



FORESTS OF North Carolina, 2012

This periodic resource update provides an overview of forest resources in North Carolina based on an inventory conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program at the Southern Research Station in cooperation with the North Carolina Forest Service. Data estimates are based on field data collected using the FIA annualized sample design and are updated yearly. The estimates presented in this update are for the measurement year 2012 with comparisons made to data reported in 2007. The sample plot population in North Carolina consists of 5,800 plots distributed across the State, of which about 15 percent are collected annually. The 2012 estimates included 4 years of data collection that measured 3,376 plots, resulting in about 58 percent new data merged with the remaining 42 percent from 2007 to produce the updated estimates. Growth, removals, and mortality (GRM) estimates were derived from remeasurement data on 3,282 of the plots. The slightly smaller sample used for GRM

estimates is due to a combination of new and/or lost plots. The data used in this publication were accessed from the FIA database on March 20, 2014.

Overview

North Carolina is home to 18.6 million acres of forest land (table 1). Forest land includes areas designated as reserved, whereas timberland is that portion, 18.1 million acres, not restricted from commercial timber production. The majority of this report is focused on timberland. The number of live trees on North Carolina's timberland in 2012 was estimated at 14.4 billion trees, an increase of 3.0 percent from 2007. Net volume increased about 6.0 percent to 37.9 billion cubic feet. Average annual net growth increased 11.4 percent to 1.6 billion cubic feet, whereas average annual removals decreased by 15.2 percent since 2007 to <1.0 billion cubic feet (table 1).

Table 1—North Carolina forest statistics, change between 2007 and 2012^a

Forest statistics	2007 estimate	Sampling error (percent)	2012 estimate	Sampling error (percent)	Change since 2007
Forest land					
Area (<i>thousand acres</i>)	18,582.2	0.64	18,620.8	0.61	38.6
Number of live trees ≥1.0 inch d.b.h. (<i>million trees</i>)	14,267.7	1.54	14,692.9	1.54	425.2
Net volume of live trees ≥5.0 inches d.b.h. (<i>million cubic feet</i>)	37,273.6	1.35	39,332.9	1.32	2,059.2
Live tree aboveground biomass (<i>thousand oven-dry tons</i>)	924,282.0	1.20	972,143.0	1.17	47,861.0
Net annual growth of live trees ≥5.0 inches d.b.h. (<i>million cubic feet per year</i>)	1,472.3	2.95	1,631.4	2.52	159.1
Annual removals of live trees ≥5.0 inches d.b.h. (<i>million cubic feet per year</i>)	1,146.8	6.17	972.0	5.80	-174.8
Annual mortality of live trees ≥5.0 inches d.b.h. (<i>million cubic feet per year</i>)	411.0	4.51	347.9	4.99	-63.0
Timberland					
Area (<i>thousand acres</i>)	18,055.5	0.69	18,121.5	0.66	66.0
Number of live trees ≥1.0 inch d.b.h. (<i>million trees</i>)	14,017.3	1.57	14,445.2	1.57	427.9
Net volume of live trees ≥5.0 inches d.b.h. (<i>million cubic feet</i>)	35,801.3	1.40	37,934.5	1.36	2,133.2
Live tree aboveground biomass (<i>thousand oven-dry tons</i>)	890,587.4	1.25	928,543.8	1.21	37,956.4
Net annual growth of live trees ≥5.0 inches d.b.h. (<i>million cubic feet per year</i>)	1,450.1	2.99	1,615.2	2.54	165.2
Annual removals of live trees ≥5.0 inches d.b.h. (<i>million cubic feet per year</i>)	1,146.6	6.17	972.3	5.80	-174.3
Annual mortality of live trees ≥5.0 inches d.b.h. (<i>million cubic feet per year</i>)	403.7	4.59	333.3	5.16	5.2

^a Estimates for 2012 represent a full sample comprised of 42 percent 2007 data and four panels (2009, 2010, 2011, and 2012), or 58 percent new data. Growth, removals, and mortality estimates for 2012 are comprised of just the four panels of new data, or 58 percent of a full sample.



Forest Area

North Carolina is divided into four survey units (fig. 1). The total timberland in all survey units is 18.12 million acres. The Piedmont unit contains the largest portion with 5.32 million acres, or 29 percent (table 2). The Southern Coastal Plain has 28 percent, the Mountains 22 percent, and the Northern Coastal Plain 21 percent of the timberland.

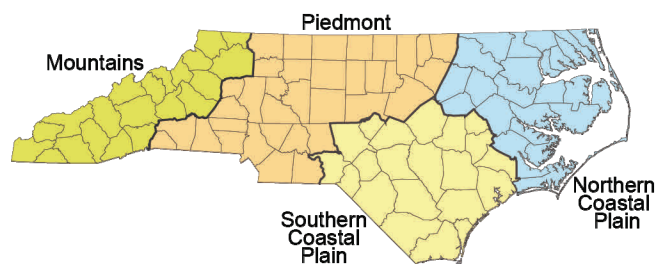


Figure 1—Forest survey regions in North Carolina.

Private individual ownerships account for most timberland with 11.03 million acres, or 61 percent (table 2). Other corporate ownerships combine for 18 percent, national forests for 7 percent, forest industry for 6 percent, and State/local governments for 5 percent of the timberland.

The largest portion of private individual ownerships, 37 percent, is located in the Piedmont. The Northern Coastal Plain contains the largest portion, 56 percent, of the forest industry timberland. The Mountains contain most, 82 percent, of the national forest timberland.

The oak-hickory forest-type group dominates with 7.05 million acres, or 39 percent, of all timberland (table 3). The loblolly-shortleaf pine forest-type group covers 30 percent, the oak-pine forest-type group 13 percent, and the oak-gum-cypress type group 10 percent of the timberland. The largest portion of the oak-hickory forest types, 44 percent, is located in the Mountains, and the Piedmont contains another 38 percent (table 3).

Table 2—Area of timberland by ownership and survey unit, North Carolina, 2012

Category	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains	State
<i>million acres</i>					
National forest	0.04	0.10	0.09	0.96	1.18
Other Federal	0.22	0.25	0.06	0.00	0.53
State and local government	0.40	0.16	0.26	0.16	0.97
Forest industry	0.34	0.61	0.12	0.03	1.10
Individual	2.79	1.96	4.05	2.23	11.03
Other corporate	1.33	0.67	0.75	0.57	3.32
Total	5.11	3.74	5.32	3.94	18.12

Table 3—Area of timberland by forest-type group and survey unit, North Carolina, 2012

Forest-type group	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains	State
<i>million acres</i>					
White-red-jack pine	0.00	0.00	0.00	0.11	0.12
Spruce-fir	0.00	0.00	0.00	0.02	0.02
Longleaf-slash pine	0.30	0.02	0.00	0.00	0.32
Loblolly-shortleaf pine ^a	2.20	1.75	1.41	0.12	5.48
Oak-pine	0.74	0.45	0.81	0.40	2.40
Oak-hickory	0.83	0.49	2.66	3.08	7.05
Oak-gum-cypress	0.84	0.84	0.13	0.00	1.81
Elm-ash-cottonwood	0.11	0.15	0.27	0.02	0.55
Maple-beech-birch	0.00	0.00	0.00	0.06	0.06
Other hardwoods ^b	0.01	0.00	0.01	0.13	0.15
Nonstocked	0.08	0.06	0.04	0.01	0.18
Total	5.11	3.74	5.32	3.94	18.12

^a Includes other eastern softwoods.

^b Includes aspen/birch and exotic hardwoods.

The Southern Coastal Plain contains the largest portion, 40 percent, of the loblolly-shortleaf pine forest types, and the Northern Coastal Plain contains another 32 percent. The majority (93 percent) of the oak-gum-cypress forest types are equally divided between the two coastal plain units. More of the oak-pine forest types, 34 percent, occur in the Piedmont, and another 31 percent in the Southern Coastal Plain.

Planted stands account for 18 percent, or 3.2 million acres, of the timberland (table 4). The Southern Coastal Plain contains 41 percent of the planted acres, the Northern Coastal Plain 34 percent, the Piedmont 23 percent, and <2 percent are in the Mountains.

Table 4—Area^a of timberland by stand origin and survey unit, North Carolina, 2012

Stand origin	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains	State
<i>million acres</i>					
Planted	1.33	1.09	0.74	0.06	3.22
Natural	3.78	2.65	4.58	3.88	14.90
Total	5.11	3.75	5.32	3.94	18.12

^a Sum of components and totals may differ due to rounding.

Volume, Biomass, and Trends

North Carolina timberland contains 37.9 billion cubic feet of total wood volume. Hardwood species comprise 24.7 billion cubic feet, or 65 percent, of the total inventory (table 5). Softwood species comprise 13.2 billion cubic feet, or 35 percent, of the total volume in the State. Total softwood inventory was highest (34 percent) in the Southern Coastal Plain, and least (13 percent) in the Mountains unit. Total hardwood inventory was highest (39 percent) in the Mountains, and least (14 percent) in the Southern Coastal Plain.

Statewide, net growth of softwoods averaged 775 million cubic feet annually (table 5). Most of the softwood net growth, 38 percent, came from the Southern Coastal Plain. Another 30 percent came from the Northern Coastal Plain. The two coastal plain units also provided 70 percent of the State's average annual 583 million cubic feet of softwood removals. However, the softwood growth to removals ratio was higher (1.5) in the Southern Coastal Plain than it was in the Northern Coastal Plain (1.1). The highest softwood growth to removals ratio in the State (1.6) occurred in the Mountains, although the softwood resource there was the least.

Table 5—All-live volume of net growth, removals, and total inventory for softwoods and hardwoods by survey unit, North Carolina, 2012

Category	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains	State
<i>million cubic feet</i>					
Softwood					
Net growth	294.4	235.9	191.6	59.2	774.6
Removals	201.1	205.4	138.3	38.2	582.9
G/R ratio ^a	1.5	1.1	1.4	1.6	1.3
Total inventory	4,443.3	3,400.6	3,573.2	1,780.7	13,197.9
Hardwood					
Net growth	111.1	106.4	332.7	283.9	840.7
Removals	76.7	72.0	176.9	63.8	389.4
G/R ratio ^a	1.4	1.5	1.9	4.5	2.2
Total inventory	3,452.8	3,484.5	8,193.0	9,606.4	24,736.6
All species					
Net growth	405.5	342.3	524.3	343.1	1,615.2
Removals	277.8	277.3	315.2	102.0	972.3
G/R ratio ^a	1.5	1.2	1.7	3.4	1.7
Total inventory	7,896.1	6,885.1	11,766.2	11,387.1	37,934.5

^a Net growth/removals ratio.

The State's net growth of hardwoods averaged 841 million cubic feet annually. Most of the hardwood net growth, 40 percent, came from the Piedmont unit. Another 34 percent came from the Mountains unit. The State's hardwood removals averaged 389 million cubic feet annually. Most of the hardwood removals, 45 percent, came from the Piedmont unit. The hardwood growth to removals ratio was highest (4.5) in the Mountains unit and less than half that in each of the other units.

Biomass totaled 929 million tons in North Carolina. Hardwood species comprise 653 million tons, or 70 percent, of the total biomass (table 6). Softwood species comprise 276 million tons, or 30 percent, of the total biomass.

The Southern Coastal Plain contains the largest portion (35 percent) of the softwood biomass. The Mountains contain the largest portion (38 percent) of the hardwood biomass.

Table 6—Aboveground biomass and carbon estimates on timberland for softwoods and hardwoods by survey unit, North Carolina, 2012

Category	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Mountains	State
<i>million tons</i>					
Softwood					
Biomass	96.84	69.72	77.60	31.80	275.95
Carbon	48.42	34.86	38.80	15.90	137.98
Hardwood					
Biomass	99.13	88.33	217.54	247.59	652.59
Carbon	49.57	44.17	108.77	123.79	326.30
Total					
Biomass	195.97	158.05	295.14	279.38	928.54
Carbon	97.99	79.03	147.57	139.69	464.27



High elevation red spruce (*Picea rubens*) in western North Carolina. (photo by Bill Lea)

Emerald Ash Borer's Potential Impact on the Forest's of North Carolina

The emerald ash borer (EAB) is a small green insect in the beetle family Buprestidae—the metallic wood-boring beetles. A native of Asia EAB was first detected in the U.S. near Detroit, Michigan in 2002 and has since spread to 23 States, including North Carolina. The beetle affects all species of ash (*Fraxinus* spp.) trees native to the United States and is rapidly changing the landscape where ash trees occur. The adult beetles lay eggs on the bark of ash trees, and when the larvae hatch, they bore into the bark, feeding on the nutrient-transporting tissues and ultimately killing the tree. To date, tens of millions of ash trees nationwide have succumbed to attack by EAB, usually dying within 2-5 years of infestation.

In North Carolina, EAB was first detected in Granville, Person, Vance, and Warren Counties in the summer of 2013. All four counties are currently under federal quarantine to help slow the spread of the beetle through regulated commodities such as firewood, ash logs, and live ash trees.

There are four species of ash trees native to North Carolina. Green and white ash are most abundant statewide, while Carolina and pumpkin ash are less commonly present in the Coastal Plain. Overall, ash is a relatively minor component of North Carolina's forests, with some 258 million trees throughout the State and areas of greater relative abundance in the Southern Coastal Plain (fig. 2). In urban settings, green ash is often an important shade tree in older neighborhoods and low-lying areas such as greenways. The impact of EAB on ash populations as it moves through the State is expected to be dramatic.

The North Carolina Forest Service maintains a page of frequently asked questions about EAB that can be accessed here: http://www.ncforestservice.gov/forest_health/fh_eabfaq.htm. Additionally, <http://www.emeraldashborer.info> serves as a national clearinghouse for current information on the pest.



Emerald ash borer (*Agrilus planipennis*). (photo by Pennsylvania Department of Conservation and Natural Resources, Bugwood.org)

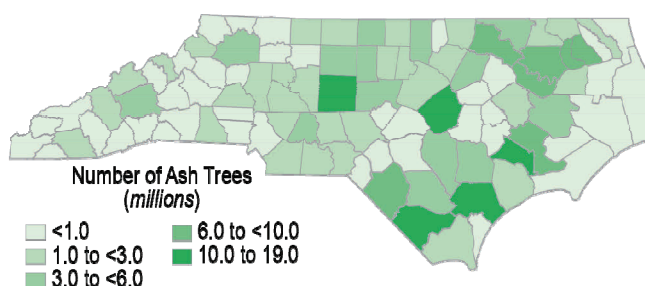


Figure 2—Population of ash trees ≥ 1 inch d.b.h. by county.

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