



Forests of New York, 2016

Overview

This resource update provides an overview of the forest resources in New York based on inventories 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 and are updated yearly.¹ Information about the national and regional FIA programs is available online at <https://fia.fs.fed.us>. Since 2002, FIA has implemented an annual inventory in New York. For the 2016 inventory, estimates for current variables such as area, volume, and biomass are based on 4,751 plot samples (3,237 forested) collected from 2011–2016. Change variables such as net growth, removals, and mortality are based on 4,558 plots (3,064 forested) collected in 2005–2011 and remeasured in 2011–2016. Estimates from earlier inventories are shown for comparison. See Bechtold and Patterson (2005), Gormanson et al. (2017), and O’Connell et al. (2017) for definitions and technical details. A complete set of inventory tables is available at <https://doi.org/10.2737/FS-RU-141>.

New York’s forest land estimate remained stable, totaling 18.8 million acres and making up 63 percent of the State’s land area (Table 1). Eighty-three percent of New York’s forest land, 15.7 million acres, is classified as timberland. Reserved forest land comprises 3.1 million acres (17 percent) of all forest land, and other forest land, where minimum productivity standards are not met, accounts for an additional 27,000 acres (0.1 percent). Past trends of volume increases continue with net volume totaling 42.6 billion cubic feet on forest land. Average annual net growth continued to outpace average annual removals on timberland by a factor of 2.5:1. Annual mortality on forestland averaged 1.1 percent of net volume. Average annual harvest removals declined to 256 million ft³ per year.

¹The 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, 2016 and 2011. 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.

	2016 Estimate	Sampling error (percent)	Change since 2011 (percent)	2011 Estimate	Sampling error (percent)
Forest land					
Area of forest land (thousand acres)	18,830	0.6	-0.7	18,966	0.7
Number of live trees on forest land (million trees)	12,003	1.3	-0.8	12,096	1.3
Live tree and sapling aboveground biomass on forest land (thousand oven-dry tons)	1,160,583	0.9	4.4	1,111,348	1.0
Net volume of live trees on forest land (million ft ³)	42,574	1.0	4.6	40,711	1.1
Net growth of live trees on forest land (thousand ft ³ per year)	747,706	2.9	2.0	732,946	3.4
Mortality of trees on forest land (thousand ft ³ per year)	477,474	3.4	-0.4	479,528	3.3
Harvest removals of live trees on forest land (thousand ft ³ per year)	256,468	8.3	-16.6	307,472	7.9
Other removals of live trees on forest land (thousand ft ³ per year)	16,828	37.7	-35.7	26,176	37
Timberland					
Area of timberland (thousand acres)	15,685	0.7	-0.9	15,820	0.8
Number of live trees on timberland (million trees)	9,524	1.4	-1.5	9,671	1.5
Live tree and sapling aboveground biomass on timberland (thousand oven-dry tons)	941,111	1.1	4.8	897,768	1.2
Net volume of live trees on timberland (million ft ³)	34,427	1.2	4.9	32,805	1.3
Net volume of growing stock trees on timberland (million ft ³)	30,638	1.2	3.4	29,625	1.4
Net growth of growing stock trees on timberland (thousand ft ³ per year)	616,539	2.4	1.7	606,280	2.8
Mortality of growing stock trees on timberland (thousand ft ³ per year)	254,899	4.3	-1.9	259,884	4.2
Harvest removals of growing stock trees on timberland (thousand ft ³ per year)	206,782	8.5	-18.8	254,795	8.1
Other removals of growing stock trees on timberland (thousand ft ³ per year)	22,039	31.1	-39.2	36,270	29.2



Forest Area

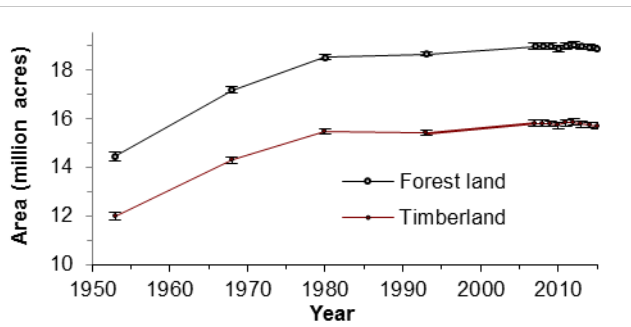


Figure 1.—Area of forest land and timberland by year, New York, 1953 to 2016.

Total forest land has remained stable in New York for the past decade. Small fluctuations in forested area have generally been within the range of sampling error. Since 1980, forest land increased from 18.5 million acres to a high of 19.0 million acres in 2012, and is now estimated to be 18.8 million acres in 2016 (Fig. 1). Analysis of plots remeasured in this last inventory show a net loss of 46,000 acres of forest land to nonforest land uses. Conversion of forest land to agricultural uses accounted for an 86,000 acre net loss, while development of forest land resulted in a loss of 36,000 acres. Other nonforest land uses reverting to forest partially offset these losses. Given the decline observed since 2012, it is possible that forest land area has peaked. Future estimates will clarify whether current conditions are the beginning of a downward trend.

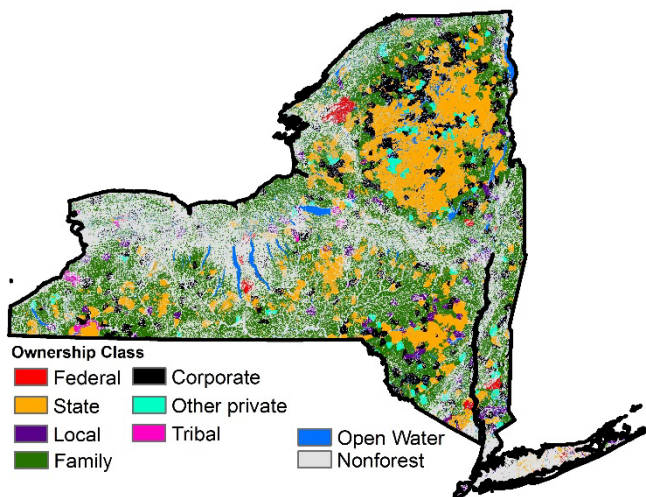


Figure 2.—Distribution of forest land by ownership class, New York, 2014.

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 (saw timber): ≥ 9.0 inches for softwoods and 11.0 d.b.h. for hardwoods

Fourteen million acres (74 percent) of forest land in New York is privately held (Fig. 2). From a timber management perspective, private ownership accounts for 89 percent of all timberland. Public ownership is comprised of federal (158,000 acres), local government (653,000 acres), and state (4.1 million acres) ownerships. Nearly 3.0 million acres of state owned land is reserved from timber harvesting. Public ownership of timberland totals 1.8 million acres.

Timberland acreage in New York has continued to shift toward larger size classes² (Fig. 3). Acreage increases in large diameter stands, coupled with decreases in medium and small diameter stand area shows a largely mature resource. Large diameter stands account for 64 percent of timberland with medium diameter stands making up 26 percent. The remaining 10 percent of timberland area is in small diameter stands.

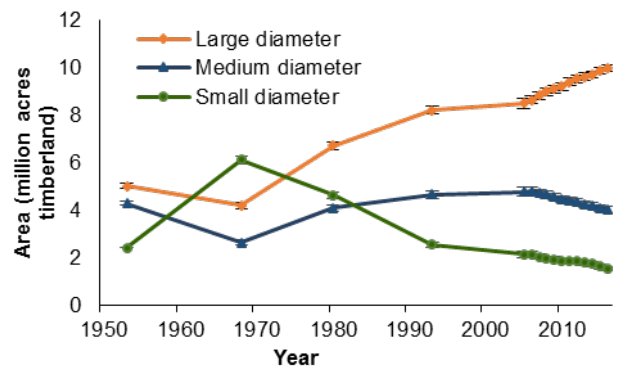


Figure 3.—Timberland by stand-size class and year, New York, 1953 to 2016.

The majority of forest area in New York is in hardwood forest-type groups, the largest being maple/beech/birch covering 55 percent of forest land. Size-class distribution varies among the eight most prominent forest-type groups (Fig. 4). Seventy percent of maple/beech/birch is large diameter stands and only 6 percent small diameter. Other hardwoods, a forest-type group comprised of 29 percent sweet birch biomass, has 46 percent of its area in small diameter stands.

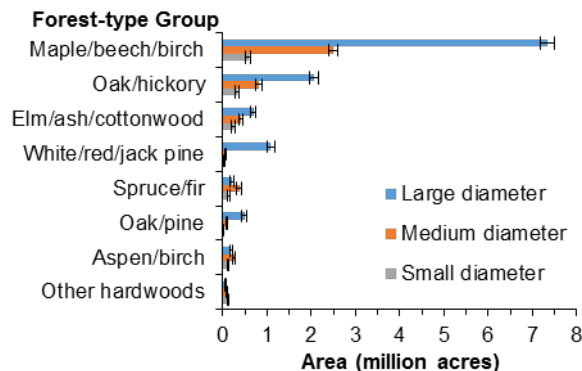


Figure 4.—Forest land by stand-size class (based on small, medium, and large trees)² for top eight forest-type groups in acres, New York, 2016.

Volume, Biomass, and Trends

Net volume on forest land continued to increase, totaling 42.6 billion ft³, 4.6 percent higher than the 2011 estimate. The top 10 species ranked by net volume (Table 2) all increased in volume since 2011, though at varying rates. Red maple increased 4.3 percent to 6.7 billion ft³, comprising 16 percent of total net volume, and remained the most voluminous species on forest land. Sugar maple is second in total net volume at 6.4 billion ft³. These top two species combined make up nearly 31 percent of all net volume in New York. Northern red oak and eastern white pine continued to have the greatest percentage increases in volume at 11.2 and 10.5 percent, respectively. White ash and American beech showed the least volume change.

Sawtimber volume on timberland totaled 99.2 billion board feet (bdf.), a 7.1 percent increase over 2011. Sugar maple continues to have the most sawtimber volume, increasing 6.1 percent to 13.7 billion bdf. Red maple and eastern white pine are ranked second and third by sawtimber volume, having increased 4.3 and 12.6 percent, respectively. These three species combined account for 39 percent of all sawtimber volume on timberland in New York. Northern red oak had the greatest increase in sawtimber volume with 14.9 percent. American beech was the only species out of the top 10 that decreased in sawtimber volume, losing 11.3 percent since 2011.

Total aboveground biomass was estimated at 1.2 billion dry tons, an increase of 4.5 percent since 2011. Percent change by species closely mirror percent change in net volume.

Net growth on timberland varied among the top 10 species, ranging from 7 million ft³ per year for basswood to 119 million ft³ per year for red maple. Annual net growth for all species on timberland was 706 million ft³ and annual removals were estimated to be 285 million ft³, for a net growth to removals ratio (G:R) of 2.5. By species, red oak exhibited the highest ratio of 4.8 followed by hemlock (4.5) and red maple (3.6). None of the top 10 species had annual removals that outpaced annual net growth, but American beech did have removals roughly equal to net growth, indicated by a G:R of 1.0, as well as mortality that exceeded net growth. Mortality for all species on timberland totaled 352 million ft³ per year, or 1.0 percent of net volume.

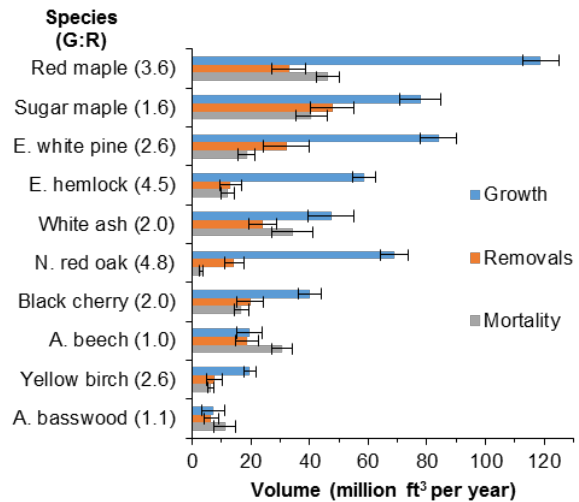


Figure 5.—Average annual net growth, removals, and mortality of net volume on timberland, with net growth to removals ratios (G:R) in parentheses, for the top 10 species ranked by total net volume, New York, 2016.

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, 2016. Volume estimates are for trees 5 inches and larger in diameter. Biomass estimates are for trees 1 inch and larger in diameter.

Species	Net volume of live trees on forest land (million ft ³)	Sampling error (percent)	Percent change since 2011	Net volume of sawtimber trees on timberland (million bdf.)	Sampling error (percent)	Percent change since 2011	Aboveground biomass on forest land (million dry tons)	Sampling error (percent)
Red maple	6,707	2.6	4.3	12,508	4.1	4.3	184	2.5
Sugar maple	6,413	3.0	2.4	13,694	4.4	6.1	204	2.9
Eastern white pine	3,448	5.7	10.5	12,390	6.4	12.6	61	5.6
Eastern hemlock	3,326	4.9	8.1	7,576	6.1	10.5	64	4.8
White ash	2,504	4.1	1.5	6,056	5.7	2.4	77	3.9
American beech	2,409	3.8	0.2	3,219	7.3	-11.3	83	3.5
Northern red oak	2,403	5.3	11.2	8,925	6.3	14.9	77	5.3
Black cherry	2,179	5.2	1.9	5,979	7.0	3.8	56	5.0
Yellow birch	2,031	4.5	2.7	2,216	8.4	4.9	61	4.3
Red spruce	1,118	6.7	5.6	1,053	12.1	0.3	21	6.3
Other softwood species	2,307	6.1	0.2	5,125	9.2	2.9	45	5.9
Other hardwood species	7,728	2.7	5.7	20,463	4.0	9.8	228	2.5
All Species	42,574	1.0	4.6	99,202	1.7	7.1	1161	0.9

Ash Resources of New York

The ash species group ranks sixth in New York by net volume on forest land. Of the three ash species identified by FIA in the state, white ash is the most prevalent, with 82 percent of ash volume. Green ash comprises 15 percent of ash volume and black ash accounts for the remaining 3 percent. White ash is an important species to the forest resources of the state having the fifth most volume of all species on New York forest land.

Emerald ash borer (EAB; *Agrilus planipennis*) is a wood-boring beetle native to Asia. First discovered in the United States in Michigan in 2002, this nonnative pest has since been found in 30 states. In 2009, it was confirmed to exist in New York and the southern half of the state is under a quarantine limiting the movement of ash products.

EAB can cause devastating effects on the ash resource. Trends from nearby states with EAB infestations may be helpful in understanding the challenges faced in New York. In Michigan and Ohio, ash volume has declined 24 and 20 percent, respectively, from 2006 to 2016. Average annual mortality in Pennsylvania has increased 90 percent since the discovery of EAB there in 2007. While ash net volume has not declined across the state, average annual net growth of ash decreased 37 percent across New York since 2009 to 62 million ft³ per year (Table 3). Decreases in annual net growth are most pronounced in the regions under quarantine. Net growth in the Lake Plain FIA Inventory unit, having 25 percent of total ash volume in New York, dropped 47 percent from 2009 to 2016 (Figure 6). Growth was down 43

percent in the Capitol District unit over the same time period. Mortality in the Catskill-Lower Hudson unit has risen above the level of gross growth resulting in negative annual net growth of -3.8 million ft³ per year, down from 10.5 million ft³ per year in 2009.

Mortality rates of ash have increased since the discovery of EAB in New York. The Lake Plain unit had an annual mortality rate of 3.9 percent in 2016, up from less than 1 percent in 2010. Statewide, annual mortality rose to 1.4 percent of net volume in 2016. Ash resources will need close monitoring to quantify future impacts of EAB in New York.

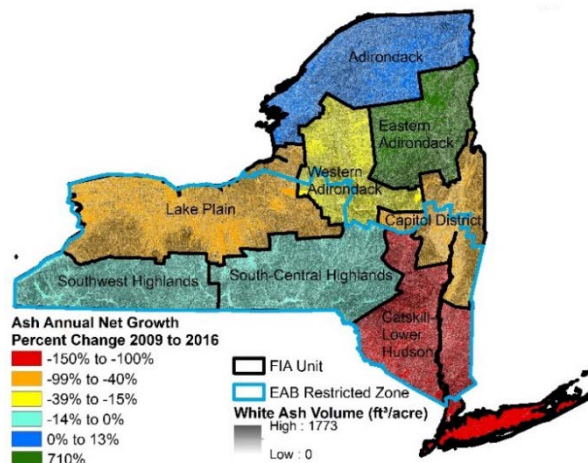


Figure 6.—Percent change in average annual net growth of ash from 2009 to 2016 by FIA unit, with white ash volume (ft³/acre) and EAB Restricted Zone (Source: NY DEC May 2017, <http://www.dec.ny.gov/animals/47761.html>), New York, 2016.

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Table 3.—Ash mortality rate as percent of net volume and annual net growth (million ft³) by FIA Inventory unit, New York.

Inventory unit	Mortality rate		Annual net growth (million ft ³)		Net volume (million ft ³)
	2010	2016	2009	2016	
Adirondack	1.6	1.9	5.6	6.4	261
Lake Plain	0.7	1.2	34.7	18.3	769
Western Adirondack	0.7	1.2	6.9	4.7	200
Eastern Adirondack	2.2	1.6	-0.4	2.4	177
Southwest Highlands	0.9	0.7	14.1	12.4	498
South-Central Highlands	0.4	0.6	20.7	18.4	607
Capitol District	1.2	1.8	6.7	3.8	166
Catskill-Lower Hudson	0.9	3.9	10.5	-3.8	386
Statewide	0.9	1.4	98.9	62.4	3,064

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