



Forests of Massachusetts, 2015

This report provides an overview of forest resources in Massachusetts based on an inventory conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program of the Northern Research Station. Estimates are based on field data collected using the FIA annualized sample design. Results are for the measurement years 2010-2015 with comparisons made to 2005-2010¹ (see footnote on bottom of page 2). Forest resource measurements were taken on 614 plots with about 20 percent of the plots measured each year. Estimates will be updated and published annually.

For core tables and more information, including definitions and technical details, please refer to the inventory citations on page 4 of this report or visit <http://fia.fs.fed.us>.

Overview

As of 2015, Massachusetts has an estimated 3.0 million acres of forest land (Table 1). The forest land area has not substantially changed since 2010. The estimated number of live trees on Massachusetts forest land in 2015 is 1.6 billion trees containing a total aboveground biomass of 218 million tons. The estimated volume of trees, ≥ 5 inch diameter at breast height, is 8.5 billion ft³. The estimated annual net growth of these trees is 154 million ft³/yr with annual mortality, harvest removals, and other removals, such as land clearing, of 73, 25, and 5 million ft³/yr, respectively.

Table 1.—Massachusetts forest statistics, change between 2005-2010 and 2010-2015

	2010 Estimate	Sampling error (percent)	2015 Estimate	Sampling error (percent)	Change since 2010 (percent)
Forest Land					
Area (thousand acres)	3,014.6	1.7	3,024.9	1.5	0.3
Number of live trees ≥ 1 in diameter (million trees)	1,551.6	3.0	1,568.7	3.1	1.1
Live tree aboveground biomass (thousand oven-dry tons)	207,534.5	2.4	217,796.1	2.1	4.9
Net volume live trees ≥ 5 in diameter (million ft ³)	7,992.8	2.6	8,448.9	2.4	5.7
Net growth live trees ≥ 5 in (thousand ft ³ /yr)	176,734.1	9.0	153,771.5	7.0	-13.0
Annual mortality of live trees ≥ 5 in (thousand ft ³ /yr)	62,846.8	11.4	72,714.2	9.0	15.7
Annual harvest removals of live trees ≥ 5 in (thousand ft ³ /yr)	38,570.7	31.1	24,550.0	25.5	-36.4
Annual other removals of live trees ≥ 5 in (thousand ft ³ /yr)	11,646.3	40.6	5,289.1	39.2	-54.6
Timberland					
Area (thousand acres)	2,845.1	2.0	2,883.8	1.8	1.4
Number of live trees ≥ 1 in diameter (million trees)	1,477.9	3.2	1,513.3	3.3	2.4
Live tree aboveground biomass (thousand oven-dry tons)	199,448.3	2.6	209,346.4	2.3	5.0
Net volume live trees ≥ 5 in diameter (million ft ³)	7,710.9	2.8	8,148.7	2.6	5.7
Net volume of growing stock trees (million ft ³)	6,999.4	2.9	7,330.7	2.7	4.7
Net growth live trees ≥ 5 in (thousand ft ³ /yr)	153,960.8	8.3	132,893.4	6.2	-13.7
Annual mortality of live trees ≥ 5 in (thousand ft ³ /yr)	40,380.4	13.1	49,306.7	10.1	22.1
Annual harvest removals of live trees ≥ 5 in (thousand ft ³ /yr)	31,818.2	31.1	20,144.5	27.9	-36.7
Annual other removals of live trees ≥ 5 in (thousand ft ³ /yr)	8,347.1	45.4	5,536.5	67.0	-33.7



Forest Area

Land Cover

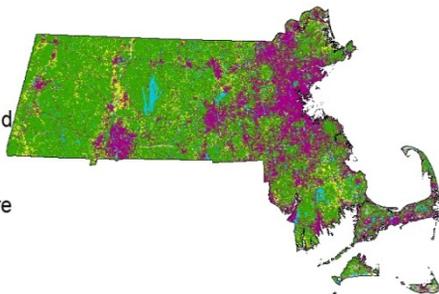
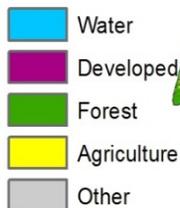


Figure 1.—Forest and other land cover, Massachusetts, 2011.
Source: National Land Cover Database (Jin et al. 2013).

An estimated 61 percent of the land area of Massachusetts meets the FIA definition of forest land. This forest land is not evenly distributed across the Commonwealth (Fig. 1). The distribution is largely determined by development patterns and, to a lesser extent, arable lands—if left alone, most land in the Commonwealth would naturally revert to forest. Areas surrounding Boston, Springfield, and Worcester, along the coast and the major transportation corridors have the lowest occurrences of forest land.

The area of forest land in Massachusetts has decreased from an estimated 3,288,000 acres of in 1952, the first year FIA started collecting data in the Commonwealth, to an estimated 3,025,000 acres in 2015, the nominal year of the most recent inventory results (Fig. 2). The general decrease from the earliest estimates is presumably due to increased development. The forest land estimates for 2010 and 2015 are not substantially different, but FIA will continue to monitor this trend to see if the economic recession or other factors may be allowing increased reversion of nonforest land to forest land.

There have been relatively few stand replacing events over the past few decades and this has resulted in the percentage of the forest land that is in the largest stand-size class² steadily increasing (Fig. 3). This has important implications for forest resilience (i.e., the ability of the forests to withstand severe weather events or insect infestations), wildlife habitat, and other ecological functions.

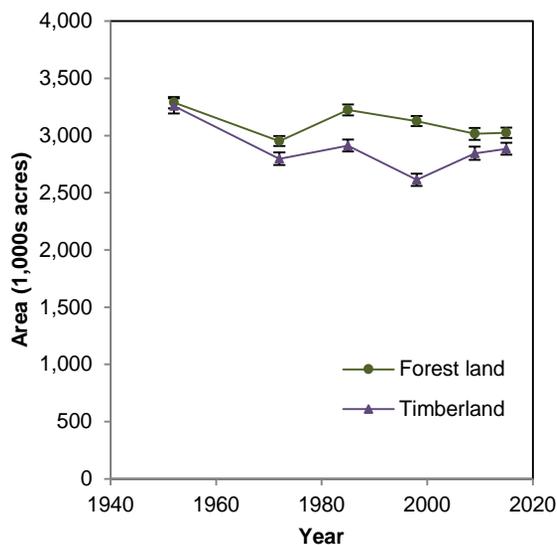


Figure 2.—Area of forest land and timberland, Massachusetts, 1952-2015. Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

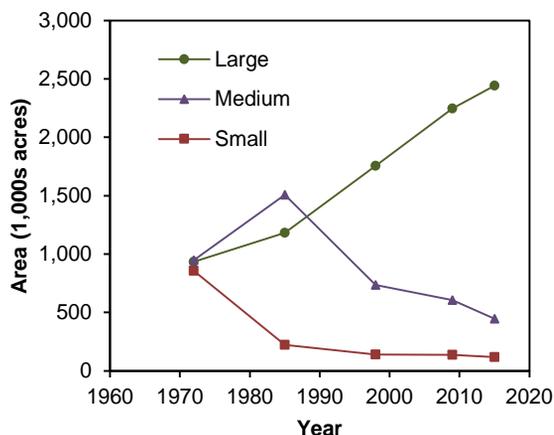


Figure 3.—Area of timberland by stand-size class², Massachusetts, 1972-2015.

¹One-fifth of the plots were measured annually from 1999 through 2013 resulting in a complete set of samples for every 5 years of data collection. In 2014, this 5-year cycle was changed to 7 years, wherein 1/7th of the plots are measured annually. The complete set of plots will be retained. All inventory estimates (both current and change) will continue to be based on the most recent measurements and remeasurements taken on these plots.

²Small: dominated by trees less than 5.0 inches diameter at breast height (d.b.h.); Medium: dominated by trees 5.0 to 8.9 inches d.b.h. for softwoods and 5.0 to 10.9 inches d.b.h. for hardwoods; Large: dominated by trees ≥9.0 inches for softwoods and 11.0 inches d.b.h. for hardwoods.

Forest Composition

There are many different ways to characterize the composition of forests, three are presented here: forest-type groups, volume, and numbers of trees. Each provides a somewhat different view of the resource and there are many other potential metrics that can be examined.

Forest-type groups are amalgamations of forest types which are based on the plurality of trees within the plot/condition. In Massachusetts, the oak/hickory and maple/beech/birch are the most common forest-type groups, representing 34 and 24 percent of the Commonwealth’s forest land, respectively (Fig. 4).

The forests of Massachusetts contain a wide variety of tree species, with 71 species observed on the FIA plots inventoried between 2010 and 2015. In terms of total volume (Table 2), eastern white pine is the most common tree in the Commonwealth, but in terms of number of stems (Fig. 5), red maple is the most common. Rankings of the next most common species vary depending on whether volume or number of trees are examined, but in addition to these two species there are a number of oak species, eastern hemlock, sugar maple, white ash, and sweet birch among the group. Collectively, the 10 most common tree species account for 84 percent of the volume of the live trees and 78 percent of the number of trees in the Commonwealth.

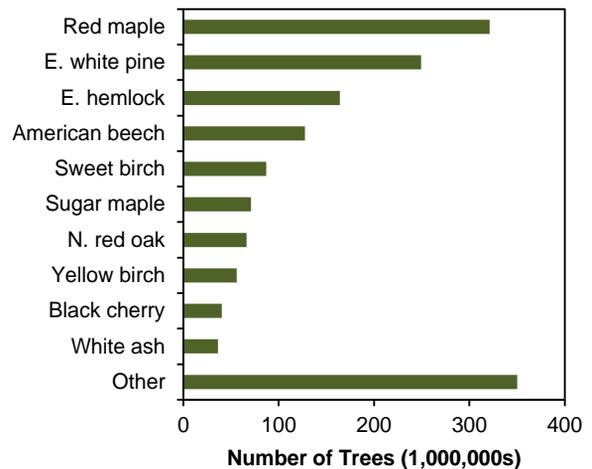
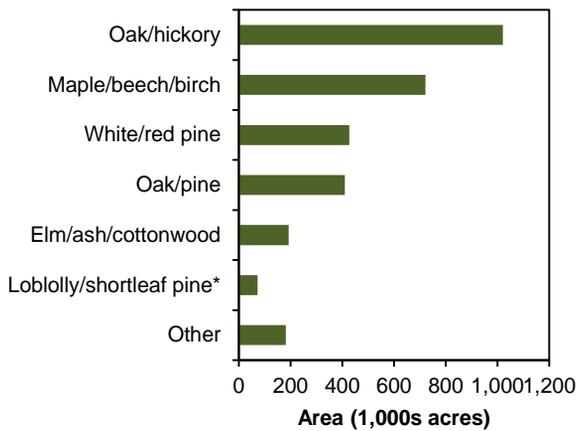


Figure 4.—Area of forest land by forest-type group, Massachusetts, 2010-2015.

* Represented by the pitch pine forest type in Massachusetts.

Figure 5.—Number of trees ≥1 in diameter by species, Massachusetts, 2010-2015.

Table 2.—Top 10 trees species by volume estimates, Massachusetts, 2010-2015

Rank	Species	Volume of live trees on forest land (million ft ³)	Sampling error (%)	Change since 2010 (%)	Volume of sawtimber trees on timberland (million board ft)	Sampling error (%)	Change since 2010 (%)
1	Eastern white pine	2,135.2	7.7	10.9	9,467.9	8.4	14.5
2	Red maple	1419	5.9	1.2	2942.8	8.8	1.8
3	Northern red oak	987.2	8.2	8.2	3,634.8	9.2	9.7
4	Eastern hemlock	859.1	10.4	3.1	2280.3	12.1	(0.4)
5	Black oak	351.0	10.6	4.8	1,115.1	13.7	7.2
6	Sugar maple	327.9	12.7	0.8	825.8	15.4	1.1
7	White ash	300.1	14.5	0.1	978.5	18.4	4.4
8	Sweet birch	269.1	11.6	8.5	564	17.4	8.8
9	White oak	247.1	10.4	12.7	795.9	14.7	24.4
10	Scarlet oak	231.8	13.2	6	670.6	15.7	6.9
	All species	8,448.9	2.4	5.7	26,700.2	3.5	9.1

Timber Removals Across Southern New England

Across Connecticut, Massachusetts, and Rhode Island, collectively referred to as Southern New England³, an estimated 63 million cubic feet of wood is being removed annually. Most of this wood, 86 percent, is being removed due to harvesting, including both commercial and non-commercial purposes, such as firewood harvesting. The remaining 14 percent of the removals are due primarily to land use conversions. The overall growth to removals ratio is 5:1 indicating the region is producing five times more wood than is being harvested. Looking just at the wood being removed for harvesting, most of it is coming from a relatively few species and fairly narrow diameter size class. Across the region, northern red oak, red maple, and eastern white pine are the dominant species being harvested (Fig. 6). Most of the trees being harvested range in diameter from 10 to 19 inches (Fig. 7). These harvesting patterns are related to relative abundance of species, preferences for certain species for timber and firewood, and harvesting practices.

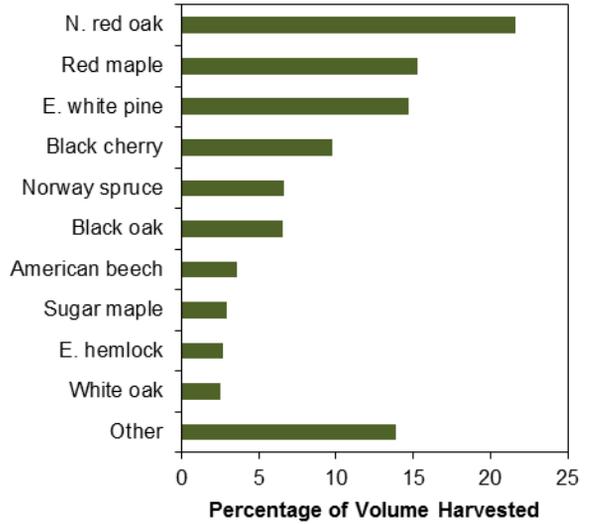


Figure 6.—Percentage of volume harvested by species, Southern New England, 2015.

³ A regional approach was taken to this analysis to avoid issues associated with small samples sizes if the three states were analyzed separately.

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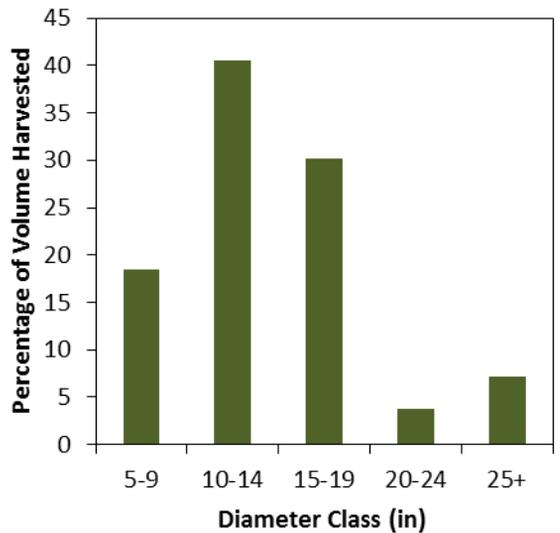


Figure 7.—Percentage of volume harvested by diameter class, Southern New England, 2015.

How to Cite This Publication

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