the governor must also commit significant state funds and resources for recovery efforts. Disasters are declared on a county-wide basis and are typically comprised of more than one New Hampshire County.

A Major Disaster could result from a hurricane, earthquake, flood, tornado or major fire which the President determines warrants supplemental federal aid. The event must be clearly more than New Hampshire or local communities can handle alone.

The Central NH Region, which encompasses parts of Merrimack County (18 communities) and Hillsborough County (2 communities), has been damaged by 20 multiple presidentially-declared major disasters in the last 41 years, between 1973 and 2013 as displayed in **Table 8.1**. Between July 2013 and September 2014, there have been no further Major Disasters declared within the region.

Table 8.1: Central NH Region Major Disaster Declarations, 1973-2013

	FEMA #	Local Disaster Name	Incident Period	FEMA Disaster Name	Includes County M / H *
RECENT 11 Disasters in 9 Years 2005-2013	4105	2013 Severe Winter Storm and Snowstorm	Feb 8-10, 2013	Severe Winter Storm and Snowstorm	HM
	4049	2011 Halloween Snow Storm	Oct 29-30, 2011	Severe Storm and Snowstorm	H
	4026	2011 Tropical Storm Irene	Aug 26-Sep 6, 2011	Tropical Storm Irene	M
	1913	2010 Severe Storms and Flooding	Mar 14-31, 2010	Severe Storms and Flooding	HM
	1892	2010 Severe Wind and Winter Storm	Feb 23-Mar 3, 2010	High Winds, Rain, Snow	HM
	1812	2008 December Ice Storm	Dec 11-23, 2008	Severe Winter Storm (Ice, Snow, Rain, Strong Winds)	HM
	1799	2008 Fall Flood	Sep 6-7, 2008	Heavy Rains and Floods	HM
	1782	2008 July Tornado	Jul 24, 2008	Tornado, Severe Winds, Heavy Rains	HM
	1695	2007 April Flood	Apr 15-23, 2007	Severe Storms and Flooding	HM
	1643	2006 Mother's Day Flood	May 12-23, 2006	Severe Storms and Flooding	HM
	1610	2005 Columbus Day Flood	Oct 7-18, 2005	Severe Storms and Flooding	HM
HISTORICAL 9 Disasters in 25 years 1998-1973	1231	1998 Severe Storms and Flooding	Jun 12-Jul 2, 1998	Severe Storms and Flooding	HM
	1199	1998 Ice Storm	Jan 7-25, 1998	Ice Storms	HM
	1144	1996 Severe Storms and Flooding	Oct 20-23, 1996	Severe Storms and Flooding	HM
	1077	1995 Flood	Oct 20-Nov 15, 1995	Storms and Floods	M
	917	1991 Hurricane Bob	Aug 18-20, 1991	Severe Storm	H
	876	1990 Flooding and Severe Storm	Aug 7-11, 1990	Flooding and Severe Storm	HM
	789	1987 Severe Storms and Flooding	Mar 30-Apr 11, 1987	Severe Storms and Flooding	HM
	771	1986 Severe Storms and Flooding	Jul 29-Aug 10, 1986	Severe Storms and Flooding	H
	399	1973 Severe Storms and Flooding	Jul 11, 1973	Severe Storms and Flooding	HM

* Disasters typically include more than just Merrimack or Hillsborough County in NH

M Merrimack (18 communities in CNHRPC Region)

H Hillsborough (2 communities in CNHRPC Region)

Source: www.fema.gov

While a natural disaster typically strikes multiple counties in New Hampshire, only those damaging either Merrimack County or Hillsborough County were identified. From **Table 8.1** above, over the last nine years, presidentially-declared natural major disasters have increased significantly. Between 2005 and 2013 (nine years), a total of 11 natural disasters occurred: 5 floods, 4 snow/ice storms, and 2 rain/wind storms. Between 1973 and 1998 (25 years), a total of 9 natural disasters occurred: 4 floods, 1 snow/ice storm, and 4 rain/wind storms.

LOCAL IMPACTS OF DISASTERS

The after-effects of extreme weather events to Central NH Region communities were both varied and yet the same for most of the storms identified in [Table 8.1](#). Depending on the type of storm, damages included: gravel and asphalt road washouts from too much water flowing through undersized culverts; ponds and wetlands overflow onto roads; downed trees and tree limbs across roads and power lines from wind, snow, and ice; wind-blown debris; downed power lines and poles resulting in large-spread power, telephone and internet outages; high snow levels and icy roads requiring extra plowing, sanding, and salting; damaged bridges and dams; flooded basements and first floors; and vehicular and other private structural damage from debris, branches, and floods.

Within the Suncook River floodplain in Allenstown, over 100 homes were evacuated along the River during the 2006, 2007, and 2010 floods, with subsequent damage of 61 homes during the 2007 event alone and over \$2 million in paid losses. As a result, the Town participated in a phased voluntary property acquisition project with homeowners to purchase about three dozen priority repetitive loss properties in the floodplain at assessed value cost with federal funding. Some of these were manufactured homes or older homes along the River before floodplain ordinance regulations. The Federal Emergency Management Agency (FEMA)'s purchase program, called more familiarly "buyouts," allowed the town to demolish the homes and return the land back to its normal floodplain capacity state as reported by the Allenstown Hazard Mitigation Plan Draft 2014, eliminating an enormous risk to residents formerly residing in the floodplain. The Suncook River flooding photo displays one such flooded home that was later purchased by the Town of Allenstown.

Figure 8.5: Allenstown Suncook River Flooding, 2007



Source: *Allenstown Hazard Mitigation Plan Draft 2014*

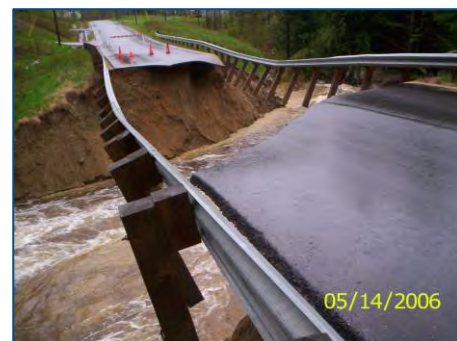
Central NH Region's Disaster Damage Costs

Once a major disaster is declared, funding comes from the President's Disaster Relief Fund managed by FEMA and disaster aid programs of other participating federal agencies. Nearly all programs require the community and the state to contribute 25% in funding toward the projects.

FEMA's Public Assistance program enables communities within disaster-declared counties to apply for funding of repair and recovery after the disaster declaration. A Presidential Major Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, and are designed to help disaster victims, businesses and public entities.

Figure 8.7 displays how much funding FEMA has granted to Central NH Region communities to help them recover from disasters between 1999 and early 2014. Over \$8.1 million attributed to nearly 800 projects was provided to the region's 20 municipalities and their Lake Districts. Even without an approved Hazard Mitigation Plan,

Figure 8.6: Loudon Road Washout and Flooding, 2006



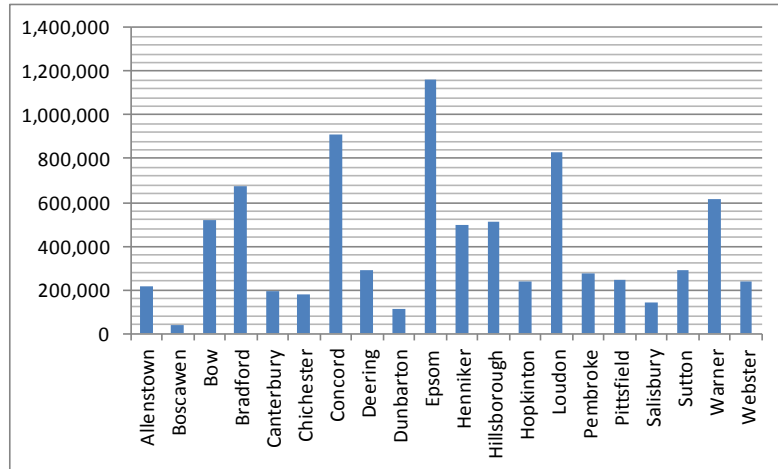
Source: *Loudon Hazard Mitigation Plan 2010*

communities can apply for and receive funding for projects after a presidential disaster declaration or presidential emergency declaration.

Eleven (11) natural disaster declarations and seven (7) emergency declarations were declared for the release of federal Public Assistance funds for municipal infrastructure indicated in **Figure 8.7**. While most communities received over \$250,000 for the time period January, 1999 through February 2014, Boscawen received the least amount of funding at about \$35,000 and Epsom received the most at over \$1.1 million. The average amount received was \$408,000 per community during this 15 year period. The Public Assistance Program is not for individual property owners (Individual Assistance Program), and therefore private losses are not accounted in this examination.

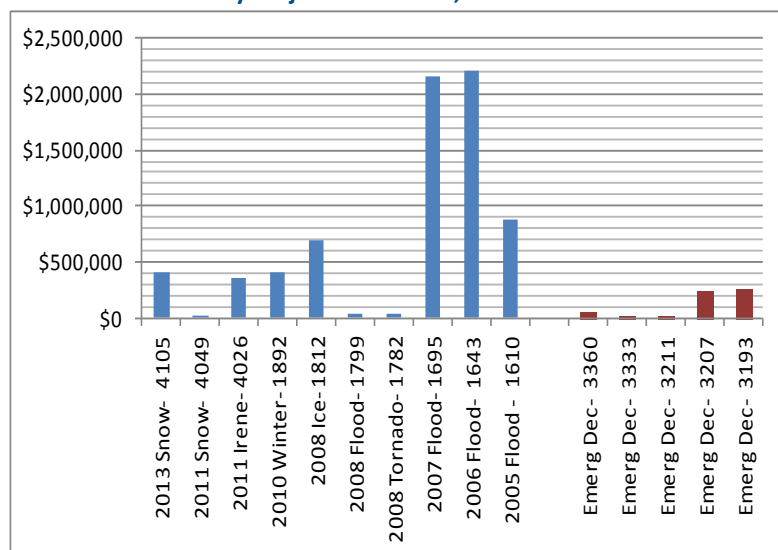
Another way to examine the funding provided to the Central NH Region is by declaration type, both the major disaster and emergency declarations shown above in **Figure 8.7**. In **Figure 8.8**, the majority of the grant awards to communities provided funding toward flooding recovery in 2005, 2006, and 2007, totaling about \$5.2 million of the total \$8.1 million. Awards to organizations or School Districts were not counted within either Figure although they are eligible for Public Assistance funding.

Figure 8.7: Public Assistance Grant Awards To Central NH Communities, 1999-2014



Source: *FEMA Public Assistance Subgrantee Database January 1999 through February 2014*

Figure 8.8: Central NH Public Assistance Grant Awards by Major Declaration, 1999-2014

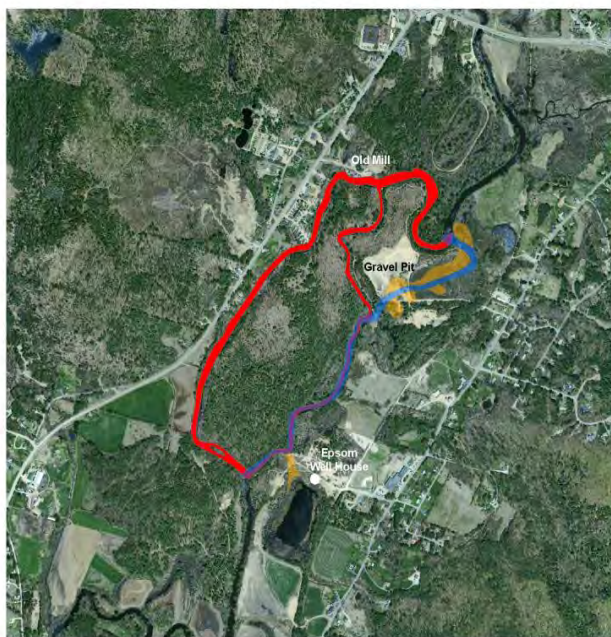


Source: *FEMA Public Assistance Subgrantee Database January 1999 through February 2014*

Suncook River Avulsion in Epsom, May 2006

During the May 10-15, 2006 “Mother’s Day Flood,” a sustained 17 inches of precipitation in south-central New Hampshire resulted in the highest-ever flows recorded on the US Geological Survey’s (USGS) stream gages of 12 rivers in the Central NH area. Peak flow measurements from these gages averaged 24 times the normal flow, either at or exceeding the 100-year flood interval. While flood damages were sustained all over the region, one location was damaged so much, permanent changes have resulted and are continuing to impact.

New Suncook River Channel



Legend

- New Channel
- Abandoned Channel
- Eroded Areas

New Channel Statistics

- Length of newly eroded channel: 0.44 miles (2,323 ft)
- Total length of new channel including reach of pre-existing channel: 1.03 miles (5,483 ft)
- Length of abandoned main channel: 1.52 miles (8,026 ft)
- Total length of abandoned channels (including secondary channel): 1.97 miles (10,402 ft)
- Average gradient of new channel: 23 feet/mile
- Average gradient of abandoned channel: 16 feet/mile

Site of Epsom avulsion: Map by NH Geological Survey; Top Photo by Concord Monitor, May 2006; Bottom photo by CNHRPC, 2010.



The Suncook River *avulsion* in Epsom caused the abandonment of one river channel and the creation of a separate, alternate new river channel during this storm event. The river cut through a sand and gravel excavation site outside of the documented 100-year and 500-year floodplain. Considered a river process anomaly because of its new location outside of property once forming an island is now land-bound and riverfront property lines changed significantly. The Suncook’s avulsion in 2006 is a case study in unique river processes. Present day problems include sandy sediment traveling from the excavation site down the Suncook River, raising the river bed, and traveling into the Merrimack River at their confluence in Bow, Pembroke, and Allenstown.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The Federal Insurance and Mitigation Administration (FIMA), a component of the Federal Emergency Management Agency (FEMA), manages the NFIP and oversees the floodplain management and mapping components of the Program.

Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP offers flood insurance available to homeowners, renters, and business owners in these communities.

To obtain secured financing from a federally insured or regulated lender to buy, build, or improve structures in Special Flood Hazard Areas (SFHA), it is legally required by federal law to purchase flood insurance. These lending institutions must determine if the structure is located in a SFHA and must provide written notice requiring flood insurance. Insurance premiums can vary according to certain risk factors. The official website of the NFIP is located at www.floodsmart.gov/floodsmart, a user-friendly and informative resource about all things flood insurance.

Although the original municipal Flood Insurance Studies (FIS) and paper Flood Insurance Rate Maps (FIRMs) were developed when a community joined the NFIP, both Merrimack County and Hillsborough County FIS and FIRMs were recently updated. No longer will single municipal FIS be developed, and the FIRMs are now in a digital (DFIRM) format.

The current effective Digital Flood Insurance Rate (DFIRM) maps for individual towns and the Flood Insurance Study (FIS) for Hillsborough County (dated 2009) and Merrimack County (dated April 19, 2010) were adopted by local Boards of Selectmen at that time. They supersede all previous FIRM maps and individual community FISs and are used to help determine which properties are located within the floodplain.

The NFIP is a critical program as it permits any property owner within NFIP-participating communities to purchase flood insurance. **Table 8.2** displays the current number of NFIP policies held within the Central NH Region communities as of July 2014.

Although the total number of parcels for the region is not known, as of the US Census 2010 the number of housing units totaled over 49,000 in **Table 8.2**. Of those, only 1.5% of housing units have active flood insurance as of July 2014, with the total number of regional policies at 727. Policies range from about \$120 to \$2,500 (average \$954) depending on where the property is located.

Flood Insurance for Property Owners

Flood insurance is available to any property owner located in a community participating in the NFIP regardless of the property location.

All Central NH Region communities are NFIP members, so any property owner in the Region can obtain flood insurance.

Source: [National Flood Insurance Program \(NFIP\)](#)

NFIP Reminders for Communities

- Enforce the floodplain regulations.
- Ensure properties have Base Flood Elevation (BFE) on file.
- Remember FIRM and DFIRM Maps are not entirely accurate.
- Be mindful that every property has a flood risk, not just those in a floodplain.
- Use NHOEP guidance materials (sourced below) and staff for assistance.

Source: [NH Office of Energy and Planning's State Floodplain Management Program](#)

Table 8.2: NFIP Policies and Claims within the Central NH Region

Community	Housing Units*	# of Policies as of 07/31/14	% of All Housing Units with Policies	Average Cost \$ Per Policy	Total # of Claims from 1978 to 07/31/14	Dollars \$ of Losses Paid to Policy Holders
Allenstown	1,881	32	1.7%	\$1,202	18	\$2,107,718
Boscawen	1,453	3	0.2%	\$2,552	2	\$3,569
Bow	2,807	19	0.7%	\$2,038	6	\$508,061
Bradford	917	28	3.1%	\$1,406	19	\$196,997
Canterbury	1,002	5	0.5%	\$363	0	\$0
Chichester	963	2	0.2%	\$817	1	\$39,878
Concord	18,852	102	0.5%	\$1,319	36	\$232,736
Deering	932	17	1.8%	\$619	10	\$31,787
Dunbarton	1,077	2	0.2%	\$460	1	\$0
Epsom	1,839	28	1.5%	\$555	22	\$7,964
Henniker	1,928	59	3.1%	\$552	3	\$890
Hillsborough	2,896	43	1.5%	\$1,051	32	\$475,071
Hopkinton	2,381	312	13.1%	\$119	4	\$25,056
Loudon	2,081	8	0.4%	\$477	0	\$0
Pembroke	2,872	20	0.7%	\$873	38	\$1,028,418
Pittsfield	1,769	14	0.8%	\$1,440	6	\$110,811
Salisbury	598	1	0.2%	\$460	0	\$0
Sutton	985	2	0.2%	\$319	2	\$11,773
Warner	1,358	19	1.4%	\$1,794	11	\$6,232
Webster	849	11	1.3%	\$660	0	\$0
Totals	49,440	727	1.5%	\$954	211	\$4,786,960

Source: FEMA NFIP Policy and Claims Database, July 2014

**Housing units can include apartments and institutional units which are not located single property parcels. As the number of community and regional parcels was not available, housing units was used to provide an overall summary of insurance coverage.*

Of those property owners having flood insurance, from 1978 to July 2014, 211 insurance claims were made to FEMA as a result of flooding. These claims total almost \$4.8 million in the region, the payments provided by the NFIP insurance pool.

Unlike the Public Assistance Program mentioned previously that helped municipalities over the last 15 years with \$8.1 million in funding, this \$4.8 million from the NFIP was distributed over the last 35 years, mainly provided to individuals to help offset private property flooding costs.

With fewer than 750 NFIP policies currently held within the Central NH Region, it is clear property owners are not adequately financially protected from flooding damage. Flooding results not only from engorged waterbodies such as ponds, wetlands, and rivers at strategic geographic locations. Rainstorms or snowmelt can overflow stormwater drains, cause severe road, driveway, roof, and impervious surface runoff, and can inundate undersized drainage systems and culverts which can be located anywhere in a community. Any property is vulnerable to flooding wherever its location.

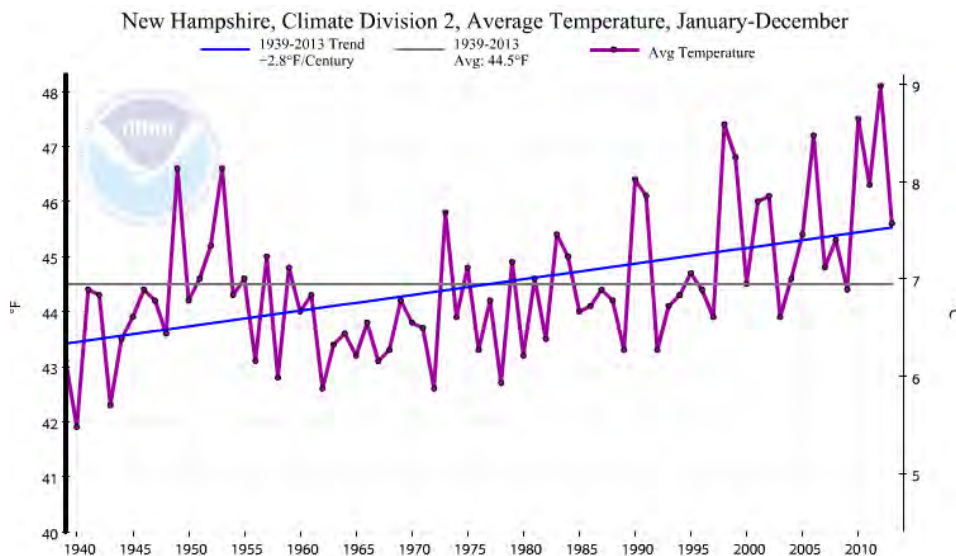
REGIONAL WEATHER PATTERNS AND CLIMATE TRENDS OBSERVATIONS

Current and past weather for the region are depicted below, summarizing the Central NH Region's weather history through yearly averages and extremes. Temperature, precipitation, snowfall, and air quality trends are described, many showing the trends over the 74-year period of 1939 to 2013. Much of the data available represents the southern half of the state and Concord and little for surrounding communities.

TEMPERATURE

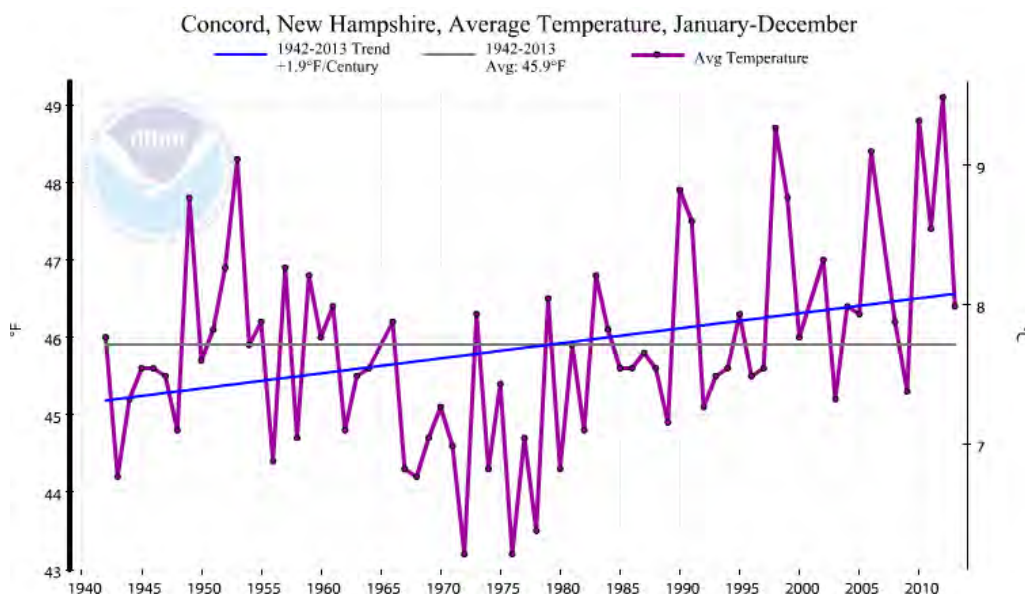
From the National Climatic Data Center (NCDC), long-term Southern New Hampshire average annual temperatures between 1939 (43.1°F) and 2013 (45.6°F) demonstrate an overall positive trendline shown in [Figure 8.9](#). The Southern New Hampshire annual temperature rose 2.8°F between 1939 and 2013, with the average annual temperature registering at 44.5°F. The trendline and average temperature line are visual representations of the average annual temperature.

Figure 8.9: Average Annual Temperature for Southern New Hampshire, 1939-2013



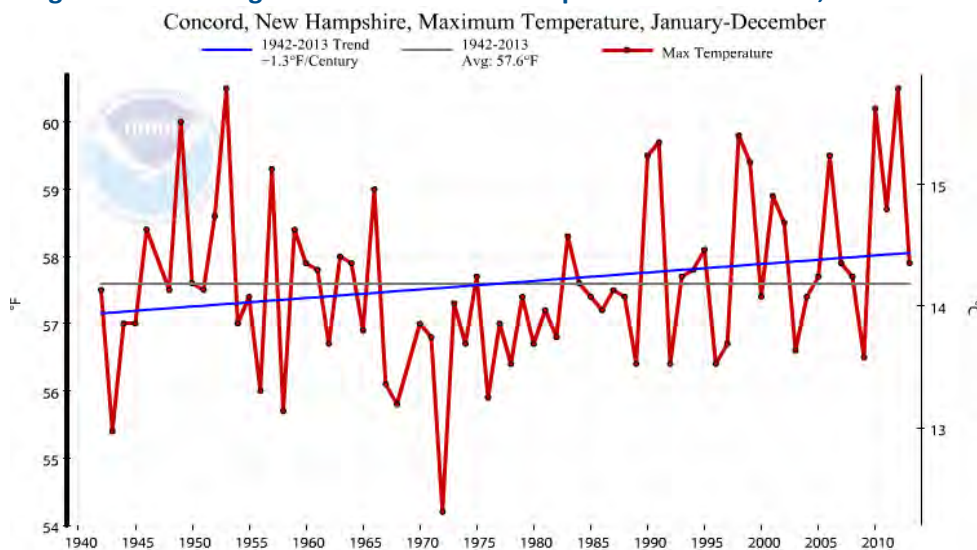
Source: *National Oceanic and Atmospheric Administration*

For Concord in the Central NH Region, [Figure 8.10](#) displays the same average annual temperature between 1942 (46.0°F) and 2013 (46.4°F). Earlier data was not available. From the trendline, Concord's graph also displays an overall positive trendline indicating a 2.8°F increase in average annual temperature during this time period. [Figure 8.10](#) illustrates similar increasing trends as were found in Southern New Hampshire ([Figure 8.9](#)), with the exception of a notably cooler period between 1960 and 1980.

Figure 8.10: Average Annual Temperature for Concord, 1942-2013

Source: *National Oceanic and Atmospheric Administration*

Figure 8.11 illustrates the maximum annual average temperatures for Concord over the same 71-year time period from 1942 to 2013. Using the trendline for consistency, the maximum annual temperature rose from 1939 (57.5°F) to 2013 (57.9°F). The average maximum temperature indicated for the time period is 57.6°F . The trendline indicates a slight rise in the maximum temperatures Concord has experienced, with an overall increase of 1.3°F for the time period. The 1970s display some of the lowest maximum temperatures, indicating colder years for the city.

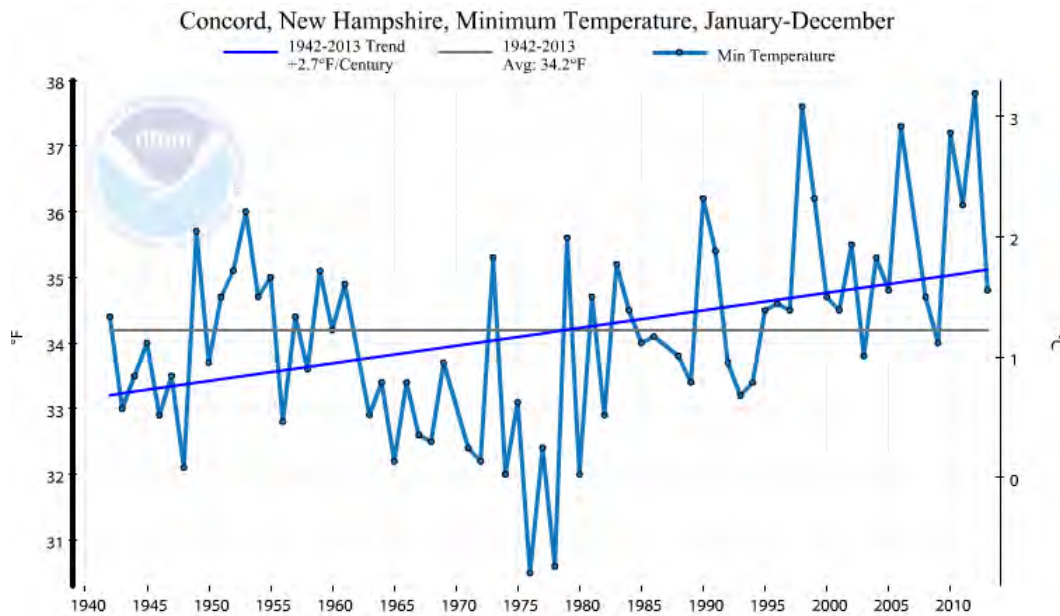
Figure 8.11: Average Annual Maximum Temperature for Concord, 1942-2013

Source: *National Oceanic and Atmospheric Administration*

Concord's annual average minimum temperatures over the 71-year period are displayed in **Figure 8.12**. The trendline between 1942 (34.4°F) and 2013 (34.8°F) indicates an overall 2.7°F increase of the

minimum temperatures over the period. The average minimum temperature recorded is 34.2°F. All of the Concord figures show the cooler period of temperatures ranging from around 1965-1980.

Figure 8.12: Average Annual Minimum Temperature for Concord, 1942-2013



Source: *National Oceanic and Atmospheric Administration*

The average low and high temperature values for Concord in comparison to record values are displayed in **Table 8.3**. The majority of record lowest temperatures occurred before 1970, with the exception of January, April, and November occurring respectively in 1984, 2003, and 1989. The record highest winter (Dec, Jan, Feb, and Mar) temperatures were relatively recent, occurring between 1998 and 2007.

Table 8.3: Historic Temperature Averages for Concord, 2013

Month	Monthly Average Low	Monthly Average High	Record Lowest		Record Highest	
			Value	Year	Value	Year
January	10 °F	31 °F	-33 °F	1984	69 °F	2007
February	13 °F	34 °F	-37 °F	1943	67 °F	1997
March	23 °F	44 °F	-16 °F	1967	89 °F	1998
April	32 °F	57 °F	8 °F	2003	95 °F	1976
May	42 °F	70 °F	21 °F	1966	97 °F	1962
June	52 °F	78 °F	26 °F	1939	98 °F	1995
July	57 °F	83 °F	33 °F	1939	102 °F	1966
August	56 °F	81 °F	29 °F	1965	101 °F	1975
September	47 °F	72 °F	20 °F	1941	98 °F	1953
October	35 °F	61 °F	10 °F	1972	90 °F	1963
November	28 °F	48 °F	-5 °F	1989	80 °F	1950
December	16 °F	36 °F	-22 °F	1951	73 °F	1998

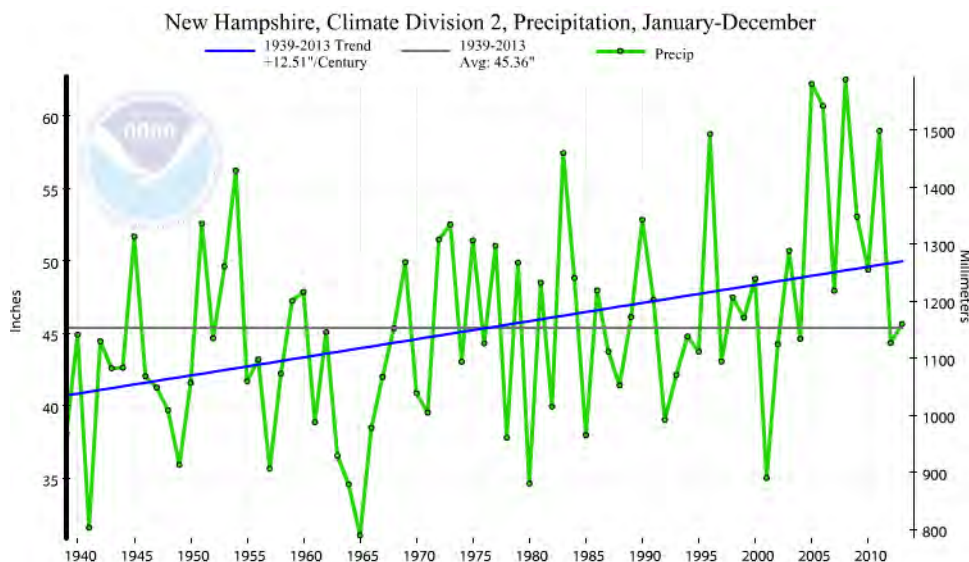
Source: *Intellicast.com*

All data indicates both Southern New Hampshire and Concord in the Central NH Region are experiencing increasing average temperatures, increasing average maximum temperatures, and increasing minimum temperatures over the last 74 years.

PRECIPITATION

In **Figure 8.13**, the 74-year period of 1939-2013 used for comparing temperature indicates Southern New Hampshire experienced an increase in average annual precipitation of 12.51" over this time period. The average annual precipitation is 45.36" which contrasts to the trendline of increasing rainfall. In 1939, the average precipitation was 38.09" and in 2013 averaged 46.65".

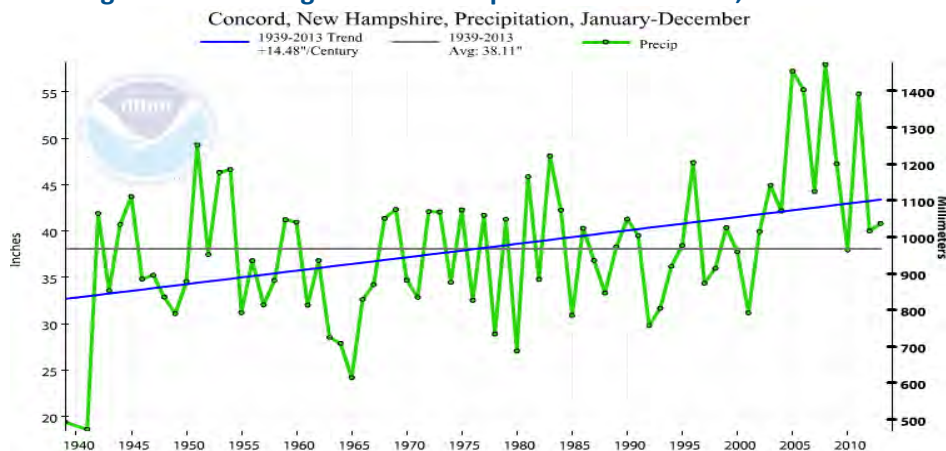
Figure 8.13: Average Annual Precipitation for Southern New Hampshire, 1939-2013



Source: *National Oceanic and Atmospheric Administration*

Concord also contended with an increase in average annual precipitation at a slightly higher amount of 14.48" over the 1939 to 2013 time period as illustrated in **Figure 8.14**. However, Concord's overall inches of annual precipitation are lower, at 19.41" in 1939 and 40.81" in 2013. Both graphs display a noticeable increase of rainfall starting around 2005 and ending in 2010.

Figure 8.14: Average Annual Precipitation for Concord, 1939-2013



Source: *National Oceanic and Atmospheric Administration*

In agreement with the graphs above, **Table 8.4** displays the three wettest years on record for Concord. The recent years of 2008, 2005, and 2006 respectively experienced over 55" of precipitation, with the

2008 wettest year accumulating 57.99". It should be noted that the three wettest years have all occurred relatively recently, as these were ranked with data dating from 1868.

Table 8.4: Concord Precipitation Annual Records

Ranking	Amount	Year
1. Wettest Year	57.99 inches	2008
2. Second Wettest Year	57.28 inches	2005
3. Third Wettest Year	55.25 inches	2006

Records: January 1868 – January 2009

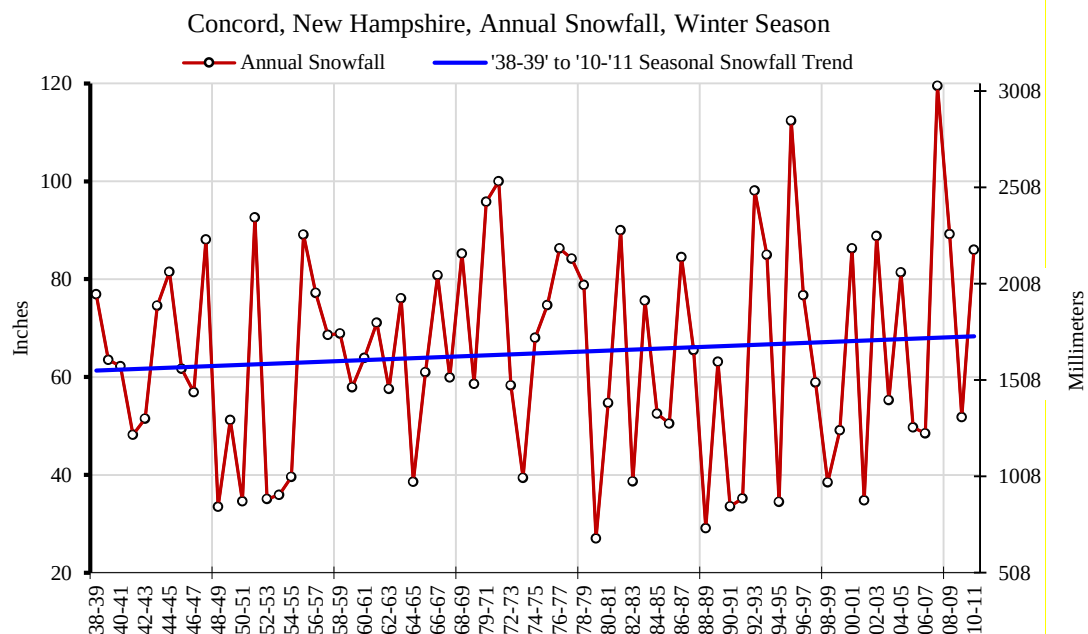
Source: *NOAA*

All data indicates both Southern New Hampshire and Concord in the Central NH Region are experiencing increasing levels of precipitation over time.

SNOW

Similar to observing temperature and precipitation, annual snowfall amounts as reported by NOAA were observed for Concord, starting in the 1938-1939 winter season through the 2010-2011 winter season. Snowfall data from 2011 until 2013 was not available for comparison. As displayed in [Figure 8.16](#), the amount of snowfall has varied over the past century. Annual snowfall has increased and decreased more rapidly in the past 30 years than during the entire century, quickly jumping from a large amount of snowfall in one year to a lesser amount in the next year and back again. Overall, the trendline indicates a slight increase in annual snowfall inches.

Figure 8.15: Annual Snowfall for Concord, Winter Season 1938/39 to 2010/11



Data Source: *NOAA* Compiled by: *CNHRPC*

The 30-year normal for snowfall in Concord decreased from 64.6 inches of snowfall from 1971-2000 to 60.8 inches of snowfall from 1981 to 2010. [Table 8.5](#) displays the highest and lowest snow records for Concord, which covers seasons throughout the century. The highest snow records in single seasons were

unsurprisingly found during the late 1800s with the exception of the 2007/2008 season which yielded 119.5" of snow. However many of the lowest records were after the turn of the 20th century. Other than those, the two lowest snowfall records were around 1980 and 1990.

Table 8.5: Concord's Highest and Lowest Snow Records

Ranking	Amount	Season
Highest	122.0 inches	1873/1874
	119.5 inches	2007/2008
	115.0 inches	1872/1873
	112.4 inches	1995/1996
	111.0 inches	1886/1887
	111.0 inches	1898/1899
Lowest	27.0 inches	1979/1980
	29.1 inches	1988/1989
	29.3 inches	1912/1913
	31.5 inches	1929/1930
	33.5 inches	1990/1991

Records: January 1868 – June 2011

Source: [NOAA](#)

Table 8.6: Concord's Top 5 Biggest Snowstorms

Ranking	Amount	Date
1	27.5 inches	March 1888
2	22.5 inches	December 2003
3	22.2 inches	October 2011
4	20.0 inches	January 1888
5	19.0 inches	January 1944

Records: January 1868 – November 2011

Source: [NOAA](#)

Table 8.6 displays Concord's top five biggest snowstorms on record since 1868 until 2011. The top ranking storm occurred in March 1888 with 27.5 inches of snowfall. The second-ranked snowstorm occurred in December 2003 with 22.5 inches of snowfall. Out of the top 20 biggest snowstorms, they are spread out through the one hundred and forty three year time period ranging in the 1800's to 1944 and from 1993 to 2011.

All data indicates Concord in the Central NH Region is experiencing variable winter weather snowfall with marked increases and decreases over small periods of time. However, the overall trendline indicates slight increasing amounts of annual snowfall during the 1938-2010 period.

AIR QUALITY

The NH Department of Environmental Services (DES) presented in August 2013 that New Hampshire averages less than nine days per year of poor air quality while air pollution reaches moderate levels 25% of those nine days, affecting those sensitive to poor air quality levels. DES monitors air quality in the state through 14 stations, two (2) residing in the region with locations in Concord and Pembroke. These stations monitor a wide range of pollutants, including ozone, fine particle, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide.

Ozone

Air quality was first monitored in the 1970s through the ambient air monitoring program. Still administering air quality today, the program uses a permit system to keep air quality levels within required criteria. When air quality data is collected and reported, the two most commonly monitored characteristics are ozone air quality and particulate air quality.

Table 8.7 displays the 86 days of Hillsborough County which exceeded the federal ozone level between 2000 and 2013 within eight hours, and compares the data to the eight (8) days of exceedance within Merrimack County. Over a 24-hour period, Merrimack County exceeded the federal parts per million over 2.5 times in seven (7) days versus eight (8) days in Hillsborough County.

Table 8.7: County Ozone Exceedance Days 2000-2013

Year	Number of 8-Hour Ozone Exceedance Days		Number of 24-Hour PM2.5 Exceedance Days	
	Hillsborough	Merrimack	Hillsborough	Merrimack
2000	2	1		
2001	13	2		1
2002	16	8	2	1
2003	8	2	2	1
2004	5	2	1	1
2005	10	3	1	1
2006	5		1	
2007	14	3	1	
2008	5			1
2009				
2010	4	1		1
2011	1			
2012	3			
2013				
Total Days	86	22	8	7

Source: *NH Department of Environmental Services*

Ozone is measured in two forms, 8-hour days and 24-hour days. **Table 8.7** displays ozone air quality has fewer 8-hour and 24-hour Exceedance days in Merrimack County than Hillsborough County. The number of both types of exceedance days is declining for Merrimack but is increasing in Hillsborough for the 8-hour ozone limits.

Particulate air is far cleaner in the State since 1990 and even the newest chemicals tested, beginning in 2000, have decreased as of 2013. Particulate air measurements are made at Hubbard Brook in Woodstock, representing particulate air quality for the entire state. Two of the highest concentrations is sulfate and sulfur dioxide, both created by man-made sources. Both of these chemicals have decreased by more than half in concentration since 1990, improving the air quality throughout New Hampshire and the region. For example, as reported by the national air data repository Clean Air Status and Trends Network (CASTNET), sulfate was measured at a concentration of 3.24 ug/m³ in 1990 and decreased to a concentration of 0.20 ug/m³ in 2013. This decrease of concentration was seen in all compounds monitored, including calcium, sodium, magnesium, potassium, and chloride that were only begun being monitored in 2000.

Air quality can be monitored on a daily basis through the 14 stations online through different websites, such as <http://airnow.gov>. Areas can be selected within New Hampshire, including Concord, providing air quality forecast, pollutant details, and current conditions to residents of the region. The forecast and reports include details on ozone air quality and particulate air quality.

Carbon Dioxide

Carbon dioxide (CO₂), the main indicator in climate change analysis, has an atmospheric residence time ranging from decades to hundreds of years and will remain in the atmosphere for, on average, 100 years once released. In addition to the commercial and industrial emissions, vehicles emit carbon dioxide into the atmosphere. Tracking vehicle miles traveled is a valuable measure of the manner by which people and freight move around the state contributing to greenhouse gas emission. The New Hampshire Climate Action Plan

Figure 8.16: New Hampshire Projected Greenhouse Gas Emission

	Emissions [MMTCO ₂ e/yr]		
	2012	2025	2050
Total Energy related Emissions	23.76	29.30	39.95
Commercial	1.47	1.64	1.98
Industrial	1.53	1.81	2.34
Residential	3.38	3.92	4.96
Transportation	9.74	12.66	18.27
Electric Power	7.63	9.26	12.39
Total Non-Combustion related Emissions	1.58	2.07	3.00
CH ₄ and N ₂ O emissions	0.73	0.75	0.79
Industrial Emissions	0.84	1.31	2.21
PFC, HFC, and SF ₆			
Total Emissions	25.34	31.36	42.95

Source: *The New Hampshire Climate Action Plan, March 2009*

displays projected increases emissions of energy-related emissions and non-combustion related emissions from 2012 through 2050 in **Figure 8.17**. The “business as usual” patterns indicate the potential contribution of emissions if people do not change their habits and energy sources. Transportation and electric power are the largest contributors to greenhouse gas emissions in New Hampshire, worsening the air quality over the Central NH Region and Merrimack and Hillsborough Counties too.

More on energy, emissions, and what communities can do is described in the following sections.

PROJECTED CHANGES IN CLIMATE AROUND THE REGION

As the previous section described past climate data trends, this section describes the expected changes in the trends of temperature, precipitation, and snow for the southern half of New Hampshire through the year 2099. These predictions were based on a Southern NH Climate Assessment using two potential scenarios of low and high emissions scenarios in the use of fossil fuels and energy use. Described are what are believed to be strong contributors to the trend of increasing emissions release and the effect easterly winds have on the state.

SOUTHERN NH CLIMATE CHANGE ASSESSMENT

Understanding the Low/High Emissions Scenarios

Climate projections made in the Southern New Hampshire Climate Assessment are based on two potential future scenarios:

1. **Low Emissions Scenario:** Reducing global emissions in favor of improvements in energy efficiency and creating renewable energy.
2. **High Emissions Scenario:** Continue the use of fossil fuels and increasing global emissions.

Source: *Climate Change in Southern New Hampshire, 2014*

Climate Change in Southern New Hampshire: Past, Present, and Future was published by the sustainability institute at the University of New Hampshire in 2014. The report reviews current conditions and projected future conditions of Southern New Hampshire under low and high emission scenarios.

The Southern NH Climate Assessment was conducted using 25 stations throughout Southern New Hampshire, including two located within the

region in Deering and the Blackwater Dam in Webster for certain data sets. The data for the 25 stations was averaged and presented as values representative of the southern half of the state. Along with future projected changes in the climate, impacts of these changes were also discussed in the Assessment.

Potential Future Weather Shifts to Southern New Hampshire: Two Emissions Scenarios

The future variations to local weather and long-term climate systems correlate with the region-specific information presented in the previous section. Different data was used but similar independent conclusions were reached.

Temperature

Temperatures are expected to increase under both scenarios, the low emissions scenario estimating an average annual temperature increase of 4°F and the high emissions scenario estimating an average annual temperature increase of 8°F to 9°F by 2099.

Annual temperatures highs are expected to increase in the spring and summer seasons, while annual temperatures lows are expected to increase in the spring and winter. These trends are expected to bring average winter temperatures above freezing, causing more rain and less snow, and an increase in drought conditions.

Days of extreme heat, reaching over 90°F, are projected to jump from 23 to 54 days per year, respectively, under low and high emission scenarios by 2070-2099.

Southern New Hampshire experienced an average of seven (7) days per year during 1970-1999. Days of extreme cold, under 32°F, are expected to decrease by 20 to 44 days per year, respectively, under low and high emission scenarios. Additionally, the number of days reaching temperatures below 0°F will decrease by eight (8) to six (6) days under low and high emission scenarios by 2040-2060.

Precipitation

Over the next century (through 2099), precipitation is expected to increase 17% to 20% percent under the respective scenarios, the majority occurring during winter and spring. Extreme precipitation is also expected to increase, the largest increase in the number of events where greater than four (4) inches of rain falls within 48 hours. Currently, an average of 4.3 high precipitation events per decade have occurred, but this is projected to increase to 10 to 12 events per decade under the low and high emissions scenarios for 2070-2099.

Although this Assessment did not include drought, the report did include hydrologic simulation from the Variable Infiltration Capacity Model, predicting only slight increases in short and medium term drought

Past Data and Future Climate Overview

SOUTHERN NH CLIMATE ASSESSMENT Projections

TEMPERATURE

What have we seen since 1970?

- Average maximum temperatures have warmed by 2.0°F (annual) and 2.9°F (winter)
- Average minimum temperatures have warmed by 3.2°F (annual) and 6.1°F (winter)

What can we expect?

- Summers will be hotter: 16-47 days above 90°F
- Winters will be warmer: 20-45 fewer days below 32°F

RAINFALL

What have we seen since 1970?

- Annual precipitation has increased by 8-22%
- Frequency and magnitude of extreme events

What can we expect?

- Precipitation annual average will increase: 15-20%
- More frequent and severe flooding

SNOW

What have we seen since 1970?

- Fewer days with snow cover
- Lake ice-out dates occurring earlier

What can we expect?

- Significant decrease of 20-50% in number of snow covered days

Source: *Climate Solutions of New England, 2014*

by the end of the century under low emission scenario. Under high emission scenarios, short and medium term drought is expected to increase by two to three fold.

Snow

Snow is projected in number of snow covered days, which is highly affected by temperatures and the amount of rain received. Currently, New Hampshire has on average 105 days per year with snow cover.

By the end of the century (2099), the Southern NH Climate Assessment projects that the number of snow covered days will decrease to 81 under the low emissions scenarios and 52 under the high emission scenario.

ANTICIPATED EXTREME WEATHER AND CLIMATE CHANGE CONCERNS IN CENTRAL NEW HAMPSHIRE

WHAT COULD HAPPEN IN THE REGION

If changes in temperature, precipitation, and snow occur as projected, especially in the severity and frequency of extreme events, impacts to the region's ecosystems, infrastructure and human health may also become more severe and become an increasing concern. Extreme events, such as heavy rainfall and hotter than usual temperatures, pose more of a threat than gradually changing trends as communities lack the resources and time to properly prepare.

More Human Health Emergency Events

Increased temperatures and frequency of extreme events can cause serious health impacts for residents around the entire region. As presented in *Climate Change in Southern New Hampshire*, Southern New Hampshire is expected to see an increase in maximum and minimum temperatures over the next century within both high and low emissions scenarios. As temperatures climb, the risk of health-related illnesses also becomes a bigger threat, and illnesses such as heatstroke, heat syncope (fainting), and heat exhaustion occur. These effects of excess heat can be especially dangerous for the aging population and residents without air conditioning or adequate health care. More urbanized areas are also at an increased risk of experiencing heat island effect due to increased impervious surface cover, creating not only an increase in health-related illness, but also an increase in greenhouse gas emission, energy demand, and air conditioning use and cost.

Lower air quality can occur from increased energy usage, especially in urban areas, causing health impacts such as respiratory and cardiovascular illnesses. This is an increased stress to residents, especially as the number of elderly residents increase who have a higher vulnerability to these illnesses. Additionally, residents already suffering from asthma and allergies, also projected to increase as seasonal pollen production accelerates due to increases in CO₂ emissions, are vulnerable to air quality decreases.

Extreme precipitation creates more favorable conditions for insects carrying viruses and diseases, such as West Nile Virus, potentially spreading to residents and wildlife in the region. Additionally, more precipitation increases the risk of waterborne illnesses caused by pollutants entering the town's water supply, commonly through stormwater runoff and sewage overflow. All extreme events can also cause infrastructure failure by adding additional stress, leading to potential injury or loss of life.

Natural Environment Disruption

Due to expected increases in precipitation and temperatures, both flooding and drought are projected to occur with more frequent occurrence, directly impacting the surrounding ecosystem. Too much water and/or lack of water can disrupt trees and plants natural growing cycle, potential leading the tree, plant, and surrounding area to die. Additionally, the potential for additional water and drought affects wetland discharge, stream flow, and water quality, affecting the habitat's quality of life and species' health within the area.

The predictions in climate change will alter where species live, potentially forcing animals to move to more desirable locations altering food circles and specie hierarchy. One animal facing these challenges are migrating birds, which are facing disturbances in food supply and increased predation. Extreme events, such as increased rain, hotter temperatures, or drought, are also affecting bird's mortality during spring and fall migrations and winter survival. Additionally, warmer weather is causing certain insect populations to appear earlier in the spring, causing them to miss fulfilling their normally critical role as prey for new chicks during the bird breeding season. This not only hurts the survival rate of chicks and adult birds, but causes the insect species to be become overpopulated, impacting humans and other animal species.

Declining Forest Health

Forests in the region are facing future impacts due to their vulnerability to increased temperatures and drier conditions projected to occur in the next century. These conditions can alter the tree's growing season, experiencing a northward shift as changes continue to occur. In more extreme cases, large weather events such as heat stress, drought, and periods of winter thaw followed by intense cold can lead to loss of trees, drastically impacting habitats throughout the forests areas.

Trees may also become susceptible to invasive species and diseases, such as the Hemlock Woolly Adelgid, already present in Epsom per the New Hampshire Department of Resources and Economic Development (DRED) in the [Forest Resources Plan Revision 2010](#). This pest invades the tree, causing the tree to become sick and be at risk of dying. Other invasive species causing harm to forests and certain tree species right now also include the Emerald Ash Borer in the Concord area and Red Pine Scale in Bear Brook State Park.

Weather Impacts on Recreational Trails

If extreme events continue to occur as projected, it is expected that use of recreational trails will be impacted from effects of downed trees, flooding, and erosion. These and other impacts can result in additional maintenance and increased management costs.

Source: [Statewide Comprehensive Outdoor Recreation Plan](#)

The impacts of the loss of forests and a shifting of the trees' natural growing season will have a direct impact on portions of the region's economic components, including declining tourism as fall foliage colors dull and leaves begin to drop earlier.

Fewer Winter Recreation Opportunities

Due to New Hampshire's location in the northeast, the state and region provide numerous sources of winter recreation and winter tourism, enhancing the quality of life and economy within the area. Snowmobiling, snow shoeing, skiing and snowboarding are among popular activities in the region, including Pats Peak Ski Area in Henniker. Additionally, the centralized location of the region provides a stopping point for shopping and eating for those traveling further North.

Also incorporated in the *Climate Change in Southern New Hampshire, Southern New Hampshire* are the projected winter conditions under low and high emission scenarios. This publication estimates that by the end of the century, snow-covered days are projected to decrease by 20 to 50 percent for low and high emission scenarios for Southern New Hampshire. This projected decrease in snow would directly impact winter recreation and winter tourism in the region, causing ski resorts around the state to increase the amount of man-made snow each season, adding stress of water availability and additional energy cost used in production.

Lake-ice out dates have been occurring earlier when compared to past ice-out records. Even though none of the lakes in the region are recorded with ice-out data, lakes within the state are consistent with data from Maine and Massachusetts with ice-out dates occurring on average a week earlier than in the past. Assuming that lakes in the region will also experience earlier ice-out dates, snowmobiling and ice fishing will be affected with shorter seasons, and be potentially eliminated in seasons where ice never completely forms over.

Risks to the Built Environment

The built environment consists of both critical infrastructure around the region such as roads, bridges, culverts, stormwater drainage systems, water and wastewater treatment facilities, natural gas lines, electric lines and poles, and municipal facilities, as well as homes, private property, businesses, and services. Some of these noted might be at risk of severe damage or failure if the anticipated extreme weather events occur. The critical infrastructure is needed to provide basic services to the public.

In cases of severe flooding, the most expensive natural disaster event in Central New Hampshire from previous [Figure 8.7](#) and [Figure 8.8](#), all buildings and homes are at risk of cosmetic and structural damage, disruption to the region's economy, businesses, and resident's personal belongings. Residents who experience damage with flooding to their homes and personal belonging may also lack proper flooding insurance, placing the resident in financial hardship. Adaptation efforts are critical so to protect current infrastructure and save money on costly repairs and replacements caused by extreme events.

Increasing Municipal Transportation Systems Maintenance Needs

The transportation system of the region is at risk of projected extreme precipitation events, threatening roads, highways, bridges, and culverts. Flooding, particularly the volume of flooding, is expected to increase, potentially closing roads and increasing the travel time for drivers and increasing the cost and energy use for pumping. Flooding can also cause severe damage to pavement and embankments, increasing maintenance, repair, and replacement costs for surrounding communities. Extreme precipitation will also increase erosion, decreasing certain infrastructure components design life span.

Culverts are also at risk to extreme precipitation events, including rain, snow, and ice. Damage can occur, increasing costs for repairs and replacements, and maintenance for clogging. Many adaptations may have to be made, including installation of larger culverts to handle larger flows from increased rain and to prevent clogging of debris and buildup of sediment.

For additional information on culverts and municipal transportation systems, see the Transportation Chapter.

Increasing Pressure on Dams

Dams offer a wide range of benefits to surrounding communities, but in cases of extreme events can be highly dangerous. Dams in New Hampshire are classified based on their potential for damage and loss of life downstream if failed. High Hazard and Significant Hazards classifications are the most crucial as they are the most likely to cause the largest amount of damage or loss of life.

Table 8.8: High and Significant Hazard Dams in the Region

High Hazard		Significant Hazard	
Municipality	Owner	Municipality	Owner
Bow	PSNH	Boscawen	Briar Hydro Ass.
Canterbury	Shaker Village Inc.	Bradford	Lake Todd Village
Concord	City of Concord	Concord	Briar Hydro Ass.
Dunbarton	US Army Corp of Engineers	Concord	St Pauls School
Dunbarton	US Army Corp of Engineers	Concord	NH Water Resources Council
Epsom	NH Water Resource Council	Deering	NH Water Resources Council
Hillsborough	PSNH	Epsom	WGR LLC
Hopkinton	US Army Corp of Engineers	Hillsborough	Town of Hillsborough
Hopkinton	US Army Corp of Engineers	Hopkinton	Town of Hopkinton
Hopkinton	US Army Corp of Engineers	Loudon	Sanborn Mills Inc.
Pittsfield	NH Water Resources Council	Pembroke	Algonquin Power Systems Inc.
Webster	US Army Corp of Engineers	Pittsfield	Town of Pittsfield
		Pittsfield	Pennichuck Water Works
		Pittsfield	Pennichuck Water Works
		Pittsfield	Winsunvale Shores Home Owners Ass.
		Sutton	NH Fish & Game

Source: *CNHRPC Core Metrics*

Table 8.8 displays the dams classified as high hazard and significant hazard in the region. There are a total of twelve high hazard dams and sixteen significant hazards dams, with the highest number of high hazard dams in Hopkinton. In relation to extreme and changing weather events, dams will be under high stress as flooding and stormwater runoff is expected to increase as heavier precipitation events are projected to become more regular. This will increase the velocity and volume of high stream flows and add pressure applied by the current to the dam, drastically affecting the dam's lifespan and potentially causing the dam to fail. Failure of any dam, especially one listed in the table above, can have devastating consequences ranging from property damage to loss of life.

The dams in the region are depicted on **Map 8.2: Floodplains, Stream Gages, and Dams**. The classifications on the map include the Low Hazard and Non-Menace categorizations of the NH Department of Environmental Services (DES).

It is required in New Hampshire that all owners of high and significant hazard dams have an updated emergency action plan in place in case of dam failure under the New Hampshire Code of Administrative Rules ENV-WR 303.06. This document should include a notification plan, information on the potential extent of downstream flooding, and pre-planned emergency actions.

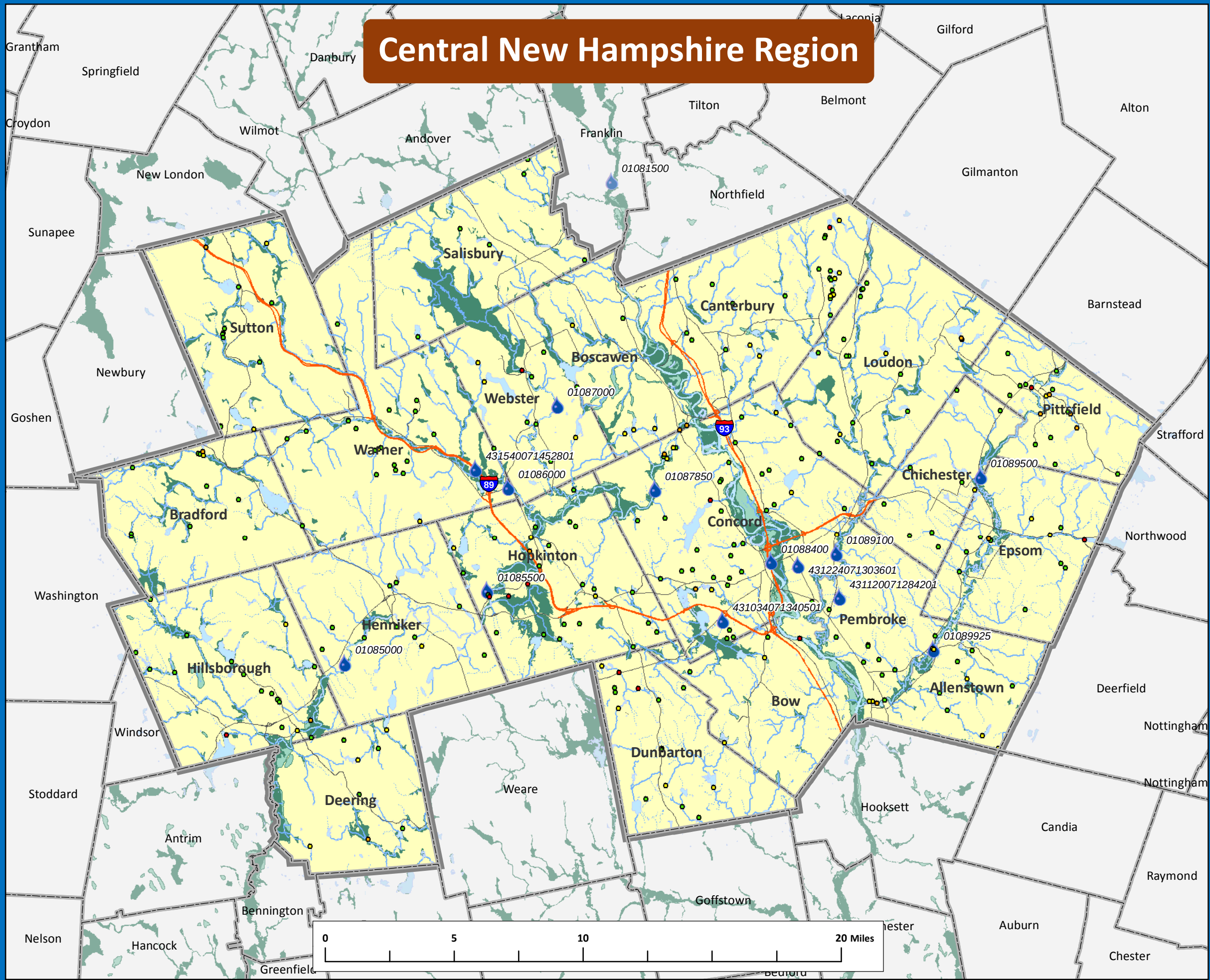
As many dams were built during the time of the Industrial Revolution and used in production, many now are in poor condition and serve little purpose. Commonly, upkeep cost begins to outweigh the benefits, especially when considering potential damages caused by extreme weather events. The Dam Removal and River Restoration Program administered by DES provides assistance to dam owners on the dam removal process and the benefits of restoring a healthier river.

Decreasing Water Resources

Water quality and quantity are both threatened by projected changing weather events, with threats of flooding, drought, erosion and stormwater runoff. By preventing groundwater from replenishing, additional runoff and sediments can lead to intensify flows in rivers and streams with higher

Central New Hampshire Region

Weather Hazards Map 8.2 Floodplains, Stream Gages, and Dams



Active Dams - Hazard Level

- High Hazard
- Significant Hazard
- Low Hazard
- Non-Menace

USGS Stream Gages & Observation Wells

Surface Waters

Rivers and Streams

Intermittent Streams

Floodplains

- 1% Annual Flood Risk (100 Year)
- 0.2% Annual Flood Risk (500 Year)

Municipal Boundaries

Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: Shows floodplains as indicated on 2011 DFIRM maps for Merrimack and Hillsborough counties.

Data Sources: Local Hazard Mitigation Committees, CNHRPC, FEMA, NH GRANIT, NHDOT, NHDES, USGS, US Army Corps of Engineers. Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission

28 Commercial Street, Suite 3
Concord, NH 03301

603.226.6020
www.cnhrpc.org

Location Map

Central New Hampshire Regional Planning Commission

28 Commercial Street, Suite 3
Concord, NH 03301

603.226.6020
www.cnhrpc.org

Location Map

contamination levels of unwanted nutrients, decreasing water quality for aquatic habitats and uses of agriculture and human consumption.

As these conditions limit water supply sources used for public water and private well systems, additional treatment may be necessary, potentially overloading treatment systems, so that water reaches required quality permits. Additionally, contamination can pollute sewage, threatening the performance of wastewater treatment facilities meeting their discharge permit levels. When discharged water does not meet water quality permit levels, the chance of residents catching water-borne illnesses increases and surrounding habitat is degraded.

Increased occurrences in flooding can also intensify flows, causing overloading of treatment systems and intensified streams and rivers. Many treatment facilities are built near water bodies for convenient discharge, putting the facilities itself at risk for water damage as floodplains increase.

For additional information on water resources, see the Natural Resources Chapter.

Aging and Inadequate Stormwater Infrastructure

Stormwater infrastructure can involve catch basins, pipes, discharge points, and culverts with the goal of redirecting stormwater runoff to a nearby water body or wastewater system for treatment. As extreme events may become more frequent, undersized culverts can be impacted by this increased flow, acting similar to a dam by blocking the passage of water. Blocking of water can lead to flooding of the area and roadways, potential leading to the closure of nearby roads. Furthermore, many culverts, and other components of stormwater infrastructure are outdated, and increased flows are added stress to the system, creating additional routine maintenance and even lead to damage or failure of the system.

Increased development with increased amounts of impervious surface adds the volume of stormwater runoff within more urban areas, creating the need for additional stormwater infrastructure to handle the larger amount of runoff. In an article titled *New Hampshire's Water Assets Under Pressure: Municipal Stormwater Systems* published in January of 2012 by New Hampshire Town and City Magazine, Timothy W. Fortier explains that studies in New Hampshire have shown that the state's stormwater infrastructure is undersized to accommodate future projected extreme events. It was also stated that even though the cost of managing stormwater is high, the potential costs of inaction is even higher.

For additional information on stormwater infrastructure, see the Natural Resources Chapter.

More Flooding

Additional impacts from flooding caused from increases in precipitation events, including hurricanes and tropical storms, follow similar trends as those already discussed, including damage with increased infrastructure repair and replacement costs. Debris will be a result of harsh flooding, including trash and downed trees, polluting waters, harming habitats, and damaging property and infrastructure. Ice Jams can occur when warm temperatures and high rains cause rapid snow melt, causing large chunks of ice to move freely, damaging or jamming against bridges, roads, docks, culverts, and riverbanks.

As the region's largest amount of snow occurs in winter when the ground is frozen, rapid snow melt from warm days is not able to infiltrate the ground, causing flooding. Additionally, flooding occurring throughout the year, such as from intense rain, also does not typically infiltrate groundwater as the flooding accumulates too rapidly for the flood water to fully infiltrate. This lack of groundwater replenish leaves the region in periods of drought, impacting water supply used for agriculture and irrigation, water used as drinking water for residents, and water available to habitats with plants, trees, and animals

dependent on certain amounts. The lack of infiltration also leaves the flood water unmanaged, putting private property as well as municipal infrastructure at risk of damage.

Floodplains are delineated by FEMA as 100-year (1% chance of a flood annually, Zones A or AE) or 500-year (0.2% chance of a flood annually, Zones C or X) by local officials and residents. Technically, they are termed Special Flood Hazard Areas (SFHAs). **Map 8.2: Floodplains, Stream Gages, and Dams** displays the floodplains in the region for both Merrimack and Hillsborough Counties.

Stream Gages in the Region

During hard rain or rapid snow pack melt events, the source to which state and local officials turn to monitor potential flooding condition is the online US Geological Survey stream gage and groundwater well gage data. These **Table 8.9** stream or groundwater monitoring gages in the Central NH Region continually measure certain conditions about water height and/or flow. While the height of the rivers is measured in feet above sea level at each location, some gages also record the volume of streamflow discharge in cubic feet per second.

Current real-time data can be automatically graphed over periods of time, rendering a useful tool to ascertain how height or flow conditions have changed over a period of wet influence. US Geological Survey Streamflow and Groundwater Gage Stations in the Central NH Region have historical data available for download as well as reports of the real-time event. Many cooperating agencies work together to log, maintain, and update the data to make it publicly available. Some of the gages in **Table 8.9** have been in operation for nearly 80 years.

The USGS Flood Inundation Mapper is a real-time mapping system that allows a user to locate stream gages and portray their forecast information on a map and in tabular form. A user can adjust how high flooding conditions may become and the respective flood inundation area is depicted on a map. In the Central NH Region, the North Chichester Suncook River gage works particularly well on this important emergency management mapping tool.

The Central NH Region has 10 streamflow gages on its major rivers as indicated in **Table 8.9**. The Blackwater River is monitored at the Blackwater Falls. The Contoocook River is monitored in three locations, one in Henniker, Hopkinton, and Penacook. The Merrimack River is monitored in two locations, one in Franklin, although north of the Central NH Region, the gage is regionally significant and within Merrimack County. The second Merrimack River gage is in Concord. The Soucook River is monitored in Concord, and the Warner River is monitored in Warner. The Suncook River hosts two gages, one in Chichester and a new gage in Allenstown at the Route 28 bridge.

Displayed in **Table 8.9**, Four (4) groundwater level monitoring stations are situated within the region. These stations periodically monitor the depth to water level in feet below land surface elevation in bedrock or sand and aquifer wells. Other monitoring wells are situated but data is not available nor does the well regularly record data. Monitoring the depth of aquifers of the Merrimack and Turkey Rivers in Concord, Soucook River in Pembroke, and Warner River in Warner provides information on how deep the groundwater fluctuates below the surface elevation.

Table 8.9 Key

Streamflow Gage	Groundwater Gage
--------------------	---------------------

Table 8.9: USGS Streamflow and Groundwater Monitoring Gage Stations

USGS Gage Station #	Town	River	Location	Measurements (Flow/Height)	Elevation (above NGVD29 sea level)	Other Operator/Owner	Comments
01087000	Webster	Blackwater River	Blackwater River Dam	Discharge, Water Height	431.73	US Army Corps of Engineers	See also ACOE site
01085000	Henniker	Contoocook River	Western Avenue	Discharge, Water Height	470.32	US Army Corps of Engineers	See also ACOE site
01085500	Hopkinton	Contoocook River	Hopkinton Dam at W Hopkinton	Discharge, Water Height	355.83	US Army Corps of Engineers	See also ACOE site
01087850	Penacook	Contoocook River	Riverhill: Carter Hill/Horsehill	Water Height	331.37	US Army Corps of Engineers	See also ACOE site
01081500	Boscawen/Franklin	Merrimack River	Daniel Webster Highway	Discharge, Water Height	251.08	US Army Corps of Engineers	National Streamflow Information Program and USACOE
01088400	Concord	Merrimack River	Loudon Road	Water Height	216.56 NAVD88	US Army Corps of Engineers	Operated only for flood control purposes. See also ACOE site
01089100	Concord	Soucook River	Pembroke Road	Discharge, Water Height, Precipitation	255.89		National Streamflow Information Program
01089925	Allenstown	Suncook River	Route 28 Bridge	Water Height	0 NAVD88	NH Water Science Center	USGS installed 2010
01089500	Chichester	Suncook River		Discharge, Water Height	329.35		
01086000	Warner	Warner River	Davisville	Discharge, Water Height	379.96		
431034071 340501 NH-CVW 312 (CVWB-1)	Concord	Turkey River	Route 13	Depth to Water Level	* 412 surf. elev. * 480 depth below surf.	NH Geological Survey	GW Monitor-Bedrock observation well
431224071 303601 NH-CVW 2	Concord	Merrimack/Soucook River Aquifer	Concord Municipal Airport	Depth to Water Level	*340 surf. elev. *60 depth below surf.	New Hampshire Water Science Center	GW Monitor-Bedrock observation well
431120071 284201 NH-PBW 148	Pembroke	Soucook River Aquifer	Commerce Way	Depth to Water Level	* 375 surf. elev. *94 depth below surf.	NH-VT Water Science Center	GW Monitor-Well in bedrock aquifer
431540071 452801 NH-WCW 1	Warner	Warner River Aquifer	Near Route 127	Depth to Water Level	* 424 surf. elev. *43 depth below surf.	Ground Water Climate Response	GW Monitor-Stratified drift observation well

Source: [USGS Water Data National Water Information System: Web Interface](#)

Figure 8.18 displays the history between 1984 and 2014 of the groundwater levels of the Merrimack and Soucook Rivers at the Concord Municipal Airport in a 60 foot deep well, indicating the rise and fall of available groundwater over 30 years. As of 2014, the level was just under 40 feet from the surface elevation, with a high of less than 32 feet around 2008 and lows of around 45 feet in the mid 1960s, mid 1990s, and early 2000s.

Stream gages and monitoring well locations are located on **Map 8.2: Floodplains, Stream Gages, and Dams**. Emergency responders should make a practice of reviewing the regional stream gage data the groundwater monitoring well locations to make determinations of whether flooding or drought may be ready to occur. Hyperlinks directly to the US Geological Survey stream gage website are available by clicking on the **Table 8.9** Gage Station # or can be searched at http://waterdata.usgs.gov/nh/nwis/current/?type=flow&group_key=basin_cdt.

Changing Food and Agriculture Production

As Merrimack County is the top county in the State for agriculture sales, impacts of increased temperatures will have a noticeable impact on agricultural practices and products. The trend of higher temperatures will promote a longer growing season for most crops, benefiting a larger number of local crops grown during the summer season. However, these same affects can have negative impacts, potentially altering the region to a climate not suitable for growing valuable crops, such as apples and blueberries. Additionally, the warmer temperatures and increase in carbon dioxide in the air creates a more ideal environment for pests and weeds, potentially increasing the use of herbicides and pesticides on crops.

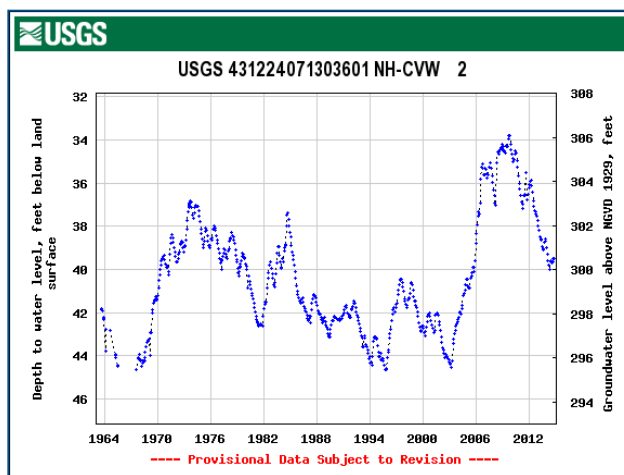
According to the Environmental Protection Agency (EPA), increases in temperature are expected to slow weight gain and lower the volume of milk produced by dairy cows. Higher overnight temperatures are anticipated to prevent the dairy cows and cattle from recovering from heat stress, leading to death of the animal.

The US Department of Agriculture (USDA) has established a Northeastern Regional Climate Center hub, located in Durham, New Hampshire, that will provide information to farmers and communities throughout the state on how to adjust to the impacts of the changing climate. This technical support will include how to respond to drought, heat stress, flood, pest and changes in the growing season; regional assessments and forecasts for hazards and adaptation planning; and outreach and education for land managers on ways to mitigate risks and thrive despite change.

PUBLIC OPINION ABOUT CHANGING WEATHER EVENTS

Local public input was sought through comments cards, outreach sessions, and through a telephone survey from around the region on changing weather trends and the communities level of preparedness and concern. Limited to zero feedback was available through the comment cards and outreach sessions, but feedback was gathered through the telephone survey, described below.

Figure 8.17: USGS Groundwater Monitoring at Concord Municipal Airport 1984-2014

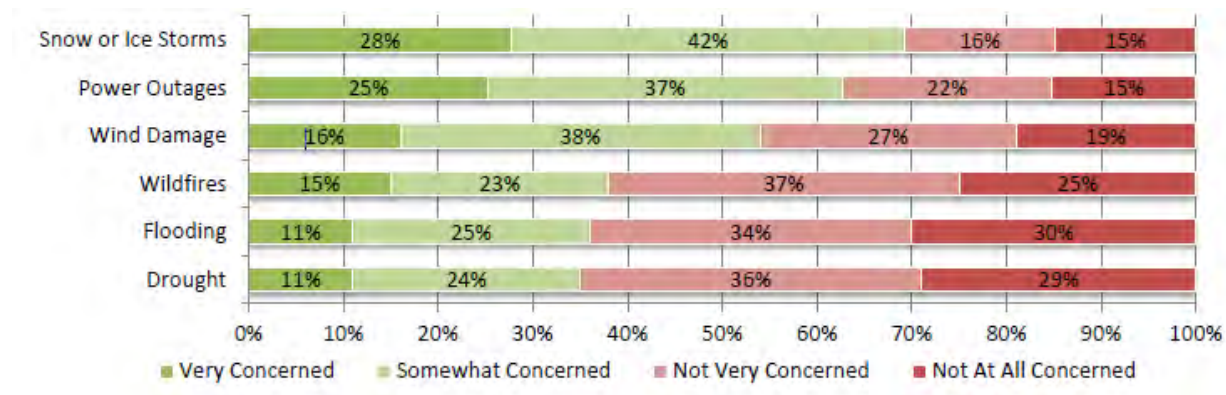


Source: [USGS Groundwater Watch](#)

TELEPHONE SURVEY

A statistically significant survey conducted via telephone by the University of New Hampshire (UNH) Survey Center published in July of 2013 for the Central and Lakes Regions of New Hampshire concluded that 70% of residents are Very Concerned and Somewhat Concerned with snow or ice storms striking in their community in **Figure 8.18**. The second highest rated concern was power outages at 62%. The least concerning event (Not Very Concerned and Not At All Concerned) was drought at 65% of responses.

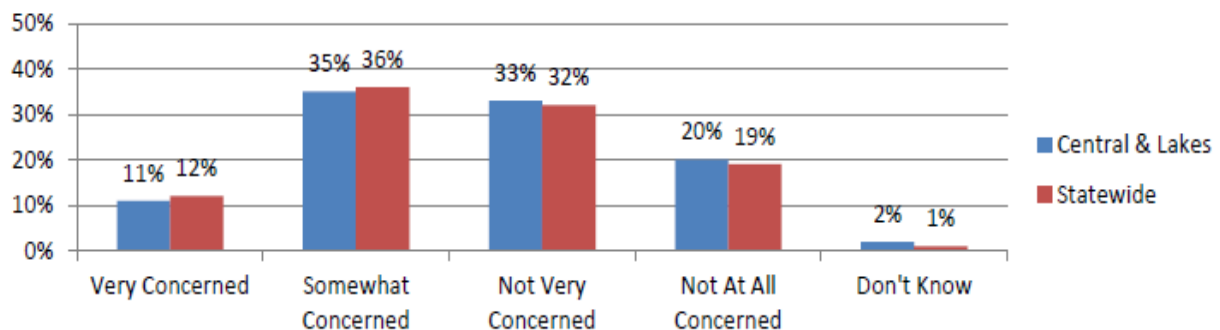
Figure 8.18: How Concerned are Residents about Weather Related Events?



Source: *University of New Hampshire (UNH) Survey Center, July 2013*

The same survey concluded that only eleven percent of residents are very concerned about their community's level of preparedness regarding weather related events. **Figure 8.19** displays 46% of people in the Central NH Region are Very Concerned and Somewhat Concerned about their municipality's level of emergency preparedness. The majority of people (53%) were Not Very Concerned and Not At All Concerned about preparedness. These results are very similar to the results reported on a statewide level, only differing one percent for each level of concern.

Figure 8.19: Levels of Concern about Community's Level of Preparedness



Source: *University of New Hampshire (UNH) Survey Center, July 2013*

Additionally, further telephone results indicated only 3% of residents valued community preparedness for weather-related emergencies as their first priority when considering investing public dollars, when provided with alternative choices of all equal investment of public funding, other, or none. Eleven percent (11%) of residents prioritized it as second priority.

WEATHER HAZARD IMPLICATIONS FOR LOCAL AND REGIONAL PLANNING

The weather the Central NH Region experiences will continue to be variable. Severe weather hazard events such as flooding, wind, snow, and high heat are expected to continue on a seasonal basis. On a long-term climate basis, the trends indicate southern and Central New Hampshire will experience more precipitation events and hotter summers and warmer winters. Hotter summers will cause more evaporation, leading to short-term drought conditions. The precipitation events are more likely to cause runoff than for water to be recaptured in groundwater recharge areas. Snow might continue to be variable from year to year, but overall snow cover seems to be falling in greater inches than 100 years ago, although melting occurs sooner.

To be a successful community and provide the services their residents require, the municipalities within the region will examine their approaches to planning, mitigation and response to weather hazards. Some of the most significant inclusive impacts, discussed in the previous sections, may affect public health, the cleanliness and availability of water supplies, natural communities and animal species, local agricultural operations, town and city infrastructure, and more.

Weather hazards have a significant and varied collective impact on the region and its population. Aging demographic cohorts have the potential to impact a declining number of volunteers for local emergency response. The weather patterns indicated in previous sections are expected to continue and may worsen.

Infrastructure is outdated and road maintenance is often a challenge for municipalities. Questions to be asked are: How will emergency response vehicles drive down narrow, poorly-maintained roadways during snowstorms or other severe weather event to reach these older residents? How long will response take?

Opportunities exist for multi-town shared emergency response services as small communities often cannot afford the individual staffing and equipment. Participation in dual-town, school district, or regional emergency drills to help manage effective emergency response should continue. Municipalities not only need to use and update their hazard mitigation plans, but a current plan is required by FEMA to remain eligible for funding. As federal funding for plan updates becomes limited, communities may be faced with expired plans within the next couple of years, potentially leading to ineligibility for hazard mitigation funding.

Many questions about adapting to severe weather and how resident needs can be met must be asked and answered by the local communities within the Central NH Region. Most likely, the answers will include “time” and “funding.” With information contained within the Weather Hazards Chapter, each of the 19 towns and one city in the region can decide what works best for their own community.

ADAPTING TO NEW WEATHER PATTERNS

New Hampshire municipalities work hard to protect residents and respond quickly when a severe weather event or presidentially-declared disaster impacts communities. Municipal funding and staffing constraints can prevent the complete planning, preparation, and response to such events. However, this new era of extreme weather hazards or variable weather patterns will require adaptation to this unique environment, requiring time, understanding, and perhaps funding to be successful.

What is Adaptation?

Adaptation is adjustment in natural or human systems in response to actual or expected weather patterns or their effects, which moderates harm or exploits beneficial opportunities. Communities can use different strategies to help protect infrastructure, private property, and populations from the effects

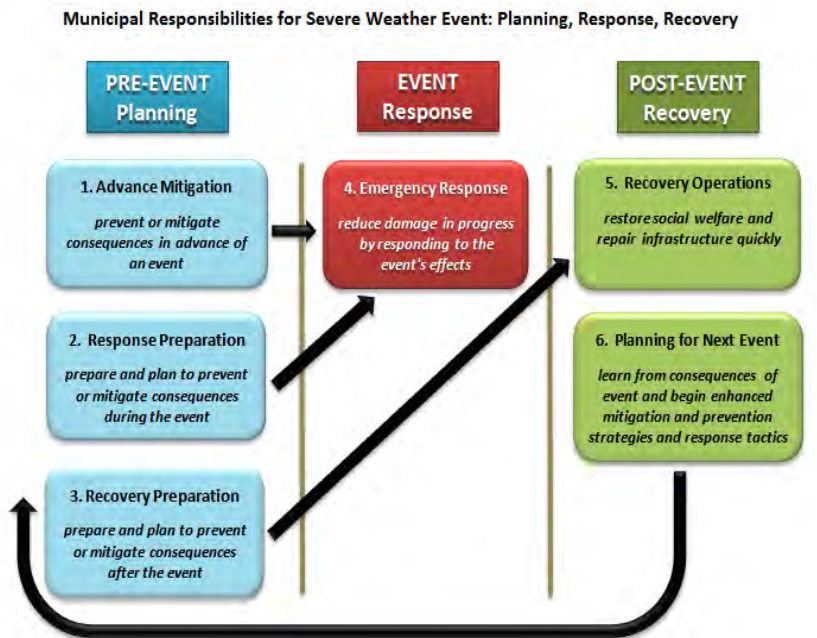
of weather hazards. Floods, severe storms, and severe winter weather are predominant in the Central NH Region.

Two main policy responses to weather hazards can be activated: mitigation and adaptation. Mitigation addresses the more common hazard such as earthquakes or flooding, while adaptation seeks to lower the risks posed by the consequences of climate changes. Most communities are familiar with mitigation through the development of hazard mitigation plans and undertaking some of the mitigation actions contained within. Adaptation, though, is a newer concept and has not been municipally utilized much yet within the region.

Figure 8.20: Municipal Response to Severe Weather Threats

Figure 8.20: displays the Planning-Response-Recovery cycle that communities use for severe weather threats. Adapting to permanent severe weather conditions is time and labor intensive, but the task still fits within the Recovery and Planning mechanisms communities are familiar with.

Adaptation measures can help reduce vulnerability to a weather hazard, such as developing stormwater management regulations. Adaptation can enable communities to benefit from opportunities of climatic changes, such as growing new crops in locations that were previously unsuitable.



Source: *Harvard University*

INVENTORYING AND REDUCING RISKS

A summary of opportunities communities can use to reduce risks are detailed below.

Vulnerability Assessments

Vulnerability Assessments help evaluate susceptibility to potential threats and identify corrective actions that can reduce or mitigate the risk of serious consequences from severe weather threats. They can also be known as Risk Assessments.

The assessments could be undertaken for individual systems that might be at risk from changing weather patterns, such as an assessment for water systems, wastewater systems, municipal emergency response, vulnerable populations, ecosystems, stormwater infrastructure (culverts), energy facilities, municipal buildings, transportation facilities (roads), etc. For transportation infrastructure, the Federal Highway Administration has a detailed model.

More commonly for municipalities, the vulnerability assessments contain all of those systems under the built, natural, and social environments. One such document, a guidebook to developing a community

vulnerability assessment, by the non-profit North Carolina MDC, incorporates a community's physical and social vulnerabilities and describes the process in detail and engages community members.

A Risk Assessment is a component of a Vulnerability Assessment. The Risk Assessment is generally a brief matrix review of hazards and the probability- and magnitude of their impact on vulnerable assets. Ready.gov provides information on Risk Assessments. A community's hazard mitigation plan contains the basics of a community risk assessment for natural, technological, and human hazard events.

Fluvial Erosion Hazard (FEH) Assessments

Inventories called Fluvial Erosion Hazard (FEH) Assessments were undertaken for several of New Hampshire's flood-prone rivers to ascertain which features might contribute to erosion of the shoreline and future flooding. The basic unit of river assessment, the geomorphic "reach," is identified, which is a specific length of the river channel and adjacent floodplain that shares characteristics that differ from its upstream and downstream neighbors. Each study reach is defined through analysis of a number of key natural physical attributes of the river and its valley. Scientists consult topographic and geologic maps and aerial photographs to identify anthropogenic (human) straightening or intervention.

In the field, data about features, such as the height and form of banks, lengths of riprap, and the locations of active erosion are collected. Cross sections are collected to measure the width of the river and depth across the channel. This information, together with observations about aquatic habitats, and bridge and culvert data, can be used to classify river constrictions, the potential for scouring and damage to crossings and the potential for debris and ice jams. Towns can then develop actions that will help prevent or reduce the same kinds of flood damage experienced in previous years. For more information, see <http://des.nh.gov/organization/commissioner/gsu/fegh/index.htm>.

In the Central NH Region, FEH data is available for portions of the Piscataquog River, Turkey River, Soucook River and Suncook River. Communities will be adding the data and maps of attribute locations within the hazard mitigation plan process with CNHRPC assistance.

Adaptation Plans

A New Hampshire adaptation plan was developed in the southwest region. The [Keene](http://www.keeneclimatechange.org) Climate Change Adaptation Action Plan was developed in 2007 after first developing an Action Plan in 2005 and a Greenhouse Gas Emissions Report in 2000. The adaption plan includes personally responsible actions such as recycling, buying local food, driving less, and improving homes with sustainable and energy efficient materials and fixtures. Municipal actions include reducing stormwater runoff, developing a wind energy assessment, and developing a food security plan.

A combination vulnerability assessments and adaptation plan was developed by the city of Portsmouth, which developed its own website called Prepare. Protect. Portsmouth. (<http://www.planportsmouth.com/cr/>) to host information and materials about how the City can protect private property and public infrastructure.

Figure 8.21: Webster Severe Winter Storm Road Closure, March 2010



Source: *Webster Hazard Mitigation Plan 2012*

Climate Change Adaptation Roadmap

The National Oceanic Atmospheric Administration (NOAA) developed a framework for integrating current and future coastal risks into local planning and decision-making using public engagement. This technique is called a Climate Change Adaptation Roadmap and is a way to develop a vulnerability assessment from extreme weather events. The Roadmap of a community characterizes their exposure to *any* current and future hazard and climate threats and incorporates relevant data and information about hazards and climate into existing planning and decision-making efforts. A certified training is provided prior to technique usage and is required for the assessment to be considered a certified Roadmap project.

The Climate Change Adaptation Roadmap process is so successful, U.S. federal agencies are required by law to develop their own Roadmaps, considered “Adaptation Plans.” Recently, the Departments of Defense, Homeland Security, and Agriculture developed their Roadmaps on what changes they will be making. Many municipalities across the country have used the Roadmap process, and within the New Hampshire, Newfields and a few other communities have participated.

LOCAL LAND USE PLANNING

The first line of community defense against the weather elements is having solid planning and municipal land use ordinances and regulations in force.

Master Plans

Over the past decade, a few of the communities in the Central NH Region have included objectives related to weather hazards within their local master plans. These objectives encompass the following themes:

- Identifying and addressing potential natural hazards.
- Ensuring that community facilities and offices can provide emergency preparedness to the community.
- Mitigating flooding occurrences and impacts.
- Limiting stormwater runoff occurrences and impacts.
- Ensuring that all residents have safe and efficient access to alternative routes in the event of an emergency.

Under New Hampshire RSA 674:2 part (e), each master plan is permitted to contain a natural hazards section, which documents the physical characteristics, severity, frequency, and extent of any potential natural hazards to the community. Master plans should also establish broad goals for public health and safety, adaptation/resilience, environmental, municipal assets, and protection of property.

Most local master plans are over seven years old and could be updated with more recent information. Weather hazards and other natural, technological, and human hazards should be considered for inclusion. The municipal hazard mitigation plan is a good source of information on this topic.

Zoning Ordinances

The floodplain zoning ordinance is an important tool in land use regulation of weather hazards. As part of a municipality’s agreement with FEMA on enrollment in the NIFIP, a municipality must adopt an ordinance that contains the minimum standards provided by FEMA. Additional protections include placing more strict provisions within the zoning ordinance, and developing a flood hazard overlay district which indicates appropriate land uses and imposes development standards.

An ordinance for design performance standards can include setbacks, building height and design, structural and infrastructure requirements. Many types of environmental ordinances could be adopted to protect the community, including wetlands protection, groundwater protection, steep slope/hillside protection, shoreland protection, habitat protection, low impact development, and other overlay districts. Conservation Subdivisions could be permitted ordinance additions, as could density transfer credits, agricultural incentive zoning, and village plan alternative zoning.

Land Use Regulations

Like ordinances, land use regulations should include public health and safety within their definitions and support the intent of protection from weather extremes. However, land use regulations are adopted by Planning Boards after public hearings.

Many of the standards adopted by zoning can be elaborated on within the subdivision or site plan review regulations. Best management practices should be stipulated within the regulations for all environmental ordinances and site development. Erosion and sedimentation control, stormwater and drainage, low impact development standards, landscaping, resource protection, road standards, and site design can all be used to protect people and property from damage.

Capital Improvements Programs (CIP) and Capital Reserve Funds (CRF)

One readily available tool to Central NH Region Planning Boards is the development of Capital Improvements Programs (CIP) to help budget for large expenditures over a length of time, usually six years. High-cost municipal stormwater, wastewater, and water treatment pipes and facility upgrades are included. This advisory document is developed and adopted by the Planning Board and provided to the Budget Committee once complete for use in preparing next year's budget and warrant articles.

To help save up for some capital expenditures within the CIP, the use of Capital Reserve Funds (CRF) can help offset the tax rate increase to property- owners by using money already placed within the accounts by voters at Town Meeting. The CRFs are operated like a savings account, only Town Meeting approval is needed to deposit or withdraw for the allocated projects.

For any high-cost adaptation projects, the CIP can help spread out the cost over time and the CRFs can be used to save for and help offset the cost of the projects once begun.

LOCAL EMERGENCY PLANNING

Ensuring emergency management planning documents are updated contribute toward community prevention and

Beginning of Municipal Emergency Preparedness Activities

Checklist

- ☐ Emergency Management Director is Active with Preparedness Activities
- ☐ Hazard Mitigation Plan Updated
- ☐ Emergency Operations Plan with Emergency Support Function Hazard Annexes Updated
- ☐ Continuity of Operations Plan Updated
- ☐ Continuity of Government Plan Updated
- ☐ Current Elected Officials and Emergency Responders are Trained in ICS and NIMS
- ☐ Hold Regular Disaster and Recovery Drills and Tabletop Exercises
- ☐ All Departments can Communicate Via Radio
- ☐ Public Health Network Participation
- ☐ Member of Several Mutual Aid Agreements and Regional Response Networks
- ☐ Redundant Systems of Municipal Electronic and Physical Records
- ☐ Recovery Plan Developed
- ☐ Locate and Write Grants to Help Fund Some Preparedness Activities
- ☐ Mitigation Actions and Adaptation Actions are Identified and Implemented

mitigation of extreme weather hazard events. However, they also permit the municipality to function properly in times of disaster events and assist with more rapid recovery of services.

Hazard Mitigation Plans

The goals of hazard mitigation plans are to reduce loss and damage of public and private assets and resources and to provide a long-term plan for construction of disaster-resilient infrastructure.

All Central NH Region communities have had at least two hazard mitigation plans written since 2003. Nearly all were developed by a group of local emergency responders and CNHRPC staff. The plans to date have been funded through FEMA. Since a FEMA-adopted plan, updated every five years, permits municipalities to be eligible for hazard mitigation grant funding, developing the plan is often a priority for communities. A series of action items (projects) accompanies the plan. Because of small local staffing and budgetary constraints, many projects cannot obtain the necessary funding for implementation.

Map 8.1: Community Past Hazard Impacts displays the locations of where the communities were impacted by flooding/washout events, wildfire, lightning, wind events, tornado, and snow and ice events. The layers were obtained directly from Hazard Mitigation Committee input.

Map 8.3: Community Vulnerabilities displays the locations of the sites within communities, such as schools, housing facilities, bridges, dams, cemeteries, churches, and other sites as identified locally as containing a vulnerable population or location. These vulnerable facilities could be vulnerable to specific hazards or the population of the site itself could be vulnerable because people gather there.

Emergency Operations Plans (EOP)

Most Central NH Region communities have an updated EOP. The plan is the responsibility of the emergency management director and is adopted by the board of selectmen. The EOP describes who will manage emergencies, how the emergencies will be managed and should identify preparedness steps, address prevention, focus on response and touch on recovery.

The local EOP is intended to meet emergency planning requirements (natural, technological, or human) of all entities having jurisdiction over such matters and should to be used as an emergency management reference and training aid for the community government, business leaders, emergency managers and responders to ensure their efficiency, effectiveness and timeliness to any type of emergency.

Continuity of Operations Plan (COOP)

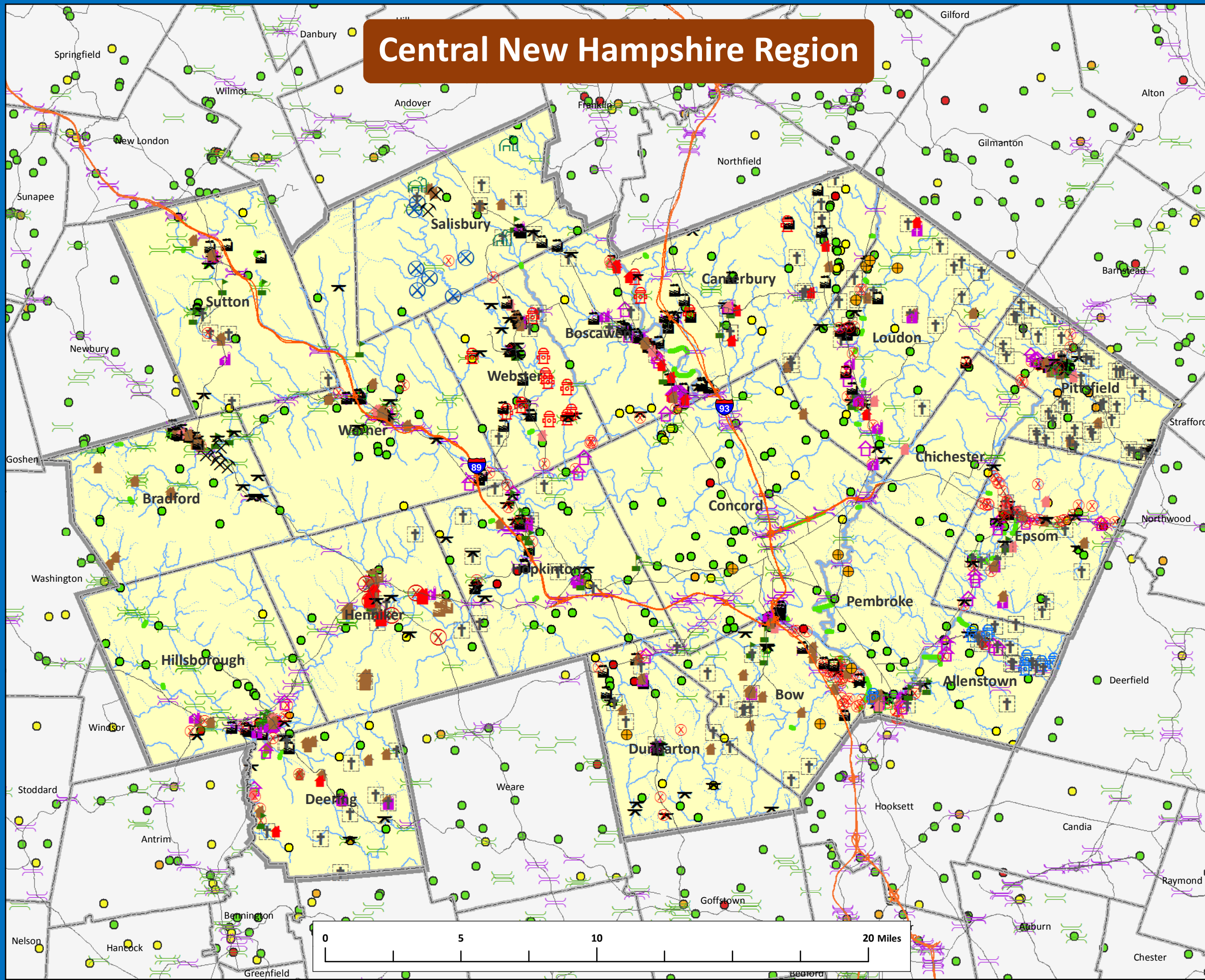
The Continuity of Operations Plan (COOP) is a contingency plan that provides for the deliberate and planned deployment of pre-identified and trained personnel, equipment and supplies to a specific emergency relocation site and/or the transfer of essential functions to another department, agency or organization during a disaster. The intended purpose is to ensure the local municipal operations continue to provide services. Most of the region's communities do not have a separate COOP; instead, many communities place the COOP within the emergency operations plan to ensure efficient operations.

Continuity of Government (COG)

The Continuity of Government (COG) alternately maintains the governmental body and identifies emergency delegation of authority in accordance with applicable laws, during emergencies or disasters. COG planning ensures a continued line of governmental authority and responsibility. The COG is generally found within an emergency operations plan to ensure the line of succession is covered.

Central New Hampshire Region

Weather Hazards Map 8.3 Community Vulnerabilities



- | | |
|-----------------------------------|-----------------------------------|
| Community Vulnerable Sites | Active Dams - Hazard Level |
| Cemetery | High Hazard |
| Church | Significant Hazard |
| Cistern/Dry Hydrant/Drafting Site | Low Hazard |
| Daycare Facility | Non-Menace |
| Large Employer | Seismic Lines |
| Elderly Housing | Seismic Lines |
| Entertainment & Recreation | Heliports |
| Flood Gate | Heliports |
| Geologic | Bridges |
| Hazardous Material Facility | Municipal |
| Hydrant | State |
| Manufactured Housing Park | Rivers and Streams |
| Rural Resource | Intermittent Streams |
| School | Municipal Boundaries |
| Unique/Historic Resource | |
| Vulnerable Population | |

Note: For base layer legend, see Base Map 1.1.

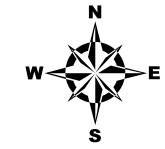
Map Explanation: Data points are from local Hazard Mitigation Plans.

Note: Concord has too many facilities to depict.

Data Sources: Local Hazard Mitigation Committees, CNHRPC, NH GRANIT, NHDOT, NHDES, USGS, FAA.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org



Recovery Plans

Recovery Plans are the after-thought of a disaster if a community does not have adopted guidelines for how to rebuild the community. These plans have become more highly regarded after the natural disasters around the country and in New Hampshire over the last decade. Supplementing the plan can be a series of zoning ordinances to aid more rapid recovery and rebuilding.

Allenstown is the one community in the Central NH Region known to have an active, adopted Recovery Plan.

PREPAREDNESS AND RESPONSE ACTIVITIES

The Central NH Region's municipalities have independent plans, resources, assets, and procedures for responding to emergencies. Mutual aid agreements between neighboring communities, or a region, or the entire state are common for most communities. Some of the regionalized mutual aid agreements include the Capital Area Fire Mutual Aid Compact (also known as Concord Fire Alarm), Central NH Hazardous Materials Team, Capital Area Public Health Network, NH Public Works Mutual Aid, Central NH Special Response Unit, and NH Hospital Mutual Aid Network. All of these organizations are available for most communities to use for hazard event response, although membership is often required.

Figure 8.22: Epsom Emergency Response, 2008



Source: Town of Epsom 2012

The development and updating of emergency plans to ensure they reflect current guidelines and regulations is time-intensive and often involves a committee approach.

Prepare, Train, and Drill

Each community in the region has an Emergency Management Director (EMD). However, this position is usually either a volunteer/stipend position (often the Fire Chief) or is taken on by a paid staff member, such as Police Chief or Town Administrator, as part of their normal duties. The region's EMDs and their emergency response teams regularly participate in local and regional exercises and most towns are members of various Mutual Aid Compacts.

Many activities should be undertaken by the municipality to prepare for weather hazards events. The most basic of these include the updating and testing of emergency operations plans through drills and exercises, ensuring redundancy of municipal records and water and wastewater systems, and training elected officials and emergency responders in Incident Command Systems (ICS) and National Incident Management Systems (NIMS).

Activities can also include infrastructure projects to mitigate specific weather hazard effects such as purchasing generators or solar for municipal buildings in the event of power outages during severe weather. Specific training programs can be made available to and taken by all emergency responders in addition to the regular certification training they must undergo. Regulations and ordinances can be developed and updated to address risks from earthquake, wind, flooding, and fire. Some of the mitigation actions to be performed are located within the community's Hazard Mitigation Plan.

Most of the local individuals who would be performing emergency preparedness activities, including fire and rescue personnel and local officials, in Central NH communities are volunteers. Police Department staff are usually the only local emergency responder employees a town can afford. The limitations of

using volunteers are noted in absence of paid staff that could develop and update plans and regulations and promote the mitigation actions to ensure adequate disaster preparedness.

Culvert Replacement

Municipal flooding, particularly in rural areas, is often caused by culverts which are too small to carry higher water flow. The upsizing of deteriorating steel culverts or undersized culverts has been a method regularly used by Highway and Public Works Departments in an attempt to solve a flooding problem. Culvert replacement with a larger pipe was often less than \$5,000 when performed locally.

In 2013, DES established standards for necessary stream crossings that are designed to lessen the risk of blockages and wash-outs of culverts and bridges, and the associated flooding. These standards require a community to file a notification and/or complete an Application for a crossing permit with the Wetlands Bureau for performing culvert replacements.

As a result, community replacement of culverts has slowed down or ceased, as additional Department staff time is now required to upgrade culverts within stream crossings. Fewer upsized culverts will result in greater risk of flooding at those locations.

DES developed a Certified Culvert Maintainer Program that allows a municipal public works employee to maintain, repair, replace, or modify culverts without first filing notifications or an Application. Instead, this individual files quarterly reports of culvert maintenance. This is an opportunity for communities to replace more culverts at stream crossings with the new NHDES rules in place.

Figure 8.23: Canterbury Road Washout and Flooding, 2005



Source: Town of Canterbury 2010

Regional and Shared Cooperative Response Participation

Some of the Central NH Region's smaller communities who could not afford to maintain their own separate emergency services have implemented regional cooperative response agreements with nearby, sub-regional towns. Particularly for the smallest population towns, regionalization has reduced town tax rates as equipment does not need to be maintained and operating expenses are eliminated, with simply an annual fee paid to the provider town.

The first agreements were modeled upon cooperative school districts and have been successful so far. Response time does not seem to be affected as volunteers often had to be called in to stations to run the vehicles to the service locations. A recent example in 2014, Bradford eliminated its volunteer Rescue Department and joined with the staffed Henniker Fire and Rescue Department for an annual fee of \$40,000.

On **Map 8.4 Community Emergency Services**, the locations of the Central NH Region's Fire Departments, Rescue Departments, Police Departments, and more are displayed. Their placement provides a visual representation of the distance between facilities. The rural nature, availability of adequate and alternate transportation systems, whether facilities are staffed, and distance away from the services other nearby communities will influence response time. When a community finds itself unable to sustain its own emergency response department, the opportunity to regionalize services presents.

Central New Hampshire Region

Weather Hazards Map 8.4 Community Emergency Services

- Community Emergency Services**
- Communications Tower
 - DOT Shed
 - Fire Department
 - Medical Facility; Medical facility
 - Police Department
 - Public Works Garage
 - Rescue Department
 - Sewage Treatment Plant
 - Town Hall
 - Utility
 - Water Supply
 - Utility Lines
 - Rivers and Streams
 - Intermittent Streams
 - Municipal Boundaries

Note: For base layer legend, see Base Map 1.1.

Map Explanation: These are loactions that would provide important services in the event of a disaster. They are derived from local Hazard Mitigation Plans.

Note: Concord has too many services to depict.

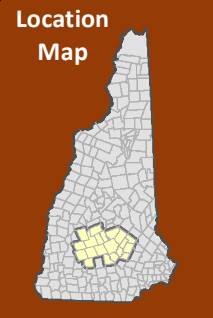
Data Sources: Local Hazard Mittigation Committies, CNHRPC, NH GRANIT, NHDOT, NHDES.
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

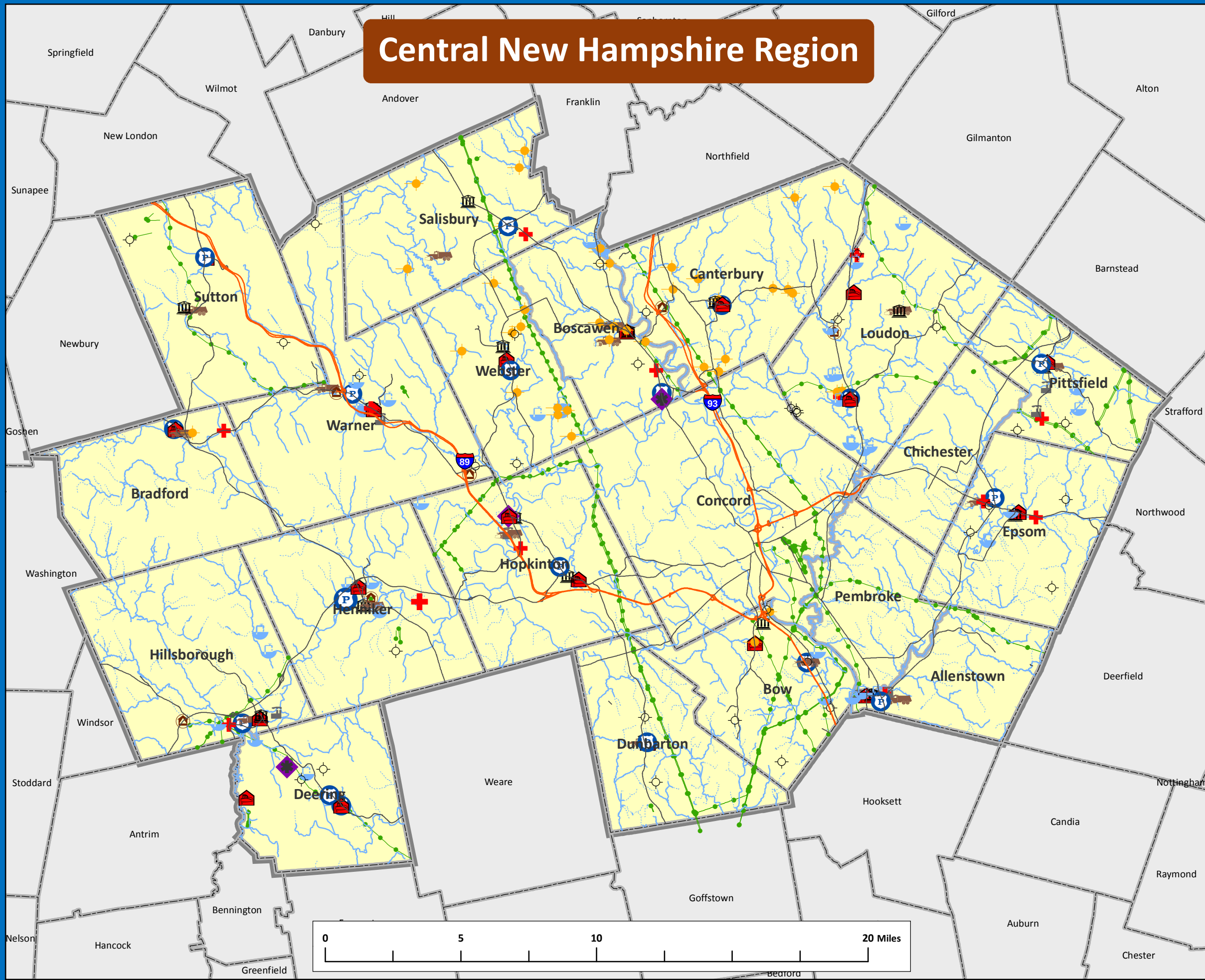
Central New Hampshire Regional Plan 2015

Central New Hampshire Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
603.226.6020
www.cnhrpc.org



Location Map





The NH Charitable Foundation funded a pilot study about similar benefits of shared and regionalized municipal services and purchases in 2014. From recent statewide surveys by the NH Municipal Association, of the 131 municipal respondents (out of 234), 40% currently use shared services such as ambulance/EMT, transfer stations and recycling facilities, and shared parks and recreation services with neighboring Hampshire communities. Other successful cooperative agreements held were for office supply bidding, fuel purchasing, sharing of grant writers and professional planners, and utility sharing. There is an article summarizing the study's findings (see www.nhmunicipal.org/TownAndCity/Article/559).

Further use of shared emergency response should be considered by the region's smaller communities. Even if a municipal service is not terminated, additional mutual aid agreements can assist with offsetting costs and volunteer time and can help reduce the response time to a call.

CENTRAL NH VISION - PREPARING FOR FUTURE WEATHER HAZARDS

The region should be made as safe as possible from future weather hazards for its residents, workers, travelers, and businesses. Infrastructure should be well-maintained and appropriate for the site. Local and regional planning should ensure mitigation, response, and recovery plans are current. The vision of how Central NH Region communities can prepare for, respond to, and recover from weather hazards and presidentially-declared disasters is simple:

“Communities are well informed and have adequate resources to plan for and respond to weather hazard events at the local and regional levels.”

The path to this vision will require much hard work on federal, state, regional, and local levels. Federal and state regulations will empower Central NH communities to be able to develop better planning and regulatory tools. The Central NH Regional Planning Commission (CNHRPC) can continue to be a resource for information regarding weather hazards and will continue to update local Hazard Mitigation Plans with communities. Much progress has been made to adapt to the effects of climate change in small ways which cumulatively have great effect.

To accomplish this vision, a series of simplified guiding principles for region were developed which support a series of actions that municipalities or the CNHRPC can achieve.

GUIDING PRINCIPLES FOR MANAGING THE EFFECTS OF WEATHER HAZARDS

These guiding principles summarize the municipal actions which can be taken within the Central NH Region to help reduce the impact of weather hazards on the 20 communities, recover social welfare and infrastructure more quickly, and encourage planning efforts and related funding to be allocated to accomplish these significant measures. The principles support the overall vision of the Chapter.

- Encourage efficient communities that are adaptive, responsive, and resilient to multi-hazard weather challenges.
- Encourage sharing of emergency facilities and equipment across town borders for regional responsiveness and to provide more resources to individual communities.
- Encourage proactive planning to mitigate the loss of life, property, infrastructure and natural resources from extreme weather events and other disasters.

ACTION ITEMS

The following action items help communities better protect themselves from severe weather events and disasters. They help formulate the path toward the stated vision of the Weather Hazards Chapter.

- Consider completing a vulnerability assessment of critical community assets to include analysis, description, and/or maps of potential natural and other hazard threats and ascertain risk to the community.
- Consider revisions of zoning ordinances, land use regulations, building codes, and municipal policies to help mitigate extreme weather hazards, such as adopting a stricter floodplain ordinance, providing conservation subdivision incentives in high-risk areas, encouraging village center zoning, utilizing transfer of development rights, and focusing on open space and land preservation.
- Utilize fluvial erosion hazard (FEH) information to ascertain the most appropriate locations for new development by keeping new buildings out of flood-prone or fluvial erosion-prone areas.
- Incorporate elements of low impact development and green infrastructure site design into local Subdivision Regulations and Site Plan Review Regulations.
- Work to protect the lands serving as floodwater storage through permanent preservation to ensure the ability of the land to retain its current water volume is continued into perpetuity.
- Encourage placing the lands surrounding public water supplies into permanent conservation using funding sources such as the NH Department of Environmental Services Water Supply and Protection Fund Grant Program.
- Encourage large public water systems to have back-up power for all critical infrastructures and ensure small water systems install a power transfer switch to readily accept a generator when necessary.
- Encourage municipal public works or highway department employees to complete the NH Department of Environmental Service's certified culvert maintainer program to provide easier maintenance and upgrading of local Class V road culverts.
- Develop municipal priority lists from the local Hazard Mitigation Plan, Asset Management Plan, Vulnerability Assessment, Energy Audit, Climate Adaptation Action Plan and Emergency Management Department needs and incorporate projects into the Capital Improvements Program.
- Assist in the development of Asset Management Plans for municipal service facilities that track the age, condition, and cost, and anticipated replacement date of each item of equipment.
- Encourage communities to adopt long-range infrastructure investments and improvements such as water and sewer lines replacement, treatment facilities improvements, and transportation system reconstruction (upgrade roads, upsize culverts, replace bridges, enhance drainage systems, etc.) into Capital Improvements Programs (CIPs) and maintenance plans.
- Identify the locations of all water crossings in the community, such as bridges and culverts, and record the dimensional, infrastructure, and waterflow characteristics, with the use of GPS

technology and take photographs of upstream and downstream features to maintain in a geodatabase.

- Encourage partnership with local businesses to help them develop disaster recovery plans to help businesses quickly recover and reopen after floods or other extreme weather.
- Support implementation of green infrastructure at municipal facilities to help reduce runoff and stormwater flows that may otherwise exceed system capacity (examples include bio-retention areas/rain gardens, low impact development methods, pervious pavement, green roofs, swales, and the use of vegetation or pervious materials instead of impervious surfaces).
- Encourage cooperative agreements among municipalities to reduce costs for services and to share resources, such as for water and sewer services, equipment and inspection staff/consultants, shared municipal services, and for more integrated transportation, land use and environment planning.
- Identify potential recommendations for severe weather adaptation actions within local and regional policy, planning, and regulatory sectors (i.e. master plan, open space plans, hazard mitigation plans, zoning ordinances and land development regulations).
- Locate funding sources to assist municipalities with achieving any climate adaptation goals, including municipal energy efficiency projects, culvert upgrading, residential home efficiency, revision of ordinances and regulations for resource conservation, etc.

RESOURCES

A significant compilation of data is included within the Weather Hazards Chapter. Most of the documents and websites listed are either referenced within the Chapter or information from their noted source was used to help formulate this document. Global, federal, state, municipal, and non-profit resources on weather events and adaptation and their associated internet hyperlinks are provided for reference within the Appendix Chapter.

Central NH Special Operations Unit Medical Element. (2014). *Central NH Special Operations Unit – Medical Element Resource Page*. Retrieved from: http://www.nh-tems.com/CNHSOU_MEDICAL.html.

City of Keene. (2014). *Climate Change*. Retrieved from the City of Keene New Hampshire: <http://www.ci.keene.nh.us/sustainability/climate-change>.

Climate Solutions. (2014). *Climate Change in Southern New Hampshire Past, Present, and Future*. Retrieved from Climate Solutions New England: <http://www.climatesolutionsne.org/>.

Comcast. (2014). *Capital Area Fire Mutual Aid Compact*. Retrieved from Comcast: <https://home.comcast.net/~jefflab1/Capital%20Area%20Fire%20Mutual%20Aid%20Compact%20%28Concord%20NH%29.htm>.

Concord. (2014). *Communications Center*. Retrieved from the City of Concord: <http://www.concordnh.gov/index.aspx?NID=1044>.

DES. (2014). *Air Quality Monitoring and Data Program*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/air/tsb/ams/aqmdp/categories/overview.htm>.

DES. (2004). *Air Pollution Transport and How it Affects New Hampshire*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/commissioner/pip/publications/ard/documents/r-ard-04-1.pdf>.

DES. (2014). *Drinking Water and Groundwater Bureau*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/water/dwgb/index.htm>.

DES. (2014). *Emergency Action Plans Program*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/divisions/water/dam/eap/>.

DES. (2014). *Flood and Geologic Hazards Program*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/commissioner/gsu/fegh/index.htm>.

DES. (2014). *New Hampshire Climate Action Plan*. Retrieved from New Hampshire Department of Environmental Services: http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm.

DES. (2014). *Wetland Rules (Env-Wt)*. Retrieved from New Hampshire Department of Environmental Services: <http://des.nh.gov/organization/commissioner/legal/rules/index.htm#wetlands>.

Department of Homeland Security and Emergency Management (HSEM). (2014). Retrieved from New Hampshire Department of Safety: <http://www.nh.gov/safety/divisions/hsem/index.html>.

- Department of Homeland Security and Emergency Management (HSEM). (2014). *Homeland Security & Emergency Management Resource Center*. Retrieved from New Hampshire Department of Safety: <https://apps.nh.gov/blogs/hsem/>.
- EPA. (2014). *Adaption Overview*. Retrieved from the Environmental Protection Agency: <http://www.epa.gov/climatechange/impacts-adaptation/adapt-overview.html>.
- EPA. (2014). *Climate Impacts in the Northeast*. Retrieved from the Environmental Protection Agency: <http://www.epa.gov/climatechange/impacts-adaptation/northeast.html>.
- EPA. (2014). *Climate Ready Water Utilities*. Retrieved from the Environmental Protection Agency: <http://water.epa.gov/infrastructure/watersecurity/climate/index.cfm>.
- EPA. (2014). *MyMaps for MyEnvironment*. Retrieved from the Environmental Protection Agency: <http://www.epa.gov/myenv/MyMap.html?minx=-71.79325&miny=43.15886&maxx=-71.47911&maxy=43.30894&ve=12,43.233948,-71.636181&pLayers=nwis>.
- EPA. (2014). *Northeast*. Retrieved from the Environmental Protection Agency: <http://www.epa.gov/climatechange/impacts-adaptation/northeast-adaptation.html>.
- EPA. (2014). *Sources of Greenhouse Gas Emissions*. Retrieved from the Environmental Protection Agency: <http://www.epa.gov/climatechange/ghgemissions/sources/transportation.html>.
- Federal Highway Administration. (2014). *Climate Change Vulnerability Assessment Pilots*. Retrieved from the U.S. Department of Transportation: http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/vulnerability_assessment_pilots/conceptual_model62410.cfm.
- FEMA. (2014). *Hazard Mitigation Assistance Programs*. Retrieved from the Federal Emergency Management Agency: <https://www.fema.gov/hazard-mitigation-assistance>.
- FEMA. (2014). *Homeowner Flood Insurance Affordability Act of 2014*. Retrieved from the Federal Emergency Management Agency: <https://www.fema.gov/media-library/assets/documents/95946>.
- FEMA. (2014). *ICS Resource Center*. Retrieved from the Federal Emergency Management Agency: <http://training.fema.gov/EMIWeb/is/ICSResource/>.
- FEMA. (2014). *Loss Statistics New Hampshire*. Retrieved from the Federal Emergency Management Agency: <http://bsa.nfipstat.fema.gov/reports/1040.htm#33>.
- FEMA. (2014). *National Flood Insurance Program Community Rating Guidelines*. Retrieved from the Federal Emergency Management Agency: <https://www.fema.gov/national-flood-insurance-program-community-rating-system>.
- FEMA. (2014). *National Flood Insurance Program Specific Rating Guidelines*. Retrieved from the Federal Emergency Management Agency: <https://www.fema.gov/media-library/assets/documents/34620>.
- FEMA. (2014). *National Incident Management System*. Retrieved from the Federal Emergency Management Agency: <http://www.fema.gov/national-incident-management-system>.
- FEMA. (2014). *Policy Statistics New Hampshire*. Retrieved from the Federal Emergency Management Agency: <http://bsa.nfipstat.fema.gov/reports/1011.htm#NHT>.

- FEMA. (2014). *The National Flood Insurance Program*. Retrieved from the Federal Emergency Management Agency: <https://www.fema.gov/national-flood-insurance-program>.
- Fortier, Timothy W. (2012, January). New Hampshire's Water Assets Under Pressure: Municipal Stormwater Systems. *New Hampshire Town and City*, 8-13.
- ICMA. (2014). Retrieved from the International City/County Management Association: <http://icma.org/en/icma/home>.
- Local Harvest CSA. (2014). Retrieved from: <http://localharvestnh.com/>.
- LRMFA. (2014). *Central NH Regional Emergency Planning Committee*. Retrieved from the Lakes Region Mutual Fire Aid Association: <http://www.lrmfa.org/lrmfaa/memberhazmat.asp>.
- National Climate Assessment 2014. (2014). *National Climate Assessment*. Retrieved from: <http://nca2014.globalchange.gov/downloads>.
- National Climatic Data Center (NCDC). (2014). *Billion-Dollar Weather/Climate Disasters: Summary Stats*. Retrieved from the National Oceanic and Atmospheric Administration: <http://www.ncdc.noaa.gov/billions/summary-stats>.
- National Climatic Data Center (NCDC). (2014). *Climate Monitoring*. Retrieved from the National Oceanic and Atmospheric Administration: <http://www.ncdc.noaa.gov/climate-monitoring/>.
- National Climatic Data Center (NCDC). (2014). Climate Data Online. Retrieved from the National Oceanic and Atmospheric Administration: <http://www.ncdc.noaa.gov/cdo-web/>
- New Hampshire Charitable Foundation. (2014). Retrieved from: <http://www.nhcf.org/>.
- New Hampshire Department of Agriculture, Markets & Food. (2014). Retrieved from: <http://www.agriculture.nh.gov/>.
- New Hampshire Farmer's Market Association. (2014). Retrieved from: <http://www.nhfma.net/>.
- NH Farm to School Program. (2014). Retrieved from the University of New Hampshire: <http://www.nhfarmtoschool.org/>.
- NHMA. (2014). *Survival Through regionalization: Effective Models for Intergovernmental Cooperation and Group Purchasing*. Retrieved from the New Hampshire Municipal Association: <http://www.nhmunicipal.org/TownAndCity/Article/559>.
- NHPHN. (2014). *Capital Area Regional Public Health Network*. Retrieved from the New Hampshire Regional Public Health Networks <http://nhphn.org/capital-area-regional-public-health-network/>.
- nhcollaborative.org. (2014). *NH Energy & Climate Collaborative Adaptation Workgroup Summary Report 2012*. Retrieved from nhcollaborative.org: http://www.nhcollaborative.org/media/Adaptation_WG_Final_Report_100512.pdf.
- NOAA. (2014). *Climate Data – Past Weather and Normals*. Retrieved from the National Oceanic and Atmospheric Administration: http://www.erh.noaa.gov/er/gyx/climate_f6.shtml.
- Northeast Climate Change Adaptation. (2014). Retrieved from the Northeast Climate Change Adaptation: <http://necca.stormsmart.org/>.
- NRCC. (2014). *Welcome to the NRCC*. Retrieved from the Northeast Regional Climate Center: <http://www.nrcc.cornell.edu/>.

- NRDC. (2014). *Extreme Weather Map 2012*. Retrieved from the Natural Resources Defense Council: <http://www.nrdc.org/health/extremeweather/default.asp>.
- NRDC. (2014). *Health and Climate Change: Accounting for Costs*. Retrieved from the Natural Resources Defense Council: <http://www.nrdc.org/health/accountingforcosts/>.
- NRDC. (2014). *Using State Revolving Funds to Build Climate-Resilient Communities*. Retrieved from the Natural Resources Defense Council: <http://www.nrdc.org/globalwarming/state-revolving-funds.asp>.
- Prepare. Protect. Portsmouth. (2014). *How Will Sea Level Rise and Climate Change Affect Portsmouth?* Retrieved from: <http://www.planportsmouth.com/cr/>.
- Ready. (2014). *Risk Assessment*. Retrieved from Ready.org: <http://www.ready.gov/risk-assessment>.
- Regional Greenhouse Gas Initiative (RGGI). (2014). Retrieved from: <http://www.rggi.org/>.
- Scientific American. (2013). *New Obama Climate Change Order Aims to Prepare Communities for Severe Weather*. Retrieved from Scientific American: <http://www.scientificamerican.com/article/new-obama-order-aims-to-prepare-for-severe-weather/>.
- Southern New Hampshire Regional Planning Commission. (1999). *Stormwater Management for New Hampshire Communities*.
- NH StormSmart. (2014). *Planning*. Retrieved from: <http://nh.stormsmart.org/before/planning/>.
- Technology Transfer Center. (2014). *NH Public Works Mutual Aid*. Retrieved from the Technology Transfer Center at the University of New Hampshire: <http://www.t2.unh.edu/ma>.
- The White House. (2014). *Climate Change and President Obama's Action Plan*. Retrieved from the The White House: <http://www.whitehouse.gov/climate-change>.
- USGS. (2014). *Water Data National Water Information System: Web Interface for WaterData and GroundwaterWatch*. Retrieved from United States Geological Survey: <http://waterdata.usgs.gov/nwis> and <http://groundwaterwatch.usgs.gov/netmapT2L1.asp?ncd=NHV>.
- USGS. (2014). *US Geological Survey Flood Inundation Mapper*. Retrieved from United States Geological Survey: <http://wimcloud.usgs.gov/apps/FIM/FloodInundationMapper.html#app=605a&c6e5-selectedIndex=3&5dca-selectedIndex=0>



INTRODUCTION

The last CNHRPC regional plan did not have an energy chapter - one indication of how the energy landscape has changed in the last 10 years. Now more than ever, the environmental and economic implications of energy use are factors that need to be incorporated into planning and land use decisions. Reliable, affordable sources of energy are critically important to everyone's quality of life and impact our economic and environmental sustainability. Whether the intent is to reduce municipal expenditures through energy efficiency improvements to municipal buildings and the transportation fleet, adopting additional building energy code standards or focusing on incorporating renewable energy and energy efficiency into land use planning, all of these approaches work towards the achievement of efficient communities – in energy use, land use, transportation use, etc. Like many of the other resources discussed in this plan, energy efficiency goes beyond municipal borders yet has its roots at the local level. Shared concerns such as reducing energy consumption often need to start at the local level and build outward to include a regional perspective. There also needs to be mechanisms in place to ensure a coordinated response to state and federal policies on energy.

This chapter focuses on the link between energy supply, energy use and land development patterns. It will outline key findings on energy efficiency activities at both the state, regional and local level, including the work of local energy committees and projects that have been implemented through various mechanisms. Balancing the work completed to date with the role available funding plays in the implementation of future work is also examined. The goal is to provide context for the concerns of local government and the role energy efficiency can and does play in the regional landscape. The extensive outreach conducted throughout the Regional Plan development and the metrics available to assess the status and trends of energy efficiency are also woven into this discussion. The outcomes of these efforts are:

- a summary of the current status of energy use, renewables, and efficiency initiatives at each level of government;
- a refinement of the shared concerns identified from local planning efforts and conversations throughout the region;
- an identification of challenges to be addressed; and
- a summary of recommendations/actions on how to meet those challenges.

EXISTING CONDITIONS / NEW HAMPSHIRE'S ENERGY LANDSCAPE

Energy efficiency is continuing to emerge not only as a solution to high energy costs and supply concerns, but as a response to current understanding of climate change impacts. An important concept to keep in mind is that New Hampshire is part of a region and really a world market when it comes to energy. Since 1997, ISO-NE (Independent System Operator of New England) has been managing the

regional electricity demand and supply in New England; what we can do as a state and a region is influence overall use and fuel choice.

Many of the New England states have significantly increased energy efficiency over the last few years as evidenced in the recent American Council for an Energy Efficient Economy (ACEEE) ranking of states' overall energy efficiency initiatives.

New Hampshire ranked 21st in the 2013 State Energy Efficiency Scorecard, dropping three spots compared to 2012. The state scored 20 points out of a possible 50, two points less than it earned in 2012. According to their assessment of New Hampshire's energy efficiency initiatives when compared to other states, the Council states that "though New Hampshire has some policies that promote energy efficiency, the state lags behind other states in the Northeast and has dropped in the rankings since last year. Designing a long-term framework for investments in energy efficiency, such as an energy efficiency resource standard, would move New Hampshire up the rankings and put it on par with other states in the region." The New England states rank as follows:

Table 9.1: New England States Rank

Massachusetts	1
Connecticut	5
Rhode Island	6
Vermont	7
Maine	16
New Hampshire	21

Quick Facts from U.S. Energy Information Administration, March 2014

- New Hampshire was the ninth lowest per capita consumer of energy among the states in 2011.
- The Seabrook nuclear power reactor, the largest in New England, provided 55% of New Hampshire's 2013 net electricity generation.
- New Hampshire's Renewable Portfolio Standard requires 24.8% of electricity sold to come from renewable energy resources by 2025; 16% of New Hampshire's 2013 net electricity generation came from renewable energy.

Energy use in the Central NH Region parallels patterns throughout the state and the northeast. New Hampshire relies on a number of different types of energy supplies – each with its own unique costs. Some important facts to remember:

FACT: New Hampshire relies on external sources of energy for nearly 90% of its total energy consumption.

FACT: Population growth has slowed but is still increasing. Household changes are also leading to changes in how energy is used – computers, phones, TVs. Any gains in efficiency may be partially offset by the increasing electric demand associated with the number of devices and appliances per household.

FACT: Energy costs and supply are dynamic; costs are not fixed.

FACT: Demand patterns for energy may decrease, BUT expenditures are increasing due to rising fuel prices.

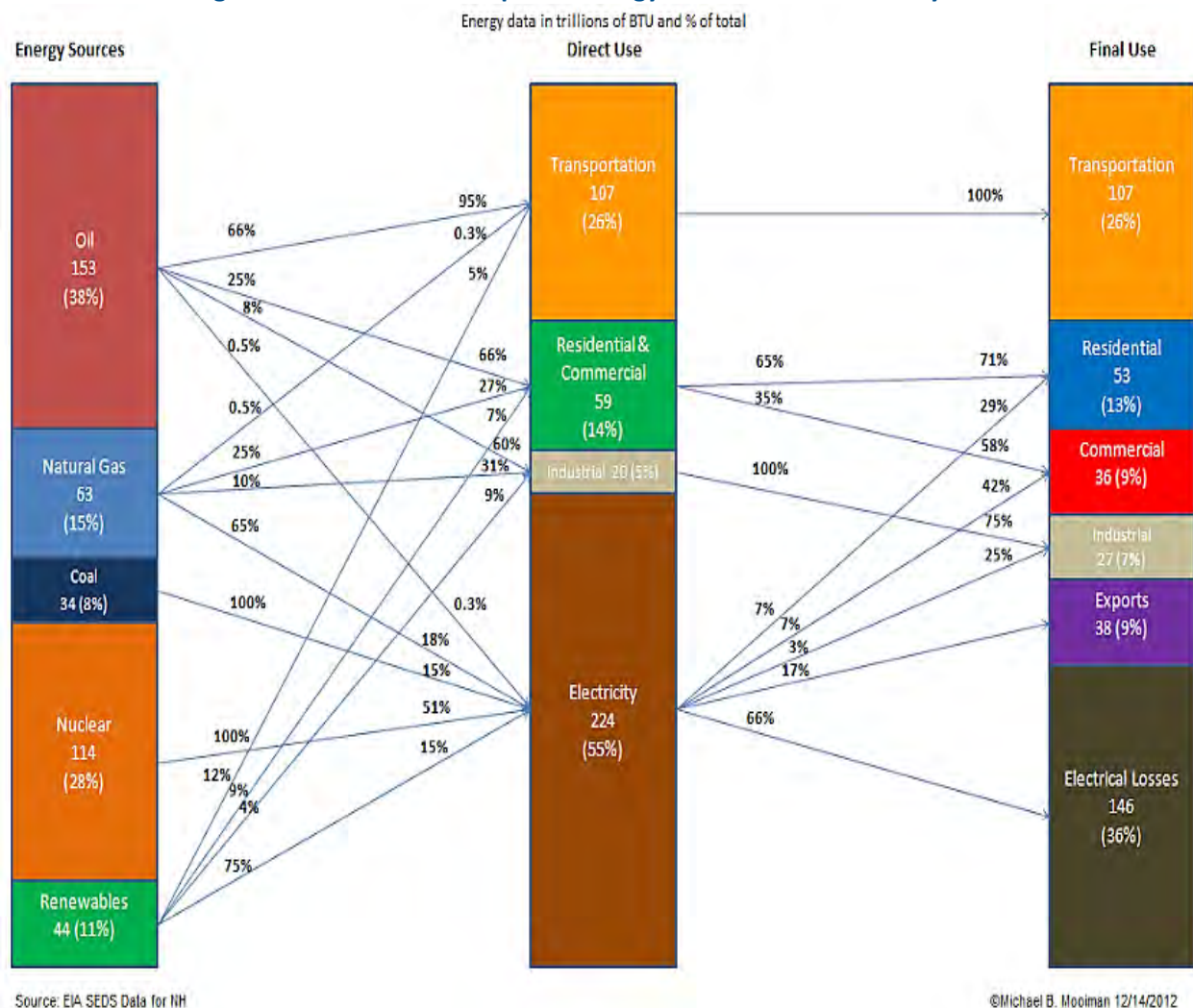
FACT: Decisions concerning energy supply and usage directly impact individual energy bills and the overall economy.

THE ENERGY PROFILE

There is certainly no lack of data on energy use and consumption. The challenge is the number of sources that exist and how to pull it all together into a comprehensive profile. While there has been no attempt here to create an exhaustive list of energy data in this regional plan, there is an attempt to highlight the more pertinent information. The biggest challenge is to correctly describe the flow of energy - from its supply, utilization and final usage - as there can often be a misunderstanding of the relationship between energy, generation, consumption, and the final disposition of energy once part of the supply has been converted to electricity and distributed to consumers.

With permission from the author, Dr. Michael Mooiman, Franklin Pierce University, **Figure 9.1** outlines this flow and summarizes the key concepts of New Hampshire's energy profile.

Figure 9.1: 2010 New Hampshire Energy Sources and Uses Analysis



Based on 2010 data available from the U.S. Energy Information Agency (EIA), this chart analyzes statewide energy flows in New Hampshire and presents a more comprehensive picture of what happens to energy in the state. There are three columns in the diagram, each connected with a number of arrows showing allocation percentages. The first column to the left shows energy supply, the middle column identifies how the energy is used directly and the last column shows the final allocation of energy that was once part of the energy supply and has been converted to electricity. The author of this chart makes the excellent point that it is important to keep in mind that electricity is not an energy source; connecting these three columns allows one to see the flow from the source to the use, including electricity, and finally, how all this energy is utilized.

Looking at the column to the left, energy sources, one can see that the largest slice of the energy supply, 38%, came from crude, oil based fuels. The other fossil fuels, natural gas and coal, made up 15% and 8% respectively. Overall, fossil fuels provided 60% of the state's energy sources. Nuclear energy supplied about 28% of the overall total. Renewables – hydroelectric, wood, waste and ethanol in gasoline, represented 11% of the total. It should be noted that a small amount of electricity was purchased from out of state in 2010, but the amount was less than 0.5% and was not included in these figures.

How the energy was used is the purpose of the center column. Examining this column in closer detail shows that direct energy use falls into four main categories: 55% went to electricity generation; 26% to transportation, and the remainder to heating for residential and commercial buildings (14%) and industrial use (5%). Looking next at the fan of arrows and their percentages, the number at the head of the arrow shows the amount of energy used in an application from a specific source and the number at the end of the arrow shows the amount of a supply used for that application. As an example, the top arrow in the diagram shows that 66% of our oil based energy supply was used for transportation and, following that arrow to the next column, it shows that 95% of energy used in this section was from oil based fuels.

As we follow these arrows for the first two columns, some highlights from the data are:

- 25% of natural gas is used in the residential and commercial sectors.
- 65% of natural gas supply is used to generate electricity and it represents 18% of the primary energy supply used to generate electricity.
- 66% of energy usage for heating households and businesses comes from oil.
- 25% of the oil supply to the state is used to heat these households and businesses.
- 15% of the total energy supply for generating electricity is from renewables; 75% of the renewable energy supply is used to generate electricity.
- 100% of coal and nuclear supply is directed towards electricity generation, making up 15% and 51% respectively of the supply for generating that electricity.

The last column of this chart looks at final use or what happened to all the energy. For electricity, it's important to note that two thirds of the energy that went into production was lost as waste heat. It is sometimes a surprise that electricity generation produces so much waste. One interesting note on this last column is that 17% of the electricity generation is actually exported out of state.

Some notable points from this last column are:

- 71% of energy for our homes came from mostly fossil fuels for direct heating and hot water applications. The remainder of the energy to our homes is from electricity usage.
- 58% of energy use for businesses was from heating and 42% is electricity.

- 36% of energy supplied was lost as waste heat during the generation and transmission of electricity, 9% was exported out of state and transportation consumed 26% of the energy supply.

Now that there is a clearer view of energy flows in New Hampshire, a brief discussion of some of the sources follows.

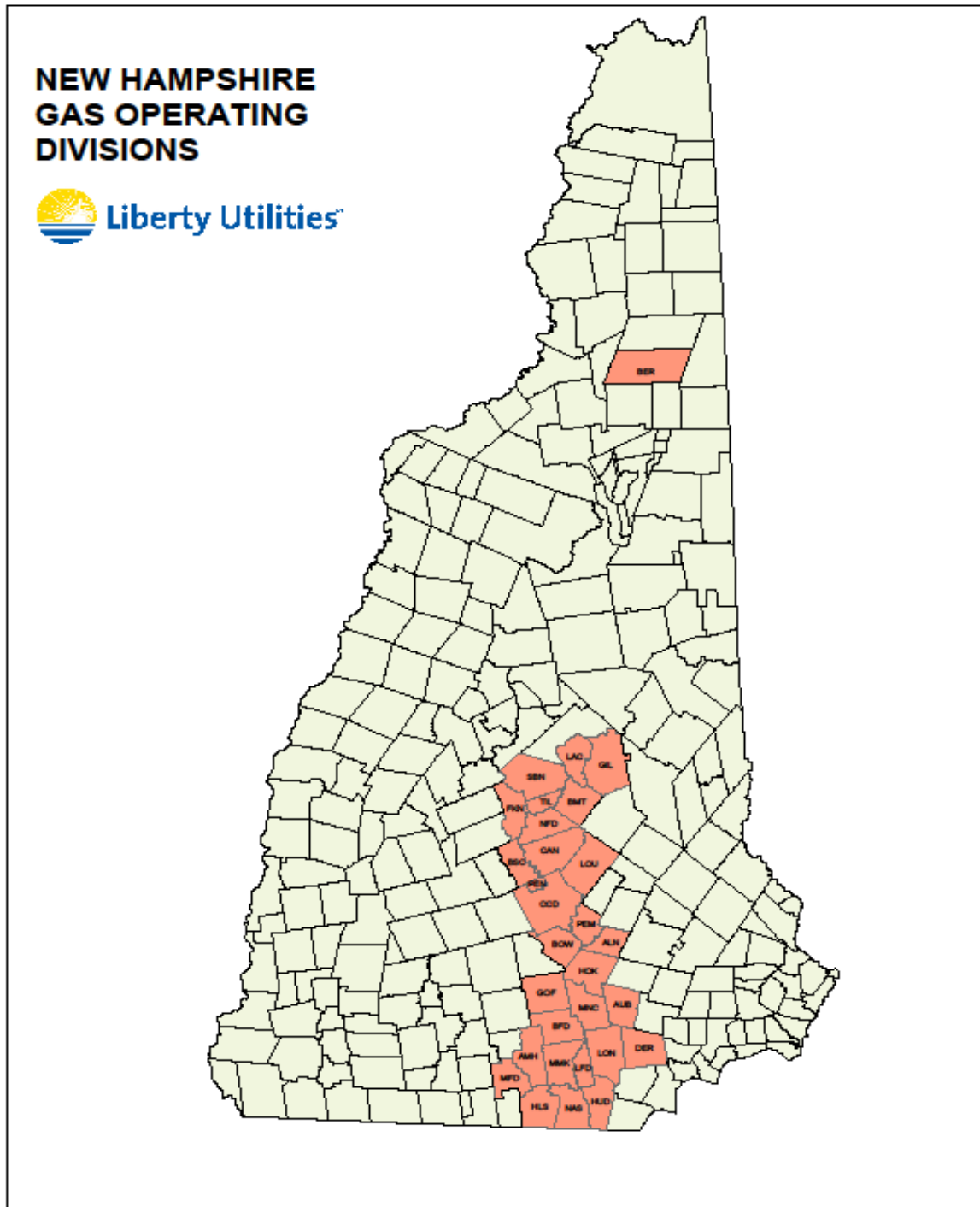
SOURCES

Natural Gas

In New Hampshire, there are four natural gas pipelines. The significant line for state residents is the Tennessee Gas Pipeline (TGP) which is owned by Kinder Morgan and brings gas from Texas, Louisiana, and the Gulf of Mexico into New England. This pipeline crosses New York and Massachusetts and distributes gas across a large section of Massachusetts. There are several tributaries off of the main line, one of which branches off near Lowell and heads north through the communities along the Merrimack River and into the Lakes Region.

According to the EIA, “about one in five New Hampshire households uses natural gas for primary home heating. Because of recent differences between natural gas and home heating oil prices, there has been an increase in the number of homeowners who have been switching to natural gas in New Hampshire and throughout New England. However, New Hampshire is still among the lowest states in per capita natural gas consumption, in part because large areas of the state do not have the natural gas distribution infrastructure.” Some of the Central NH Region’s communities (see following map) are served by Liberty Utilities and are able to heat with natural gas. In Concord, close to 50% of heating is from natural gas.

Figure 9.2: Liberty Utilities Service Area



Petroleum

Nearly half of all New Hampshire households rely on fuel oil for heat in the frigid winters. (EIA, NH Energy Profile)

Nearly half of all New Hampshire households rely on petroleum as their primary heating fuel, making the state and the Region particularly vulnerable to fuel oil shortages and price spikes during the winter months.

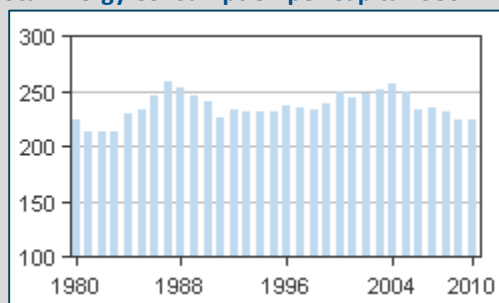
The transportation sector consumes more petroleum products than any other sector. State law requires the use of a biodiesel blend in state vehicles unless the blend costs more than all-petroleum fuel. The state also requires reformulated motor gasoline blended with ethanol in the populated areas of southeastern New Hampshire to limit ozone formation.

Total Per Capita Energy Consumption for New Hampshire

One measure of the energy intensity of the New Hampshire economy deals with the gross measure of total energy consumed divided by the state population. This per capita indicator is a good measure of energy consumption because decisions by individual consumers have an important effect on overall energy consumption.

Source: U.S. Energy Information Administration (EIA) State Energy Data System ([SEDS database](#)).

Figure 9.3: Total Energy Consumption per Capita 1980 – 2011(million Btu)



Coal (EIA Data)

New Hampshire has two coal-fired generating stations, Schiller at Portsmouth and one in the Central NH Region, Merrimack Station at Bow. Both are owned and operated by PSNH and the Merrimack Station is the utility's largest plant and generates approximately 439 megawatts (MW), enough to roughly supply 190,000 households. One unit of the plant was built in 1960; the other in 1968. In response to a 2006 state law (RSA 125-O), PSNH installed a scrubber system by 2011 that is targeted to capture 80% of the mercury from the coal and reduce sulfur dioxide emissions by roughly the same percentage. The cost of the scrubber system increased from an estimate cost of \$250 million in 2006 to \$422 million. The Public Utilities Commission (PUC) is currently examining what portion of that cost could be passed on to ratepayers. The Schiller station can burn either coal or oil, and one unit was converted in 2006 to burn woody biomass. Although coal's share of New Hampshire electricity generation has declined in the face of cheaper natural gas, it still typically provides up to one-seventh of net electricity generation.

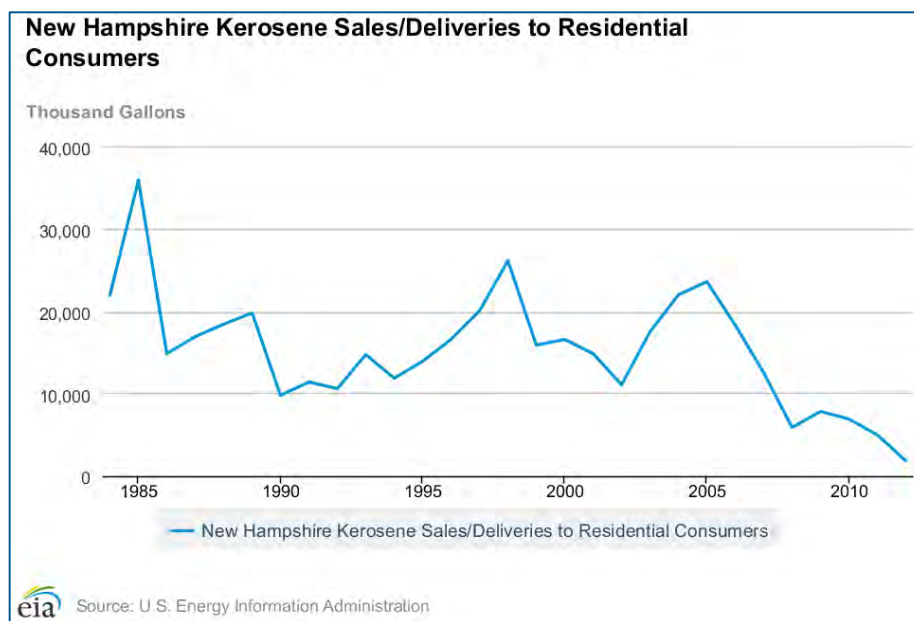
Propane

Propane is a hydrocarbon gas that is a byproduct of natural gas and oil extraction and makes its way to New Hampshire's retailers via rail, propane tanker trucks or ship. Propane is stored as a liquid underpressure until utilized; In New England, there are two large propane storage terminals, one in Providence, Rhode Island and the other in Newington, New Hampshire. Propane use in New Hampshire has increased steadily over the years, averaging out to around a four percent/year increase since 1960. While propane does not represent a high percentage of New Hampshire's energy use, it is important in more rural areas without access to natural gas. Currently, there is an excess of propane produced and the US is actually exporting it. The propane industry is not regulated by PUC and pricing can fluctuate significantly from dealer to dealer.

Kerosene

Kerosene is a stable, cold temperature fuel source that is often a source of home heating oil for mobile or manufactured homes. Since these homes tend to have storage tanks located outside of the home, kerosene has historically been the fuel of choice in a northern state like New Hampshire. Unfortunately, it is one of the most expensive home heating fuels - though not as expensive as heating with electricity. Close to 6% (2012 ACS data) of New Hampshire's housing stock is categorized as mobile homes, 6.4% in the Central NH Region, and these higher fuel prices often impact those with lower incomes who can't necessarily afford these costs. Many of these homes were built before 1980 and are often in need of weatherization improvements as well. The good news is that kerosene use has declined markedly in recent years (see [Figure 9.4](#) below), indicating that other choices in heating such as conversion to propane systems or mixing of fuels are being made.

Figure 9.4: New Hampshire Kerosene Sales/Deliveries to Residential Consumer



A Further Note on Electricity:

Seabrook, the largest nuclear plant in New England, can provide up to half of New Hampshire's generation.

Most of New Hampshire's net electricity production comes from just five large generating plants. Electricity generation from natural gas has increased markedly since 2003 with the commissioning of two large generating stations. As increasing amounts of natural gas are used for electricity, in New Hampshire and in New England as a whole, assurance of natural gas supply is becoming a critical strategic energy issue for the region.

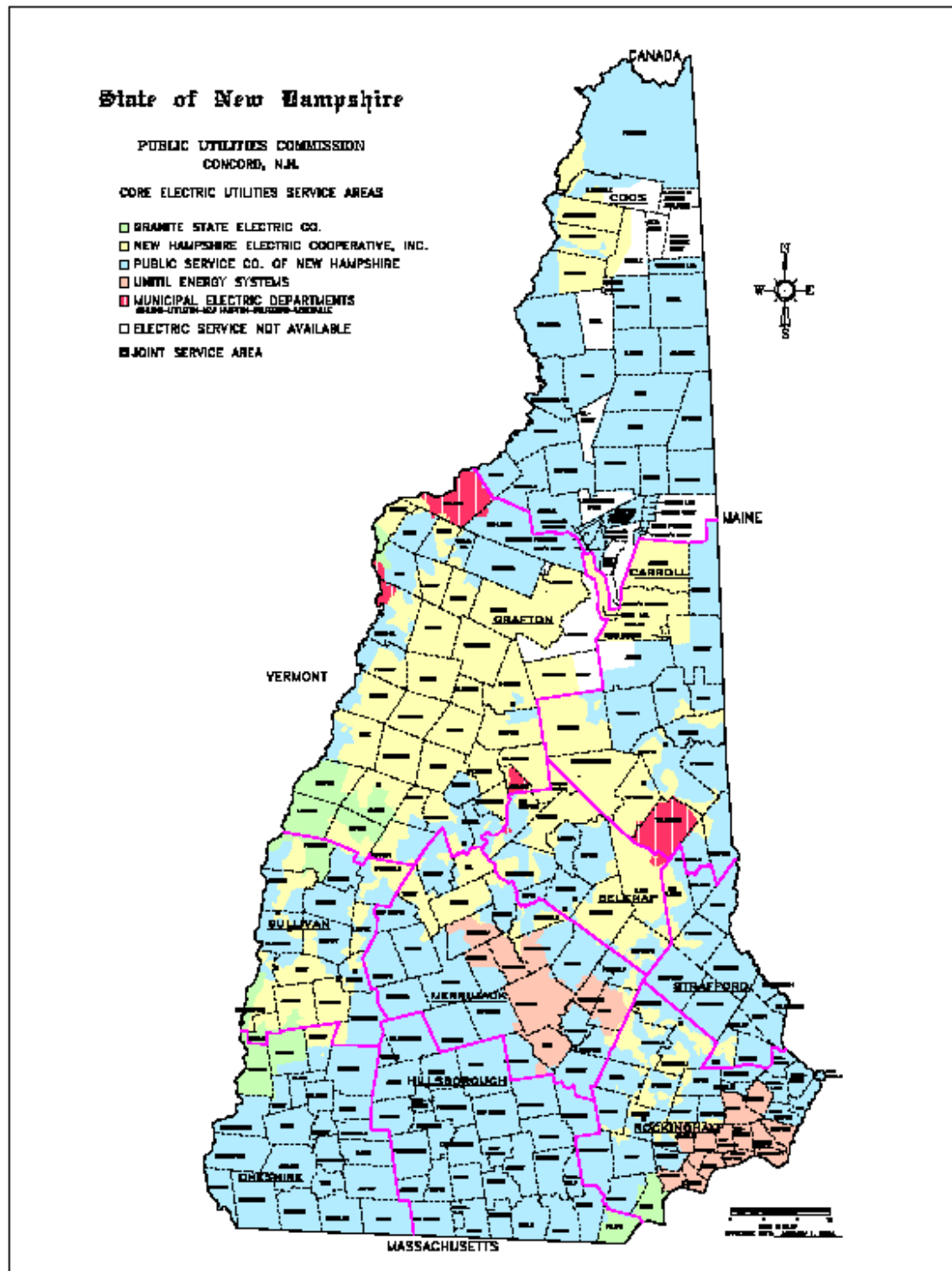
The Central NH Region is served by the following utilities: PSNH, NH Electric Coop and Unitil. (see [Figure 9.5](#)).

Cogeneration: Concord Steam

Concord Steam Corporation uses biomass to produce steam to heat downtown Concord and also to produce electricity for sale to utilities. This district heating company has been supplying steam to downtown Concord since 1938. There are around 110 customers with close to 200 commercial and institutional buildings with the largest base of customers the State of New Hampshire and the City of Concord. Forestry waste, such as tree tops and branches normally left behind in the forest after timber-harvesting operations, is used. To supplement its wood-burning operation, Concord Steam uses natural gas or #2 oil, the same oil that is used to heat residential homes. Burning this resource generates steam which turns turbines to produce electricity. When the steam leaves the generator at a lower pressure and temperature, it can then be piped to Concord's businesses for heat. This process is called "cogeneration," a way of getting the most out of a fuel source. On average, two megawatts are available for electric generating capacity.

The operation originally planned to relocate to a different site on South Main Street in Concord but that is no longer an option and they are negotiating to remain at the current location on the State Hospital grounds. www.concordsteam.com/index.html

Figure 9.5: Core Utility Service Areas



RENEWABLE ENERGY SOURCES

DEFINITIONS

Coupled with the vast amount of data, there is also an “energy dialect” that needs to be understood, particularly in the area of renewable energy. Below is a list of definitions that may clarify some of the terms used in this section and chapter as well as in the energy efficiency field.

Energy Conservation - reducing or going without a service to save energy. Turning off lights, reducing vehicle trips are a couple of examples.

Energy Efficiency – using less energy to provide the same service. Anywhere energy is used there are opportunities to increase efficiency. In most cases, energy efficiency measures will pay for themselves over time with lower energy bills.

Renewable Energy - source of clean energy that can be replenished. Does not change the amount of energy consumed but uses a renewable energy source.

Renewable Portfolio Standard (RPS) – New Hampshire’s RPS was established in May 2007 as RSA 362-F and requires the state’s electricity providers -- with the exception of municipal utilities -- to acquire by 2025 renewable energy certificates (RECs) equivalent to 24.8% of retail electricity sold to end-use customers. The RPS includes four distinct standards for different types of energy resources; these are classified as Class I (largest class and includes new and existing renewable facilities), Class II (solar), Class III (existing biomass and landfill gas facilities) and Class IV (existing, small hydro with certain restrictions). See www.puc.gov for a detailed explanation of the classes. What an RPS does is establish a base level of demand but allows the market to determine which renewable energy resources will meet that demand. Initially proposed as a mechanism to support renewable energy development in competitively restructured electricity markets, the RPS model today is now seen to serve other functions such as encouraging fuel diversity and economic development.

Renewable Energy Credits (RECs) – Renewable energy credits or certificates (RECs) are sold separately from the underlying physical electricity and are tracked, traded and sold in the market. As renewable generators produce electricity, one REC is created for every 1 megawatt-hour (MWh) of electricity placed on the grid. RECs represent the “attributes” (environmental, social, and other non-power qualities of renewable electricity generation) of renewable electricity generation from the physical electricity produced, serving as “currency” for renewable energy markets. Since RECs only represent the non-power attributes, they are not subject to delivery constraints.

Alternative Compliance Payments (ACPs) - If utilities do not meet their renewable energy quotas, they are required to make what is known as “alternative compliance payments” to the state for every megawatt hour of energy for which they did not acquire RECs. These alternative compliance payments are essentially an assessed fee to those utilities and competitive electricity providers that have not complied with the RPS. If RECs are not available or prices exceed the alternative compliance price, the electrical supplier will often elect to pay the fee, i.e., the alternative compliance payment.

THE SOURCES

Biomass

According to the U.S. Energy Information Administration, nearly 1 in 12 homes in New Hampshire depend on wood products as a primary heat source. New Hampshire is still 84% percent forested and roughly 81% is considered viable timberland. Biomass products such as wood pellets and chips, logwood and briquettes, are an important part of the state’s economy and can keep fuel dollars in the local economy.

According to a recent presentation by the Northern Forest Center to the Energy Efficiency and Sustainable Energy (EESE) Board on January 17, 2014, about 50% of the wood pellets consumed in New Hampshire are from in-state sources.

As noted in [Table 9.2](#) below, only natural gas is cheaper based on the heat content. Since biomass is part of the renewable energy market, there is the opportunity to sell the renewable energy attributes or RECS. As discussed earlier in this Chapter, these renewable energy attributes or RECs are traded separately from the underlying electricity. New Hampshire was the first state in the nation to create RPS incentive provisions for thermal renewable systems that are equivalent in value to those for renewable electric technologies.

Table 9.2: 2014 Heat Cost Comparison

<i>Current Heating Fuel Values - September 2, 2014</i>			
Fuel Type	Price/Unit	Heat Content Per Unit (BTU)	Price Per Million BTU (See Note 1)
Fuel Oil (#2)	\$3.496/Gallon	138,690	\$25.20
Propane	\$3.097/Gallon	91,333	\$33.91
Kerosene	\$4.154/Gallon	135,000	\$30.77
Natural Gas 1st Tier (<100 Therms)	\$0.848/Therm	100,000	\$8.48
Natural Gas 2nd Tier (>100 Therms)	\$0.800/Therm	100,000	\$8.00
Wood (Bulk Delivered Pellets) (See Note 2)	\$245.97/Ton	16,500,000	\$14.91
Wood (Cord) (See Note 3)	\$310/Cord	20,000,000	\$15.50
Electricity	\$0.1531/kwh	3,412	\$44.88

Source: *NH Office of Energy and Planning, September 2014 data*

Notes:

1. Pricing information is presented in per-BTU ([British Thermal Unit](#)) format in order to give consumers an idea of the true cost of the fuel per unit of heat. A gallon of oil, when burned, will produce a different amount of heat than a ton of wood. If you are wondering what the cost savings might be if you were to switch to a different fuel type for heating your home, the US Energy Information Administration has produced a [calculator](#)  to help with that.
2. Wood pellets priced contain 70% - 85% hardwood; delivery size: 3-10 tons.
3. The price of firewood sold by the cord can vary widely depending on the location, time of year and quality of the wood being sold. The cost shown here is an average of "seasoned" cordwood to allow for a general comparison to other forms of energy. Cordwood can be highly variable in moisture content, quality, species makeup, etc., correspondingly heat values and prices will vary. For information on using cordwood, see [Heating with Wood](#) from the UNH Cooperative Extension.

Electricity in New Hampshire is also generated from the combustion of wood by seven major power plants in New Hampshire. In the Central NH Region, Wheelabrator Concord Company operates a waste-to-energy plant that includes two furnace/boiler systems that processes up to 500 tons of solid waste per day. The plant produces high pressure steam capable of producing around 14 megawatts of electricity annually, close to supplying the electricity for 17,000 homes.

The seven wood-burning plants that generate electricity from wood chips are located throughout the state and produce around 150 megawatts, with none operating in the Central NH Region. The commissioning of the State's largest wood-fired power plant, the Burgess plant in Berlin on the site of the old Frasier Paper Mill, will increase the electrical generation from its current 5% to 7.5%, raising production to close to 225 megawatts.

It is important to note that, with the exception of the 50 megawatt Schiller plant in Portsmouth operated by PSNH, these plants are typically smaller operations with capacities around 15 to 20 megawatt capacity. Most of the other plants were built in the mid-to-late 80s when the utilities were actively pursuing this industry and negotiated 20-year power purchase agreements with them.

Interest in biomass as a source of heating has also been increasing for residential, commercial, and municipal uses, thanks in part to rebate programs and other sources of funding the last few years. New Hampshire's new commercial and industrial rebate program for wood pellet boilers issued 13 rebates in state fiscal year 14; none are located in the Central NH Region. In 2012/2014, five rebates were issued under the residential wood pellet program in the towns of Pittsfield, Warner, Hillsborough, Bow and Canterbury.

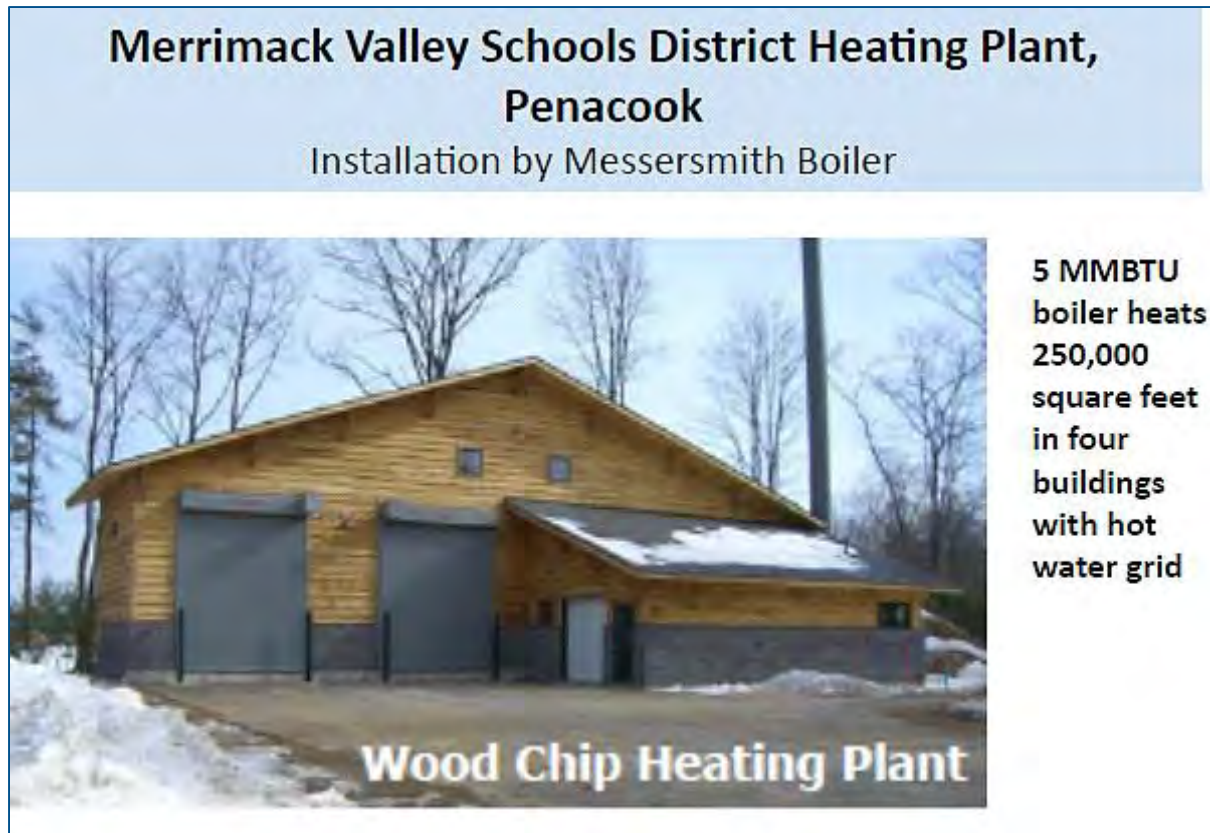
Recent data shows that 16 municipal/institutional **wood chip** heating systems have been installed statewide; in the Central NH Region, two systems have been installed, one at the Merrimack Valley School District in Penacook and Pembroke Academy in Pembroke.

Wood Chips/Wood Pellets

Wood pellets are typically composed of low-grade material, harvested during forestry operations or produced as a by-product of lumber and wood product manufacturing (e.g., sawdust). Wood chips can be from the whole tree, bole chips from the woods or chipping plants or pulp quality chip from sawmill or chipping plants. The whole tree chip is normally used in large industrial wood-to-energy facilities and are often re-ground at these facilities for a more effective flow of the supply. Bole chips are most often used for smaller, thermal boilers and they produce less ash and tend to combust more efficiently; pulp chips are usually debarked and are chipped to precise size specifications. Some boilers can switch between the two sources. There are many differences between these two sources, including costs. Wood pellets, on a heat-equivalent basis, are more expensive than wood chips. There are also fewer suppliers for pellets and emissions from chips can be higher if there are no emission controls; the ash is often used as a soil additive by farmers.

Wood pellet appliances are often the best option for residential and small commercial applications. For larger installations, wood pellets are sometimes selected because some wood pellet heating systems are initially cheaper than comparably sized chip systems; however a wood chip heating system at community-scale facilities, such as schools, can have a lower lifetime cost than a wood pellet system. Any proposed installation should be evaluated to determine the best fuel and system for the specific application.

Figure 9.6: Merrimack Valley Schools District Heating Plant



Source: *Presentation by NH Wood Energy Council at Local Energy Conference, April 14, 2014*

Municipal/Institutional **wood pellet** heating systems in New Hampshire now total over 29 systems, including the following locations in the Central NH Region: the New Hampshire Department of Resources and Economic Development's warehouse in Allenstown; Hopkinton town garage; New England College in Henniker; and New Hampshire Audubon in Concord.

New Program

New Hampshire is one of five states that was recently awarded funds from the U.S. Department of Agriculture to stimulate development of wood energy projects. The New Hampshire Wood Energy Council/Support Team is a diverse group of biomass stakeholders that is launching the program and the North Country Resource Conservation and Development Council is overseeing the effort. The \$250,000 grant was received in September of 2013 and will run for three years.

The initiative is intended to help expand institutional and community scale wood biomass thermal energy in NH by providing education to interested community and business leaders and facilitating the exploration and establishment of wood energy projects. The initiative will provide technical expertise (engineering) necessary for facility owners and operators to make more informed, technology decisions on whether heating with wood is a viable option. The group will reach out to a wide number of potential users of wood biomass energy, including but not limited to schools, builders, engineers, architects, financial service providers, local energy committees, health care facilities, building owners, plumbers, and residential developers/managers, with information, case studies, and on-the-road visits to facilities. The project is targeting feasibility assistance for up to 45 potential facility owners, resulting in at least five installations. See the New Hampshire Wood Energy Council's website for information on the rollout of the Program (www.nhwoodenergycouncil.org).

Solar

According to the U.S. Department of Energy, demand for solar is at an all-time high; in the first quarter of 2012, 85% more panels were installed compared to the first quarter of 2011. Once thought of as not practical in northern climates, solar energy has much potential for providing clean, reliable and safe energy. Solar technologies have proven to be successful in New Hampshire and continue to be a viable option both commercially and residentially. As technologies continue to improve and costs lower, solar thermal collectors and photovoltaics are becoming more competitive in the marketplace.

The Cost of Solar Energy

The challenges for solar installation include the installation costs and some of the “soft” costs such as permitting and interconnecting the system to the power grid. However, the cost of solar panels or solar modules has been falling significantly, from \$76.67/watt in 1977 to just \$.68/watt today (www.costofsolar.com) and is expected to continue dropping in the near future. Grid-tie (connected to your electrical utility company’s power “grid”) has not only become more mainstream but the decreasing price is attributed to many factors, including technology improvements such as the mini inverter. Each panel in an array has its own on-board inverter which eases the effects of partial shading on the panels. The number of qualified installers has also continued to expand and more electricians are gaining experience in wiring solar installations.

There is also an initiative launched in 2011 by the Department of Energy called SunShot with the goal of making solar energy resources more affordable and accessible for everyone. The target is to reduce the total installed cost of solar energy systems to \$.06 per kWh by 2020. For more information on this initiative, follow this link: www.energy.gov/eere/sunshot/sunshot-initiative

The NH Office of Energy and Planning (OEP) is a recent recipient of a grant as part of the New England Solar Cost Reduction Partnership (NESC RP) from the US Department of Energy’s Rooftop Solar Challenge II Program. The intent of this grant is to increase implementation of solar photovoltaic (PV) by driving down its associated costs. Under this grant, NH is focusing on the “soft costs” associated with residential permitting, zoning and interconnection. Statewide model permitting and zoning, a guide to the utility interconnection process, and additional educational resources, including training, will be developed for use by municipalities and made available through OEP’s website (www.nh.gov/oep).

Solar Energy Use

In 2013, solar installations in the U.S. accounted for 31% of new electricity generation installed. According to the Interstate Renewable Energy Council, (IREC), residential capacity installed in 2013 grew by 68 percent. A total of 145,000 residential PV systems were installed during that year. Growth in this industry is driven by many factors and certainly varies by sector and state. The federal tax credit is still available, installed costs continue to decline and state and utility rebates all are contributing to the solar market growth. By many standards, this is still an industry that is in its relative infancy when you consider that in 1985 annual solar installation demand stood at 21 MW.

In 2005, New Hampshire's largest solar array was the 48kW solar array on the roof of the Stonyfield Farm yogurt factory. It remained the largest in the state until PSNH installed a 51 kW array on their roof in 2009. In 2012, New Hampshire's largest solar array was the 525 kW solar array installed on the top level of the Manchester Airport parking garage. In a recent pilot program, eight solar panels were installed by PSNH on utility poles, four in Nashua and four in Berlin, with the energy generated by each 200 watt panel directed into the local distribution system. The output can be monitored online and the panels were provided at no cost for a period of six months as part of the pilot program.

In the Central NH Region, over 17 commercial and industrial solar rebates have been issued, with the largest number of rebates issued in Concord at six. Other communities with rebates issued include Boscawen, Loudon, Chichester, Warner, Bow and Henniker. Some notable projects in the region include a solar hot water installation that features 12 flat solar collectors that reheat the gas water heater at the Common Man Restaurant in Concord, a solar electric array at the Comfort Inn also in Concord, a 5.76 kw awning mount (also including 2 car charging stations) at Grappone Toyota in Bow, and a ground mount solar hot water installation at Concord's Central Fire Station. With the Peterborough project just getting underway with a grant from the Renewable Energy Fund in 2014, New Hampshire will have a 950 kilowatt solar array installation, the largest such array in New Hampshire to date. The installation will be built by Borrego Solar of Lowell, Massachusetts, and will be located on the site of one of the Town's former sewage lagoons and is expected to generate one megawatt of electricity annually – enough to power the nearby sewage treatment plant and perhaps other municipal buildings.

Figure 9.7: Common Man Hot Water Solar Installation, Concord



Source: *Revision Energy*

The residential market continues to grow as well with small units being installed in domestic homes to supply a proportion of the household electricity needs. More than 1,200 statewide systems have been installed since the PUC established the rebate program in 2009. A good source of information on solar energy for residential homes can be found at <http://www1.eere.energy.gov/solar/pdfs/44792.pdf>.

As solar systems become more mainstream, there is developing interest in looking at the role of zoning and land use regulations to ensure that solar renewable energy projects are compatible with existing land use regulations. Looking at ways to support renewable energy projects that are not overly restrictive or contradictory to the installation of the systems within the framework of “sound” community development is important. Some potential considerations by communities include whether the systems are considered an accessory use or a conditional use in certain areas, height and setback limitations, scale, and aesthetics (i.e. glare).

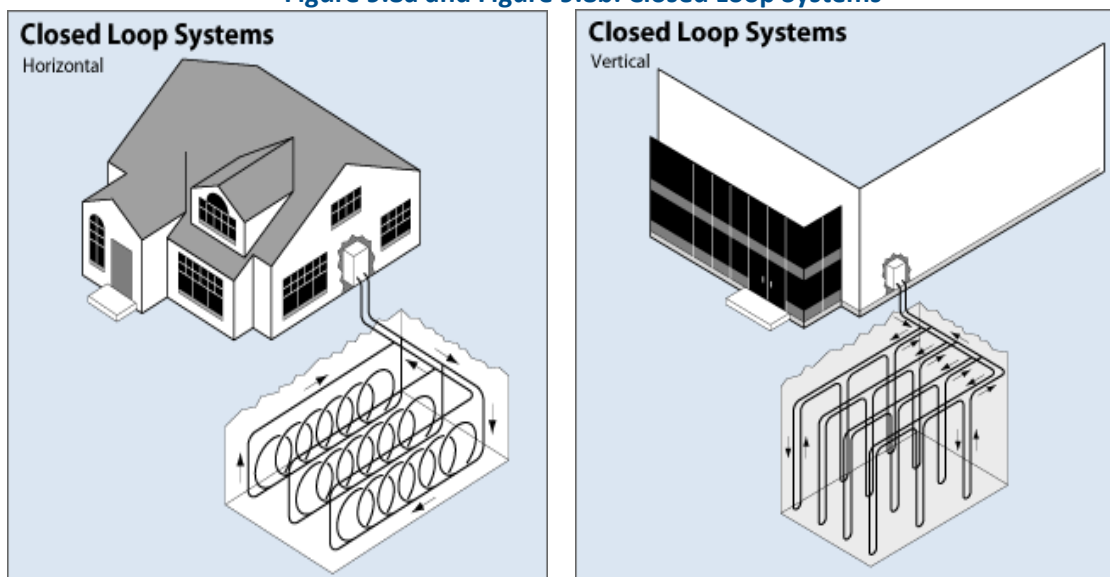
Geothermal

Geothermal energy is defined as two types.

The first utilizes high temperatures of deep bedrock in areas that have strong geologic activity, often the site of hot springs. Water is usually pumped down through deep wells, some as deep as 4 or 5 miles, to access rocks with temperatures around 212°F or higher. The water is heated by the rocks and is drawn back to the surface to produce steam which can then be used to drive turbines and generators to produce electricity. These rather large systems are typically found in the western US; New Hampshire has only one potential site located in the White Mountains area.

The other type of geothermal energy uses the more readily accessible soils where the temperature of the ground is 50 to 55°F at 4 or more feet below the surface (below the frostline). This utilization of energy in the ground is more correctly termed geothermal heat pump system, ground source heating or "geoexchange." There are two main components, the heat pump and the circulation system that is drawing the heat from the ground. Using electricity, heat pumps move a glycol solution through an underground system of pipes. There are typically four basic types of ground loop systems; three are closed-loop systems, horizontal, vertical and pond/lake and the fourth is the open-loop system. One type of residential installation is the horizontal configuration in which the piping is buried in a shallow trench 4 to 6 feet deep alongside a home (see drawing below).

Figure 9.8a and Figure 9.8b: Closed Loop Systems

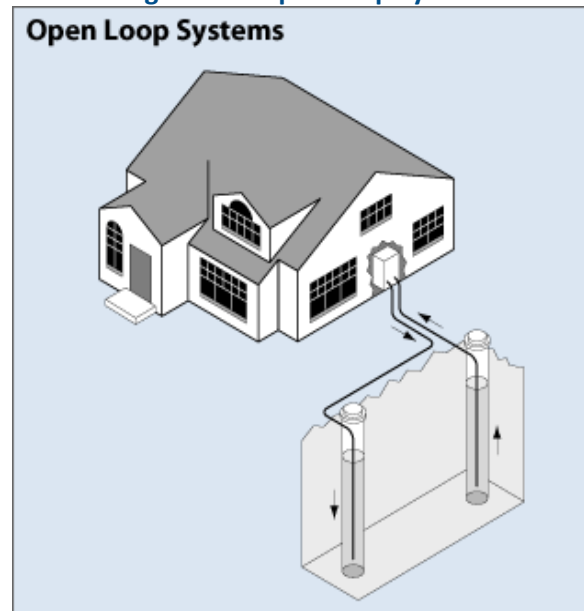


Source: www.energy.gov/energysaver/articles/geothermal-heat-pumps

The vertical system where the piping is enclosed in wells which penetrate deep into the ground is shown above and is often used for commercial building or schools because the horizontal system would simply require too much land area. The advantage with these vertical closed loop systems is that, in these deep wells, the piping can come in contact with the ground water and water is a highly efficient medium for transferring the heat from the ground to the circulating fluid.

The open loop system uses well or surface water as the heat exchange source. Once the circulating fluid has cycled through the system, the water returns to the ground via another well as shown in the diagram below.

Figure 9.9: Open Loop System



Source: www.energy.gov/energysaver/articles/geothermal-heat-pumps

These systems are becoming more popular but they do have some limitations that can restrict their use. The units can be very expensive with upfront costs in the range of \$20,000-\$35,000 or more. The differences between a closed loop and open loop system for well systems tend to be specific to the site in question and requires careful study of the site characteristics.

There are other hybrid type systems that use several different geothermal resources that won't be discussed here but can be found at: www.energy.gov/energysaver/articles/geothermal-heat-pumps.

In New Hampshire, geothermal systems are regulated by the Department of Environmental Services (DES). The Environmental Protection Agency (EPA) requires states to inventory several classes of injection wells. Open loop wells are considered Class V injection wells which needs to be registered with DES. Closed loop systems also are required to register with DES. For more information, see

www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-23.pdf.

Merrimack County Nursing Home: “A Geo Dream”

An example of a large and successful geoexchange project in the Central NH Region is the Merrimack County Nursing Home (MCNH) in Boscaawen, NH. This is a nursing facility that, on average, has about 290 residents and a staff of 425, and is roughly 235,000 square feet.

The building is heated and cooled by an all geoexchange mechanical system. The building uses water drawn from 16 standing column wells on the property to circulate through 326 water to air heat pumps which draw the energy out of the 60°F well water in the winter. All 16 wells are located in the nursing home’s parking lot. Split up into two well fields, eight wells are located in the upper parking lot, and eight in the lower, with the farthest well 850 feet from point of entry into the building. Each eight-well field is piped to its own supply and return manifold. The caps are protected by manhole covers, and can be found in the green spaces between parking areas. Each well took about six days to drill. The well water, except for a small stream, is returned to the wells at 55°F. This same system provides air conditioning over the summer with a heat pump located in each resident’s room where the temperature can be adjusted to between 68° and 75°F.

Suspended above drop-ceiling tiles are either three or four-ton ClimateMaster TS units with copper-nickel heat exchangers. The majority of the units serve two bedroom areas. With the smaller systems, air movement is limited to two rooms, greatly reducing the threat posed by airborne pathogens. “I was skeptical at first,” said Sid McDonald, director of facilities at MCNH. “The bugs got worked out the first year the system was in, and ever since then, it’s been phenomenal.”

Aquifer flow under MCNH was much better than expected. The flow of water in the wells is so steady, easily maintaining design temperature despite the influence of system geoexchange, that there’s no need even for a five percent bleed-off of water. The supply of waterborne BTUs is so good that, for eight or nine months of the year, only 10 of the 16 wells are used. So, just to keep things equal in the wells, the system is set up to tap from different wells on a rotating basis year-round.

“It’s really amazing how well the system has worked out, almost like a dream,” said Skillings, President of Skillings and Sons, the drillers for the project. “By rotating wells, MCNH not only saves even more electric, but conserves pump life and the aquifers as well.”

Source: (Based on article by Dan Vastyan, “Geothermal Think Tank Takes on the Extraordinary Job”, Energy Systems, September, 2012.)

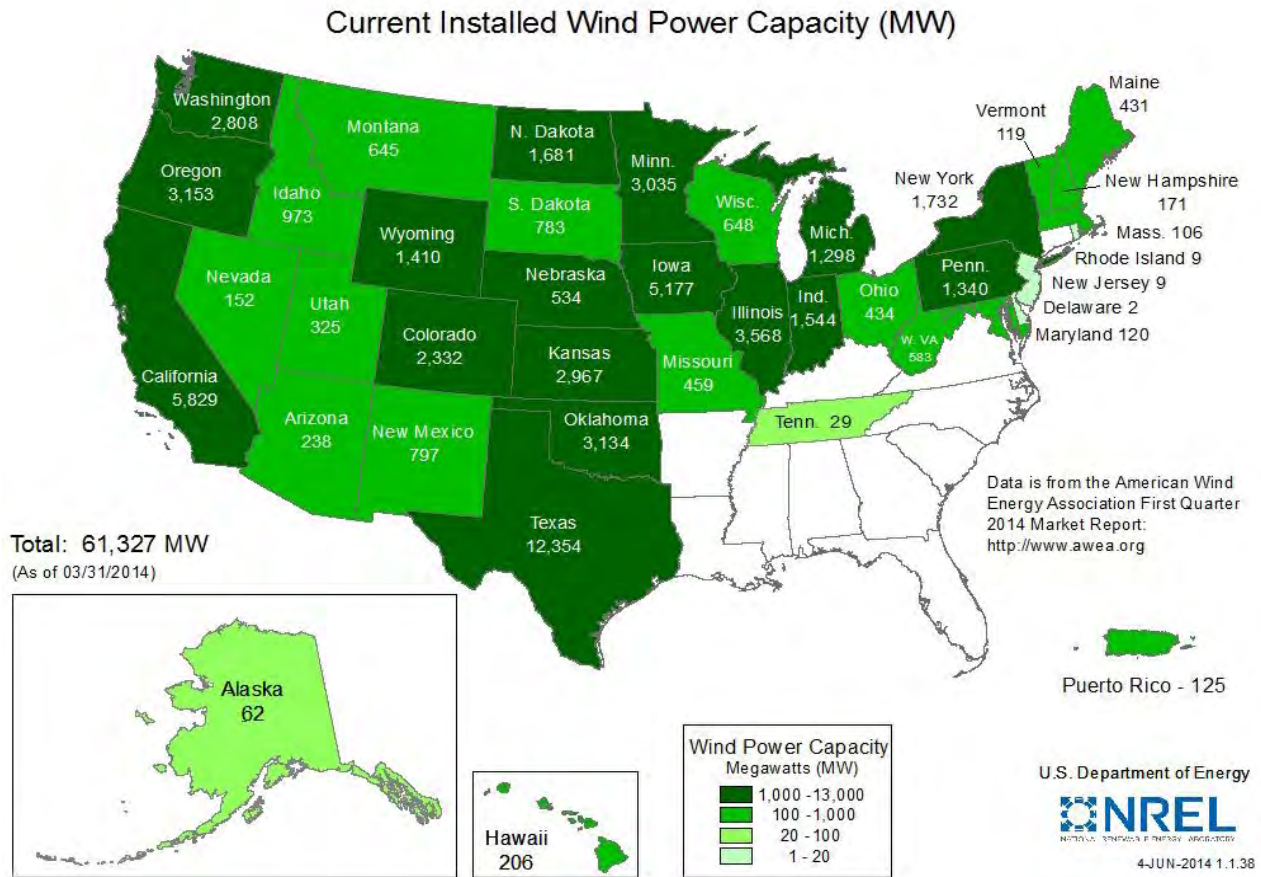
Wind Power

While New Hampshire may not have the wind power capacity or potential of other states (see map below), there have been three major wind projects approved by the state’s Site Evaluation Committee (SEC) and others are in the queue. SEC functions as the state’s permitting authority for the review, approval, monitoring and enforcement of compliance in the planning siting, construction and operation of energy facilities. See www.nhsec.nh.gov/index.htm for more information on the Committee.

Most of the US wind power capacity is from Texas up to North Dakota and the west coast. While it is evident from **Figure 9.10** that New Hampshire certainly has wind power potential, viable sites for wind turbines exist mostly between 2,500 and 3,500 feet in elevation. Such locations, particularly those without existing development can be aesthetically or ecologically sensitive. While the “wind farm” development is an intensive undertaking, there have been advances in in community scale wind turbine

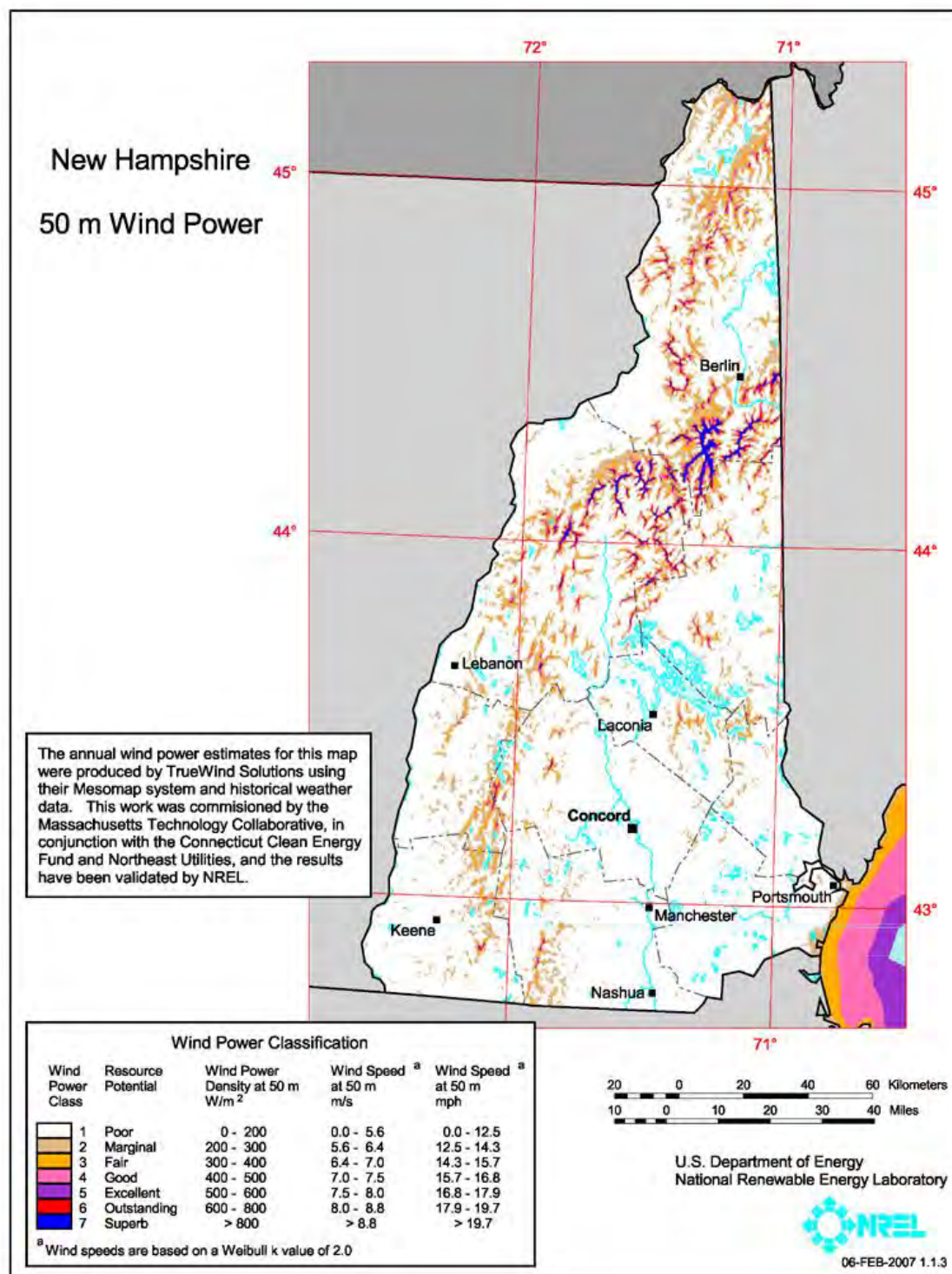
technology and the interest continues, albeit on a limited scale when compared to other renewables such as solar and biomass.

Figure 9.10: Current Installed Wind Power Capacity (MW)



Source: http://apps2.eere.energy.gov/wind/windexchange/wind_installed_capacity.asp

Figure 9.11: New Hampshire Wind Power



Source: http://apps2.eere.energy.gov/wind/windexchange/windmaps/community_scale.asp

Examining [Figure 9.11](#) above, it is evident that the areas with the most potential for large scale wind projects are in the western part of New Hampshire and in the White Mountains area – one viable reason for the three major wind projects currently in operation being located in Lempster, Groton and Dixville/Millsfield.

Hydropower

Hydropower, or hydroelectric power, is considered to be the most common and least expensive source of renewable electricity in the United States today. According to the U.S. Energy Information Administration, historically, all renewable electricity generated in the United States came from hydropower resources. In NH, close to 30% of renewable electricity is provided by hydropower.

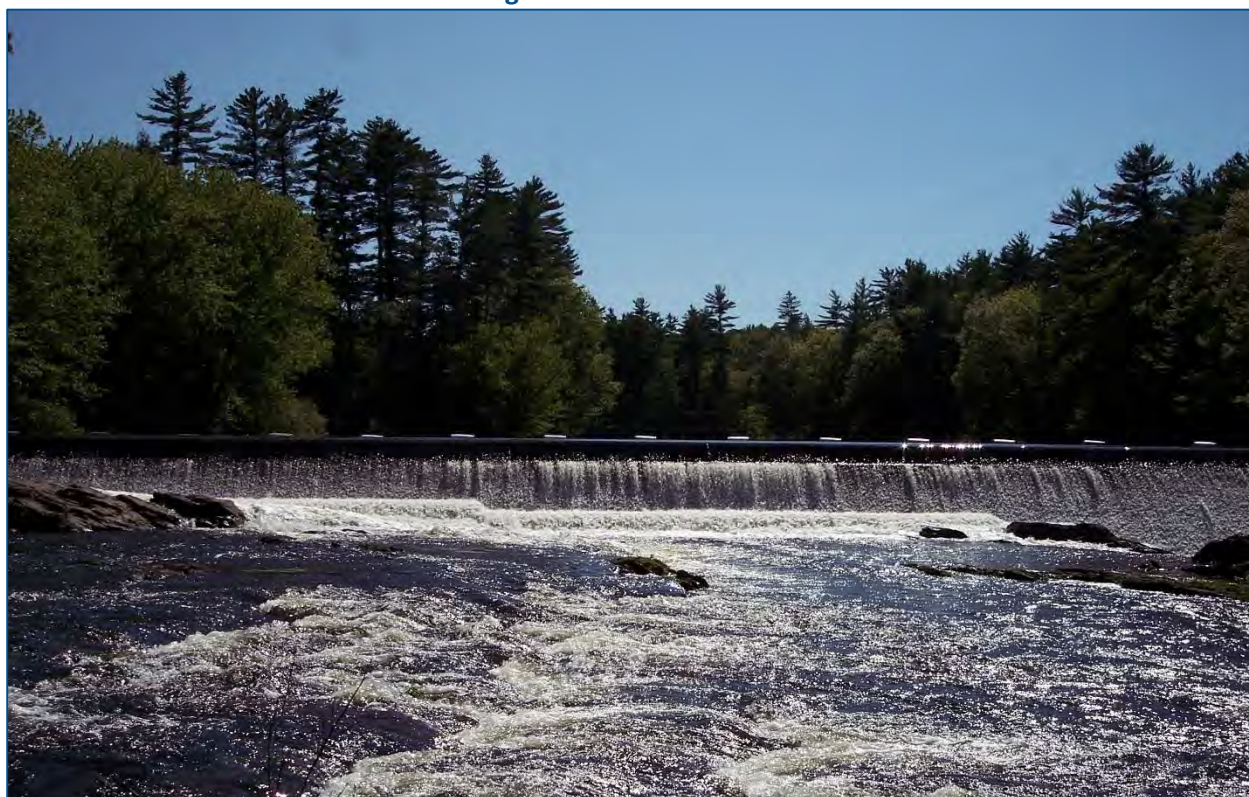
New Hampshire has a hydropower advantage for the simple reason that, broadly speaking, it is a river valley. Sixty-seven percent of the state is drained by the Merrimack River. Hydropower technologies use flowing water to create energy that can be captured and turned into electricity. There is a long history of hydro not only in the state but in the Central NH Region.

Below is a list of the current facilities operating in the Central NH Region.

Penacook – upper and lower falls located on the Contoocook River, operated by Briar Hydro Associates and certified by Low Impact Hydropower Institute (LIHI) through 2015. (2,800 kilowatts)

Rolfe Canal – operated by Briar Hydro Associates and certified by LIHI, the facility is located on the Contoocook River on the north end of Concord. Current certification expires in 2017. (4.28 megawatts)

Figure 9.12: Rolfe Canal



Source: [Low Impact Hydropower Institute](#)

Jackman Hydro – operated by Northeast Utilities, the parent company of PSNH, the facility is located in Hillsborough on the north branch of Contoocook River. (3.6MW)

Garvin Falls – operated by Northeast Utilities, the parent company of PSNH, the facility is located on the Merrimack River. (12.4MW)

The LIHI is a non-profit organization that focuses on the reduction of hydropower generation impacts through a certification process. Certification through the LIHI means that the hydropower facility has been found by the Institute to meet or exceed the Institute's Certification Criteria which address eight key areas: river flows, water quality, fish passage and protection, watershed protection, threatened and endangered species protection, cultural resource protection, recreation, and facilities recommended for removal. Certification is designed to provide consumers with assurance that a facility has avoided or reduced their environmental impacts pursuant to the Low Impact Hydropower Institute's criteria. Once certified, the owner or operator can market the power from the facility to consumers as produced by a LIHI Certified Facility. Certification from the Institute may also qualify the power produced for other "green" energy certification programs.

One statutory change that is favorable to small hydro facility owners is SB 218 that was signed into law June 19, 2012. The changes in Section 9 of the law allow hydro facilities of one megawatt or less that are connected to the grid to qualify for the state's RPS Program under Class IV (the class for existing small-scale hydropower), regardless of whether or not these facilities have fish passages. The Granite State Hydropower Association (GSHA) estimates that approximately 50 facilities totaling roughly 20 megawatts could potentially qualify statewide.

The Section 9 amendments increase the supply of Class IV RECs, making it easier for suppliers of electricity to purchase these RECs and thus avoid the potentially more expensive form of compliance, alternative compliance payments. The changes also allow more of the money spent on Class IV RECs to go to small-scale hydro facilities in New Hampshire.

ENERGY STORAGE – the Potential Impact

There are many initiatives currently underway to develop new storage technologies to address the challenge of storing energy from intermittent sources such as solar, hydropower and wind. These new initiatives will eventually lead to better integration of renewable energy sources into the grid. Launched in 2009, the Department of Energy's Advanced Research Projects Agency – Energy (www.arpa-e.energy.gov/) is investing funds to further the study of projects/initiatives ranging from battery storage for transportation to grid-scale energy storage.

ENERGY EFFICIENCY PROGRAMS AND RESOURCES

Many organizations as well as state and federal agencies provide numerous incentives and programs for citizens, businesses and local governments to take advantage of energy efficiency measures. While this list is by no means complete, there is an attempt to create a useful source for information on energy efficiency assistance.

CORE ENERGY EFFICIENCY PROGRAMS (NH Saves)

The CORE Electric Programs were funded initially by a portion of the System Benefits Charge (SBC) on customer's bills. The Programs represent a portfolio of cost-effective electric and gas programs available to all New Hampshire residents, businesses, municipalities, nonprofits, schools and

universities. Recently, the Programs have been supplemented by funds secured by the utilities from the ISO-New England's Forward Capacity Market, and the Regional Greenhouse Gas Initiative (RGGI). Funding for the Natural Gas Utility Programs is through the Local Distribution Adjustment Charge (LDAC) on customer's bills. These energy efficiency programs are administered by New Hampshire's four electric and two natural gas utilities and are intended to assist in making energy efficiency improvements by providing incentives for weatherizing homes, upgrading to more efficient lighting and appliances and purchasing high efficiency gas and hot water systems. Other programs, such as the Large Business Energy Solutions (200 kWh or more; 40,000 therms or more) and a Municipal and Small Business Program, offer incentives for high efficiency electric and gas technologies such as lighting, programmable thermostats, coolers, hot water measures, refrigeration, etc., and are available for businesses and municipalities retrofitting existing buildings, performing retrofits or new construction. There are also education/training opportunities on such topics as the energy code and energy audits.

One program of interest for municipal customers is PSNH's Smart Start Program. PSNH pays the upfront efficiency improvements and the customer pays over time with the savings obtained from the lower energy costs.

Following passage of SB 123 in 2013, the utilities were required to set aside \$2 million dollars of the RGGI auction proceeds for a municipal program, including school systems. Following the program's development, letters were sent to municipalities in January, 2014. Utility representatives have contacted all community officials as of the writing of this Plan.

Prior to 2014, the utilities had completed \$1.5 million in municipal energy efficient work each year; the dedicated \$2 million is allowing them to now do more targeted outreach. The utilities are also supporting the Local Energy Working Group (LEWG), to conduct outreach to municipalities (www.nhenergy.org). Funds are available for municipal customers to assist in hiring a contractor to provide technical assistance to help identify energy efficiency improvement opportunities and to help communities manage a project, if there isn't capacity at the local level. Each utility may have funding via a revolving loan fund to assist municipalities in paying for the improvements. Websites for further information on some of the programs include:

- Energy Code Training: www.nhenergycode.com
- ButtonUp Workshops: www.myenergyplan.net/buttonup/
- Business Seminars: <https://www.psnh.com/NewsEvents/Seminars.aspx>

Associated Grocers of New England, Pembroke

Associated Grocers of New England (AGNE) was recognized by Food Logistics Magazine as one of the Top Green Providers for an LED lighting project that is saving the company significant energy costs. The project, managed by Leading Edge Design Group (LEDG), used best-in-class LED technology through Digital Lumens fixture upgrades that deliver intelligent light within the 380,000 square foot distribution center located in Pembroke which includes docking, cold storage, maintenance, dry goods and salvage.

The consultant worked closely with AGNE to complete extensive lifecycle and energy cost analysis efforts for the project, enabling AGNE to secure significant energy rebates and assisting them in realizing a one-year return on investment in upgrading from their previous T5 HO fluorescent lighting to the Digital Lumens Intelligent Lighting.

The first phase in the facility's 20,600-square-foot freezer storage was touted as a success, saving \$52,000 in costs annually, along with a projected reduction in energy consumption of up to 90 percent.

For the second phase, the facility integrated the Digital Lumens Intelligent Lighting system, replacing fluorescent lighting throughout most of the 380,000-square-foot facility, including the docking, maintenance, dry goods, salvage and cold storage areas.

Energy rebates were granted for the project. LEDG worked with PSNH and the New Hampshire Pay for Performance Program, allowing AGNE to reach close to a one-year return on its investment. See the following statistics on this project:

- Energy Use Reduction: 1,654,000 kWh
- Annual Energy and Maintenance Savings: \$190,044
- Annual Carbon Dioxide Reductions: 3.3 million pounds

REGIONAL GREENHOUSE GAS INITIATIVE (RGGI) FUND

In 2012 the General Court voted to modify the RGGI program and its associated revenue stream in New Hampshire. The law redistributes all future RGGI income that New Hampshire receives from the carbon allowance auctions from competitive grant programming administered by the Public Utilities Commission to, in part, ratepayers, with the remaining portion going into the existing CORE programs.

New Hampshire Pay for Performance

The New Hampshire Pay for Performance (NH P4P) is now in its third year of operation and is funded through RGGI. A recent extension of this Program was granted through state fiscal year 15. The goal of this Program is to address energy efficiency needs of the commercial, industrial and municipal sectors. TRC Energy Services administers the Program and has worked with 45 facilities across the state, totaling more than twelve million dollars in construction. Five projects funded in the Central NH Region include the Hopkinton School District with a heating system upgrade and boiler replacement, Pleasant View Center with lighting and heating upgrades, Comfort Inn with boiler upgrades and insulation and air sealing improvements, Associated Grocers of New England in Pembroke (see case study insert) and Bovie Screen Process Printing in Bow with insulation and lighting upgrades. There are many resources

available on the website, particularly in the area of audits that can be used as guidance for other communities seeking to pursue energy improvements/upgrades: www.nhp4p.com

Renewable Energy Fund (REF)

Since its inception in July 2009, the Renewable Energy Fund has established five grant and rebate programs that have seen substantial demand and growth over time. The newest rebate program is for commercial and industrial wood pellet/furnace program for non-residential wood pellet heating systems. For more information on the REF rebates, see www.puc.nh.gov/Sustainable%20Energy/SustainableEnergy.htm.

The REF has awarded 1,614 rebates for renewable energy systems, and provided New Hampshire homeowners, businesses, schools, municipalities, non-profit organizations and other eligible entities with \$7,455,536 in funding towards these systems. In addition the PUC's competitive grant program has provided funding for renewable projects featuring technologies from biomass heating systems to hydroelectricity upgrades to photovoltaic, solar hot air, and landfill gas to energy, among others. In 2014, \$3.8 million was awarded in grants. The ten projects funded include some of the largest solar projects to date and also include four biomass projects, two hydro, one wind and three solar projects. While none are located in the Central NH Region, they can certainly serve as models for future endeavors in this area. These ten commercial-scale renewable energy projects will move forward with grants ranging from \$100,000 for biomass boilers at schools in Walpole and Charlestown to \$1.2 million for the installation of a 950 kilowatt solar power array in Peterborough - by far the largest such array in New Hampshire. Among other grants, a \$1 million award will help fund an 8.6 megawatt wind farm in Berlin, while a \$300,000 grant will fund a biomass district heating system at the Holderness School.

COMMUNITY DEVELOPMENT FINANCE AUTHORITY (CDFA)

Municipal Energy Reduction Fund (MERF) and Better Buildings

These Programs are managed by the Community Development Finance Authority (CDFA) and are available to help municipalities improve the energy efficiency of their municipal buildings and operating systems. CDFA was awarded \$1.5 million in funding from the Greenhouse Gas Emissions Reduction Fund, through the PUC to capitalize the MERF fund and to finance energy improvements to municipal facilities and activities.

Loans to municipalities are structured out of energy savings. The savings are calculated based on the last several years of energy usage and several years of future projected usage. The terms of the loans will be flexible and can be structured as a service contract if desired by the municipality. Eligible activities are improvements to HVAC equipment, air sealing and insulation in walls attics and foundations and installation of alternative energy sources.

Enterprise Energy Fund (EEF)

The Enterprise Energy Fund is another program managed by CDFA and is a low-interest, revolving loan fund available to businesses and nonprofit organizations to help finance energy improvements and renewable energy projects in their buildings. CDFA and its partners were initially awarded \$3.5 million in American Recovery and Reinvestment Act funding through the New Hampshire Office of Energy and Planning, to capitalize a revolving loan fund, the Enterprise Energy Fund. An additional \$3.1 million was approved in November 2010 for use only in commercial businesses. Funds will be loaned to businesses and nonprofits to reduce their energy costs and consumption; loan amounts can range from \$10,000 to \$500,000.

Examples of eligible activities include:

- Improvements to the building envelope, including air sealing and insulation in the walls, attics, and foundations;
- Improvements to HVAC equipment and air exchange;
- Installation of renewable energy systems;
- Improvements to lighting, equipment, and other electrical systems; and
- Conduction of comprehensive, fuel-blind energy audits.

CDFA administers the funds for medium and large nonprofits and commercial businesses. The Jordan Institute will conduct energy assessments and help borrowers make energy improvement decisions.

NEW HAMPSHIRE BUSINESS FINANCE AUTHORITY (BFA)

Business Energy Conservation Revolving Loan Fund

Administered by the BFA, loans are available to for-profit and non-profit entities to improve energy efficiency in New Hampshire work places. Some of the requirements for the program are a minimum loan amount of \$100,000 with a term not to exceed five years. While no minimum collateral coverage is required, the BFA will seek a security interest in all assets being financed.

FEDERAL TAX CREDITS

Available at 30% of the cost, these tax credits are available with no upper limit through 2016 for existing homes and new construction for geothermal heat pumps, small residential wind turbines and solar energy systems. Installation costs on primary and secondary homes, excluding rentals, are eligible. For residential fuel cells and microturbine systems, 30% of the cost is eligible for the tax credit; there is a cap of up to \$500 per 0.5 kW of power capacity and only primary residences can apply. All must meet energy star requirements in order to be eligible for the tax credit:

www.energystar.gov/index.cfm?c=tax_credits.tx_index.

USDA RURAL ENERGY FOR AMERICA PROGRAM

The USDA's mission for this program to aid agricultural producers and small businesses in rural areas to reduce their energy use and expand opportunities for renewable energy. The Program awards grants, guaranteed loans, or a combination of the two to a variety of projects. Eligible communities are those of less than 50,000 population and those not contiguous to a community of 50,000 or more. In New Hampshire, all communities would be eligible except Manchester, Nashua and any abutting communities. Recent awardees in New Hampshire include:

- Funspot, Weirs Beach - replaced all lighting for significant savings on electricity consumption
- EZ Steel and Fabrication, Bath - installed a geothermal heating system to replace a propane fired system
- Stuart and John's Sugarhouse, Westmoreland - purchased two reverse osmosis machines to make the production of maple syrup more energy efficient.
- Van Berkum Greenhouse, Deerfield - purchased energy curtain for greenhouse to reduce oil costs by limiting heat loss at night and blocking excessive heat buildup during the day
- Pleasant View Gardens, Pembroke - purchased a wood fired boiler system to replace an oil fired system that eliminated the use of #2 heating oil and provided significant cost savings.

Figure 9.13: Pleasant View's Pembroke Energy Plant

PROPERTY ASSESSED CLEAN ENERGY (PACE)

In 2010, House Bill 1554 was signed into law and allowed municipalities to establish energy efficiency and clean energy districts. Once a district is adopted by a municipality, an innovative financing tool called Property Assessed Clean Energy (PACE) comes into play. PACE enables municipalities to set up programs to fund energy improvements in commercial buildings and allows repayment of the investments through property “tax” assessments. It is important to note that the financing is tied to the property, not the building owner(s) and paying for investment through property taxes can allow for more affordable and longer term paybacks.

Since its adoption in 2010, concerns were raised by federal housing authorities regarding lien positions on residential mortgages. The 2014 amendments to this original legislation address many of these concerns by focusing the program on commercial buildings and clarifying lien positions by requiring agreements between all parties (municipality, mortgage lienholder, property owner and PACE lender). The cap on commercial projects in the original legislation (\$60,000) is also revised, now increasing the project size cap to \$1 million or 35% of the property and building assessment if the financing comes from the municipality; privately financed projects have no cap. The amendment also allows financing sources to include banks, financial institutions or private investors. It is important to note that municipalities can designate a partner to administer this program as it does have some complexity to it. For more information, see the Jordan Institute’s website: www.jordaninstitute.org.

SCHOOL ENERGY EFFICIENCY PROGRAMS

Unfortunately, the New Hampshire Energy Smart Schools Program is now discontinued but the Department of Education will certify buildings should funding be secured from other sources. In New Hampshire, eleven high performance schools have been built. Three of these schools are in the Central NH Region – Mill Brook Primary School, Christa McAuliffe Elementary School and Abbott-Downing Elementary School, all located in Concord.

St. Paul's School, Concord

In 2011, St Paul's School was recognized by the Northeast Energy Efficiency Partnership (NEEP) as an Energy Efficiency Leader in its Leaders Recognition Program. Over the last few years, the School has taken several steps to reduce its electricity and heating costs. Working with Unitil, its energy provider, St. Paul's has undertaken several initiatives that have resulted in a reductions of campus energy use by 1.5 million kilowatt hours since 2006. In 2010, the School expended \$150,000 in energy efficiency measures and received over \$53,000 in rebates. Some of the improvements include:

- Lighting replacements and associated controls at the Gymnasium, Hockey Center and other athletic facilities.
- Upgrades at the Hockey Center with an innovative refrigeration system that reduces energy use in the building by 30%.
- Retro-fitting the central boiler to now use natural gas as an alternate heating source instead of oil.
- Window replacements in several School buildings and faculty residences.
- The Math and Science Building and Athletic Center were designed to LEED standards; faculty residence renovations have also been designed to these standards.

PRIVATE INVESTMENT FUNDING

Besides reliance on the building owner financing the improvements, there is another type of underwriting for larger commercial buildings/owner through an Energy Services Company (ESCO). ESCOs generally guarantee the energy savings and make the upfront investment in energy efficiency.

ENERGY SERVICES COMPANIES OVERVIEW (ESCO)

With a service contract usually between 7 to 20 years, ESCOs have the responsibility for turn-key project development, as well as the technical and performance risks. In addition, the ESCO may make recommendations for retrofits, maintenance services and training, or other conservation measures.

ESCOs have many different corporate and ownership structures; some are large engineering or equipment manufacturers while others may be subsidiaries of oil and gas companies or non-regulated energy suppliers. It is also common for regulated utility companies to own an ESCO.

ESCOs typically engage clients through Energy Performance Contracting (EPC) where the ESCO assumes performance risk, guaranteeing a minimum amount of energy-use reduction. EPCs address the main issue that tends to prohibit facility owners from investing in energy efficiency projects—an inability to guarantee savings and a return on capital investments. The MUSH (Municipal, Universities, Schools and Hospitals) market has been “fertile ground” for ESCOs for many years and often uses energy performance contracts to implement projects.

When an ESCO undertakes a project, the company's compensation, and often the project's financing, is directly linked to the amount of energy that is actually saved. The comprehensive energy efficiency retrofits inherent in ESCO projects often require a large initial capital investment and offer a relatively long payback period. Debt payments are tied to the energy savings offered under the project so that the

customer pays for the capital improvement with the money that comes out of the difference between pre-installation and post-installation energy use and other costs

THE POWER PURCHASE AGREEMENT (PPA)

Renewable energy projects are typically financed separately from energy-efficiency projects, often involving some form of bonding or other debt obligation. However, ESCOs and other providers are offering another tool for financing renewable energy projects: the power purchase agreement (PPA).

PPAs facilitate the financing and implementation of onsite energy installations. An independent power producer, or provider, and a private entity, or buyer, enter into a contract where the provider finances, builds, operates, and maintains a renewable energy system located on the buyer's property and sells back the generated energy. PPAs are contracts in which the service provider pays for 100% of the costs for purchasing, financing, installing, and operating and maintaining a renewable energy system. The developer or an independent financier will own the system itself, while the client makes regular, contractually defined payments to purchase the measurable output of energy from the system. After a set contract term, ownership of the system typically transfers to the client, with all costs for the system plus profit paid to the provider from the regular payments for the energy.

For an institution with a tight budget, the PPA approach can be attractive. Typically, no down payment is required and the PPA shifts the system's performance risk from the client to the service provider. PPAs can also be considered off-balance sheet investments as the building owner does not hold title to the equipment, and payments are made through the operating budget

One reason for utilizing a PPA structure is to capture financial benefits provided by local utilities and tax incentives provided by local, state, and federal governments. Many of these mechanisms are unavailable to public and non-profit entities as they require taxable income from which to deduct renewable energy system project costs. Therefore, a PPA structure in which a school utilizes a for-profit company as the purchaser, installer, operator, and maintainer of the system allows capture of the tax incentive benefits by the for-profit entity.

STATE ENERGY POLICY INITIATIVES

While many energy issues are outside of the state's direct influence, there are several key areas where the state can focus its attention and impact policy that has a direct connection to energy costs and diversifying fuel supply. Awareness of state policies and how they can influence local energy planning and available program/project development is important as the region and its communities strive to achieve more energy efficiency.

STATE ENERGY STRATEGY (SB191)

An Advisory Council was tasked with developing a revised 10-year statewide energy strategy, the aim of which is to provide forward-looking guidance on electric, gas, and thermal energy strategies and optimize the ready availability of energy supply, energy affordability, the state retention of energy expenditures, jobs, and the use of renewable energy sources and energy efficiency policies, including demand-side policies.

The four main categories that frame the energy strategy are:

- Advance electric grid modernization;
- Increase investments in cost effective energy efficiency;

- Diversify fuel choice; and
- Increase transportation options.

More detail on the recommendations is available at:

www.nh.gov/oep/energy/programs/documents/energy-strategy.pdf

ENERGY EFFICIENCY RESOURCE STANDARD (EERS)

An EERS establishes specific targets for energy savings that utilities or non-utilities must meet through customer energy efficiency programs. Currently, New Hampshire is the only state in the northeast with no EERS or its equivalent. Nationwide, twenty-six states have an EERS with the strongest requirements in Massachusetts, Rhode Island and Vermont, which all require close to 2.5% savings annually. A long standing recommendation of earlier studies in New Hampshire, there is currently a project underway by the PUC to draft an EERS.

OTHER INITIATIVES

NET METERING

The Public Utilities Commission allows net metering which permits homeowners to receive credit for on-site electricity generation such as from a solar photovoltaic (PV) or wind turbine installation when the generation exceeds household or business consumption. This is accomplished by use of an electric meter that can run both forward and backward so that the host is billed only for the net reading on the meter. The 2012 data shows that over 1,000 installations have taken place through the four utilities, with the most by PSNH.

BUILDING ENERGY CODE

The New Hampshire State Building Code for residential and commercial buildings is now the 2009 International Energy Conservation Code (IECC). A part of the overall building code, the energy code establishes minimum requirements for energy efficient design and construction for both new and renovated buildings. By establishing the minimum requirements, the codes set the baseline for energy efficiency in new construction and major renovations to which further design upgrades and strategies may be compared. A structure built to the 2009 energy code requirements will be 14% more energy efficient than one built to the 2006 code. Likewise, the 2012 code represents a 30% improvement in energy performance over the 2006 code. These represent incremental steps toward the goal of net zero buildings by 2030. Only Durham has adopted the stricter 2012 code in New Hampshire.

Reducing energy usage in New Hampshire buildings is the main goal behind the NH Building Code Collaborative. The Collaborative has its roots in the ARRA Program's Energy Code Challenge and is presently still in operation. The goal of the Collaborative is to achieve 90% building code compliance by

Group Net Metering

Recently allowed by the PUC, this is a type of metering that allows a group of customers to combine meters as a single billing and to join together to offset their electric bill as a new metered system. While it works similar to net metering, group metering allows one generating source to share the generation with a group of customers within the same utility service area. The benefit of group net metering is that one resident, who may have the ideal location for solar, can now share the renewable energy, and costs, with others.

2017. It is estimated that New Hampshire is now at <50% compliance. The mission of the Collaborative is to bring training resources to local code enforcement officials- educational programs. There are online resources available at www.nhenergycode.com as well as publicized training events statewide. The PUC also has resources available to help answer questions and functions as a reviewer should a municipality not have a code enforcement official.

In New Hampshire, residential and commercial buildings represent 50% of the state's total energy consumption. New Hampshire buildings use more energy and emit more carbon dioxide than either the industrial or transportation sectors. (Source: New Hampshire Baseline Residential and Commercial Construction Activity and Associated Market Actors Characterization prepared by GDS Associates, March 2011: www.nhenergycode.com/live/code_docs/roadmap/APPENDIX%20A%20-%20NH%20Baseline%20Construction%20Activity%20and%20Market%20Characterization%20Report%20-%20March%202011.pdf).

The following table from the GDS Report on Building Energy Code, March 2011, shows that statewide, hospitals/clinics, retail, and schools/colleges are the greatest contributors to high levels of energy consumption per square foot. Hospitals/clinics are within the top three for eight out of New Hampshire's ten counties. Retail is within the top three for six out of ten, and schools/colleges are present in every county's top three.

Table 9.3: Top Contributors to Increased Energy Consumption, 2006-2009 – by County

County	Total Increase in Energy Consumption (MMBTUs)	Top Contributors to Increased Energy Consumption (percent of county total)
Rockingham	578,269	Retail (24.2%), Hospitals/Clinics (18.2%), Schools/Colleges (12.3%)
Strafford	416,124	Hospitals/Clinics (38.7%), Schools/Colleges (15.1%), Offices (13.0%)
Grafton	373,738	Laboratories (33.3%), Hospitals/Clinics (23.1%), Schools/Colleges (11.6%)
Hillsborough	312,438	Retail (32.3%), Hospitals/Clinics (20.6%), Schools/Colleges (15.9%)
Coos	269,416	Police/Courthouse/Prison (82.3%), Schools/Colleges (7.4%), Retail (6.5%)
Merrimack	228,704	Retail (27.9%), Schools/Colleges (19.2%), Hospitals/Clinics (16.9%)
Belknap	142,963	Hospitals/Clinics (31.9%), Retail (25.9%), Schools/Colleges (17.1%)
Cheshire	117,197	Police/Courthouse/Prison (26.7%), Schools/Colleges (22.5%), Office (11.7%)
Carroll	110,428	Hospitals/Clinics (28.9%), Retail (27.0%), Schools/Colleges (18.5%)
Sullivan	75,770	Retail (17.0%), Hospitals/Clinics (10.4%)

In 2011, GDS surveyed 173 members of the state's building code association to ask a series of questions related to barriers to code compliance. The top three barriers to code compliance that were identified are:

- Inadequate education and accessibility to resources
- Lack of accessible training
- Lack of guidance documents readily available to the building community

Another interesting result of the survey was the collection of information regarding the years of experience for code enforcement officers. Survey results indicated that the majority of code officials (53%) reported having 1-7 years of experience while 21% each reported having between 8-14 years and

more than 15 years' experience. respectively. Around five percent reported less than one year's experience.

2030 Challenge Initiative

The 2030 Challenge Initiative is an initiative that has received the endorsement of the American Institute of Architects (AIA) and its 80,000 member and many organizations, including the National Conference of Mayors. The 2030 Challenge asks the global architecture and building community to adopt the following targets:

- All new buildings, developments and major renovations shall be designed to meet a fossil fuel, greenhouse gas (GHG) - emitting, energy consumption performance standard of 60% below the regional (or country) average/median for that building type.
- At a minimum, an equal amount of existing building area shall be renovated annually to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 60% of the regional (or country) average/median for that building type.

The fossil fuel reduction standard for all new buildings and major renovations shall be increased to:

- 70% in 2015
- 80% in 2020
- 90% in 2025
- Carbon-neutral in 2030 (using no fossil fuel GHG emitting energy to operate).

These targets may be accomplished by implementing innovative sustainable design strategies, generating on-site renewable power and/or purchasing (20% maximum) renewable energy.

ENERGY EFFICIENCY WORK IN AND AROUND THE CENTRAL NH REGION

LOCAL ENERGY COMMITTEES

There are currently eight Local Energy Committees (LECs) in the Central NH Region— Bow, Henniker, Hopkinton, Dunbarton, Concord, Warner, and Webster. The newest Committee just getting started is in Pembroke. Some Committees are working on energy chapters in master plans, inventories or audits of municipal buildings and/or moving forward with specific projects such as wood pellet boilers for public facilities. When more funds were available under the ARRA Program, CNHRPC was engaged in discussions with many LECs in the region as part of the Roundtable that was organized to coordinate the work of the LECs in the region. (See page 10.39 for a summary on the specifics of the Energy Technical Assistance Program – ETAP).

Two communities have moved forward with this earlier work and adopted energy chapters – Warner and Concord. Two other communities currently have draft chapters, and Henniker is pursuing the development of its energy chapter.

LEED CERTIFIED BUILDINGS IN CONCORD

The U.S. Green Building Council's LEED (Leadership in Energy & Environmental Design) Certification program provides third-party verification of green buildings. LEED-certified buildings satisfy prerequisites to achieve different levels of certification. Prerequisites and credits differ for different LEED rating systems.

There are currently ten certified building in the Central NH Region, all located in Concord. They include the SMILE! Building, Primex addition, St Paul's Athletic Center, Audubon Society of NH, Society for the Protection of NH Forests (SPNHF), North Branch Construction headquarters and the federal Readiness Center— check the US Green Building Council's website for more data and the full listing at www.usgbc.org

LOCAL REGULATIONS

- RSA 72:61-72 enables municipalities to provide exemptions from local property taxes for specific renewable energy installations (solar, wind and wood). The purpose of this law is to remove any disincentives for the property owner to install a renewable energy system.

Close to 50% (9) of the Central NH Region's communities have enacted renewable energy exemptions:

Table 9.4: Communities That Enacted Renewable Energy Exemptions

MUNICIPALITY	SOLAR	WIND	WOOD
Bow	✓		✓
Canterbury	✓		
Chichester	✓		✓
Deering	✓		
Hillsborough	✓	✓	✓
Hopkinton	✓		
Henniker	✓	✓	✓
Warner	✓	✓	
Webster	✓		

- In 2008, the legislature enacted RSA 674:63 that gave authority to municipalities to regulate the construction of small scale wind turbines up to 100 MW. Eight communities in the Central NH Region have small wind turbine ordinances – Boscawen, Bow, Concord, Dunbarton, Epsom, Hillsborough, Hopkinton and Loudon. To date, no applications have been received.

MASTER PLANS

As mentioned previously, 35% or 7 of the communities in the Central NH Region support and encourage energy conservation and efficiency with specific goals and/or policies in their master plans. They include:

Allenstown, 2003

To expand the list of utility providers to create options for Allenstown residents when choosing energy options.

Bradford, 2004

Explore methods to encourage energy efficient housing construction.

Concord, 2008

To promote energy conservation and efficiency of the housing stock including the use of new technology, reduction of demand for heating fuel, electricity, and potable water.

To promote energy conservation and efficiency for economic development including the use of new technology, reduction of demand for heating fuel, electricity, and potable water.

To encourage Concord residents, businesses and institutions to reduce their carbon footprint

To promote regulations and policies that support sustainable land use.

To maximize energy conservation and efficiency in the City of Concord in both the private and public sectors to promote a sustainable future for Concord.

Loudon, 2001

To encourage energy-conservation methods and design for the construction of new homes and for the rehab of existing homes, using solar energy and energy-efficient materials.

Pittsfield, 2009

To address the concerns of energy and transportation costs with creative approaches that address the long range need for municipal transportation.

Salisbury, 2007

To encourage energy conservation construction and design for new homes and for the rehabilitation of existing homes.

Warner, 2011

To support energy-efficient home design and construction, including the use of on-site renewable energy production.

To offer incentives for energy efficient, environmentally sound commercial development.

To look for opportunities to improve energy efficiency and reduce energy costs when making building improvements.

To develop strong regulatory tools that promote energy conservation, efficiency, and renewable energy production.

To encourage land use patterns that minimize energy use, such as denser mixed use nodes and the development of a multi-modal transportation network.

To encourage and provide educational resources for residents to reduce private energy consumption.

To promote Warner as an energy conscious community to attract environmentally responsible commercial and residential development.

WASTEWATER SYSTEMS AND ENERGY EFFICIENCY IN THE CENTRAL NH REGION

There are several wastewater systems in the Central NH Region and these facilities are often a large consumer of energy as part of their operations. According to the Department of Environmental Services (DES), of the seven operating treatment facilities in the region, five have undergone energy audits (see **Table 9.5** for the summary).

Table 9.5: Status of Energy Audits at Wastewater Treatment Plants

Facility	Municipal Served	Energy Audit Status	Energy Improvements to Date
Allenstown	Allenstown Pembroke	No audit	VFDs installed, SCADA process control for DO. DO and ORP monitoring conducted.
Concord	Concord Bow	Detailed Process Audit	Lighting, motion sensors, energy management system for HVAC and solar water heater, staff training, process control with DO turndown, energy star roofing, energy efficient boiler
Henniker	Henniker	Lighting, Envelope and HVAC audit	Lighting, VFDs, weatherization and motion sensors. Process level audit next.
Hillsborough	Hillsborough	Lighting and Electrical Audit	No improvements to date
Hopkinton	Hopkinton	Lighting Audit	None to date
Penacook	Concord Boscawen	Detailed Process Audit	Lighting, VFD's on most pumping systems, process control with DO turndown, energy management systems, energy efficient boiler
Pittsfield	Pittsfield	Lighting/HVAC audit	Lighting and weatherization installed; solar mixes in lagoons
Warner Village	Warner	Lighting/HVAC audit	VFD's installed, implementing audit findings

VFD = variable frequency drive

SCADA = supervisory central and data acquisition system

DO = dissolved oxygen

ORP= oxidation-reduction potential

DES offers a loan program available - the Clean Water State Revolving Loan (CWSRF) that offers principal forgiveness as a way to encourage loan recipients to perform detailed process level energy audits at their facilities. Up to \$20,000 of principal forgiveness is available for a loan taken out for any eligible project. There is a template for an RFP available on DES's website

at: www.des.nh.gov/organization/divisions/water/wweb/grants.htm. There is also a loan forgiveness program available for asset management programs for up to \$30,000.

ENERGY TECHNICAL ASSISTANCE PROGRAM IN THE CENTRAL NH REGION

Much of the municipal work on energy efficiency in New Hampshire and the Central NH Region was completed under the ARRA funded Energy Technical Assistance Program (ETAP) administered by the Office of Energy and Planning. It stimulated much interest in energy efficiency projects.

Audits were also conducted through the Local Energy Audit Exchange Program, with Canterbury's Municipal Building, Chichester's Safety Building, Pembroke's Library, Safety Center and Perry Eaton Building and Hopkinton's Middle School.

Energy Technical Assistance Program - ETAP

This was an ARRA funded program that ended in 2012. The goal of ETAP was to offer technical assistance to all New Hampshire communities and counties to improve the energy efficiency of its municipal and county buildings. The program was designed to assist communities in identifying potential energy efficiency projects through energy inventories and building assessments, and to provide specific guidance to move projects forward to initiation and completion. Two million dollars was allocated for this phase of the Program; additional funds were available to implement any identified projects and was administered by OEP. The nine regional planning commissions performed two roles; facilitating the outreach to communities for this grant and providing technical planning assistance, such as writing energy chapters of master plans, conducting regulatory audits and helping municipalities compile inventory data. In the Central NH Region, 16 of 20 communities participated in the ETAP. Statewide, over 50% of communities and counties participated in the Program. Warner and Concord now have adopted energy chapters and two other communities, Boscaawen and Allenstown, have draft chapters completed by CNHRPC staff under this Program.

Table 9.6: Communities Participating in in ETAP

Municipality	# of Buildings Assessed	Other Technical Assistance
Allenstown	4	RPC Energy Chapter
Boscaawen	5	RPC Energy Chapter
Bradford	2	
Bow	5	
Chichester	1	Building Use Review
Concord		RPC Master Plan Asst.
Deering	2	
Dunbarton		Energy Inventory Tool
Hillsborough		Energy Inventory Tool
Hopkinton	4	RPC Regulatory Audit
Loudon		RPC Master Plan Asst.
Pittsfield		Park and Ride Engineering Study
Salisbury	2	
Webster	2	

ENERGY EFFICIENCY AND PUBLIC SENTIMENT IN THE CENTRAL NH REGION

What we found out from listening sessions, surveys and local master plans:

- At listening sessions, energy efficiency did not register as a stand-alone comment from people providing input on what they appreciate about the region and want to see improved.
- 35% of master plans in the region have goals that support and encourage energy efficiency and conservation.
- A random, statistically-significant UNH telephone survey of Central NH Region and Lakes Region residents indicates 90% of people surveyed want the local and state government to get involved with energy efficiency policies and regulation
- Support for energy efficiency as an investment of public dollars was second only to environmental protection.

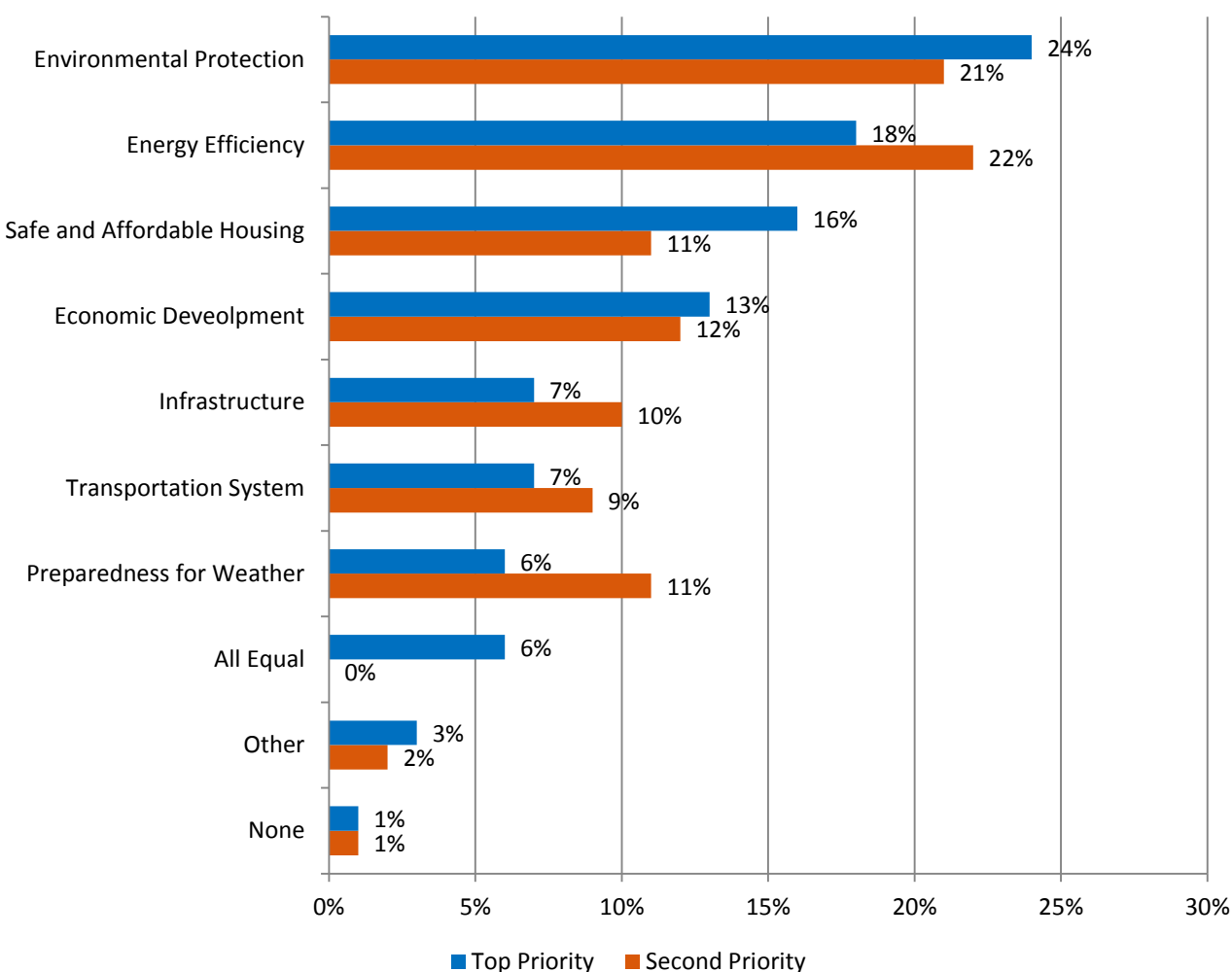
As mentioned above, the extensive public input for the Regional Plan included a 2013 telephone survey conducted by the University of New Hampshire (UNH) Survey Center for the nine regional planning commissions that gauged residents' opinions on a range of issues, including energy. There were some specific questions regarding energy policies and initiatives; two were asked of Central NH Region and Lakes Region residents and one was a statewide question. Overall, the UNH Survey results for the Central and Lakes Region (combined to ensure statistical confidence levels) show results very similar to the statewide results.

Residents view energy efficiency and energy choices as the second most important priority for investing public dollars. Residents are largely in favor of all the proposed energy efficiency and renewable energy projects, except for the concept of having public charging stations made for electric vehicles. Below is a summary of the specific energy related questions.

Investment of Public Dollars

Residents' top priority for investing public dollars is environmental protection (23%), followed by energy efficiency (17%), safe and affordable housing (17%), economic development (13%), transportation (7%), infrastructure (7%), preparedness for weather (6%), all priorities are equal (6%), something else (3%) and none of the above (1%). When the top two responses are combined environmental protection (42%) and energy efficiency (37%) are the two most cited priorities.

Figure 9.14: Priorities for Investing Public Dollars

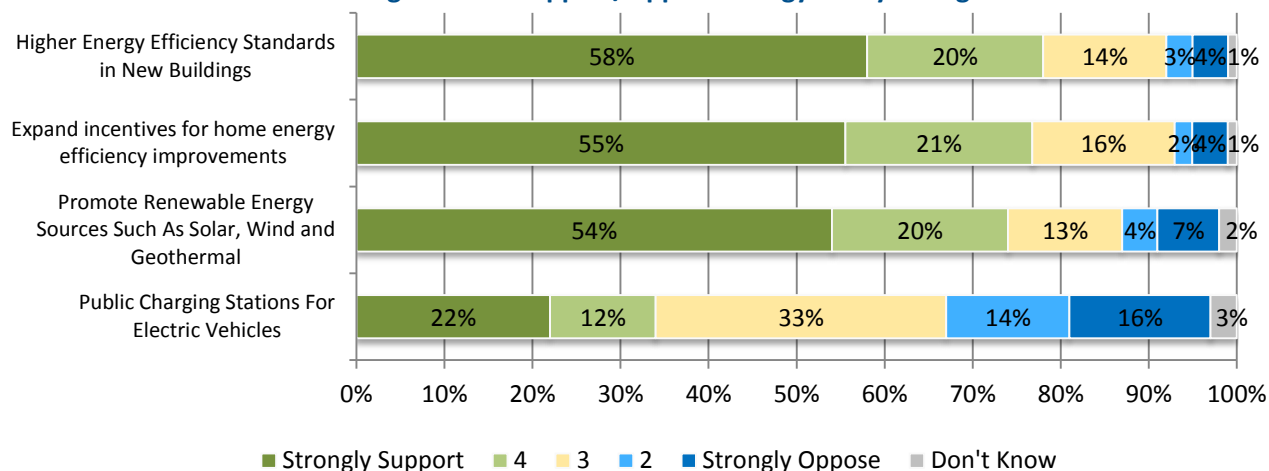


Source: *New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013*

Energy Policies

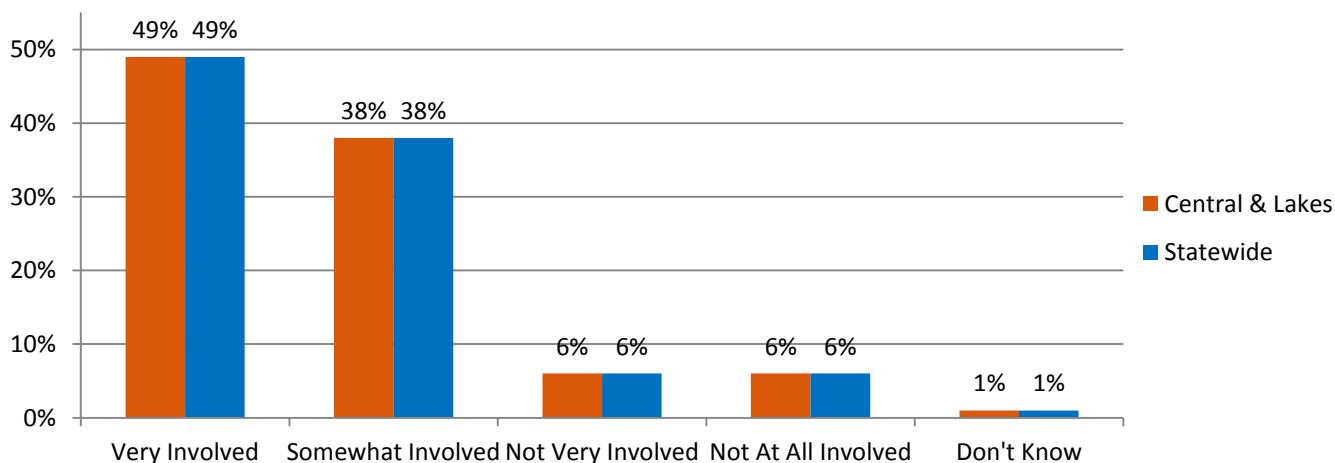
A large majority of residents (78%) support higher energy efficiency standards in new buildings (with 58% who “strongly support”), followed by expanding incentives for home energy efficiency improvements (76%), and promoting renewable energy sources such as solar, wind and geothermal (74%). Meanwhile only 34% were in support of public charging stations for electric vehicles.

- Households earning between \$40,000 and \$59,999 and those aged 60 to 69 and those who work at home are *more likely* to strongly support higher energy efficiency standards in new buildings and incentives for home energy efficient improvements.
- Those with a high school education or less and those who are not employed are *more likely* to strongly support public charging stations for electric vehicles.
- Households earning between \$40,000 and \$90,000 and those aged 60-69 are *more likely* to strongly support promoting renewable energy sources.

Figure 9.15: Support/Oppose Energy Policy Changes

Source: *New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013*

Almost half of residents (49%) think that local governments should be very involved in guidelines for renewable energy (such as large wind farms), 38% think they should be somewhat involved, 6% think they shouldn't be very involved, 6% think they should be not at all involved and 1% don't know.

Figure 9.16: How Involved Should Local Governments Be In Guidelines For Renewable Energy?

Source: *New Hampshire Regional Planning Commissions, A Granite State Future 2013 Statewide Survey Central & Lakes Region Report. July 2013*

What we can conclude is that energy efficiency is strongly supported by the local citizens in the region. As a regional planning commission, there are opportunities to support energy efficiency initiatives and planning activities that can create greater awareness and opportunities for local officials and local residents on what can be done to encourage/promote energy efficiency initiatives in our communities.

IMPLICATIONS FOR LOCAL/REGIONAL PLANNING: CHALLENGES AND OPPORTUNITIES

There is strong, broad-based support for energy efficiency in the Central NH Region. This is the most critical cornerstone to building the vision and implementation recommendations for this Chapter.

New Hampshire is known for its tradition of local control in land use development and as such, planning efforts that are sensitive to energy issues have their roots at the local level. Communities that support energy efficiency efforts also support sustaining settlement patterns that reduce transportation infrastructure, conserve natural resources and promote open space protection. Zoning controls the type and density of development and promoting more compact development furthers these efforts.

As stated earlier in this Chapter, transportation is the leading source of energy use in the region. While the region's older villages continue to serve as a node, and a model, for pedestrian friendly designs, residents also feel a strong connection to the rural character of the Central NH Region, often cited by residents as what they value the most. While it is possible to accomplish both compact design and maintaining rural character, there can be challenges that arise and need to be addressed.

There is also the increasing concern for the aging population at both the regional and state levels and its impacts on our abilities to reach destinations - for recreation, health care and social services. This has a direct correlation to the land use patterns and infrastructure of our communities and how we need to get from point A to point B. As New Hampshire's population continues to age, more compact development and transportation challenges also become pressing critical needs in many of our communities. The link between energy efficiency and transportation is a strong one and has a long history of initiatives in the Central NH Region.

Many of Central NH's communities have identified energy efficiency goals in their master plans ranging from supporting energy efficient home design and construction, including the use of on-site renewable energy production (Warner) to addressing the concerns of energy and transportation costs with creative approaches that address the long-range need for municipal transportation (Pittsfield). As renewable energy sources become more accessible, citizens and community officials need to carefully assess the needs for energy and balance this with the prevailing land use patterns in the community. Renewable energy sources presently make up approximately 7% of the electricity used. As tax credits, rebates and other incentives continue to evolve and hopefully stabilize with a consistent funding stream, it is expected that renewable energy installations will become more prevalent. While there are certainly challenges that still need to be addressed, there are also opportunities to improve on the status quo.

CHALLENGES AND OPPORTUNITIES

Many of the challenges identified in this Chapter focus on resources and funding. While there are numerous energy efficiency rebate programs, trainings and free software available, it is often difficult for local officials and volunteer board members to wade through the pages of information on numerous websites. There is a need to better align and coordinate programs so that it is easier to understand what the resources are and where to go for incentives, financing and technical assistance. For example, in order to pursue improvements in energy code compliance, a robust training and education program needs to be available consistently

An important point to remember about energy efficiency measure is that, even if individuals aren't actively pursuing energy efficiency improvements or conservation measures themselves, we all benefit from others' efforts as a reduction in energy consumption leads to lower energy rates due to load reduction and deferred investments in transmission and generation.

so that there is access to help when issues or problems arise. As mentioned earlier in this Chapter, there is also state level work that needs to be done on overcoming market barriers in the energy efficiency field.

Capacity

The majority of communities and small businesses in the Central NH Region often cite the lack of time and technical resources as obstacles to addressing energy efficiency. Everyone agrees that starting the foundation of improving energy efficiency begins with the development of a plan, but the staff resources needed to take on the tasks associated with this plan are often lacking.

According to the final evaluation conducted for the ETAP project, the technical assistance from regional planning commission staff was identified as the most valued outcome of this effort. Along with technical assistance, the second most valued assistance was the collection of the building energy information for the inventory. Implementation challenges identified from the recommendations was heavily weighted towards the inability to secure funding for the improvements and lack of staff resources to devote to the projects. Additional help from the regional planning commission staff and from others in finding funding was also identified as a critical need.

We need to find creative ways to address this issue. Some of the recommendations at the end of this chapter represent the beginnings of seeking a solution to this issue.

Building Code Education and Enforcement Gaps

As noted earlier in this Chapter, there is a continuing need for more training and education in this area. Many building inspectors are part-time or are at capacity with other demands on their time. Easily accessible, on demand training is needed across the region. Finding ways to support and connect inspectors/code enforcement officials for more peer-to-peer training also needs to be addressed.

Tracking Energy Use: Keeping Municipal Costs Down

Audits, inventories and benchmarking are good places to start when energy efficiency is your goal. Municipal energy use tracking and facility/infrastructure inventories can offer a wealth of information about energy use, types of energy used, and the efficiency of New Hampshire's rich inventory of municipal historic properties and what communities are doing to preserve them.

Tools currently available include the Small Town Carbon Calculator (STOCC) developed by UNH and Clean Air-Cool Planet that can total energy use and costs and the Portfolio Manager developed by EPA that tracks energy trends and reports for buildings and water utilities over multiple years (<http://www.nhenergy.org/calculators.html>). Many communities struggle with this phase and need consistent assistance in accomplishing this task.

Reducing Transportation Emissions in a Rural Region

Transportation use is one of the biggest consumers of energy in the region. In a mostly rural region, with dispersed settlement patterns outside of villages and downtowns and limited transit service, finding creative solutions to reducing energy usage is a challenge. The transportation sector impacts overall air quality as well as energy consumption. According to the Granite State Clean Cities Coalition (GSCCC), more than 50% of the air pollution in New Hampshire and the northeast is generated by the transportation sector. There are many initiatives currently in operation that work on the reduction of vehicle miles traveled and increased efficiencies in transportation. Programs such as the GSCCC, Commute Green and the Volunteer Driver Program are all necessary and need to continue to grow in order to ensure greater stability for our transportation future.

Financial Incentives

The number of programs/incentives that are available in New Hampshire often is a source of confusion for businesses and residents trying to take advantage of rebates or financing options. While there has certainly been a decrease in funding sources since ARRA funding has expired, the fractured number of programs and no one source for information on funding opportunities and rebates is a challenge.

There is also the concern of sustainable, consistent funding sources and finding more innovative ways to work closer with traditional lenders. The biggest hurdle many communities face is the lack of financial resources to address energy efficiency projects that have been identified.

Technology and Its Impacts

One aspect of energy efficiency that often is difficult to both understand and keep current on is the quickly changing technology in energy efficiency. With lower costs being actively pursued in the solar market and advances in energy storage, there are only positives as we move forward. Even as we see improvements from energy efficiency measures, there is the realization that additional/new facilities due to the impending retirement of current generation facilities is in our future.

Finally, there are two “bigger picture” areas that will directly impact how we obtain our energy in the future and inject more flexibility into the generation of electricity. The discussion surrounding “smart grid” technology and the micro-grid are evolving and need to continue to be monitored. Keeping current and informed on these technologies is important to bring cost efficiencies and resiliency to our communities in the future. The potential for addressing or mitigating future storm related power outages through this technology is of strong interest to our communities and the region.

CENTRAL NH VISION - ENERGY

What we heard from the surveys and public outreach sessions and what we know from research and data analysis/ trends informed the identification of the above challenges. Knowing these challenges is the starting point for crafting a vision statement as the opportunity to address these very challenges starts with the vision.

The following vision for Energy Efficiency in the region is based on all of this work, including the Region’s Local Energy Committee Roundtable that met in 2012, the region’s master plans and the public outreach results:

“Energy consciousness is a factor in development decisions that reduce energy consumption, improve energy efficiency and encourage renewable energy. The region’s communities have sufficient funding and resources to pursue local and cooperative energy projects.”

The guiding principles that follow are focused on the refinement of this vision and build the foundation for the action items that are identified at the conclusion of this Chapter. These principles represent how CNHRPC can support the achievement of the vision. These guiding principles translate into the following actions items that also can be found in the Plan’s Implementation Chapter.

GUIDING PRINCIPLES

- Encourage compact development, energy efficiency, and responsible management of resources and waste.
- Encourage the adoption of energy efficient approaches to building and site planning to promote efficient use of resources and reduce pollution.
- Strengthen the ability at the regional level to serve as a responsive resource to needs and planning issues at the local level.
- Promote efficient expenditures of public funds for the benefit of the region and its residents.
- Assist efforts to reinvigorate community centers and rural villages to maintain the character of the region's communities, utilize existing infrastructure, and preserve open space.

ACTION ITEMS

- Establish program area on CNHRPCs website that serves as a clearinghouse for energy related activities/initiatives in the region.
- Coordinate and provide ongoing forums for local and regional projects/programs that showcase best practices in energy efficiency/renewables.
- Conduct regulatory reviews for interested communities that identify any barriers to effectively reviewing and regulating renewable energy applications.
- Collaborate with others to provide customized training opportunities for local code enforcement officials to expand understanding and compliance with the state's energy code.
- Provide guidance and technical assistance to communities on the preparation of an energy chapter in master plans that connects efficient land use and energy.
- Encourage and provide guidance to communities on the use of energy audits as the first step in identifying opportunities to improve energy efficiency and reducing municipal energy use.
- Work with other partners on addressing financial and other barriers to successfully implementing energy efficiency initiatives/projects.
- Expand awareness and understanding of rebate and loan programs that can support municipal and regional efforts on energy conservation and efficiency.
- Work with communities to encourage the use of land use principles that include strategies to create connectivity to recreation and services, utilize existing infrastructure and integrate green building measures into project design.
- Forge partnerships with schools to integrate energy related topics into the curriculum and raise awareness of energy use and conservation.
- Ensure that the region is represented in any efforts to address energy efficiency measures and reduce greenhouse gas emissions at the regional and state level.
- Keep up on emerging technology for renewable energy sources and evaluate viability for applicability in the region.

RESOURCES

- ACEE. (2013). *State Energy Efficiency Scorecard*. Retrieved from American Council for an Energy Efficient Economy: <http://aceee.org/state-policy/scorecard>
- DSIRE. (2013-2014). *New Hampshire: Incentives/Policies for Renewable and Efficiency*. Retrieved from Database of State Incentives for Renewables and Efficiency: <http://www.dsireusa.org/incentives/index.cfm?getRE=1?re=undefined&ee=1&spv=0&st=0&srp=1&state=NH>
- GDS Associates. (2012, April). *New Hampshire Energy Code Compliance Roadmap, Volumes 1 and 2 and Appendices A&E*. <http://www.nhenergycode.com/live/index.php?go=roadmap>
- Mooiman, Michael. (2012, December 13). *Energy in NH: NH Energy Picture*. Retrieved from Energy in NH: <http://nhenergy.blogspot.com/search?updated-min=2012-01-01T00:00:00-05:00&updated-max=2013-01-01T00:00:00-05:00&max-results=2>
- NH PUC. (2013, November 7). *Annual Report on RGGI*. Retrieved from NH Public Utilities Commission: <http://www.puc.nh.gov/Sustainable%20Energy/GHGERF/RGGI%20Annual%20Reports/2013%20RGGI%20Annual%20Report%20to%20NH%20Legislature.pdf>
- OEP. (2012, September 5) *Energy Technical Assistance for New Hampshire Communities: Final Report*. Retrieved from Office of Energy and Planning, prepared by CLF Ventures.
- PSNH. *Core Utilities Service Areas*. Retrieved from Public Service of New Hampshire: <http://www.psnh.com/downloads/Core-Electric-Utilities-Service-Areas-Map.pdf?id=4294968709&dl=t>
- US EIA. (2014, March 27). *New Hampshire: State Profile and Energy Estimates*. Retrieved from U.S. Energy Information Administration: <http://www.eia.gov/state/?sid=NH>