USDA United States Department of Agriculture

RESOURCE UPDATE FS-170

Forests of New York, 2017

This resource update provides an overview of the forest resources in New York based on inventories conducted by the USDA 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 and are updated yearly.[1] Information about the national and regional FIA programs is available online at http://fia.fs.fed.us. Since 2002, FIA has implemented an annual inventory in New York. For the 2017 inventory, estimates for current variables such as area, volume, and biomass are based on 4,701 plot samples (3,186 forested) collected from 2011–2017. Change variables such as net growth, removals, and mortality are based on 4,538 plots (3,037 forested) collected in 2005–2011 and remeasured in 2011–2017. Estimates from earlier inventories are shown for comparison. See Bechtold and Patterson (2005), Gormanson et al. (2018), and Burrill et al. (2018) for definitions and technical details. A complete set of inventory tables is available at https://doi.org/10.2737/FS-RU-170.

Overview

Forest land in New York decreased 1.4 percent since 2012 with an estimate of 18.7 million acres (Table 1). Timberland comprises 15.6 million acres, or 83 percent of all forest land. The estimate of reserved forest land remained at 3.1 million acres (17 percent of total forest land). Forest land not meeting minimum productivity standards (other forest land) makes up only 0.1 percent of total forest land, or 26,000 acres. Increases in total net volume continued with an estimate of 42.9 billion ft^3, representing a 4.6 percent increase over 2012. Increased net growth and decreased removals on timberland resulted in the growth to removals ratio increasing from 2.1:1 in 2012 to 2.5:1 in 2017. Though annual mortality on forest land increased, it decreased as a percentage of net volume from 1.18 percent in 2012 to 1.14 percent in 2017.

[1]The 5-year cycle (1/5th of plots measured annually) was changed to a 7-year cycle in 2014, wherein 1/7th (14.3 percent) of the plots are measured annually.

Table 1.—New York forest statistics, 2017 and 2012. Volume estimates are for trees 5 inches and larger in diameter. Number of trees and biomass estimates are for trees 1 inch and larger in diameter. Sampling errors in tables and error bars in figures represent 68 percent confidence intervals.

	2017 Estimate	Sampling error (%)	2012 Estimate	Sampling error (%)	Change from 2012 (%)
Forest land					
Area (thousand acres)	18,730.8	0.6	19,005.5	0.7	-1.4
Number of live trees (million trees)	11,867.4	1.3	12,143.7	1.3	-2.3
Aboveground biomass of live trees (thousand oven-dry tons)	1,169,405.3	0.9	1,120,867.6	1.0	4.3
Net volume of live trees (million ft^3)	42,926.9	1.0	41,048.5	1.1	4.6
Annual net growth of live trees (thousand ft^3/yr)	761,838.0	2.8	735,519.1	3.0	3.6
Annual mortality of live trees (thousand ft^3/yr)	488,271.1	3.3	483,625.8	3.0	1.0
Annual harvest removals of live trees (thousand ft^3/yr)	253,359.8	8.1	299,959.4	7.4	-15.5
Annual other removals of live trees (thousand ft^3/yr)	15,276.3	40.1	21,614.5	35.9	-29.3
Timberland					
Area (thousand acres)	15,587.3	0.7	15,864.2	0.8	-1.7
Number of live trees (million trees)	9,406.9	1.5	9,693.5	1.5	-3.0
Aboveground biomass of live trees (thousand oven-dry tons)	948,818.3	1.1	905,870.5	1.2	4.7
Net volume of live trees (million ft^3)	34,742.6	1.2	33,091.9	1.3	5.0
Net volume of growing stock trees (million ft^3)	30,922.3	1.2	29,711.9	1.4	4.1
Annual net growth of growing stock trees (thousand ft^3/yr)	617,184.4	2.4	618,185.3	2.5	-0.2
Annual mortality of growing stock trees (thousand ft^3/yr)	260,677.6	4.3	260,833.5	3.8	-0.1
Annual harvest removals of growing stock trees (thousand ft^3/yr)	202,231.5	8.3	245,873.1	7.5	-17.7
Annual other removals of growing stock trees (thousand ft^3/yr)	23,070.2	30.8	29,876.6	28.5	-22.8

Forest Area

Forest land in New York has been relatively stable for nearly 4 decades, ranging from 18.5 million acres in 1980 to 19.0 million acres in 2012 (Fig. 1). The 2017 estimate of 18.7 million acres, however, represents the lowest full-cycle estimate since annual inventory began in 2002. A closer analysis utilizing plots that changed land use between visits reveals a net forest land loss of 141,000 acres. Most of this loss went to the idle farmland (80,000 acres) and other undeveloped (48,000 acres) categories. Generally, such land-use change results from small changes in maintenance patterns (mowing, edge maintenance, etc.). In this case, analysis of change is complicated by a change in definition of "forest land" from a minimum 10 percent stocking to a minimum 10 percent canopy cover. This may have resulted in land that previously qualified as forest land to no longer be categorized as such.

Eighty-three percent of New York's forest land is classified as timberland (Fig. 2). The state is unique in the East for having a substantial portion (17 percent) of forest land as publicly-owned reserved, primarily in the Adirondack Park. Only 9 percent of forest land is publicly-owned timberland, primarily State (6 percent) and local government (3 percent). Private timberland comprises 74 percent of all forest land and is 89 percent of all timberland.

The decades-long trend in timberland acreage becoming more dominated by large diameter stands[2] has continued (Fig. 3). In 2017, sawtimber-size stands accounted for 65 percent of timberland, an increase of 5 percentage points over 2012. Conversely, poletimber stands dropped to 26 percent and small-diameter stands comprise only 9 percent of all timberland, down from 12 percent in 2012.

Maple/beech/birch and oak/hickory forest-type groups collectively comprise 73 percent of forest land in New York. These 2 groups had 66 percent of their area in large diameter stands in 2012 and 70 percent in 2017. Gains in area of large diameter maple/beech/birch stands were offset primarily by decreases in small diameter stands, which dropped to 5 percent of area (Fig. 4). Oak/hickory forest land increased to 65 percent large diameter with 3 percentage point drops in each of the small and medium diameter classes.

[2] Small diameter stands (sapling/seedling): dominated by trees less than 5.0 inches diameter at breast height (d.b.h.); medium (poletimber): 5.0 to 8.9 inches d.b.h. for softwoods and 5.0 to 10.9 inches d.b.h. for hardwoods; large (sawtimber): ≥9.0 inches for softwoods and 11.0 d.b.h. for hardwoods.

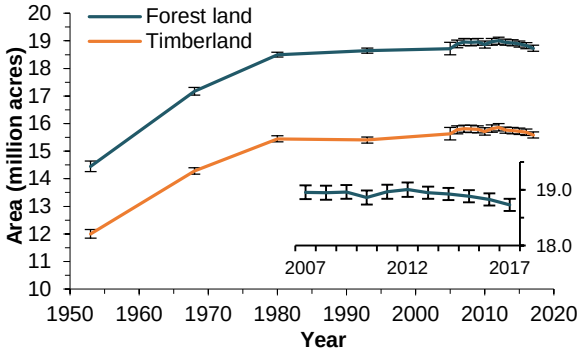

Figure 1.—Area of forest land and timberland by year, New York, 1953 to 2017.

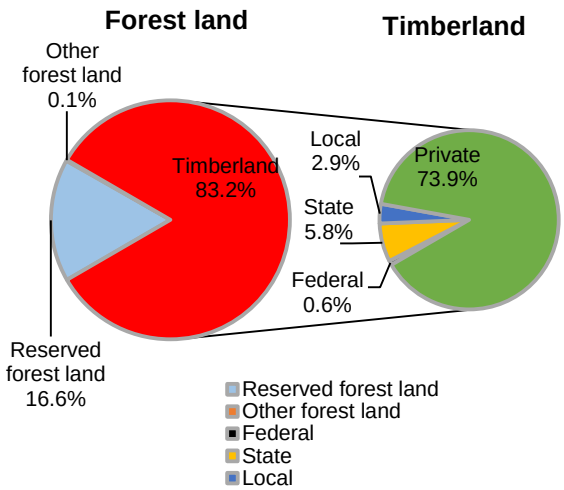

Figure 2.—Proportion of forest land by land use and ownership class, New York, 2017.

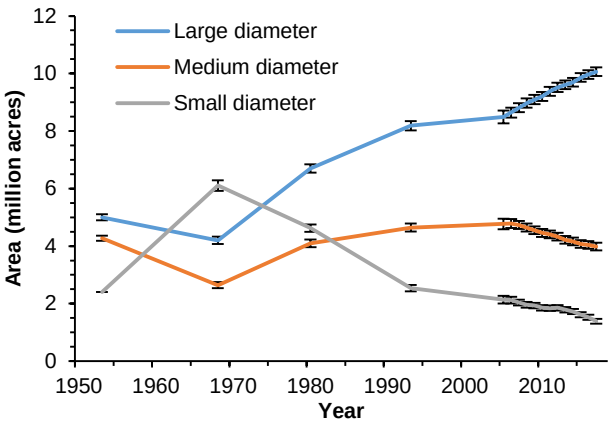

Figure 3.—Timberland by stand-size class and year, New York, 1953 to 2017.

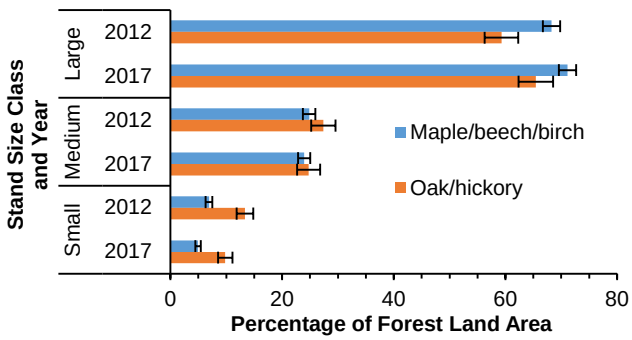

Figure 4.—Percent of forest land by stand-size class (based on small, medium, and large trees)[2] for the top two forest-type groups by area, New York, 2017.

Volume, Biomass, and Trends

The net volume of trees on forest land increased 4.6 percent over the 2012 estimate. This represents a greater rate of increase than that observed in 2012 when net volume rose 4.1 percent over 2007. On a per-acre basis, the rate of volume increase is greater still, due to the decrease in the total forest land estimate. The 42.9 billion ft^3 of net volume on forest land is equal to 2,292 ft^3 per acre, 6.1 percent greater than the 2012 estimate of 2,160 ft^3 per acre.

Northern red oak had the greatest rate of volume increase among the top species by volume at 11.8 percent (Table 2). American beech was the only species exhibiting negative volume change, though the 0.2 percent loss is well within the sampling error.

Sawtimber volume on timberland increased 7.8 percent over 2012, to 100.7 billion board feet (bdft). Again, gains in per-acre volume exceeded absolute percentages of increase. Volume totaled 6,458 bdft/acre, a 9.7 percent increase since 2012 and an increase in the rate of change from 2012, when sawtimber volume per acre gained 7.4 percent over the previous 5 years.

Northern red oak continued to have the greatest rate of sawtimber volume increase among the top 10 species, gaining 15.4 percent from 2012. Eastern white pine and eastern hemlock both gained 10.1 percent in sawtimber volume. Sugar maple has the greatest sawtimber volume at 13.7 billion bdft, a 7.8 percent increase over 2012. Beech was the only "top 10" species to lose sawtimber volume, dropping 12.4 percent to 3.1 billion bdft.

Aboveground biomass on forest land increased 4.3 percent from 2012 to 1.2 billion tons.

A 2 percent increase in net growth and a 16 percent decrease in removals led to an increase in the statewide timberland growth to removals ratio (G:R) from 2.1 in 2012 to 2.5 in 2017. Net growth on timberland totaled 716 million ft^3/year and removals stood at 282 million ft^3/year.

Red oak leads the list in terms of G:R among the top species at 4.5 (Fig. 5). Beech has the lowest G:R on timberland (1.0) indicating annual removals equal to net growth.

G:R ratios of the 20 tree species having at least 1 percent of total timberland volume vary substantially. Current trends may indicate future composition changes. Red pine had a G:R of 0.5 (down from 1.0 in 2012) with removals more than double annual net growth. Sweet birch had a G:R of 11.6 in 2017, up from 3.1 in 2012.

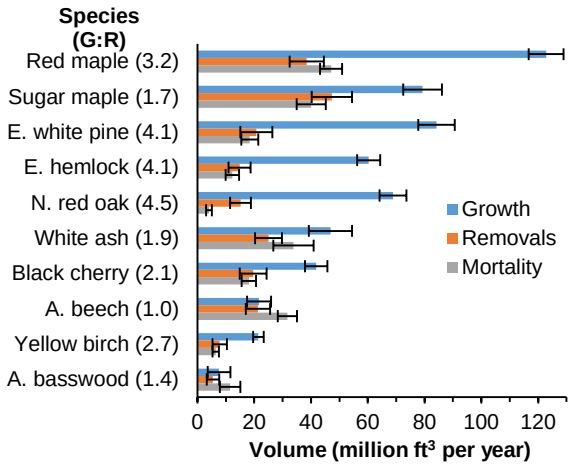

Figure 5.—Average annual net growth, removals, and mortality volume on timberland, with net growth to removals ratios (G:R) in parentheses, for the top 10 species ranked by total net volume on timberland, New York, 2017.

Table 2.— Net volume and percent change on forest land; sawtimber volume and percentage change on timberland, and aboveground biomass on forest land for the top 10 species based on net volume of live trees on forest land, New York, 2017. Volume estimates are for trees 5 inches and larger in diameter. Biomass estimates are for trees 1 inch and larger in diameter.

	Net volume of live trees (million ft^3)	Sampling error (percent)	Percent change since 2012	Net volume of sawtimber (million bdft)	Sampling error (percent)	Percent change since 2012	Aboveground biomass (million dry tons)	Sampling error (percent)
Red maple	6,758.2	2.6	4.6	12,711.9	4.1	5.7	185.2	2.5
Sugar maple	6,413.8	3	2.4	13,741.1	4.4	7.8	203.8	3.0
Eastern white pine	3,483.4	5.7	8.9	12,518.1	6.4	10.1	61.4	5.6
Eastern hemlock	3,338.4	4.9	6.8	7,665.0	6.2	10.1	63.8	4.8
White ash	2,526.3	4.1	1.8	6,119.6	5.7	3.2	77.9	3.9
Northern red oak	2,471.6	5.3	11.8	9,239.4	6.2	15.4	79.2	5.2
American beech	2,417.4	3.8	-0.2	3,125.5	7.4	-12.4	82.9	3.5
Black cherry	2,205.2	5.2	4.4	6,200.1	7.1	8.7	56.6	5.0
Yellow birch	2,034.1	4.5	2.4	2,177.7	8.7	2.1	61.3	4.4
Red spruce	1,133.5	6.9	6.5	1,095.1	12	4.6	21.4	6.4
Other softwood species	2,308.5	6.1	0.1	5,191.1	9.2	5.5	44.7	5.9
Other hardwood species	7,836.5	2.7	5.7	20,873.8	4	9.9	231.4	2.5
All species	42,926.9	1	4.6	100,658.3	1.7	7.8	1,169.4	0.9

Oak Wilt in the Empire State

Oak wilt is a disease caused by the fungus *Ceratocystis fagacearum* that develops in the xylem of trees. Trees respond by plugging the xylem, thereby preventing transport of water and nutrients (Munck 2017). Oak wilt has been known to exist in the United States for nearly 75 years, having been first discovered in Wisconsin in 1944.

Oaks comprise over 5 percent of all trees 5-inches or greater in diameter in New York and all species are susceptible to oak wilt. The Catskill-Lower Hudson inventory unit has the greatest density of oak, where the genus comprises over 18 percent of all trees (Fig. 6).

The Catskill-Lower Hudson is also the unit with the most instances of oak wilt in the State. The disease has been found in Brooklyn, Islip, Riverhead, and Southold (NY DEC, n.d.) (Fig. 6). Additional cases of oak wilt exist in Canadaigua and Glenville. Protective zones for management of oak wilt and quarantine districts to prevent the movement of infected materials have been established around areas of confirmed infections.

While all oaks can be affected by oak wilt, the progression of symptoms is varied. Species in the red oak group (northern red, black, scarlet, and pin oak) experience rapid deterioration beginning with a browning of leaves at the tips that works toward the base, followed by the tree losing leaves from the top of the crown down (NY DEC, n.d.). The disease quickly progresses in red oaks, which generally succumb to the effects within 6 weeks. Species of white oak (white, chestnut, swamp white, and bur oak) experience a slower progression of symptoms with individual branches dying off. The disease can take several years to kill white oaks (NY DEC, n.d.).

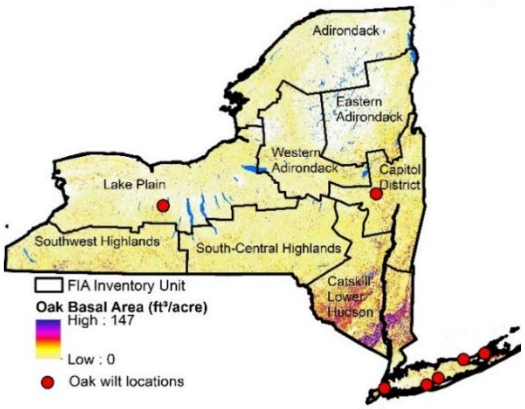

Figure 6.—Oak basal area (2009) with oak wilt locations and FIA inventory units, New York, 2017.

Oaks, particularly in the red oak group, are a major component of the timber products industry within the Capitol District and Catskill-Lower Hudson inventory units, comprising over 30 percent of harvested volume in each unit despite making up only 17 percent and 27 percent of total volume in each unit, respectively (Table 3). A rapid spread of oak wilt throughout New York's southern units could prove disastrous to the forests and forest industry of the region.

	White oak group		Red oak group	
Inventory unit	% of total net volume	% of total harvest removals	% of total net volume	% of total harvest removals
Adirondack	0.8	-	1.0	1.2
Lake Plain	2.2	1.2	4.3	12.2
Western Adirondack	0.0	-	0.9	-
Eastern Adirondack	0.3	-	2.7	5.0
Southwest Highlands	1.8	0.2	7.2	6.1
South-Central Highlands	1.2	1.3	7.7	9.6
Capitol District	4.1	8.5	12.7	26.0
Catskill-Lower Hudson	8.7	2.8	18.6	27.7
Statewide	2.5	1.2	7.1	8.5

Table 3.—Oak statistics by FIA Inventory unit, New York, 2017.

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How to Cite This Publication
Albright, Thomas A. 2018.
Forests of New York, 2017.
Resource Update FS-170. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.
https://doi.org/10.2737/FS-RU-170.

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The published report is available online at https://doi.org/10.2737/FS-RU-170.