USDA
United States Department of Agriculture

RESOURCE UPDATE FS-20

Forests of Massachusetts, 2013

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 2009-2013 with comparisons made to 2003-2007. Forest resource measurements were taken on 545 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 2013, Massachusetts has an estimated 3.0 million acres of forest land (Table 1). The forest land area has not substantially changed since 2007. The estimated number of live trees on Massachusetts forest land in 2013 is 1.6 billion trees containing a total aboveground biomass of 216 million tons. The estimated volume of trees, ≥ 5 inch diameter at breast height (d.b.h.), is 8 billion ft^3. The estimated annual net growth of these trees is 172 million ft^3/yr with annual mortality, harvest removals, and other removals, such as land clearing, of 65, 32, and 6 million ft^3/yr, respectively.

Table 1.—Massachusetts forest statistics, change between 2003-2007 and 2009-2013

	2007 Estimate	Sampling error (percent)	2013 Estimate	Sampling error (percent)	Change since 2007 (percent)
Forest Land					
Area (thousand acres)	3,034.5	1.7	3,035.8	1.5	0.0
Number of live trees ≥1 in diameter (million trees)	1,559.5	3.0	1,598.0	2.9	2.5
Live tree aboveground biomass (thousand oven-dry tons)	201,155.6	2.3	215,848.8	2.0	7.3
Net volume live trees ≥5 in diameter (million ft^3)	7,750.4	2.5	8,332.8	2.3	7.5
Net growth live trees ≥5 in (thousand ft^3/yr)	159,709.1	5.6	172,419.9	6.9	8.0
Annual mortality of live trees ≥5 in (thousand ft^3/yr)	52,980.9	9.1	65,601.2	9.2	23.8
Annual harvest removals of live trees ≥5 in (thousand ft^3/yr)	61,907.2	20.8	32,131.1	25.4	-48.1
Annual other removals of live trees ≥5 in (thousand ft^3/yr)	5,201.3	67.7	6,018.8	36.0	15.7
Timberland					
Area (thousand acres)	2,852.8	2.0	2,901.7	1.8	1.7
Number of live trees ≥1 in diameter (million trees)	1,476.9	3.2	1,543.6	3.1	4.5
Live tree aboveground biomass (thousand oven-dry tons)	192,853.3	2.5	208,245.2	2.2	8.0
Net volume live trees ≥5 in diameter (million ft^3)	7,466.5	2.7	8,064.4	2.5	8.0
Net volume of growing stock trees (million ft^3)	6,833.3	2.8	7,268.6	2.7	6.4
Net growth live trees ≥5 in (thousand ft^3/yr)	146,873.9	6.0	150,791.5	6.2	2.7
Annual mortality of live trees ≥5 in (thousand ft^3/yr)	35,318.2	9.3	42,637.2	10.1	20.7
Annual harvest removals of live trees ≥5 in (thousand ft^3/yr)	54,436.9	21.4	25,997.1	26.0	-52.2
Annual other removals of live trees ≥5 in (thousand ft^3/yr)	22,486.4	44.5	1,932.8	43.9	-91.4

Forest Area

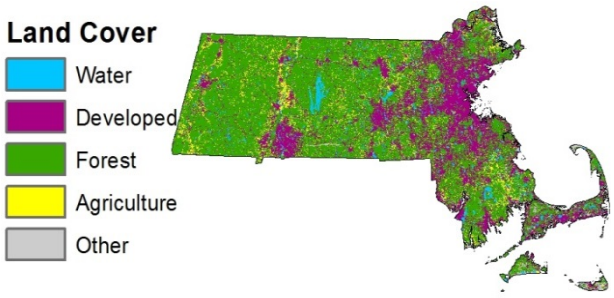

Figure 1.—Forest and other land cover, Massachusetts, 2011.
Source: National Land Cover Database (Jin et al. 2013)

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 along 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 3,036,000 acres in 2013, 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 difference between the forest land estimates for 2007 and 2013 are not substantially different, but FIA will continue to monitor this trend to see if the economic recession or other factors may be resulting in 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 class[1] 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.

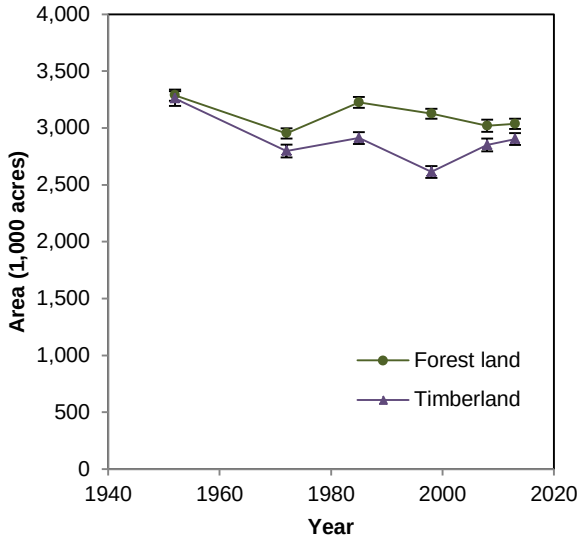

Figure 2.—Area of forest land and timberland, Massachusetts, 1952-2013.

Note: Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

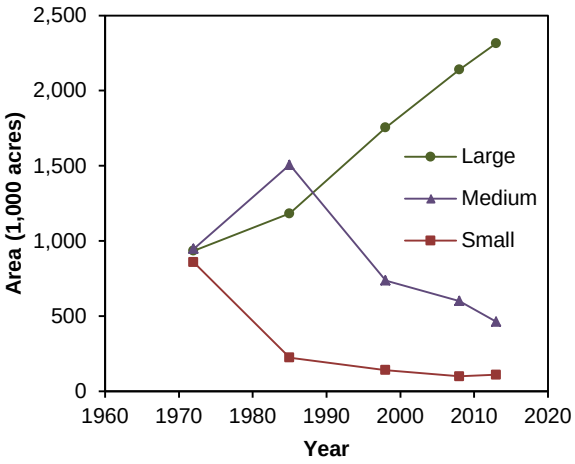

Figure 3.—Area of timberland by stand-size class[1], Massachusetts, 1972-2013.

[1]Small: dominated by trees less than 5.0 inches 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 group, 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 82 species observed on the FIA plots inventoried between 2009 and 2013. In terms of total volume (Table 2) eastern white pine is the most common species, but in terms of number of trees (Fig. 5), red maple is the most common. Ranking of the next most common species varies depending on whether volume or number of trees are examined, but includes these species along with eastern hemlock, sugar maple, and a number of oak and birch species. Collectively, the ten most common tree species account for 84 percent of the volume of the live trees and 77 percent of the number of trees in the Commonwealth.

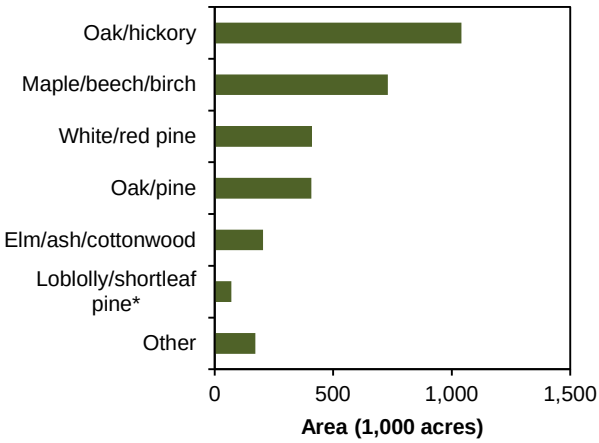

Figure 4.—Area of forest land by forest-type group, Massachusetts, 2009-2013. * Represented by the pitch pine forest type in Mass.

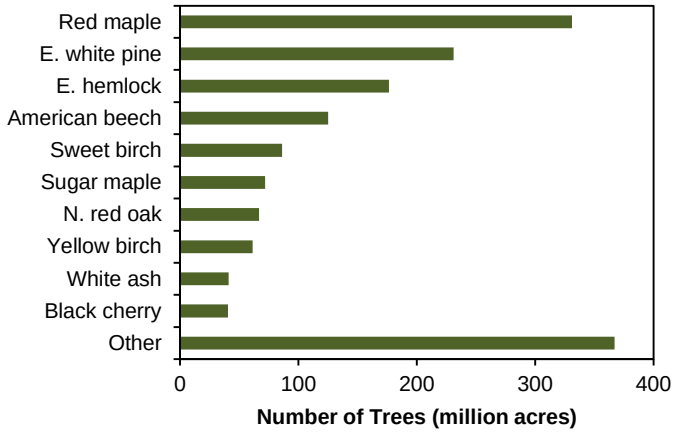

Figure 5.—Number of trees ≥1 in diameter by species, Massachusetts, 2009-2013.

Table 2.—Top 10 trees species by volume estimates, Massachusetts, 2009-2013

Rank	Species	Volume of live trees on forest land (million ft³)	Sampling error (%)	Change since 2007 (%)	Volume of sawtimber trees on timberland (million board ft)	Sampling error (%)	Change since 2007 (%)
1	Eastern white pine	2,013.9	7.8	7.2	8,843.6	8.5	10.9
2	Red maple	1,437.1	5.8	0.9	2,991.7	8.6	3.5
3	Northern red oak	968.7	8.2	11.5	3,591.9	9.1	19.0
4	Eastern hemlock	886.4	10.1	15.2	2,370.4	11.7	13.1
5	Black oak	340.6	10.6	12.4	1,056.3	13.8	23.8
6	Sugar maple	335.8	12.9	4.7	833.9	15.6	8.5
7	White ash	310.3	13.8	11.5	1,011.6	17.4	21.3
8	Sweet birch	261.2	11.5	13.3	557.7	17.1	22.4
9	White oak	234.2	10.3	8.6	699.9	14.4	11.4
10	Scarlet oak	222.7	13.1	5.9	639.1	15.5	13.3
	Other softwoods	220.3	15.2	8.1	537.2	18.3	12.5
	Other hardwoods	1,101.7	6.1	5.3	2,840.6	9.1	18.0
	All species	8,332.8	2.3	7.5	25,974.0	3.5	13.1

Forest Ownership of Massachusetts

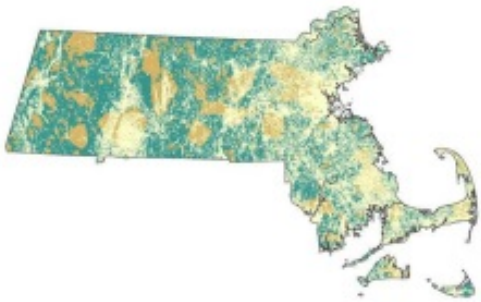

Figure 6.—Private (■) and public (■) forest ownership, Massachusetts, 2013 (Hewes et al. 2013).

An estimated 65 percent of Massachusetts' forests are privately owned (Fig. 6). Of these private forests, most are owned by families and individuals, collectively referred to as family forest ownerships. This group accounts for 47 percent of the forest land in the Commonwealth.

Other private ownerships, including corporate, tribal, conservation groups, and clubs, account for an additional 19 percent of the Commonwealth's forest land. Federal, State, and local governments control 3, 19, and 13 percent of the Commonwealth's forest land, respectively.

The 2011-2013 National Woodland Owner Survey (NWOS; Butler et al. In preparation) provides insights into the dominant ownership group, family forest ownerships, and focuses specifically on family forest ownerships with 10+ ac of forest land. There are an estimated 27,000 family forest ownerships in Massachusetts with 10+ acres of forest land. On average they have 39 acres of forest land. The reasons for owning this land are varied, but most are related to amenity values, such as aesthetics and privacy (Fig. 7). More information will be available in forthcoming NWOS reports (www.fia.fs.fed.us/nwos).

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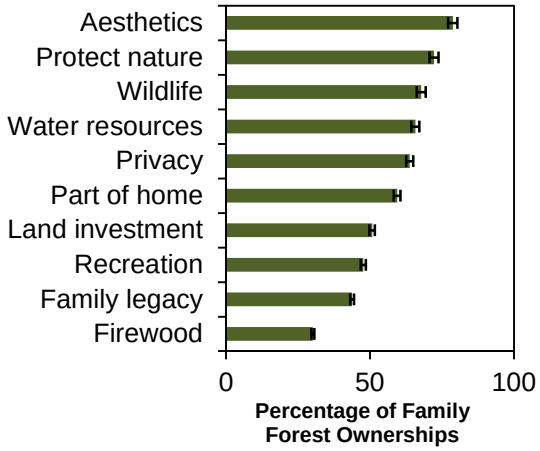

Figure 7.—Reasons for owning* forest land, family forest ownerships with 10+ ac of forest land, Massachusetts, 2011-2013. * Many ownerships have multiple reasons for owning.

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