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RESOURCE UPDATE FS-135

Forests of New Jersey, 2016

This publication provides an overview of forest resources in New Jersey following an inventory by the U.S. Forest Service, Forest Inventory and Analysis program (FIA), Northern Research Station (NRS). Estimates are derived from field data collected using an annualized sample design and are updated yearly. Beginning in 2014, NRS-FIA switched to a 7-year cycle length. For the 2016 inventory, estimates of current variables such as area, volume, and biomass are based on 1,091 plots measured in 2011-2016. Change variables such as net growth, removals, and mortality are based on 733 plots measured in 2006-2011 and resampled in 2011-2016. Estimates from earlier annual and periodic inventories are shown for comparison. See Bechtold and Patterson (2005), O'Connell et al. (2014), Gormanson et al. (2017) for definitions and technical details. A complete set of inventory tables is available at https://doi.org/10.2737/FS-RU-135.

Overview

Forest land makes up a large portion of New Jersey; 40 percent of land, or nearly 2 million acres, is forested (Table 1). Ownership is evenly distributed among private (47 percent) and public (53 percent) ownership. Timberland is 86 percent of forest land, 14 percent is reserved, and one-tenth of 1 percent is other forest land.

Table 1.—New Jersey forest statistics, 2016

	2016 estimate	Sampling error (%)	2011 estimate	Sampling error (%)	Change since 2011 (%)
Forest Land					
Area (thousand acres)	1,989.7	2.0	1,963.6	2.6	1.3
Number of live trees ≥1 in diameter (million trees)	893.6	4.2	919.4	5.3	-2.8
Aboveground biomass of live trees ≥1 in diameter (million oven-dry tons)	118.6	2.8	112.7	3.6	5.2
Net volume of live trees ≥5 in diameter (million ft^3)	4,293.2	2.9	4,069.0	3.8	5.5
Net growth of live trees ≥5 in diameter (million ft^3/yr)	73.9	11.8	86.2	12.3	-14.2
Annual mortality of live trees ≥5 in diameter (million ft^3/yr)	50.1	11.4	37.9	14.4	32.3
Annual harvest removals of live trees ≥5 in diameter (million ft^3/yr)	9.9	35.2	14.9	40.8	-33.0
Annual other removals of live trees ≥5 in diameter (million ft^3/yr)	1.4	77.3	3.0	55.7	-54.9
Timberland					
Area (thousand acres)	1,717.3	2.7	1,683.1	3.5	2.0
Number of live trees ≥1 in diameter (million trees)	774.5	4.9	792.3	6.1	-2.2
Aboveground biomass of live trees ≥1 in diameter (million oven-dry tons)	101.2	3.4	95.4	4.3	6.1
Net volume of live trees ≥5 in diameter (million ft^3)	3,678.9	3.6	3,455.8	4.5	6.5
Net volume of growing-stock trees ≥5 in diameter (million ft^3)	3,334.6	3.7	3,201.4	4.7	4.2
Net growth of growing-stock trees ≥5 in diameter (million ft^3/yr)	57.9	12.3	74.1	12.6	-21.8
Annual mortality of growing-stock trees ≥5 in (million ft^3/yr)	33.5	13.9	27.6	16.5	21.3
Annual harvest removals of growing-stock trees ≥5 in (million ft^3/yr)	7.3	39.3	11.4	43.9	-35.7
Annual other removals of growing-stock trees ≥5 in (million ft^3/yr)	1.2	80.7	4.9	55.3	-76.8

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

Forest Area

Since 2008, the area of forest land in New Jersey has remained consistent (Fig. 1). In an effort to improve consistency, FIA's definition of forest land was revised in 1999 (Widmann 2005). As a result, areas previously classified as nonforest, e.g., forested rights-of-way and urban lands, were reclassified as forest land. Subsequently, these changes resulted in an increase in forest land in 1999, while timberland had little change.

While forest land covers much of New Jersey, most forest area is found in the northwestern and southeastern portions of the State, with the bulk of forest land occurring in the Pinelands (Fig. 2).

Two forest-type groups—oak/hickory (856,000 acres) and loblolly/shortleaf pine (457,500 acres)—occupy 66 percent of forest land in New Jersey. Within these two groups, pitch pine (427,400 acres) and white oak/red oak/hickory (257,500 acres) are the largest forest types, respectively.

Forest land consists mainly of sawtimber stands (70 percent); 24 percent of forest land is made up of poletimber stands, 5 percent contain sapling-seedling stands, and 1 percent is nonstocked. The average age of forest stands continues to increase (Fig. 3). Currently, 69 percent of stands are over 61 years of age.

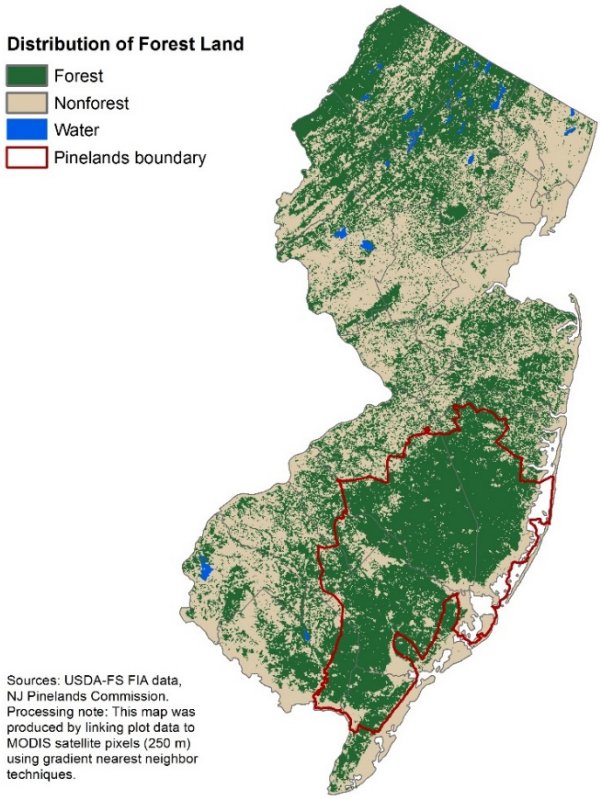

Figure 2.—Distribution of forest land, New Jersey, 2009.

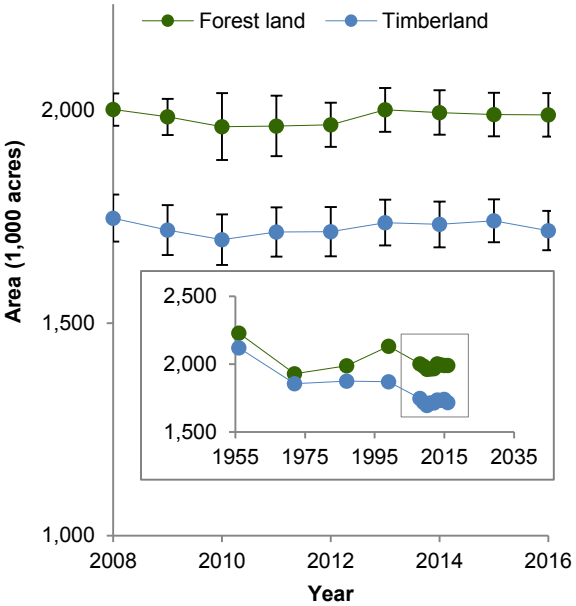

Figure 1.—Area of timberland and forest land by year, New Jersey.

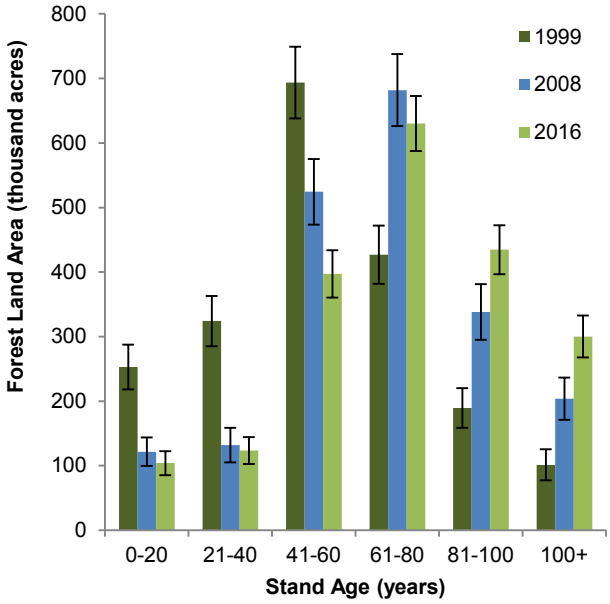

Figure 3.—Area of forest land by stand age and inventory year, New Jersey.

Volume, Biomass, and Trends

New Jersey's forest land contains approximately 893.6 million trees (greater than 1 inch diameter at breast height [d.b.h.]) (Table 1). The northern half of the State is dominated by red maple (*Acer rubrum*), sweet birch (*Betula lenta*), and eastern redcedar (*Juniperus virginiana*). However, in the southern half of New Jersey, pitch pine (*Pinus rigida*), red maple, and Atlantic white-cedar (*Chamaecyparis thyoides*) are the most numerous species.

Pitch pine is the most voluminous species on forest land, followed by red maple and yellow-poplar (*Liriodendron tulipifera*) (Table 2). Live-tree and sapling biomass totals 118.6 million tons on forest land, which equates to 59.3 million tons of carbon in New Jersey's forests (Table 1).

Over the last 5 years, net growth on forest land has decreased by 14 percent (Table 1). Pitch pine had the highest growth, followed by northern red oak (*Quercus rubra*) and yellow-poplar; these three species accounted for 44 percent of growth statewide. In contrast, mortality increased by 33 percent since 2011 (Table 1). Four species made up 48 percent of total mortality: pitch pine, red maple, scarlet oak (*Quercus coccinea*), and white ash (*Fraxinus americana*) (Table 2).

Average annual removals of live trees on forest land totaled an estimated 11.3 million ft^3 (Table 1). Removals due to harvesting accounted for 88 percent of total removals in 2016. Sweetgum (*Liquidambar styraciflua*), Scotch pine (*Pinus sylvestris*), and black walnut (*Juglans nigra*) comprised 45 percent of total harvest removals (Table 2).

Table 2.—Number, volume, biomass, growth, mortality, and removals of live trees on forest land by species for the top 12 tree species by volume, New Jersey, 2016

Common Name	Latin Name	Number (million trees)[a]	Net volume (million ft^3)[b]	Aboveground biomass (million dry tons)[a]	Average annual net growth (thousand ft^3)[b]	Average annual mortality (thousand ft^3)[b]	Average annual harvest removals (thousand ft^3)[b]
Pitch pine	*Pinus rigida*	168.0	697.1	15,774.8	15,230.6	7,010.5	94.0
Red maple	*Acer rubrum*	125.0	475.3	13,265.6	6,026.7	6,557.0	78.5
Yellow-poplar	*Liriodendron tulipifera*	9.2	306.1	6,218.8	7,596.3	208.9	--
White oak	*Quercus alba*	46.3	269.2	9,059.0	1,721.7	3,155.4	227.8
Northern red oak	*Quercus rubra*	9.8	230.7	7,324.4	9,790.8	2,201.7	--
White ash	*Fraxinus americana*	18.9	222.9	6,504.1	905.3	5,179.5	--
Sweetgum	*Liquidambar styraciflua*	29.5	216.2	5,259.6	3,874.5	807.6	2,148.8
Chestnut oak	*Quercus prinus*	15.0	199.4	6,443.9	3,887.2	1,180.0	--
Black oak	*Quercus velutina*	12.4	169.2	5,233.9	4,954.7	2,535.5	779.2
Scarlet oak	*Quercus coccinea*	23.2	168.2	6,026.4	-400.8	5,337.1	566.4
Atlantic white-cedar	*Chamaecyparis thyoides*	45.5	149.0	2,307.2	1,864.0	2,148.4	--
Sweet birch	*Betula lenta*	26.1	128.0	4,171.8	1,789.2	1,037.2	675.2

[a] Trees ≥1 inch d.b.h.
[b] Trees ≥5 inches d.b.h.
Note: Table cells without observations are indicated by --. A value of 0 is due to rounding of a small value.

Impacts to Forests in the Wake of Hurricane Sandy

Hurricane Sandy made landfall on the coast of New Jersey in late October of 2012. Subsequent high winds, heavy rainfall, and flooding caused substantial damage to property and had a devastating effect on people. To better understand the storm's impact on forest resources, the status of trees in the zone of high sustained winds (greater than 50 knots) and statewide impacts to removals and mortality were analyzed (Fig. 4).

The number of trees (greater than 5 inches d.b.h.) on forest land that were in the zone of high sustained winds decreased by 24 percent between 2011 and 2016. Species with a more than 30 percent loss in number included American holly, white ash, black oak, sassafras, and Atlantic white-cedar (Table 3). Three percent of live trees in the storm's path had broken tops, i.e., the live top was completely detached from the bole. Green ash, sassafras, and blackgum had the largest percentage of broken tops.

Between 2011 and 2016, 64 percent of average annual removals occurred on forest land within the zone of high sustained winds. Statewide, average annual mortality caused by weather increased from 2.7 million ft^3/year in 2008 to 7.2 million ft^3/year in 2013. Weather-induced mortality rose to 8.8 million ft^3/year in 2016.

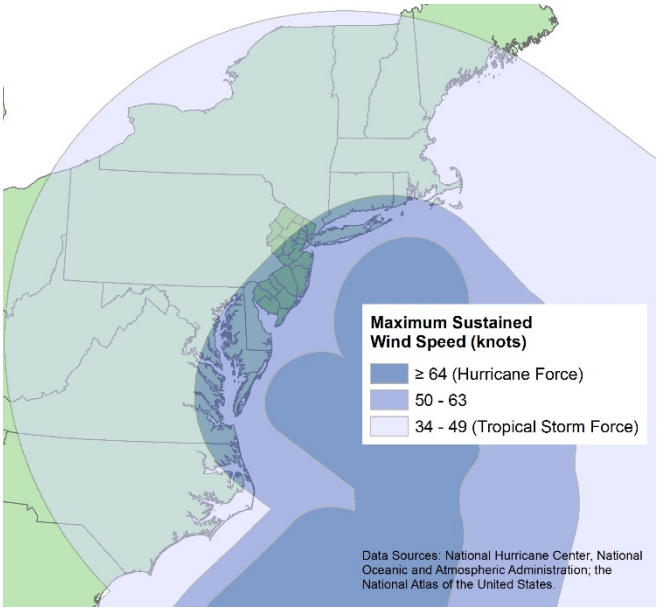

Figure 4.—Radii of maximum sustained wind speeds sustained along the Atlantic coast of the U.S. during Hurricane Sandy, October, 2012.

Table 3.—Change in the number of trees and the number of trees with a broken top on forest land and within the zone of sustained winds greater than 50 knots caused by Hurricane Sandy by species, New Jersey, 2011-2016. Species are listed in decreasing order of abundance.

Species	Change in number of trees (%)	Number of trees with a broken top (%)
Pitch pine	-25.6	0.6
Red maple	-27.3	6.4
Atlantic white-cedar	-31.0	1.3
White oak	-23.1	6.1
Sweetgum	-23.0	6.9
Scarlet oak	-26.5	1.9
Black oak	-35.3	2.3
Blackgum	-20.2	8.2
Chestnut oak	-21.7	-
White ash	-35.6	3.6
Sassafras	-33.7	9.8
American holly	-36.7	5.2
Green ash	-14.2	14.0

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