

## 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/](http://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**

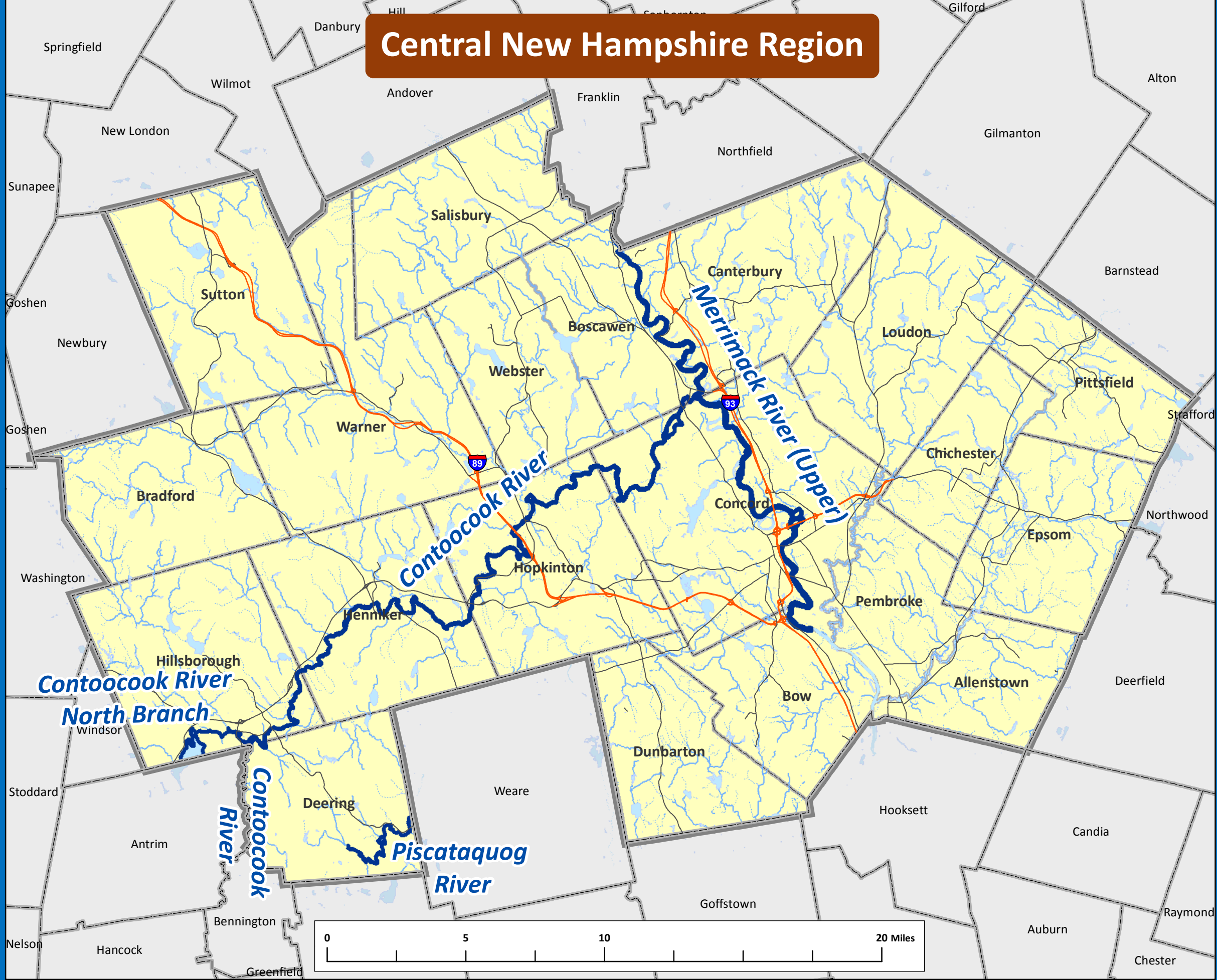
The Merrimack Conservation Plan is the final product of a two year effort facilitated by the Society for the Protection of New Hampshire Forests, working with conservation and planning professionals representing 33 private organizations and public agencies in New Hampshire and Massachusetts. In 2012, 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-](http://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

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#### Location Map

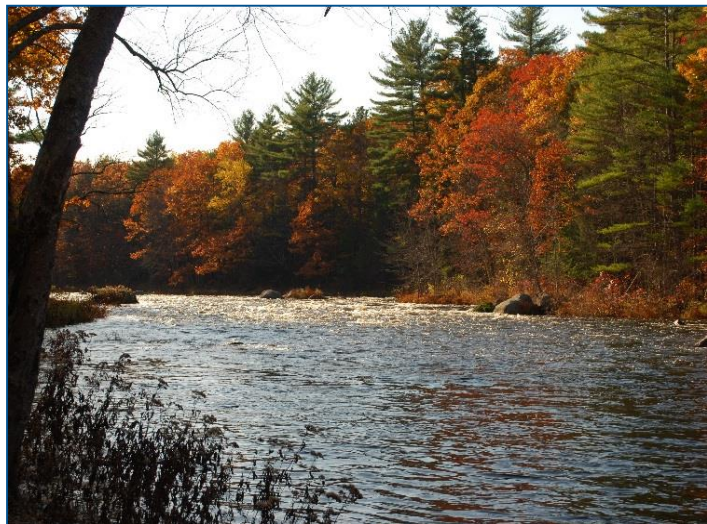


property protection against the ongoing river adjustments triggered by the avulsion. (See the Weather Hazards Chapter for a full discussion of this topic.)

### 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](http://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:

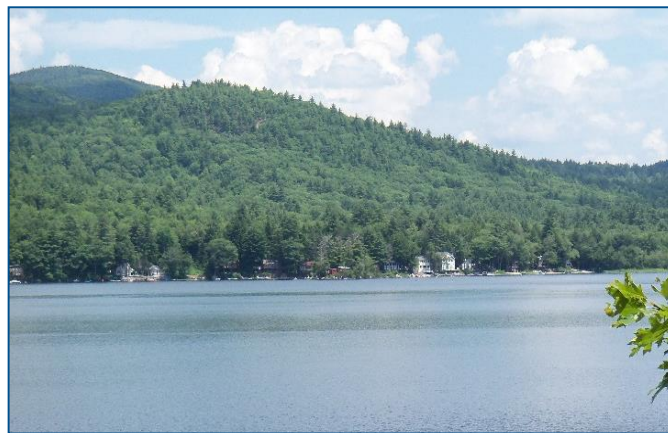
[www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf](http://www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf).

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

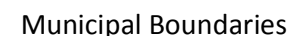
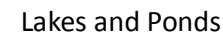
# Major Lakes and Ponds

**Map 7.2**

# Natural Resources

## Map 7.2

# Major Lakes and Ponds



**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



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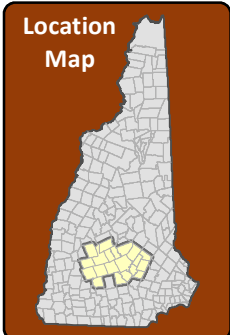
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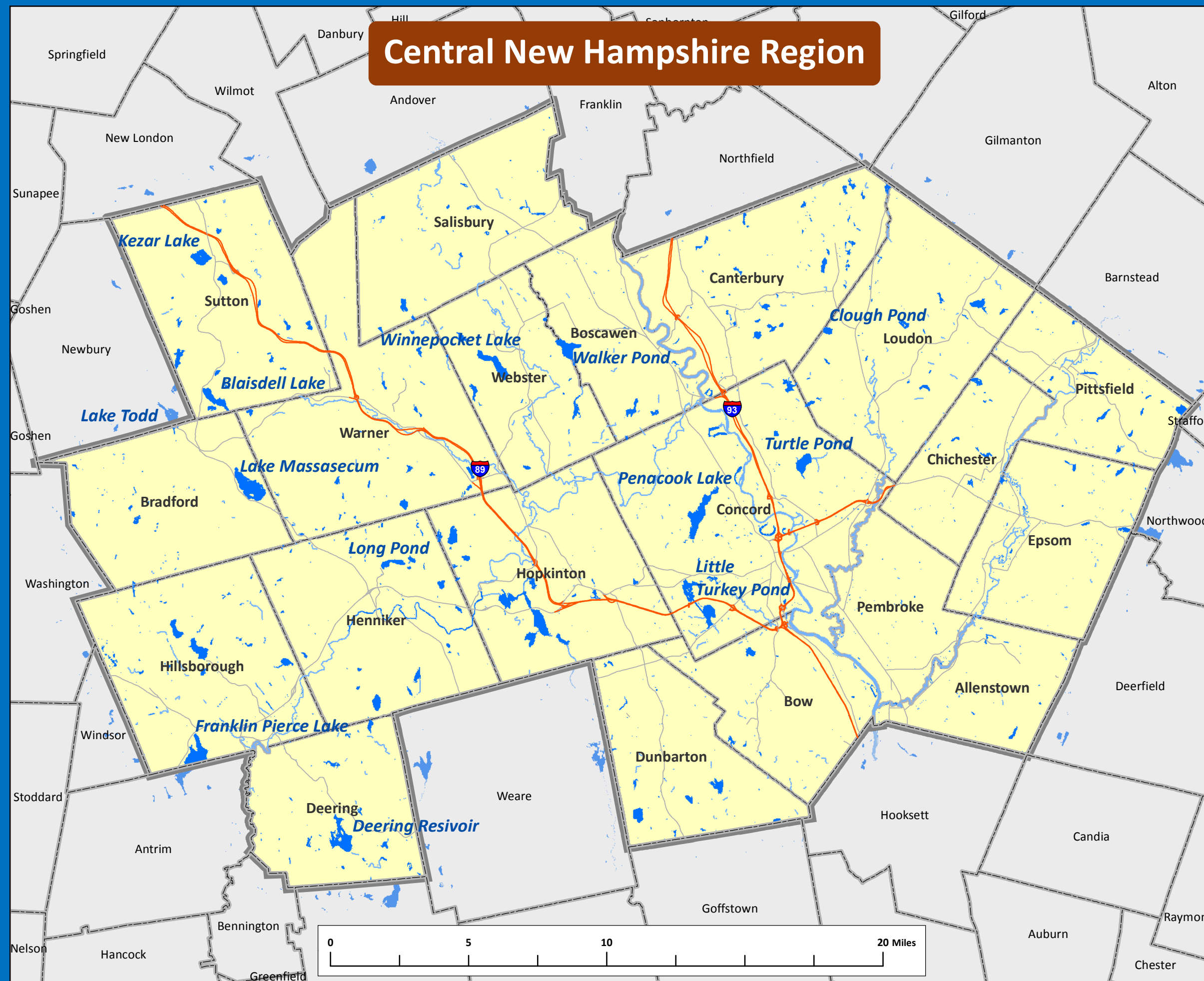
Location  
Map



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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](http://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 Allentown 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](http://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](http://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](http://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

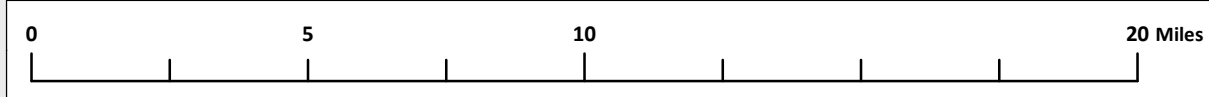
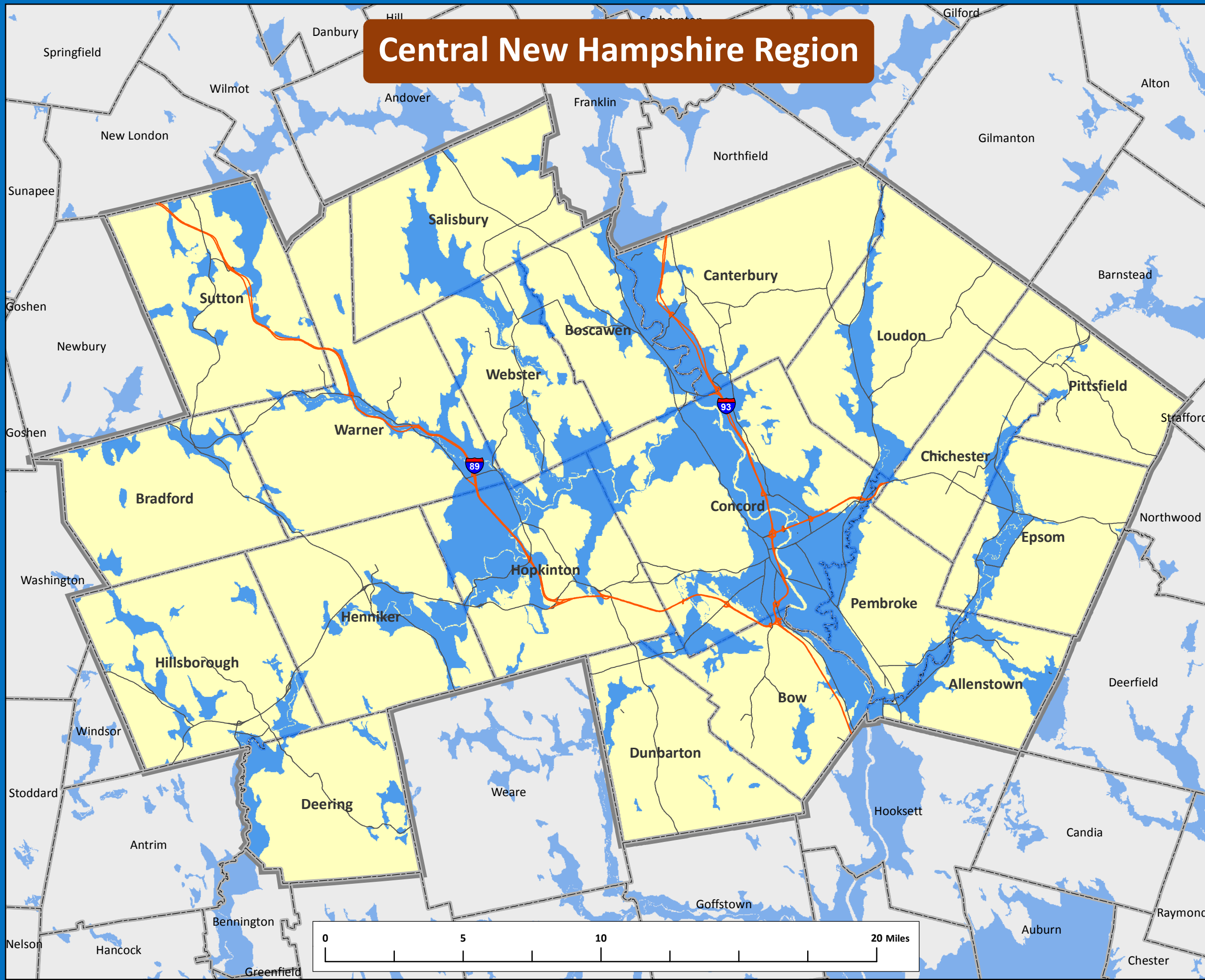
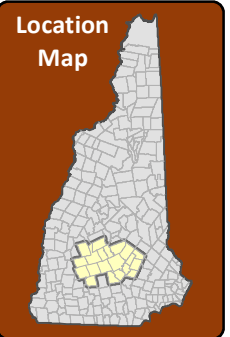
Note: For base layer legend, see Base Map 1.1.

**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
<b>GAA</b>	<b>Delineated Wellhead Protection Areas</b> Prohibits new and monitors existing high-risk users, such as landfills. Authorizes active management of potential contamination sources (PCSs) on local level.
<b>GA1</b>	<b>Groundwater of High Value for Present or Future Drinking Water</b> No land use prohibitions. Authorizes active management of PCSs on local level.
<b>GA2</b>	<b>Potentially Valuable Stratified Drift Aquifers.</b> No active management.
<b>GB</b>	<b>All Groundwater Not Assigned to a Higher Class.</b> 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
<b>Allenstown</b>	Yes	<b>Chichester</b>	No	<b>Henniker</b>	No	<b>Pittsfield</b>	No
<b>Boscawen</b>	No	<b>Concord</b>	Yes	<b>Hillsborough</b>	No	<b>Salisbury</b>	No
<b>Bow</b>	Yes	<b>Deering</b>	Yes	<b>Hopkinton</b>	No	<b>Sutton</b>	No
<b>Bradford</b>	No	<b>Dunbarton</b>	No	<b>Loudon</b>	No	<b>Warner</b>	No
<b>Canterbury</b>	Yes	<b>Epsom</b>	No	<b>Pembroke</b>	Yes	<b>Webster</b>	Yes

Source: DES, [www.des.nh.gov](http://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.

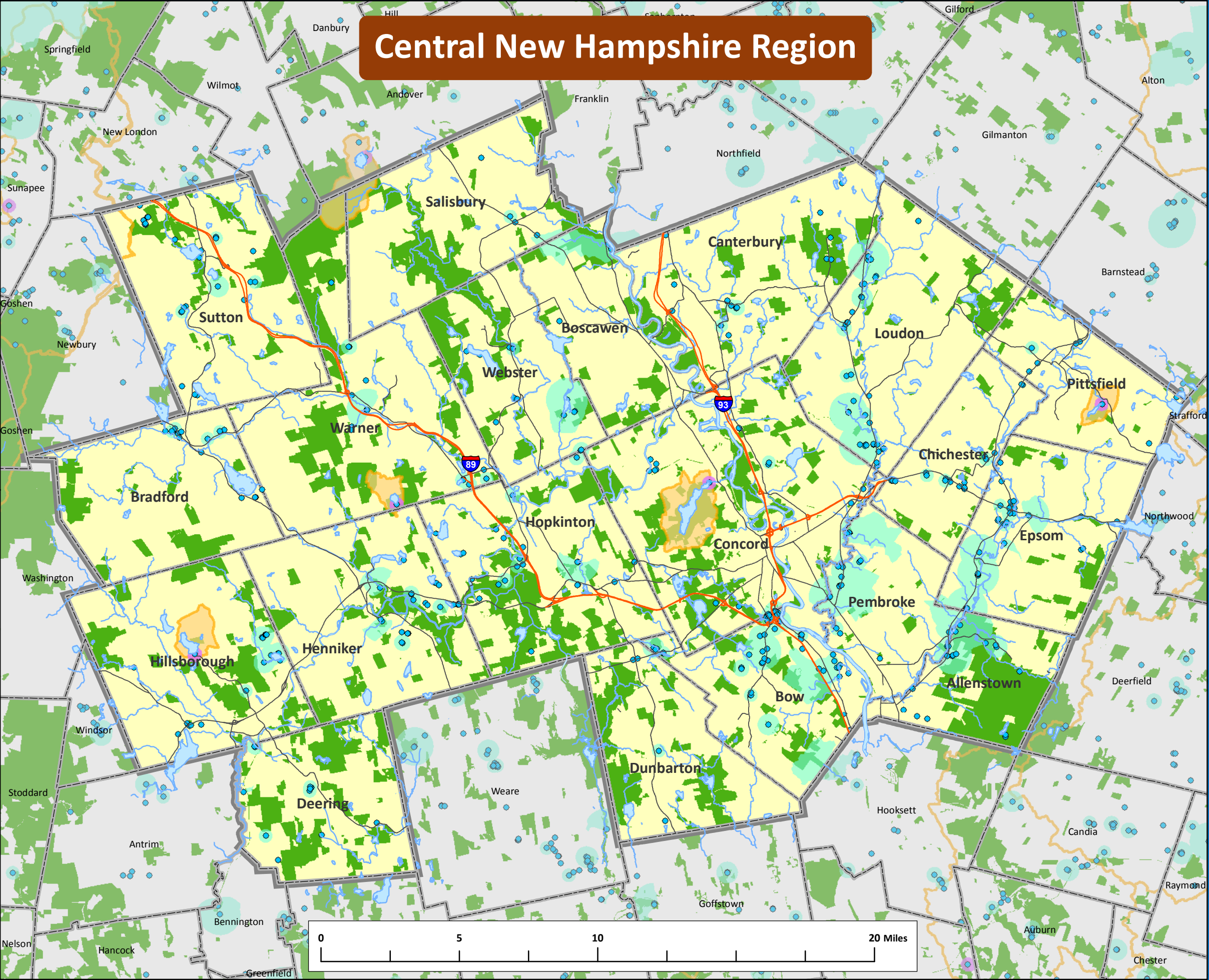


# Central New Hampshire Region

## 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.

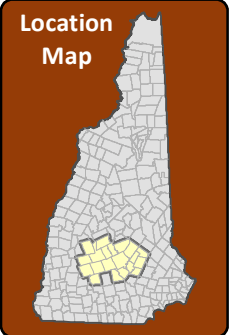
**Data Sources:** NH GRANIT, NHDOT, NHDES, CNHRPC.  
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

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#### 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%
<b>Total</b>	<b>114,836</b>	<b>51.9%</b>	<b>48.1%</b>

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
<b>Total</b>	<b>240.852</b>	<b>242.62</b>	<b>1.768</b>

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](http://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](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](http://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](http://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%
<b>Total</b>	<b>114,836</b>	<b>--</b>	<b>--</b>

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](http://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

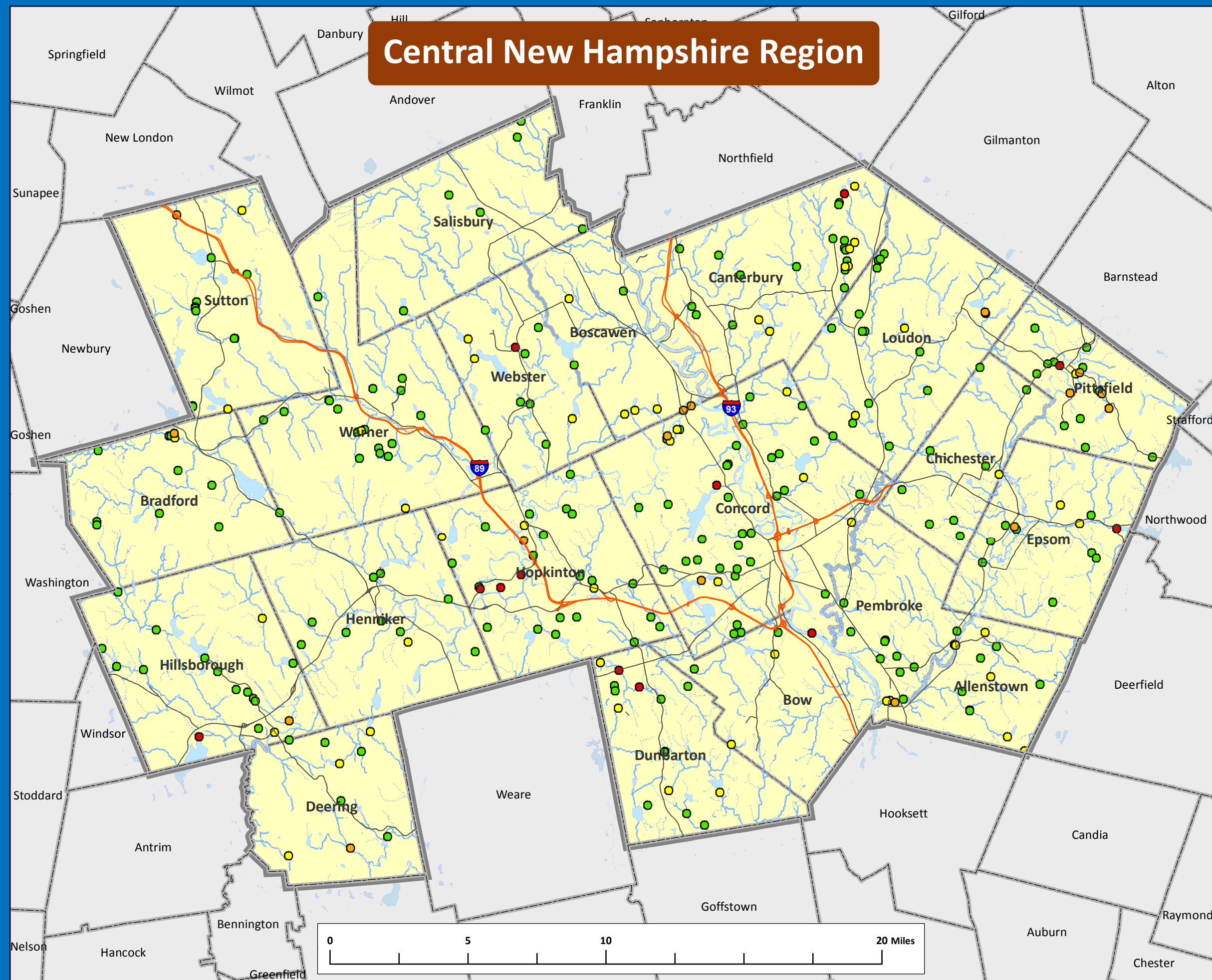
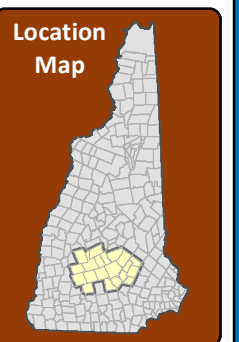
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Location  
Map



### 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.




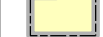


# Central New Hampshire Region

## Natural Resources

Map 7.6

## Conserved Flood Storage Lands

-  Conserved Flood Storage Lands
-  Not Conserved Flood Storage Lands
-  Conservation Lands
-  Municipal Boundaries

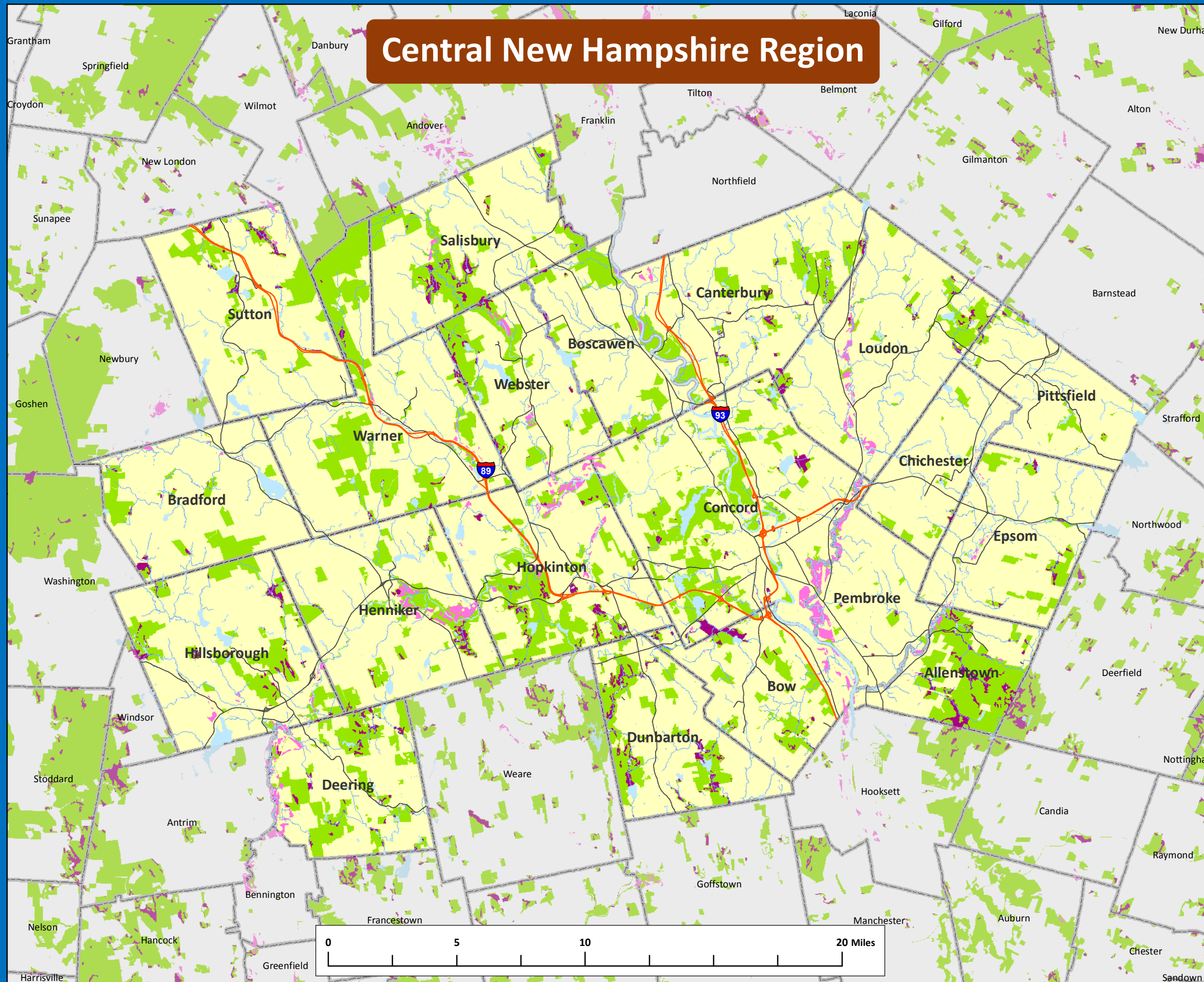
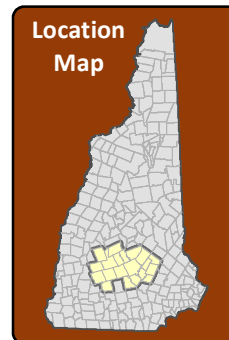
Note: For base layer legend, see Base Map 1.1.

**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.

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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](http://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

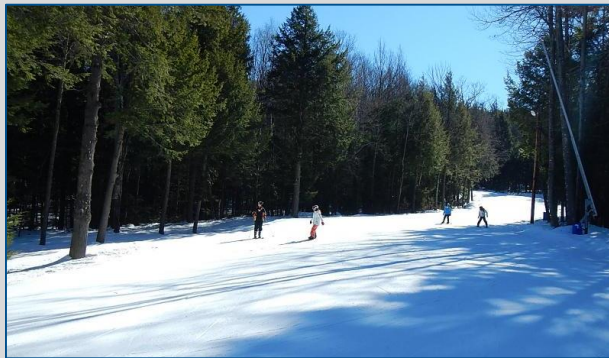
Located in Henniker, Pats Peak Ski Resort has been the region's only ski resort since doors opened in 1963. Today, the resort has significant snow making capabilities and includes 28 trails, with an elevation of 1,460 feet and ski trains running up to one a half miles long. In non-winter months, Pats 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](http://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**



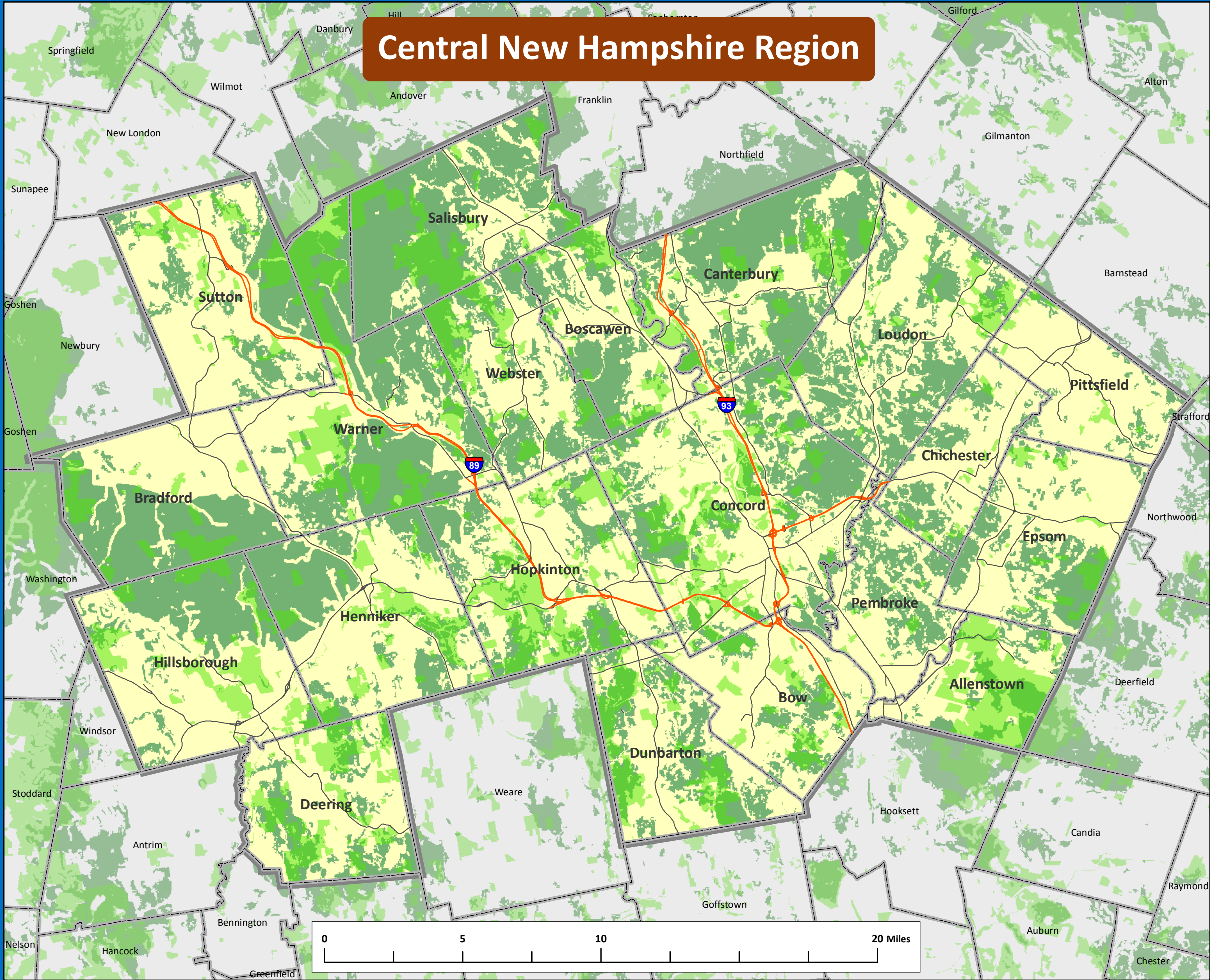
Source:

*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.

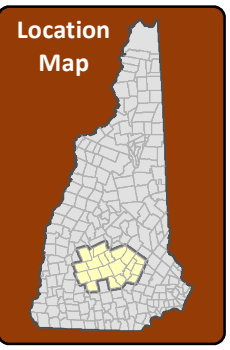
Data Sources: NH GRANIT, NHDOT, NHFGD, CNHRPC.  
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

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#### 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](http://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](http://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](http://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](http://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](http://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

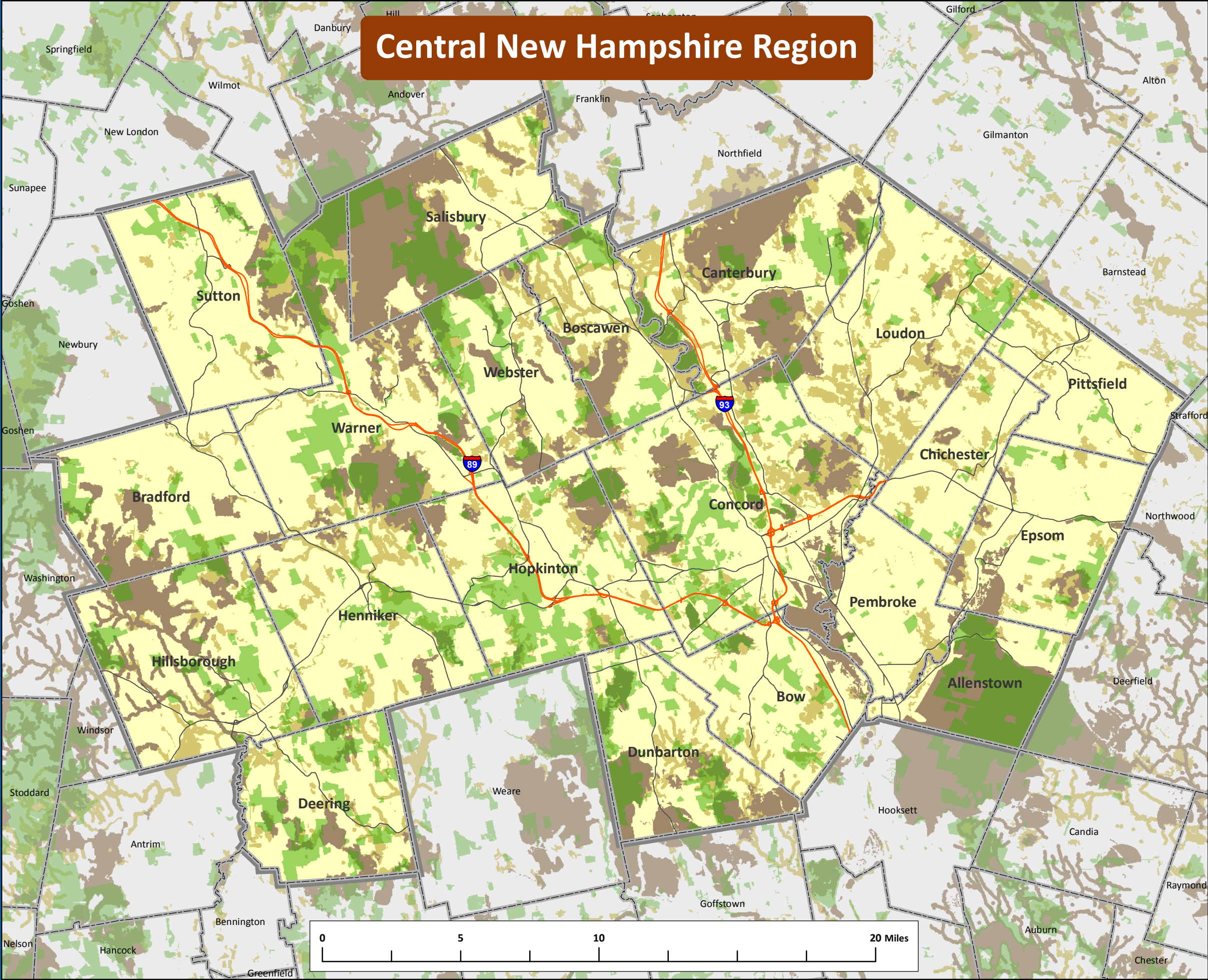
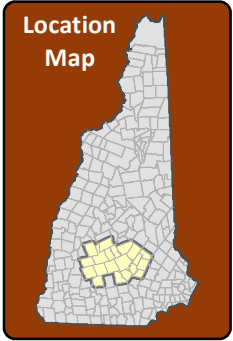
Note: For base layer legend, see Base Map 1.1.

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.

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**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](http://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](http://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](http://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

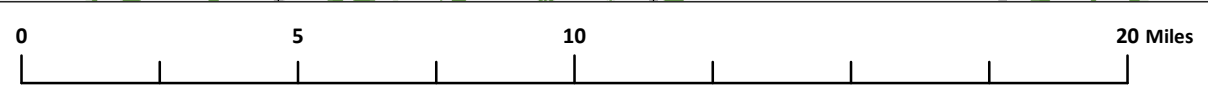
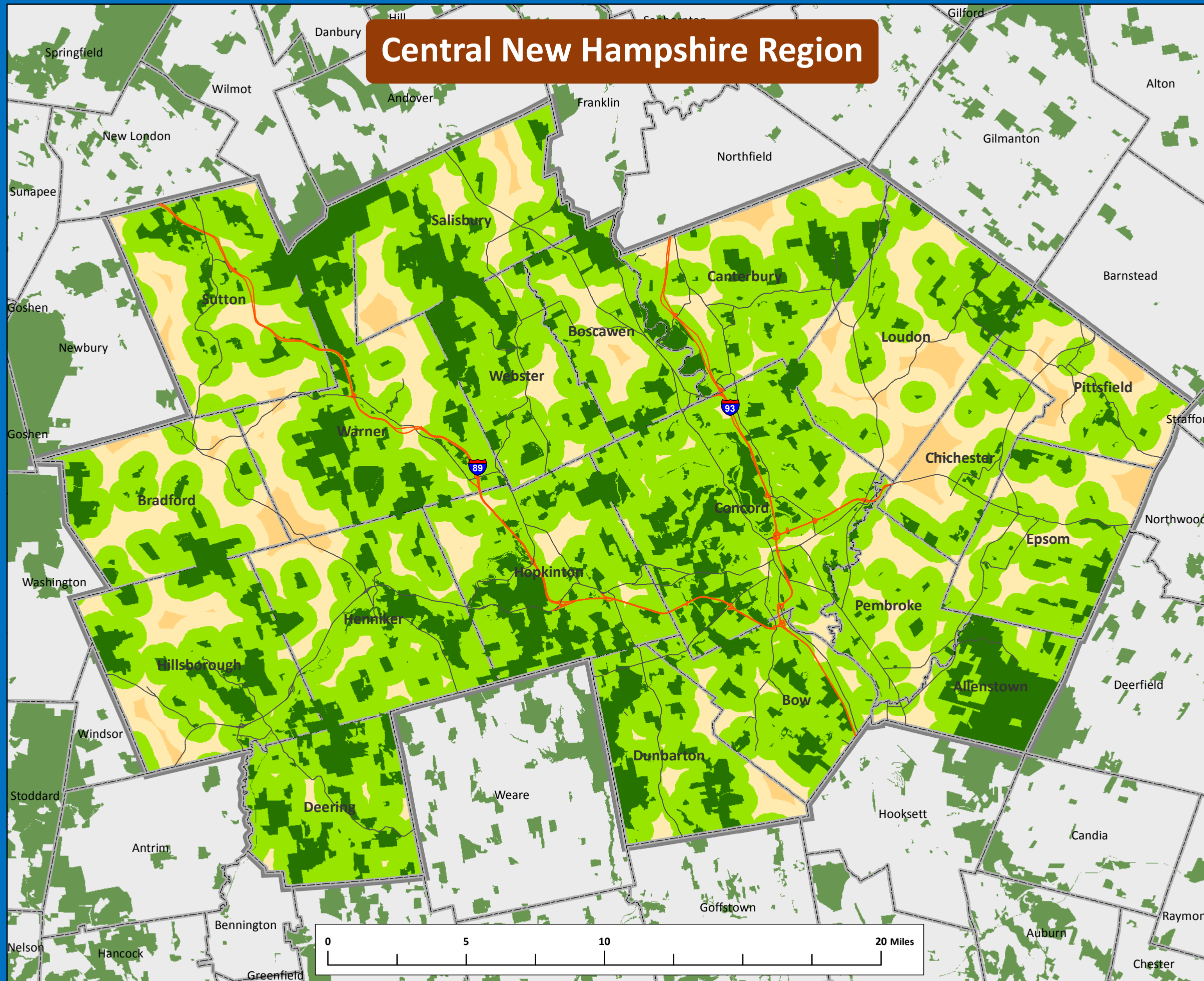
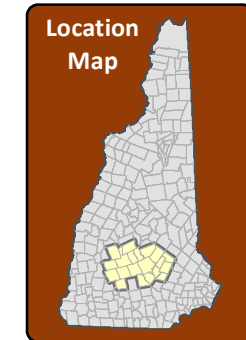
Note: For base layer legend, see Base Map 1.1.

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



### 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, Contooscook, 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](http://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](http://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](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](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](http://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](http://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](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](http://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.

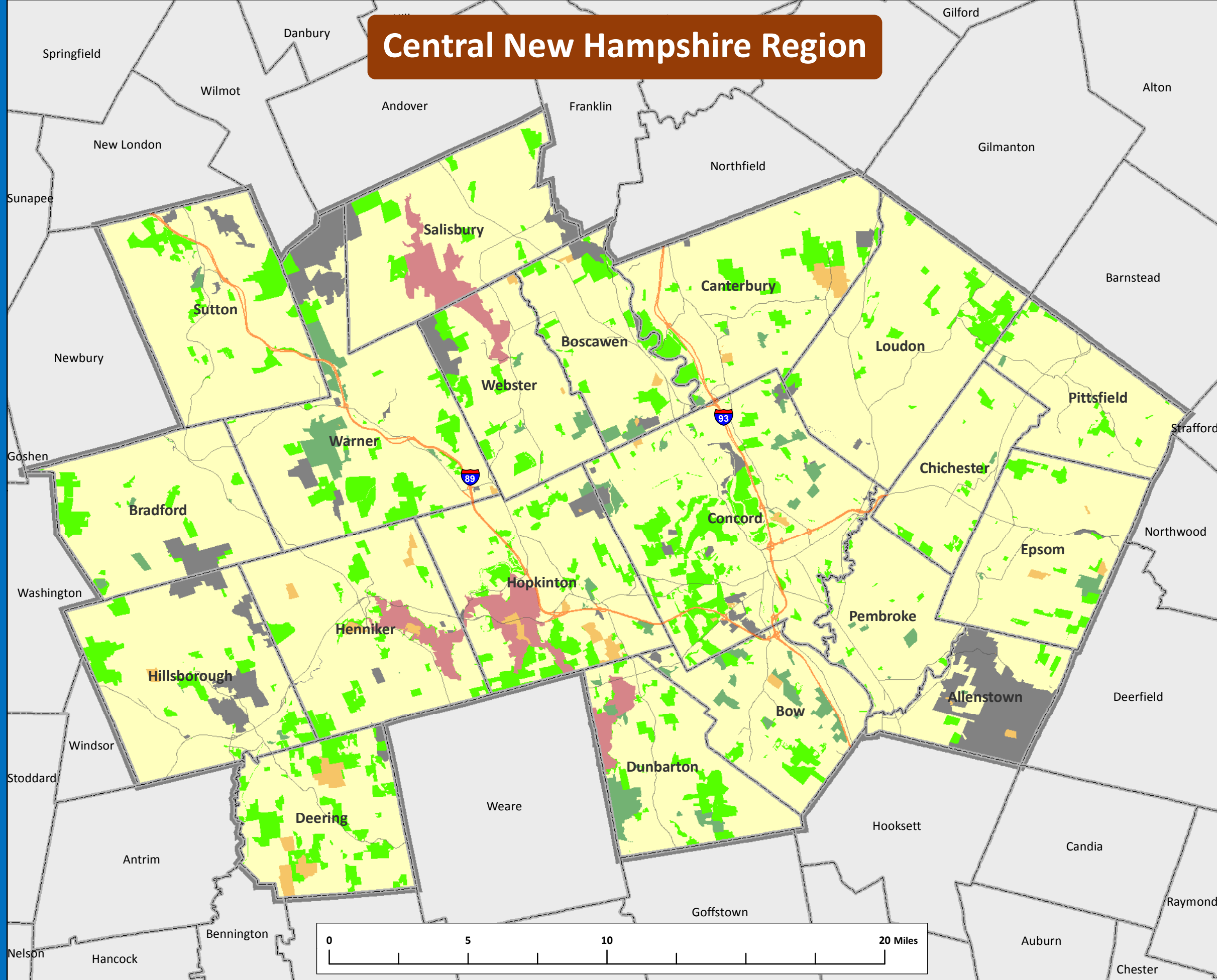
The [Map 7.10](#) Recreation Lands and [Map 7.11](#) Recreation Sites illustrates many of the recreation areas and access points for land and water recreation opportunities that exist in the region.

### 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.

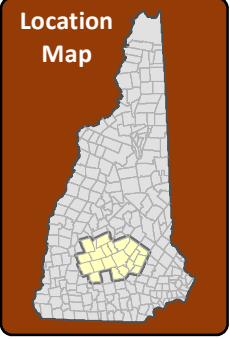
**Data Sources:** NH GRANIT, NHDOT, NHDES, CNHRPC.  
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

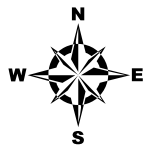
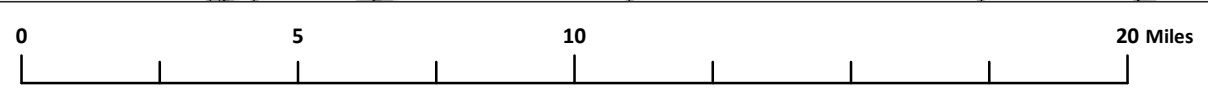
### Central New Hampshire Regional Plan 2015

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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.

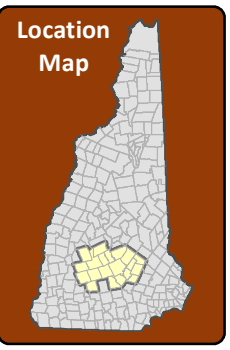
**Data Sources:** NH GRANIT, NHDOT, NHDRED, CNHRPC.  
Map produced by CNHRPC for the Central New Hampshire Regional Plan 2015.

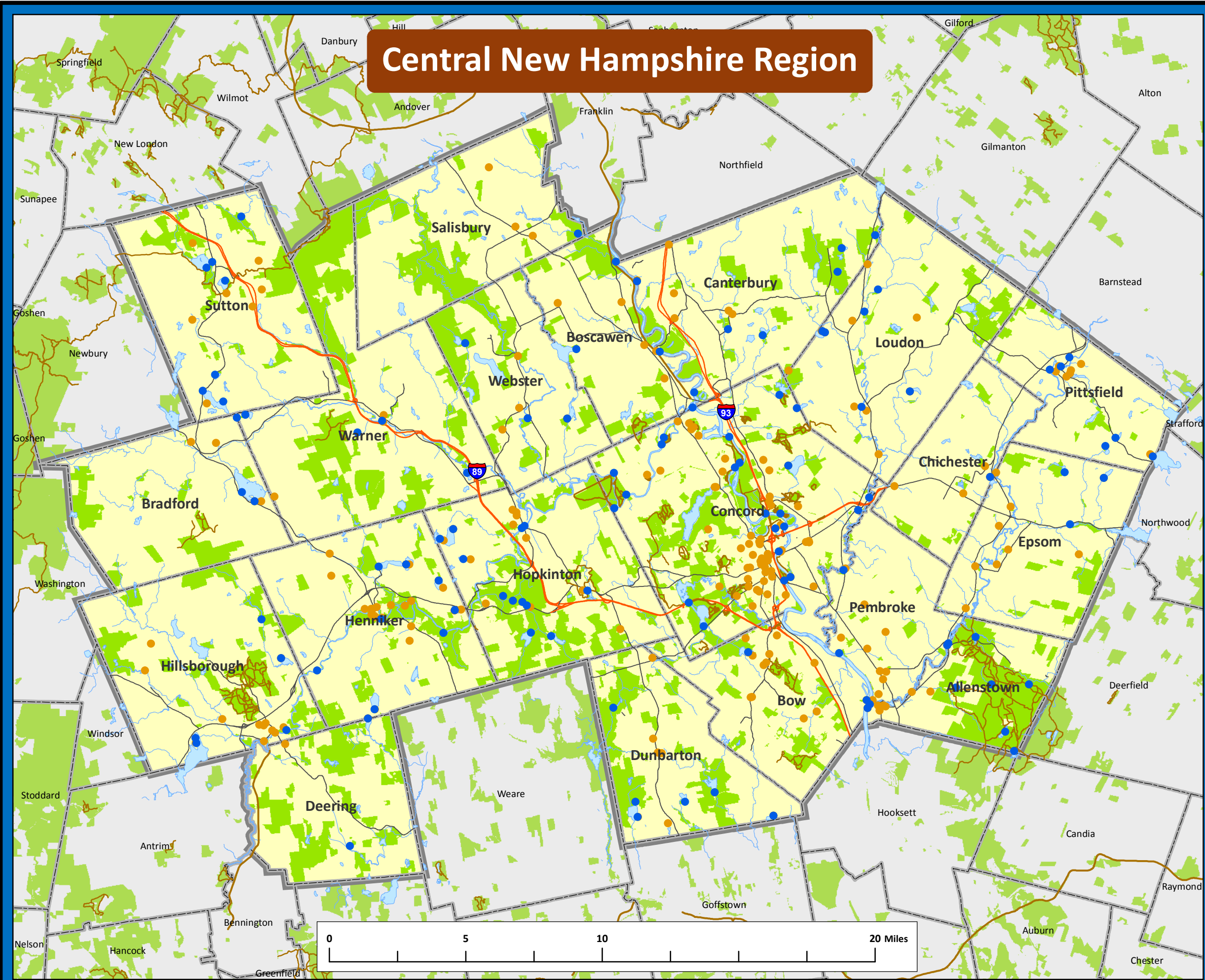
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#### Location Map





- 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**

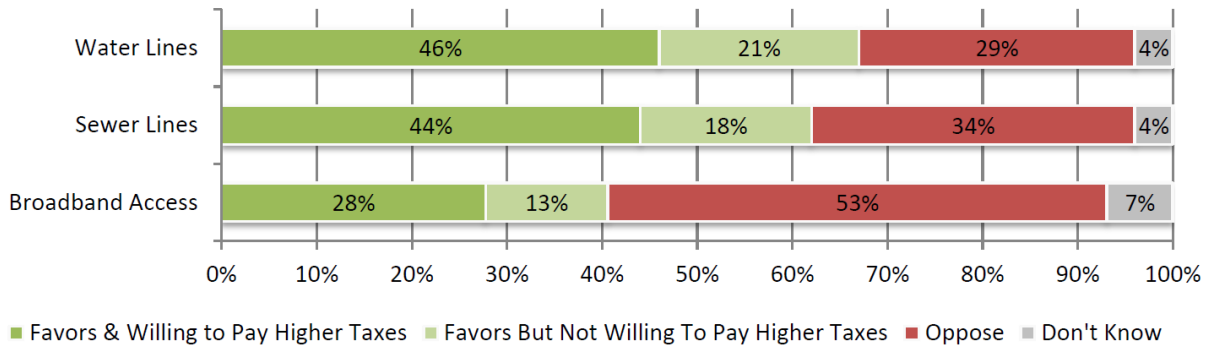
A 2013 telephone survey conducted by the University of New Hampshire Survey Center for the nine Regional Planning Commissions gauged residents opinions on a range of issues. For statistical significance, residents in the Central and Lakes Regions were combined. A major key finding from the survey is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

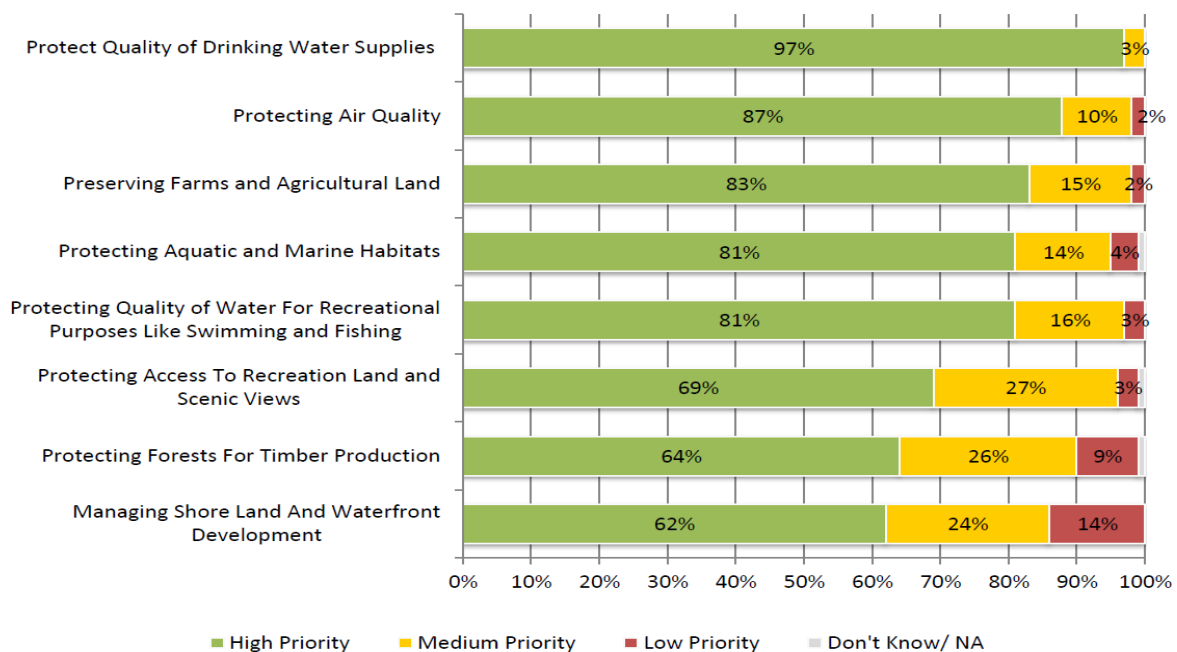
**Figure 7.15: Favor or Oppose Using Municipal Funds to Provide Utilities for Development**



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](http://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:

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*“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.”*

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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.

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