



Forests of New Hampshire, 2013

This publication provides an overview of forest resources in New Hampshire based on inventories conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program of the Northern Research Station. Since 1999, FIA has employed an annual inventory measuring data on a nominal 20 percent of sample plots each year. For the 2013 inventory, estimates for current variables such as area, volume, and biomass are based on 1057 plot samples collected from 2009-2013. Change variables, such as net growth, removals, and mortality, are based on 897 samples collected in 2004-2008 and resampled in 2009-2013. Estimates from earlier annual and periodic inventories are shown for comparison. See Bechtold and Patterson (2005) and O’Connell et al. (2013) for definitions and technical details.

Overview

Currently, New Hampshire is home to nearly 4.8 million acres of forest land (Table 1). Since the 1997 inventory, the estimate of forest land has been relatively stable (Fig. 1). However, the volume and biomass of trees has risen (Table 1 and Morin et al. 2011). Average annual net growth, mortality, and removals have higher sampling errors, indicating higher uncertainty in trend estimates; however, the latest inventory shows a notable 12 percent decrease in average annual mortality and 19 percent decrease in average annual harvest removals of trees on forest land (Table 1).

Table 1.—New Hampshire forest statistics, 2013 and 2007. Volumes are for trees 5-inch and larger in diameter. Number of trees and biomass are for trees 1-inch and larger in diameter. Sampling errors and error bars shown in tables and figures in this report represent 68 percent confidence intervals.

	2013		2007		Change
	Estimate	error (percent)	Estimate	error (percent)	since 2007 (percent)
Forest Land					
Area (thousand acres)	4,784	0.9	4,790	0.9	-0.1
Number of live trees (million trees)	4,222	2.5	4,138	2.6	2.0
Aboveground biomass of live trees (thousand oven-dry tons)	285,325	1.6	273,281	1.7	4.4
Net volume of live trees (million ft ³)	11,011	1.9	10,529	1.9	4.6
Annual net growth of live trees (thousand ft ³ /yr)	196,779	5.0	164,675	6.9	19.5
Annual mortality of trees (thousand ft ³ /yr)	109,836	5.6	124,830	13.7	-12.0
Annual harvest removals of live trees (thousand ft ³ /yr)	127,138	11.7	156,693	12.7	-18.9
Timberland					
Area (thousand acres)	4,498	1.1	4,523	1.2	-0.5
Number of live trees (million trees)	3,884	2.7	3,797	2.8	2.3
Aboveground biomass of live trees (thousand oven-dry tons)	269,642	1.8	261,281	1.9	3.2
Net volume of live trees (million ft ³)	10,387	2.0	10,051	2.0	3.3
Net volume of growing stock trees (million ft ³)	9,485	2.1	9,226	2.1	2.8
Annual net growth of growing stock trees (thousand ft ³ /yr)	188,343	4.0	159,224	7.4	18.3
Annual mortality of growing stock trees (thousand ft ³ /yr)	74,776	6.0	96,578	8.3	-22.6
Annual harvest removals of growing stock trees (thousand ft ³ /yr)	107,650	11.9	137,207	12.9	-21.5



Forest Area

New Hampshire's current area of forest land has been stable since the late 1990s. Timberland accounts for 94 percent of this forest land or 4.5 million acres. Slightly more than 5 percent of forest land is reserved from timber production and less than 1 percent is other forest land identified as not being able to meet minimum productivity standards. New Hampshire's total area is 5.8 million acres (excludes census water, e.g., Lake Winnepesaukee).

The northern unit of New Hampshire has a higher area of and proportion of forest land when compared to the southern units (Fig. 2). The northern unit also has more than double the proportion of forest land in public ownership (38 percent) when compared with the southern unit (14 percent).

Maple/beech/birch is the dominant forest-type group, covering 51 percent of the forest land (Fig. 3). In fact, the maple/beech/birch type group makes up over 50 percent of the forest land area in all but the four southeastern most counties.

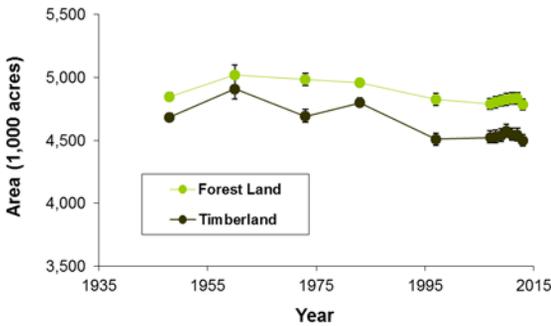


Figure 1.—Forest land and timberland by year, New Hampshire.

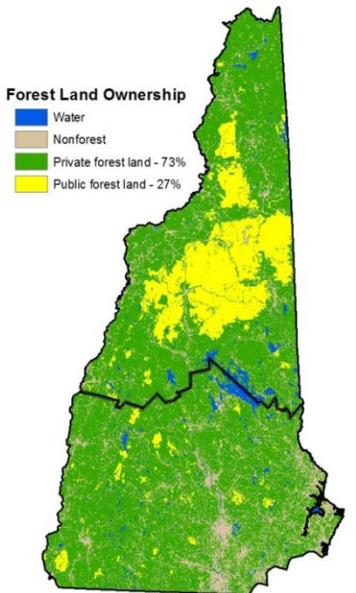


Figure 2.—FIA unit boundary and area of forest/nonforest with forest identified by major ownership group, New Hampshire, 2013.

White/red pine and spruce/fir are the most abundant softwood forest-type groups. Together they account for 33 percent of the forest land in the State.

The forest-type groups that are more widely distributed in the southern unit (e.g., oak/pine, oak/hickory, and white/red pine) have generally higher proportions of private ownership. Families and individuals, corporations, and other private entities own the majority of forest land (51, 17, and 5 percent, respectively). The state of New Hampshire, U.S. Forest Service, and local public entities own the remainder (4, 17, and 6 percent, respectively).

New Hampshire's forests have been maturing as illustrated in the distribution of timberland by stand-size classes (Fig. 4). Since the 1960 inventory, the acreage of large-diameter stands has been increasing. Until the 1983 inventory, the acreage in small-diameter stands was declining and has since been stable. The acreage of medium-diameter stands has been declining since the 1983 inventory.

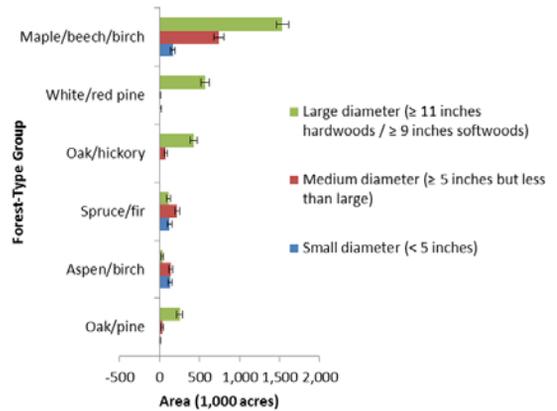


Figure 3.—Forest land by stand-size class (based on small, medium, and large trees) for top six forest-type groups by acres, New Hampshire, 2013.

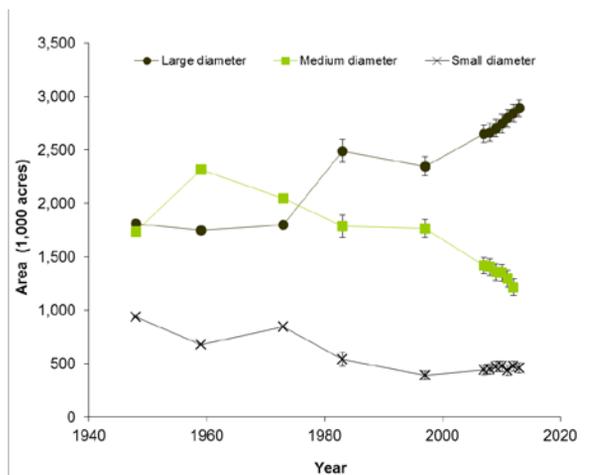


Figure 4.—Timberland by stand-size class and year, New Hampshire.

Volume, Biomass, and Trends

Increases in volume, biomass, and number of large-diameter trees have accompanied the increase in area of forest land and large-diameter stands in New Hampshire.

There are approximately 927 million live trees (at least 5-inch diameter) on forest land accounting for approximately 11 billion ft³ of volume and 261.3 million oven-dry tons of aboveground biomass. Volume increased 4.6 percent and biomass increased by 4.4 percent since the 2007 inventory (Table 1).

Contributing to this increase, notable gains in volume were observed for eastern hemlock (*Tsuga canadensis*), red spruce (*Picea rubens*), northern red oak (*Quercus rubra*), and eastern white pine (*Pinus strobus*). By contrast, paper birch (*Betula papyrifera*), American beech (*Fagus grandifolia*), and balsam fir (*Abies balsamea*) decreased in volume.

The average annual mortality rate as a proportion of annual mortality volume to the live volume at the beginning of the inventory period for all species combined is 1 percent. Only paper birch and balsam fir had annual mortality rates greater than 2 percent (Fig. 5).

The negative net growth estimate for paper birch indicates that mortality was greater than growth (Table 2). While the net growth rates for yellow birch and American beech were not negative, both species are clearly suffering from forest health issues based on the high annual mortality and low annual net growth of each. The likely causes are birch decline and beech bark disease (*Cryptococcus fagisuga* and *Neonectria*), respectively.

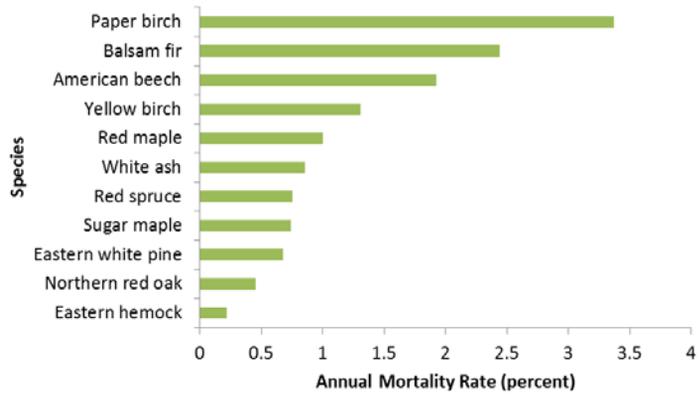
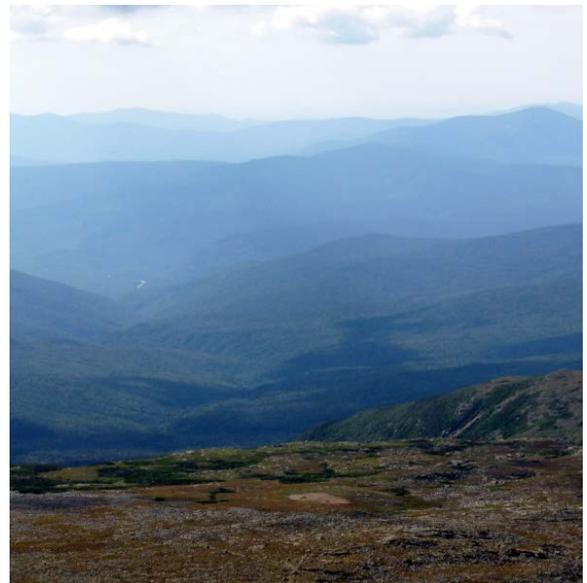


Figure 5.—Annual mortality rate by species, New Hampshire, 2013.



View of the White Mountains in northern New Hampshire. Photo by Randall Morin, U.S. Forest Service.

Table 2.—Number, net volume, oven-dry biomass, net growth, mortality, and harvest removals of live trees on forest land, New Hampshire, 2013 (selected prominent species)

Species	Trees ^a (million trees)	Net volume ^a (million ft ³)	Aboveground biomass ^b (thousand tons)	Net growth ^a (thousand ft ³ /yr)	Mortality ^a (thousand ft ³ /yr)	Harvest removals ^a (thousand ft ³ /yr)
Red maple	172	1664	46,970	24,722	16,680	16,315
Eastern hemlock	99	1160	22,556	30,501	2,276	8,119
Balsam fir	94	507	10,709	13,702	12,618	7,165
Eastern white pine	83	2206	38,276	46,260	14,053	30,102
Red spruce	68	577	10,978	10,781	3,942	6,350
Sugar maple	65	878	28,067	15,175	6,364	15,782
Northern red oak	63	1184	38,563	32,800	4,933	6,449
Yellow birch	60	644	20,783	4,557	8,085	5,100
Paper birch	60	493	14,277	-10,451	18,212	3,052
American beech	58	503	17,652	4,106	10,116	5,291
White ash	25	333	10,092	5,679	2,793	4,551

^aTrees at least 5-inch diameter trees. ^bTrees at least 1-inch diameter trees.

Reserve Status — Improved Implementation

FIA defines reserved forest land as forest land withdrawn by law(s) prohibiting the management of land for the production of wood products (not merely controlling or prohibiting wood-harvesting methods). All private forest land, regardless of conservation easements that may restrict harvesting, is not reserved. Timberland does not include reserved forest land. The new procedures allow for some publicly owned forest land to be classified as reserved even in the absence of a strict law against commercial harvesting. Examples are local parks, state parks, and national wildlife refuges.

In an effort to increase consistency among states and across inventory years, a refined set of procedures determining reserve status have been implemented with version 6.0 of the FIA field manual which took effect with the 2013 inventory year (began October 2012).

Furthermore, all previously collected annual inventory data (1999 to present) have been updated using the new standardized interpretation.

Starting now, timberland estimates generated for earlier annual inventories can differ from previously published estimates. The 2012 inventory was the last inventory in which all data were available under the previous and improved implementations (Table 3). Small changes in the timberland estimates are minor given the inherent variability in the associated estimates.

The improved implementation of the reserve status definition increases the spatial and temporal accuracy of timberland estimates allowing for higher quality trend analyses and potentially better forest management decisions.

Table 3.—Comparison of timberland estimates calculated using previous and improved reserve status implementations, New Hampshire, 2012. Volumes are for trees 5-inch and larger in diameter.

	2012 Estimate improved	2012 Estimate previous	Difference	Difference (percent)
Timberland				
Area (thousand acres)	4,498	4,638	-140	-3.0
Number of live trees ≥1 in diameter (million trees)	3,884	4,001	-117	-2.9
Aboveground biomass of live trees ≥1 in (thousand oven-dry tons)	269,642	275,981	-6,339	-2.3
Net volume of live trees ≥5 in diameter (million ft ³)	10,387	10,670	-283	-2.7
Net volume of growing stock trees ≥5 in diameter (million ft ³)	9,485	9,821	-336	-3.4
Annual net growth of growing stock trees (thousand ft ³ /yr)	188,343	195,344	-7,001	-3.6
Annual mortality of growing stock trees (thousand ft ³ /yr)	74,776	83,078	-8,302	-10.0
Annual harvest removals of growing stock trees (thousand ft ³ /yr)	107,650	105,292	2,358	2.2
Annual other removals of growing stock trees (thousand ft ³ /yr)	6,391	7,631	-1,240	-16.2

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