



SOCIETY FOR THE  
PROTECTION OF  
NEW HAMPSHIRE  
FORESTS



# New Hampshire's Changing Landscape 2010



# Population Growth and Land Use Change in the Granite State

Prepared by the Society for the Protection  
of New Hampshire Forests

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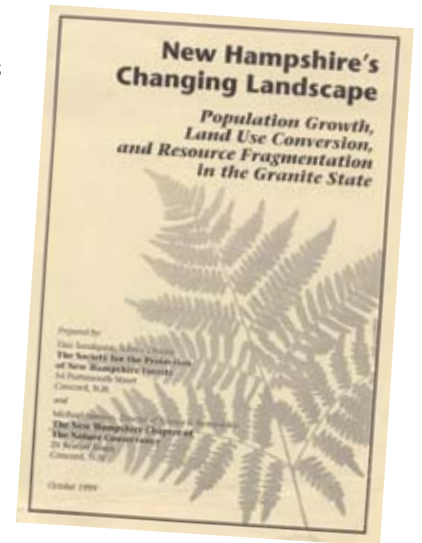


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Protection of New Hampshire Forests in 2010.

# About New Hampshire's Changing Landscape

## Background

In 1999 the Forest Society released New Hampshire's Changing Landscape, a report that explored the relationships between population growth, land use change, and the loss of the state's natural resource base. The first of its kind in the state, this report provided important baseline findings that informed decision-makers about key conservation priorities of concern to the entire state at the time. The report covered the loss of forest land base to development, explored the status of agriculture in the state, addressed both critical water supply resources and wetlands, and made the first statewide assessment of threats to New Hampshire's biodiversity.



New Hampshire's Changing Landscape was updated again by the Forest Society in 2005. Various new and expanded demographic and natural resource data were compiled to create a profile for each of the 259 municipalities and unincorporated places in New Hampshire, with the intent that communities could use

this information in the development of their master plans and as case-making materials for land conservation projects.

Beginning in 2008, the Forest Society embarked on a major project to update New Hampshire's Changing Landscape once again. The availability of new information on the state's natural resources had expanded tremendously, and the scientific disciplines that serve various natural resource areas have also generated many important new studies and findings of interest to the conservation community.

Today a regularly updated, interactive database with more than 250,000 records profiling every New Hampshire community is available online (<http://clca.forestsociety.org/nhcl>), along with maps, graphics, and electronic slides that can be adapted to suit many conservation purposes.

This short summary highlights the significant findings that emerge from the latest analysis of the state's natural resource base. For more information, including additional background on the scientific studies cited in this summary, please see the full technical report at <http://clca.forestsociety.org/nhcl>.



*The availability of new information on the state's natural resources has expanded tremendously since the first publication of New Hampshire's Changing Landscape.*





## NEW HAMPSHIRE EVERLASTING

Since the original report, the Forest Society celebrated its centennial anniversary in 2001, a milestone accompanied by the release of the organization's strategic vision for the 21st century. Titled New Hampshire Everlasting, the vision statement reads:

The Society for the Protection of New Hampshire Forests envisions a living landscape where managed woodlands, farms, and wildlands are woven into the fabric of community life. We envision people caring for lands that sustain dynamic communities with clean water and air, employment, forest and agricultural products, habitat for native plants and animals, scenic beauty, and recreational opportunities.

Thus, the Forest Society's vision is, at its heart, an initiative to conserve New Hampshire's quality of life with the realization that the state's rich endowment of natural resources sustains its economy and culture. The information presented in New Hampshire's Changing Landscape is structured around the Forest Society's strategic vision.

## EXECUTIVE SUMMARY

The Forest Society 2011 update to New Hampshire's Changing Landscape uses more comprehensive data than ever to show how the state is responding to economic and social forces.

### Key findings include:

New Hampshire's population is projected to increase by 180,000 new people, or 14% growth, which is about half the growth rate that was predicted in 2005.

The slower growth rate is due in part to changing trends in population migration. While the average in-migration in this decade has been about 4,000 persons per year, 2007 and 2008 marked the first years since the early 1990s when New Hampshire experienced net out-migration of about 20,000 in both those years.

Residential growth continues to expand along existing transportation corridors, with Carroll County leading the way (thanks to Route 16) with 24% projected population growth, or double the state's overall growth rate. This puts the natural resources in that region at particular risk.

In 1950, almost two thirds of New Hampshire was at rural density; by 2030, it will be only about one third, and most of that will be in the northern half of the state.

Despite a recent uptick in multi-family housing, low density single-family housing construction accounts **for almost 74% of all housing construction in New Hampshire over the last two decades.**

Based on current trends and predictive models, New Hampshire's forested lands will continue to decline. Forest loss linked to population growth indicates the conversion of another 225,000 acres in the years out to 2030, dropping New Hampshire forest land to 78.5% of total land area.

We continue to rapidly develop the state's sources of clean drinking water-- almost 20,000 acres of land over aquifers was converted from natural land cover to urban land uses from 2002 to 2010. Only 22% of appropriate aquifers are protected from future development.

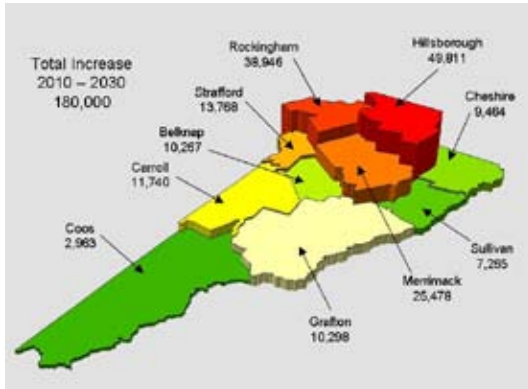
New Hampshire continues to lose farmland. Over the last two decades, the state has seen a 23% decline in acres used for cropland and pasture.

*Our vision is at its heart an initiative to conserve our quality of life with the realization that the state's rich endowment of natural resources sustains our economy and our culture.*

## POPULATION CHANGE

### 2010 and Beyond to 2030

New Hampshire's population is projected to increase by 180,000 persons in the years ahead to 2030. Roughly 70% of that growth will occur in the four southeastern counties, adding nearly 128,000 people to 33% of the state's land base.



Hillsborough and Rockingham counties will see the most population growth, with an increase of more than 87,700 people. The two counties today already are home to about half the entire population of the state. Add Merrimack and Strafford counties, and the regional share rises to nearly 75% of New Hampshire's 1.3 million population.

In terms of percent change, Carroll County will lead the way at 24% growth, reflecting a strong gain of nearly 12,000 people. Belknap, Merrimack, and Sullivan counties are all expected to grow by an estimated 17%, with Merrimack adding the most population at 25,500 on top of a base of 149,700.

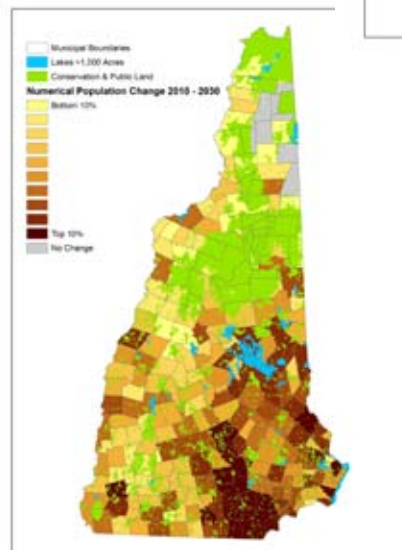
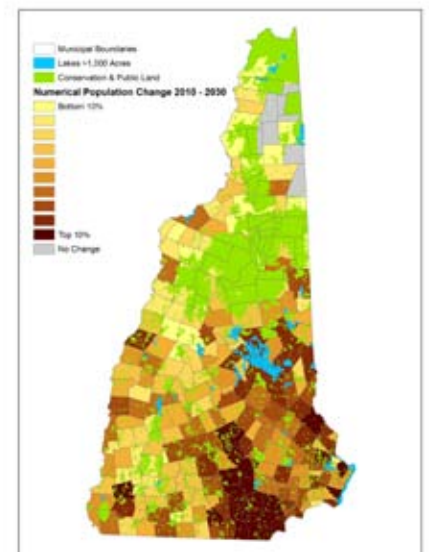
Total Population Increase 2010-2030 180,000

### Community Growth

The two "Population Change 2010-2030" maps show projected population growth by municipality in numerical terms (left) and by percent change (right). Darker colors indicate higher values. The lower Merrimack River corridor connecting Concord, Manchester, and Nashua is projected to add the greatest population on a community-by-community basis. Additional growth areas appear in the Route 16 corridor north and into the Lakes Region. Smaller urbanizing areas around Hanover, Keene, and Portsmouth are also apparent.

The Percent Population Change map shows different patterns. Note the higher values in the Lakes Region and along east-west corridors in central New Hampshire. Percent growth projections can be misleading in rural communities with low existing populations, where population density remains very low, and the ability to absorb growth may be quite ample. However, municipalities with high percent change projected in urbanizing regions (Merrimack River corridor, Lakes Region) will see more significant growth impacts on natural resources.

Population Change 2010-2030

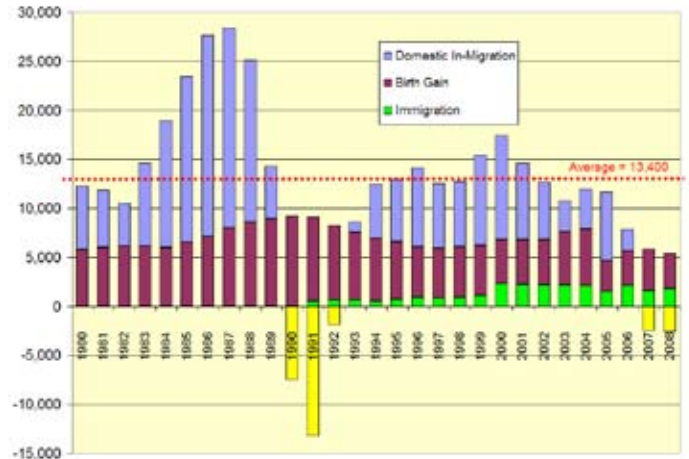


*New Hampshire's population is projected to increase by 180,000 persons by the year 2030.*

## GROWTH DUE TO MIGRATION

### Birth Gain v. Migration

Economic boom and bust cycles, such as those that took place during the mid-1980s and again in the early 2000s, have dramatic effects on the number of people moving into and out of the state. It is commonly assumed that all population growth in the state is due to new residents moving into the state from other places, but the long-term data in the “Population Change in New Hampshire Due to Net Birth Gain & In-Migration 1980 – 2008” chart show that birth gain accounts for about half New Hampshire’s population change.



Population Change in New Hampshire Due to Net Birth Gain & In-Migration 1980-2008

*Birth gain accounts for about half New Hampshire’s population gain from 1980 to 2008. In the last few years, the state has experienced more out-migration than in-migration.*

While the average in-migration in this decade has been about 4,800 persons per year, 2007 and 2008 marked the first years since the early 1990s when New Hampshire experienced net out-migration totaling about 20,000 (yellow bars). The downward trend of in-migration actually starts in 2000, signaling the beginning of another cyclical demographic change similar to the 1990s.

### Incoming v. Outgoing

Historically, most new residents arrive in New Hampshire from elsewhere in New England. The greatest numbers have come from a single state – Massachusetts, which contributed more than 63,900 people between 2000 and 2008. New Hampshire is also an exporter of population to other states, with Florida and Maine taking in almost 24,000 former Granite State residents in that time period.

State	99-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	Total
Massachusetts	8,956	10,035	10,361	10,359	9,675	7,345	4,377	2,662	63,795
New Jersey	1,039	813	676	750	919	675	735	160	6,009
Connecticut	487	356	298	423	246	537	477	343	3,096
New York	897	364	66	140	299	269	189	150	2,434
Foreign	459	414	157	82	161	225	211	295	2,046
Rhode Island	125	76	137	79	139	258	121	106	974
Vermont	140	-14	-66	2	7	72	110	99	348
Pennsylvania	192	4	-100	-139	1	-54	-69	1	-164
California	73	214	14	-77	-133	-74	-190	-99	-272
Colorado	47	-11	43	-61	-69	-148	-73	-163	-470
Georgia	3	-191	-209	-296	-192	-275	-196	-124	-1,392
Virginia	-112	-14	-270	-306	-324	-274	-324	-98	-1,722
Texas	51	21	-141	-560	-329	-356	-373	-401	-1,600
South Carolina	8	-167	-233	-326	-396	-614	-396	-361	-2,345
North Carolina	-13	-273	-338	-657	-605	-1,035	-1,009	-945	-5,125
Arizona	-712	-615	-619	-704	-640	-747	-701	-258	-5,195
Maine	-423	-1,273	-1,450	-941	-636	-246	-639	-542	-6,110
Florida	-1,574	-2,160	-1,934	-3,705	-3,495	-2,822	-1,760	-1,004	-18,101
<b>Total</b>	<b>10,981</b>	<b>7,981</b>	<b>8,992</b>	<b>2,187</b>	<b>2,644</b>	<b>3,236</b>	<b>-298</b>	<b>-994</b>	<b>21,271</b>

Net Population Gain Due to In-Migration 2000-2008

The “Net Population Gain Due to In-Migration 2000 to 2008” table shows the relative flow of migration by state from 2000 to 2008, with net loss to other states highlighted in yellow. In part, the current trend appears to be away from New Hampshire and to sunnier states (lower half of table).

For the period from 1990 through 2006, 51.7% of working age adults nationwide moved to other states for employment-related reasons, 23.0% for family-related reasons, 8.1% to attend college, 8.6% for housing-related reasons, and 8.7% for other reasons. Similarly, New Hampshire imported population from New Jersey, Connecticut, and New York may be motivated by the rural character and quality of life in New Hampshire, but employment and family reasons are primary drivers, especially with regard to New Hampshire’s newest residents from Massachusetts and Maine.

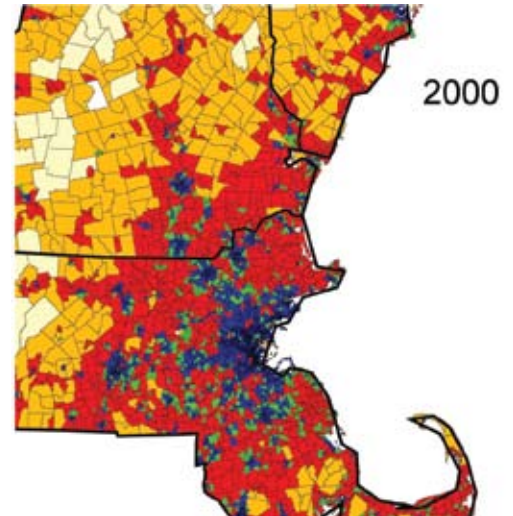
## POPULATION DENSITY

### Regional Trends

Population density provides a metric that helps us think about the “carrying capacity” of the land in terms of the services provided by a range of natural resources – including clean air and water, forest and agricultural products, wildlife habitat, remote recreation opportunities, and solitude – all of which make up the quality of life we enjoy in New Hampshire.

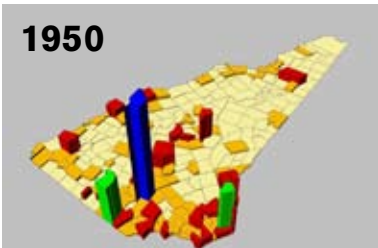
The “Population Density by Land Class” map illustrates how New Hampshire is influenced by population in the Boston metropolitan area, based on 2000 census data. Population density is shown by five classes with rural demographics at one end of the scale and the dense urban fabric of cities at the other. The red colors show suburban densities that top out at more than one person per acre of land. A relatively new geographic term – exurban – population density shown in orange describes the transition between what we typically think of as rural and suburban and helps to reveal the outward growth frontier spreading into central New Hampshire from the south.

Population Density by Land Class



*The legend gives the population density ranges for each class. The map is based on census tracts and blocks.*

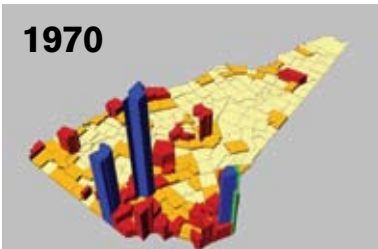
1950



### NH Over Time

The same population density scheme is applied in a “Municipal Growth in New Hampshire over Time” map series, starting in 1950 (population 532,000) and ending with current forecasts for community growth in 2030 (population nearly 1.6 million). Note how growth has changed in southeastern New Hampshire and north up the Merrimack River valley.

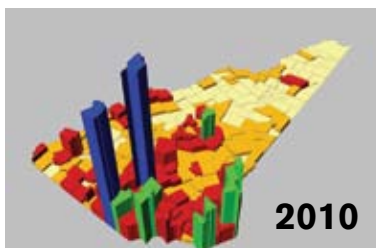
1970



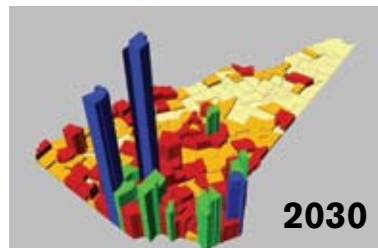
### Summary & Forecast

Just as it has historically, population growth, if it continues as projected to 2030, will dramatically change the character of the state and challenge the ability of our natural resources to support the quality of life we presently enjoy. In 1950 almost two thirds of New Hampshire was at rural density; by 2030, only about one third of the state will be rural, and most of that will be in the northern half of the state. Suburban communities accounted for only 10% of the state’s land area in 1950, but will be typical in one third of New Hampshire by 2030. Urban densities will increase five-fold by 2030.

Change in Municipal  
Population Density  
1950 2030



2010



2030

## HOME BUILDING & LAND USE CHANGE

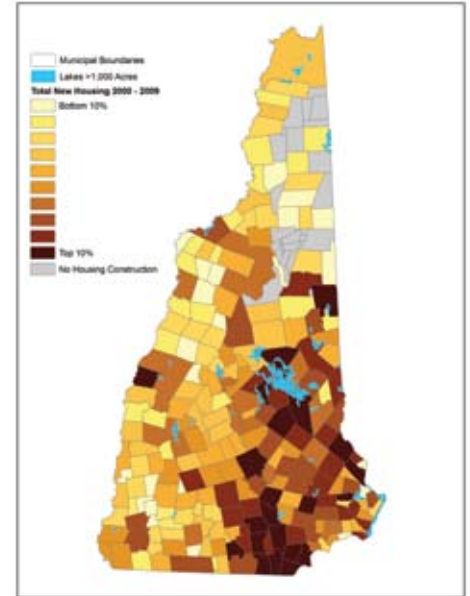
### Where is NH Building?

Construction of new housing in New Hampshire represents one of the greatest impacts to our natural resources. The majority of new residential construction continues to be low-density, single family housing, which historically has consumed large land areas and fragments natural resource features such as forests, wetlands, and stream networks. However, the increased construction of multi-family housing in Manchester, Nashua, Dover, and southern tier suburban communities suggests that a new trend toward more efficient, higher density housing closer to urban centers is emerging.

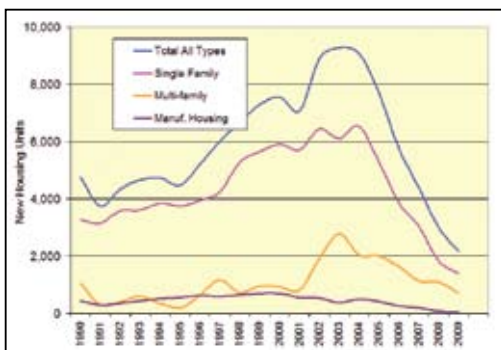
*Construction of new housing in New Hampshire represents one of the greatest impacts to our natural resources*

The “Total New Housing 2000-2009” map below shows the distribution of new housing of all types from 2000 to 2009 across New Hampshire by percentile. The darkest areas are communities experiencing the top 10% of total housing construction. Hillsborough and Rockingham counties saw 45% of all new construction – nearly 29,500 homes built in this time period.

Much of the new housing construction has been concentrated in the lower Merrimack River Valley from Concord to Nashua. The Lakes Region, the Route 16 corridor in Strafford County, and scattered communities such as Conway, Littleton, and the Lebanon/Hanover area also saw significant increases in housing construction.



Total New Housing  
2000-2009



Estimate of New  
Housing Units  
Per Year in  
New Hampshire  
by Type 1990-2009

### Recent Trends

The “New Housing Units” chart is based on New Hampshire Office of Energy & Planning (OEP) housing data from 1990 to 2009. The significance of single family housing construction appears in the pink line, accounting for almost 74% of all housing construction in New Hampshire during this time period.

The recovery of the housing industry from the economic recession of the early 1990s is apparent on the left side of the chart, with a peak in new construction activity around 2002 and 2005 that is second only to the run-up in the mid-1980s (approximately 20,000 new units per year). A steep decline in the numbers of total housing and single family housing begins in 2005 and has continued unabated since then. Annual trends for the construction of new housing have not been this low – less than 3,000 units per year -- since the 1960s, according to historical data from the New Hampshire Office of Energy and Planning. This “breather” represents an opportunity for towns to plan for more sustainable growth once the economy rebounds.



## FOREST CHANGE

### Background

New Hampshire remains the second-most forested state in the nation, after neighboring Maine, but our forest lands continue to decline from a high of 87% in 1960 to about 82% today. This represents a loss of nearly 450 square miles of forest, with about one-third of that change occurring since 1997. The economic value of forests has been calculated at more than \$1.7 billion dollars per year, or about 30% of the state's gross domestic productivity from its open space economic sectors. Forests also provide many invisible amenities, including ecosystem services such as abundant clean water and air, the ability to capture and store atmospheric carbon, and the capacity to mitigate the effects of flooding.

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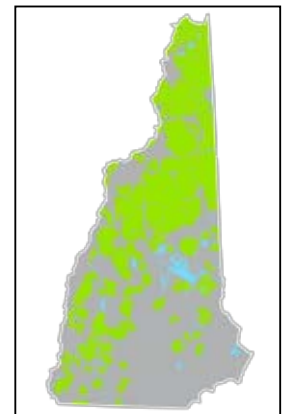
**Forest fragmentation** (shown in the photo on this page) is now a common term in natural resource management and public policy-making related to natural resources. The term refers to the progressive dissection of forested areas by the construction of new roads and highways as well as small-scale clearing and conversion of forests for residential, commercial, and other land uses. Because forests are the dominant natural land cover in New Hampshire, fragmentation also has negative impacts on wildlife habitat, water quality, and other natural systems.

Forest Fragmentation

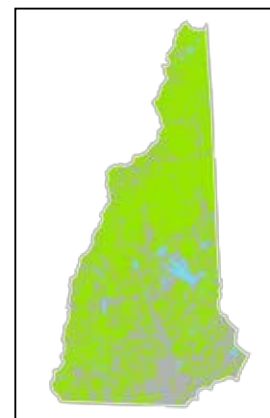
The results of a predictive model on forest loss linked to population growth indicates the conversion of another 225,000 acres in the years out to 2030 if past development patterns continue, dropping New Hampshire forest land to 78.5%.

### Significance of Forest Blocks

A forest block is an intact area of forest canopy without regard to ownership, and defined by travelled roadways, large water bodies, and non-forest land uses. A 500-acre block can provide adequate habitat for some species, help protect water quality, allow for sustainable forest management, and offer opportunities for outdoor recreation. A 5,000-acre block represents a minimum size for sustainable forest management at regional scale, as well as a framework that supports long-term ecological functions and processes. The "New Hampshire Forest Block" maps show forest blocks in 2006.



>5,000 Acres



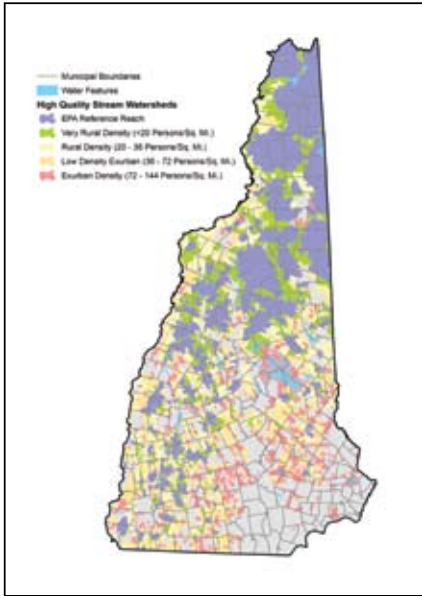
>500 Acres

New Hampshire Forest Blocks

## CRITICAL WATER RESOURCES

### High Quality Stream Watersheds

As part of a larger study of New England water quality, the United States Geological Service mapped nearly 7,200 watersheds for every perennial a stream in New Hampshire, and estimated water quality based on population density and percent of developed and agricultural land. While the focus of the study was on nitrogen and phosphorus contamination, “reverse engineering” the data points to watersheds with very high quality.



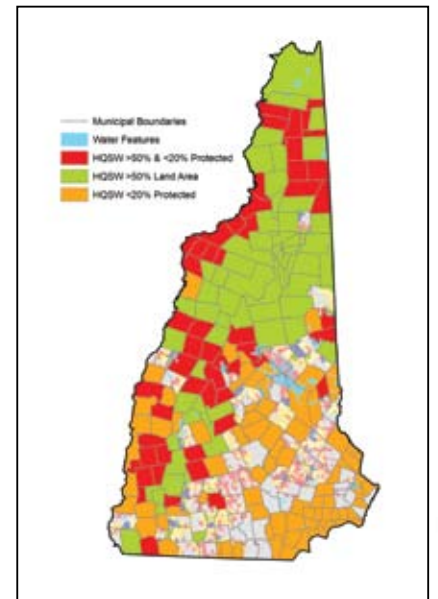
High-Quality Stream Watershed

The “High Quality Stream Watershed” map shows three classes of watersheds with high water quality, and two transitional classes. The reference reach watersheds shown in blue are designated in the study as “near pristine”. By adjusting the population density slightly, other watersheds with high water quality can be seen. The exurban watersheds in the orange and pink show the boundary zone between developed areas with lower water quality and the high quality stream watersheds.

More than 50% of the state falls in the top three high-quality stream watershed classes. While 46% of these watersheds are currently protected, the share of protected high quality stream watershed decreases dramatically with increasing population density.

### Protecting Our Headwaters

Whether within the more rural western half of the state, or part of the remaining open space in rapidly urbanizing southeastern N.H, the great majority of high-quality stream watersheds function as the headwaters for our lakes, ponds and rivers, as well as clean and abundant water to the state’s aquifers.



Protected Watersheds

The “Protected Watersheds” map offers a strategic approach to protecting these important headwaters areas. By filtering municipal data for land area with more than 50% high quality stream watersheds and/or less than 20% of these areas currently protected, key communities with both conditions appear in red below as high priority for land conservation. The orange municipalities with relatively low levels of protection may not have extensive land area in high quality watersheds, but what remains should be a priority, especially where watersheds span two or more communities.

## DRINKING WATER SUPPLY

### *High-Yield Aquifers*

Thanks to the last glacial period, New Hampshire is blessed with about 805,000 acres of sand and gravel aquifer formations that contain an abundance of clean water. Recent updates of New Hampshire Department of Environmental Service (DES) data on aquifer lands suitable for development of future municipal water supplies show that only 246,000 acres of aquifer remain after accounting for various contamination threats, roads, and development. Of that, only 85,000 acres, or 11%, is suitable for new municipal water supply wells pumping at minimum rates. Only 25,000 acres, or 3%, of all aquifer land is suitable for very high-yield municipal wells.

Because the entire surface of a sand and gravel aquifer is important in recharging the groundwater reservoir, maintaining natural land cover is key. However, these flat, sandy plains are easily developed for other uses. As a result, about 70% of our aquifers are now off-limits for future water supplies, and of the 246,000 acres without contamination impacts, only 22% of that land is currently protected, and the level of protection varies significantly across the state.

Another trend identified in the NH DES study is the rate of new development occurring on aquifers around the state. Almost 20,000 acres of land over aquifers was converted from natural land cover to urban land uses from 2002 to 2010, with most of this change happening in southeast New Hampshire. This aerial photo shows an area in Dover along the Bellamy River, with 2002 aquifer areas in green, and 2010 development in pink. Most of the new development is low- to high-density residential and a new school.



*Aerial Photo of Dover Aquifers*

The red circle indicates a contamination site new in 2010. While this continues to be a concern on water supply lands, only 325 acres of aquifer were affected in the same time period.

### *Drinking Water Protection Areas*

Nearly 850,000 people in New Hampshire—about two thirds of the state's population — get their drinking water from public water supply systems. The wells and reservoir intakes serving these public systems have about 282,000 acres of land designated as protective area surrounding the water supplies, but only 13% of that land is currently protected from development.

Forested watersheds provide important water quality benefits and help sustain groundwater recharge to our aquifers. Forested land covers about two thirds of these critical water supply lands, but only 15% of the forest is protected.

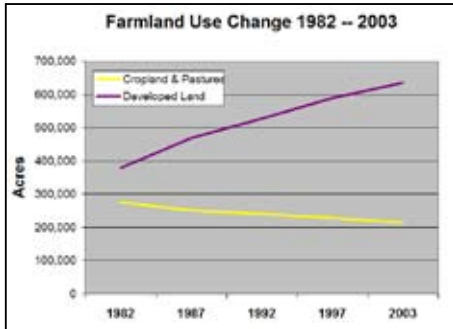
Recent studies of domestic water demand and groundwater recharge in the Seacoast region project a 54% increase in demand by 2025 (about 3.65 billion gallons per year), while climate change impacts are forecast to reduce groundwater supplies by 5% by 2025 (1 billion gallons per year). This will result in a water deficit in the region that will affect existing water users and future development potential and points to the need to manage and protect the natural systems that provide clean and abundant water.



## FARMING IN NEW HAMPSHIRE

### *New Hampshire's Other Great Working Landscape*

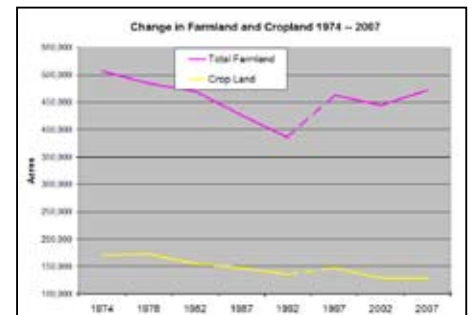
Farming in New Hampshire involves various agricultural land uses ranging from intensively cropped land to open pastures and hay meadows and farm woodlots. These lands are important not only to the cultural heritage and open space values of the state, but also to the contribution agriculture makes to the state's economic activity –approximately \$935 million in 2005. However, after holding steady for much of the first half of the last century, agriculture as a way of life has been in marked decline in the state since the 1950s, with farm land steadily converted to other land uses.



*Farmland Use Change  
1982-2003*

### *Farm Land Changes*

A 2003 estimate of land area devoted to farming in New Hampshire shows a total of nearly 214,000 acres in cropland and pastures, or about 4% of the state's land area. This number is down from more than 276,000 acres in 1982, for a 23% decline in a little over 20 years. The chart below shows this trendline (yellow) against the change in developed land, which increased more than 250,000 acres in that time period, converting both farm and forest land.



*Change in Farmland  
and Crop Cover*

*Farming in New Hampshire involves various agricultural land uses, including intensively cropped land, open pastures, hay meadows, and woodlands.*

More detail on the decline of farmland in New Hampshire is found in another federal survey conducted nationwide every five years, which records the number of farms, their size, and acres of land in cropping, pasture and woodland. The chart below shows two seemingly disparate trends: the numbers of farms in New Hampshire are increasing in recent years, while cropland has seen a steady decline. The chart below shows an uptick in the total number of farms from 2002 to 2007; this is due to smaller, custom farming enterprises springing up, especially in southeast New Hampshire. However, cropland statewide has shrunk almost 19,500 acres from 1997 to 2007 –that is about 30 square miles of our most productive land going fallow or being converted to other uses in ten years.

### *Farms and Forests*

The “forest and field” character of New Hampshire farms is evident in the woodland component of the NASS data. Statewide, 56%, or nearly 265,000 acres, of farm ownership is woodland. Larger farms typically have a greater share of land in forests, up to 80%. This means more than 400 square miles of forests in New Hampshire are under agricultural stewardship, and are tied to the destiny of these farms.



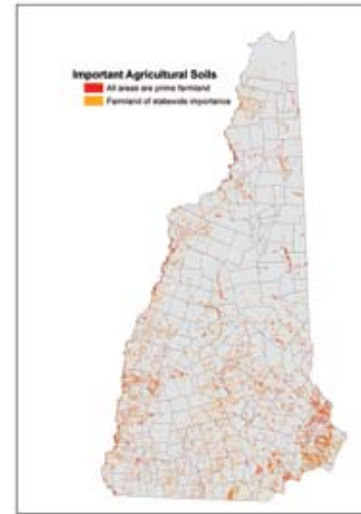
## Important Agricultural Soils

Productive farming is dependent upon a key natural resource: productive soils. Our best soils cover only 380,000 acres, or 6.6% of the state, and are widely scattered in relatively small pockets, as can be seen in the “Important Agricultural Soils” map.

Concentrated areas of fertile soils can be found in the Connecticut River valley to the west, pockets in southern New Hampshire, and the Seacoast region which has the greatest abundance of excellent agricultural soils due to its unique geology.

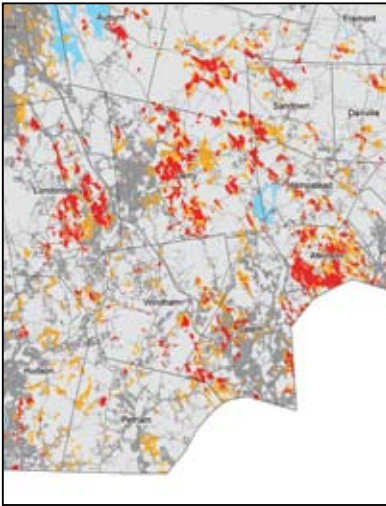
Southeastern New Hampshire is also the most densely populated and urbanized region in the state, putting these soils at the highest risk of conversion.

Important Agricultural Soils



## Conversion to Other Uses

Because farm soils are typically found on land that is flat, open, and therefore easily developed, a significant share of an already scarce resource has been converted permanently to other land uses. Satellite imagery from 2006 shows that about 4% of the best soils have been lost to roads and highways; another 12% have changed to urban land uses, for a total of about 60,000 acres statewide now unavailable for food and forage production.



Southeastern  
New Hampshire  
Farm Soils

The “Southeastern New Hampshire Farm Soils” map shows an urbanizing area where our best farm soils have steadily been developed for several decades. Note how the roads and built-up areas in gray dominate what was once our best farmland in the state.

## Protection Status

By intersecting land use data from 2006 satellite imagery, NRCS soils mapping, and data on land conserved in New Hampshire, a land protection challenge becomes apparent. Our most productive, actively cultivated cropland totals about 72,000 acres statewide but is only about 9% protected. Of the 201,000 acres of prime farmland soils

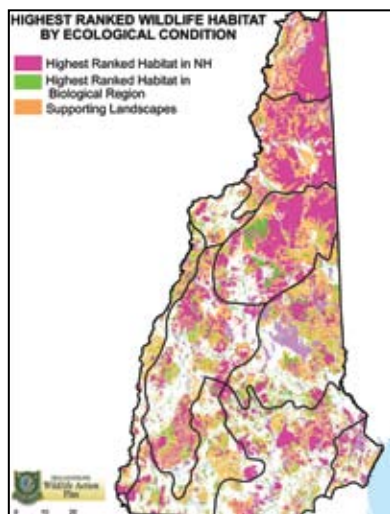
statewide, only 11% are protected, and only 9% of the 179,000 acres of soils of statewide importance to agriculture are protected.

Southeastern New Hampshire is the most densely populated and urbanized region in the state, putting these soils at the highest risk of conversion.

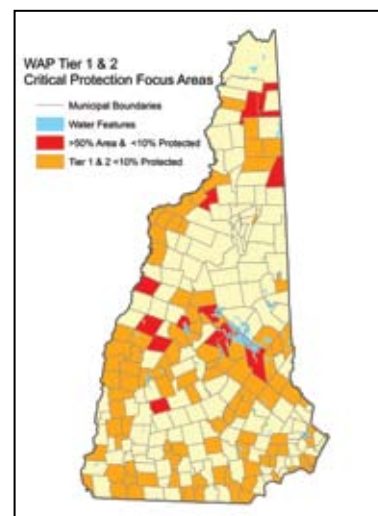
## WILDLIFE HABITAT

### NH Wildlife Action Plan

New Hampshire is fortunate to have a comprehensive study of the state's diverse wildlife habitats and strategies for conserving them in the New Hampshire Wildlife Action Plan (WAP), released in 2006 by the New Hampshire Department of Fish and Game and updated in 2010. The WAP is a wide-reaching, science-based plan that replaces an older, piecemeal approach of accounting for wildlife habitat in conservation planning. One of the most important parts of the plan is an assessment of habitat quality statewide that identifies the "best of the best" wildlife habitat in the state.



Highest Ranked Wildlife Habitat by Ecological Condition



Critical Protection Focus Areas

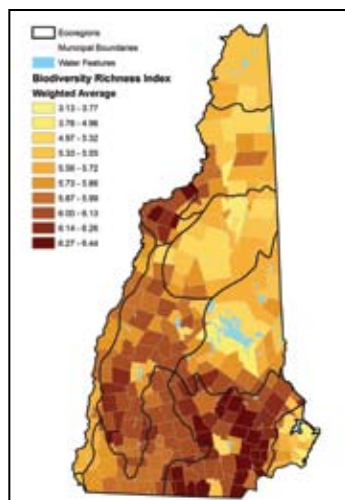
The "Highest Ranked Wildlife Habitat by Ecological Condition" map shows the extent and distribution of the three habitat tiers ranked by habitat condition in the 2010 update. The pink Tier 1 areas represent the top 10% to 15% of wildlife habitat statewide, followed by green-colored Tier 2 habitat areas. Gold Tier 3 supporting landscapes act as buffers to protect the ecological integrity of the top two tiers. The highest ranking areas within an ecoregion, are shown in black outlines.

In 2010 Tier 1 habitat occupied about 28% of the state and was nearly 42% protected. Tier 2 covered only 9% and was about 33% protected. Tier 3 involved about 32% land area and was 28% protected. The existence of this data as a baseline will allow future comparisons as the New Hampshire landscape changes as a result of development from predicted population growth.

### Protection Priority Areas

The proportion of each habitat tier may seem ample, but given that these areas represent the state's best chance to preserve future biodiversity, it begs the question of how much is enough.

The "Critical Protection Focus Areas" map shows 169 communities in red or orange where accelerated protection of high quality wildlife habitat should be considered a priority. Orange appears where less than 10% of Tier 1 and 2 habitat is protected, and red indicates places where more than 50% of the land area is ranked in either or both tiers.



Biodiversity Richness Index

### Biodiversity Richness

Another study gives a different metric and view of habitat protection priorities. The Biodiversity Richness Index" map shows the relative richness of vertebrate species by municipality, with bioregion boundaries overlaid for reference. Note the clustering of high-scoring areas in the rapidly urbanizing southeast New Hampshire, and the more rural upper Connecticut River Valley and the Monadnock region. Also note the differences between this map and the "Critical Protection Focus Areas" map that result from two different but valid modeling approaches.

## Footnotes:

**A full copy of New Hampshire Everlasting and more information on our strategic vision may be found at the Society's website: [www.forestsociety.org/nhe](http://www.forestsociety.org/nhe).**

<sup>2</sup>NH Office of Energy & Planning, Interim Municipal Population Projections, 2010 – 2030, released August, 2010.

<sup>3</sup>Voting with Their Feet? Local Economic Conditions and Migration Patterns in New England, Alicia Sasser, New England Public Policy Center, Federal Reserve Bank of Boston, 2009.

<sup>4</sup>Ibid, Sasser, 2009.

<sup>5</sup>The classification scheme shown in this map is taken from the work of Dr. David Theobald, Colorado State University, who describes a continuum of population and housing densities across the developed landscape.

<sup>6</sup>NH OEP housing supply trends data for 2010 are not available due to lag time in preparing statewide data on the previous year.

<sup>7</sup>Based on USFS Forest Inventory & Analysis data.

<sup>8</sup>Based on a model developed by the Forest Society in the 1999 New Hampshire's Changing Landscape report with the assistance of Professor Tom Lee, University of New Hampshire.

<sup>9</sup>US Geological Service National Land Cover Data, 2006.

<sup>10</sup>See SPARROW modeling project at <http://nh.water.usgs.gov/projects/sparrow/about.htm>.

<sup>11</sup>A Guide to Identifying Potentially Favorable Areas to Protect Future Municipal Wells in Stratified-Drift Aquifers, NH DES, 2010.

<sup>12</sup>Drinking water protection areas designated by NH DES.

<sup>13</sup>See <http://nh.water.usgs.gov/projects/seacoast/index.htm>.

<sup>14</sup>New Hampshire Department of Agriculture, Markets & Food from a study by Laurence Goss, Impact of Agriculture on New Hampshire's Economy in Fiscal Year 2005.

<sup>15</sup>NRCS National Resource Inventory data, 1982 to 2003.

<sup>16</sup>USDA National Agricultural Statistical Survey (NASS), 1974 – 2007. Note: the dashed lines in the chart are due to a change in sampling and statistical analysis adopted by NASS.

<sup>17</sup>Based on the NRCS classification for Prime Farmland Soils and Soils of Statewide Importance.

<sup>18</sup>For more information, see [http://www.wildlife.state.nh.us/Wildlife/wildlife\\_plan.htm](http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm).

<sup>19</sup>Vermont/New Hampshire GAP Analysis Project, US Fish & Wildlife Service.



This report was produced by the Society for the Protection of New Hampshire Forests in collaboration with conservation partners throughout New Hampshire, as well as state and federal agencies. The complete report can be viewed online at <http://clca.forestsociety.org/nhcl>.

Since 1901, the Society for the Protection of New Hampshire Forests has worked to establish permanent conservation areas and promote the wise stewardship of private lands. Supported by 10,000 families and businesses, the Forest Society is the state's oldest and largest non-profit land conservation organization. For more information, visit [www.forestsociety.org](http://www.forestsociety.org).

*Photo by Jerry and Marcy Monkman, EcoPhotography.*



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