USDA
United States Department of Agriculture

RESOURCE UPDATE FS-131

Forests of Rhode Island, 2016

This report provides an overview of forest resources in Rhode Island 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 2011-2016 with comparisons made to 2007-2011* (see footnote on bottom of page 2). Forest resource measurements were taken on 125 plots with about 14 percent of the plots measured each year. Growth, mortality, and removals statistics are based on 109 remeasured plots. 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. A complete set of inventory tables is available at https://doi.org/10.2737/FS-RU-131.

Overview

Rhode Island has an estimated 366,400 acres of forest land (Table 1). The forest land area has not substantially changed since 2011. The estimated number of live trees on Rhode Island's forest land in 2016 is 165 million containing a total aboveground biomass of 26 million tons. The estimated volume of trees, ≥5 inches diameter at breast height, is 913 million ft^3. The estimated annual net growth of these trees is 17 million ft^3/year with annual mortality, harvest removals, and other removals, such as land clearing, equal to 30, 10, and 3 percent of the annual growth, respectively.

Table 1.—Rhode Island forest statistics, 2007-2011 and 2011-2016

	2011 Estimate	Sampling error (percent)	2016 Estimate	Sampling error (percent)	Change since 2011 (percent)
Forest Land					
Area (thousand acres)	359.5	4.0	366.4	3.5	1.9
Number of live trees ≥1 inch diameter (million trees)	177.3	7.8	164.8	7.7	-7.1
Live tree aboveground biomass (thousand oven-dry tons)	24,133.1	5.2	25,852.4	4.7	7.1
Net volume live trees ≥5 inches diameter (million ft^3)	851.1	5.7	912.7	5.2	7.2
Net growth live trees ≥5 inches (thousand ft^3/yr)	19,989.8	11.4	17,242.3	17.8	-13.7
Annual mortality of live trees ≥5 inches (thousand ft^3/yr)	4,428.5	17.1	5,153.9	19.1	16.4
Annual harvest removals of live trees ≥5 inches (thousand ft^3/yr)	573.5	69.7	1,799.0	44.4	-- [a]
Annual other removals of live trees ≥5 inches (thousand ft^3/yr)	2,422.7	78.0	469.3	67.6	-- [a]
Timberland					
Area (thousand acres)	347.7	4.3	352.5	3.9	1.4
Number of live trees ≥1 inch diameter (million trees)	172.3	8.0	160.5	8.0	-6.8
Live tree aboveground biomass (thousand oven-dry tons)	23,421.8	5.4	25,053.7	5.1	7.0
Net volume live trees ≥5 inches diameter (million ft^3)	829.0	5.9	887.5	5.5	7.1
Net volume of growing stock trees (million ft^3)	761.9	6.4	776.0	6.4	1.9
Net growth of growing stock trees ≥5 inches (thousand ft^3/yr)	17,403.1	10.7	15,739.3	15.0	-9.6
Annual mortality of growing stock trees ≥5 inches (thousand ft^3/yr)	3,259.1	19.9	3,122.6	22.3	-4.2
Annual harvest removals of growing stock trees ≥5 inches (thousand ft^3/yr)	511.3	69.3	1,571.6	45.3	-- [a]
Annual other removals of growing stock trees ≥5 inches (thousand ft^3/yr)	2,459.1	62.7	405.3	70.6	-- [a]

[a] Value not included due to small sample size and large variance for associated estimate.

Forest Area

An estimated 55 percent of the land area of Rhode Island meets the FIA definition of forest land. This forest land is not evenly distributed across the State (Fig. 1). The distribution is largely determined by development patterns and, to a lesser extent, arable lands—if left alone, most land in the State would naturally revert to forest. Areas surrounding Providence and along the coast have the lowest occurrences of forest land.

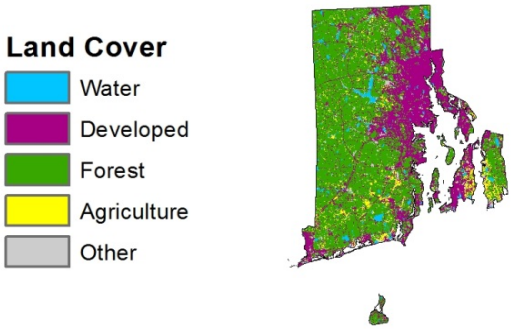

Figure 1.—Forest and other land cover, Rhode Island, 2011. Source: National Land Cover Database (Jin et al. 2013).

The area of forest land in Rhode Island has decreased from an estimated 434,000 acres of in 1952, the first year FIA started collecting data in the State, to an estimated 366,400 acres in 2016, 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 in 2011 and 2016 are not substantially different, but FIA will continue to monitor this trend.

There have been relatively few stand replacing events, such as hurricanes or intensive timber harvesting, over the past few decades and this has resulted in the percentage of the forest land that is in the largest stand size class** 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.

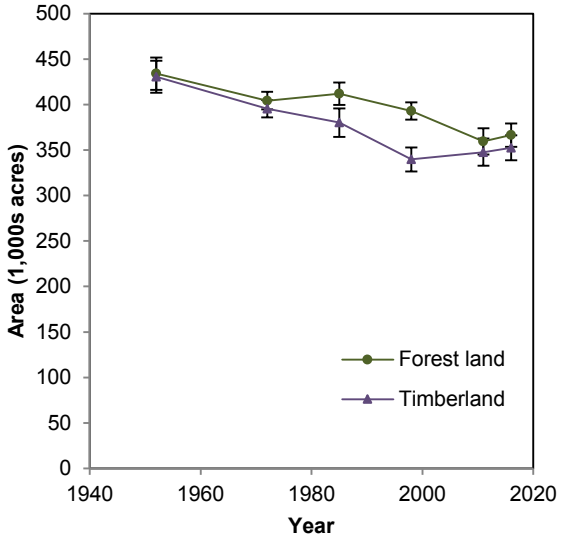

Figure 2.—Area of forest land and timberland, Rhode Island, 1952-2016. Sampling errors and error bars shown in the tables and figures in this report represent 68 percent confidence intervals for the estimated values.

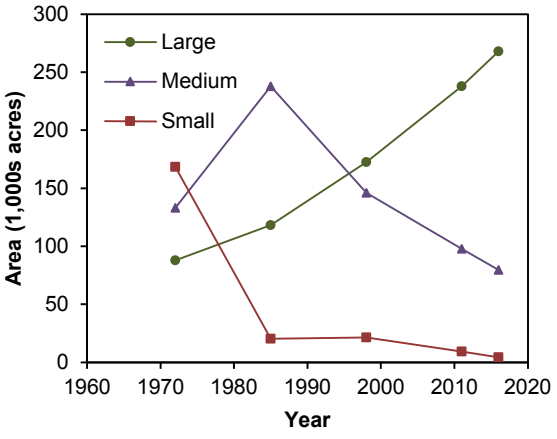

Figure 3.—Area of timberland by stand-size class, Rhode Island, 1972-2016.**

*One-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.

**Small: 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 Trends

There are many different ways to characterize the composition of forests, three are presented here: forest-type groups, volume, and numbers of stems. 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 calculated based on the plurality of trees within the plot/condition. In Rhode Island, the oak/hickory forest-type group is by far the most common forest-type group, representing 63 percent of the State's forest land (Fig. 4). In Rhode Island, this group is indeed dominated by oaks, northern red, scarlet, black, and white oaks in particular, but it also includes substantial amounts of red maple and other species.

The forests of Rhode Island contain a wide variety of tree species, with 46 species observed on the FIA plots inventoried between 2011 and 2016. In terms of total volume (Table 2) and number of trees (Fig. 5), red maple is the most common tree in the State. This species accounts for an estimated 22 percent of the volume and 27 percent of the number of trees. Rankings of the next most common species vary substantially depending on whether volume or number of trees are examined, but includes eastern white pine and a number of oak and birch species. Collectively, the 10 most common tree species account for 91 percent of the volume of live trees and 86 percent of the number of trees in the State.

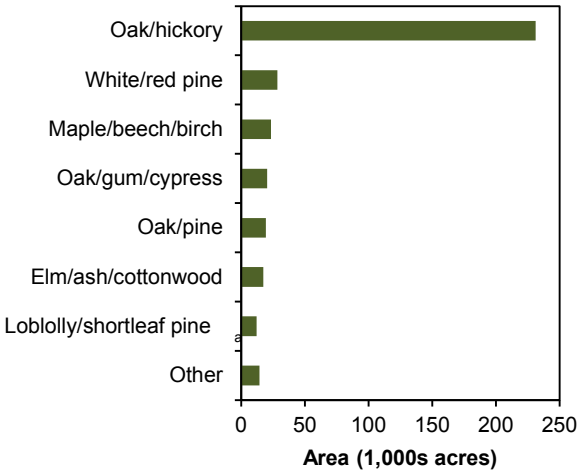

Figure 4.—Area of forest land by forest-type group, Rhode Island, 2011-2016. [a] Represented by the pitch pine forest type in Rhode Island.

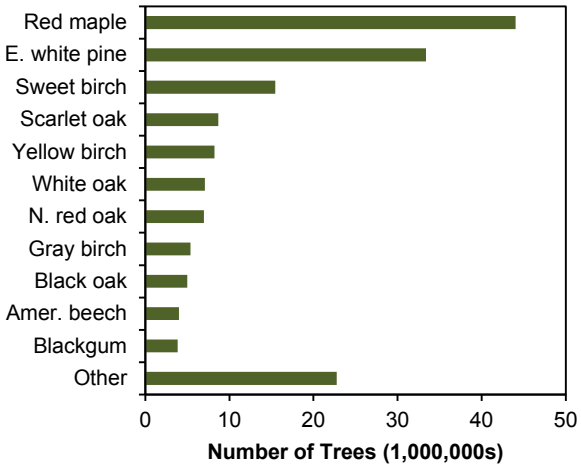

Figure 5.—Number of trees ≥1 inch diameter by species, Rhode Island, 2011-2016.

Table 2.—Top 10 trees species by volume estimates, Rhode Island, 2011-2016

Rank	Species	Volume of live trees on forest land (million ft³)	Sampling error (%)	Change since 2011 (%)	Volume of sawtimber trees on timberland (million board ft)	Sampling error (%)	Change since 2011 (%)
1	Red maple	196.7	10.6	2.2	303.7	19.2	-21.0
2	Eastern white pine	176.9	19.3	29.5	802.0	20.5	31.6
3	Northern red oak	135.9	16.7	13.9	518.4	19.8	9.4
4	Scarlet oak	90.9	15.8	19.1	231.8	18.2	26.7
5	Black oak	87.5	17.8	-6.1	297.7	20.4	-7.3
6	White oak	75.2	13.8	12.7	253.1	18.6	17.9
7	Pitch pine	21.3	47.9	8.7	78.2	52.4	9.8
8	Sweet birch	17.0	29.2	-22.4	12.0	50.2	-58.6
9	Blackgum	15.5	31.3	-9.4	38.0	48.7	-25.6
10	Yellow birch	14.5	32.8	10.7	20.0	42.0	11.7
	All species	912.7	5.2	7.2	2,725.0	8.3	6.3

A Closer Look at Timber Supply: Who Owns the Wood and Who is Harvesting?

Knowing who owns the timber resource, and who is and who is not harvesting, is important for making informed business and policy decisions. Due to small sample size issues, results are presented for Southern New England (i.e., Connecticut, Massachusetts, and Rhode Island). The many commonalities across the ownerships and forests of the region help justify this combination.

Most of the forest land across Southern New England is privately owned with 46 percent of all forest land classified as family forest land (Fig. 6). The distribution of the standing timber volume is similar to the acreage distribution. The relative distribution of timber harvesting reflects differences in ownership objectives and management practices; 56 percent of the removals are from family forest lands.

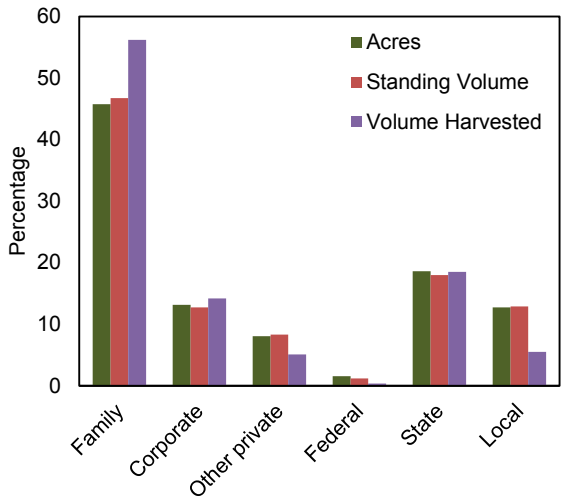

Figure 6.—Percentage of forest land, standing timber volume and annual timber harvest volume by ownership class, Southern New England, 2016.

Using data from the National Woodland Owner Survey (Butler et al. 2016), the 387,000 family forest ownerships (50,000 family forest ownerships with 10+ acres) across the region can be examined in greater detail. Family forest ownerships have a range of size of holdings with 79 percent of the family forest land in holdings less than 100 acres (Fig. 7). But the larger ownerships, those with 100+ acres, contribute a disproportionate 60 percent of the annual timber harvest from family forest lands. Looking at other attributes of family forest ownerships, such as reasons for owning, absentee ownership, owner age, and interactions with forestry professionals (Silver et al. 2015), are also important and should be considered in future examinations of timber harvesters.

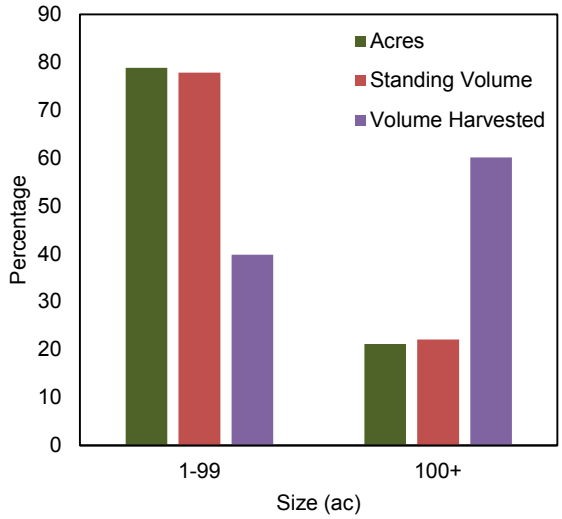

Figure 7.—Percentage of forest land, standing timber volume and annual timber harvest volume by family forest ownership size class, Southern New England. Plot data: 2012-2016 (remeasured from 2007-2011). NWOS data: 2011-2103.

Literature Cited

Butler, B.J.; Hewes, J.H.; Dickinson, B. [et al.]. 2016. **USDA Forest Service National Woodland Owner Survey: National, regional, and state statistics for family forest and woodland ownerships with 10+ acres, 2011-2013**. Res. Bull. NRS-99. Newtown Square, PA: U.S. Dept. of Agriculture, Forest Service, Northern Research Station. 39 p. https://doi.org/10.2737/NRS-RB-99.

Jin, S.; Yang, L.; Danielson, P. [et al.]. 2013. **A comprehensive change detection method for updating the National Land Cover Database to circa 2011.** Remote Sensing of Environment. 132: 159–175. https://doi.org/10.1016/j.rse.2013.01.012.

Silver, E.J.; Leahy, J.E.; Weiskittel, A.R. [et al.]. 2015. **An evidence-based review of timber harvesting behavior among private woodland owners**. Journal of Forestry. 113(5): 490–499. https://doi.org/10.5849/jof.14-089.

How to Cite This Publication
Butler, Brett J. 2017. **Forests of Rhode Island, 2016.** Resource Update FS-131. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.

Northern FIA: http://nrs.fs.fed.us/fia/
National FIA: http://fia.fs.fed.us

Contact Information
Brett J. Butler, Research Forester
USDA Forest Service, Northern Research Station
160 Holdsworth Way
Amherst, MA 01003
Phone: 413-545-1387 | Email: bbutler01@fs.fed.us

The published report is available online at https://doi.org/10.2737/FS-RU-131.