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Forest Inventory & Analysis Factsheet

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Mixed forest along the Cove Mountain Trail, near Mt. Harrison, in the Great Smoky Mountains National Park of Sevier County, Tennessee. (photo by Brian Stansberry, Wikimedia.org)

This science update provides an overview of forest resource attributes for the State of Tennessee based on an annual inventory conducted by the Forest Inventory and Analysis (FIA) Program at the Southern Research Station of the United States Department of Agriculture Forest Service in cooperation with the Tennessee Department of Agriculture Division of Forestry. These annual estimates, along with Web-posted supplemental tables, will be updated annually. For more information regarding past inventory reports for this State, inventory program information, field sampling methodology, and estimation procedures, please refer to the citations at the end of this report.

Annual Update

Tennessee forest resources have changed very little since the previous annual inventory in 2010. In 2011, Tennessee forests accounted for an estimated 13.9 million acres (table 1) of which 13.5 million acres (97 percent) are considered available for timber production (timberland). About 8 billion live trees are estimated to be growing in Tennessee forests, over 1,200 trees for every person living in the State. In those trees ≥5 inches diameter at breast height (d.b.h.), the State's forests contain over 29 billion cubic feet of wood volume. Average annual net growth has declined since 2010 while mortality and removals have increased (table 1).

Table 1—Tennessee forest statistics, associated sampling error, and change between 2010 and 2011

Forest statistics	2011 estimate	Sampling error	Change since 2010	Forest statistics	2011 estimate	Sampling error	Change since 2010
		---- *percent* ----				---- *percent* ----	
Forest land estimates				**Timberland estimates**			
Area (*acres*)	13,941,332	0.74	-0.10	Area (*acres*)	13,499,339	0.80	-0.34
Number of live trees ≥1-inch diameter (trees)	8,015,758,041	1.57	0.33	Number of live trees ≥1-inch diameter (trees)	7,802,994,453	1.62	0.07
Net volume in live trees ≥5 inches diameter (ft^3)	29,462,961,547	1.36	0.25	Net volume in live trees ≥5 inches diameter (ft^3)	28,114,769,261	1.43	-0.11
Net volume of growing-stock trees (ft^3)	25,463,259,714	1.51	0.56	Net volume of growing-stock trees (ft^3)	24,285,571,388	1.57	0.23
All-live tree aboveground biomass ≥1-inch diameter (*oven-dry short tons*)	773,857,575	1.24	0.06	All-live tree aboveground biomass ≥1-inch diameter (*oven-dry short tons*)	741,377,620	1.30	-0.29
Annual net growth of live trees ≥5 inches (ft^3/*year*)	700,735,487	2.90	-6.84	Annual net growth of live trees ≥5 inches (ft^3/*year*)	775,854,754	3.63	-8.78
Annual removals of live trees ≥5 inches (ft^3/*year*)	439,850,571	7.06	4.80	Annual removals of live trees ≥5 inches (ft^3/*year*)	440,800,890	7.03	4.79
Annual mortality of live trees ≥5 inches (ft^3/*year*)	274,955,089	4.70	5.35	Annual mortality of live trees ≥5 inches (ft^3/*year*)	263,415,549	4.85	5.96

Forest Extent

In 2011, forest land in the State of Tennessee covered an estimated 13.9 million acres. The Tennessee landscape has remained ≥50 percent forested for about 50 years. In fact, forest land has been increasing over that time period (table 2). From an estimate in 1961 of 13.7 million acres to the 2011 estimate of 13.9 million acres, forest land has increased nearly 2 percent. Essentially, while small fluctuations have occurred over the last 5 decades, Tennessee forests are more plentiful today than they were in the 1960s. Since the 1999 inventory, there has been very little change in any region (fig. 1).

Table 2—Area by land class for the State of Tennessee for the periodic inventories conducted prior to the year 2000 and the annual inventories of 2004 and 2011

Land class	1961	1971	1980	1989	1999	2004	2009	2011
	thousand acres							
Timberland	13,432	12,820	12,879	13,265	13,305	13,254	13,549	13,499
Other/reserved	264	317	430	337	407	566	456	442
Total forest land	13,696	13,136	13,309	13,603	13,712	13,821	14,004	13,941
Nonforest land	12,826	13,339	13,142	12,845	13,260	13,151	12,313	12,370
Total land area	26,522	26,475	26,450	26,447	26,972	26,972	26,972	26,972
Percent forested	52	50	50	51	51	51	52	52

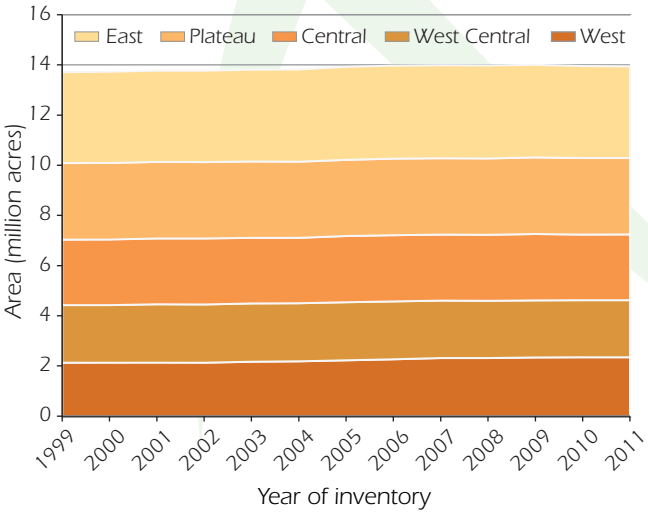


Figure 1—Area of forest land for each FIA unit for the 1999–2011 inventories, Tennessee.

Karst formations on the slopes of Black Mountain near Grassy Cove, Tennessee. (photo by Brian Stansberry, Wikimedia.org)

Forest Land Ownership

Tennessee forests are largely held within private ownerships across the State. In fact, 84 percent of all forest land, or 11.7 million acres, in Tennessee is privately owned (fig. 2). About 10 percent or 1.4 million acres is Federally owned and managed. The remaining 6 percent of forest land across the State is owned by State and local governments.

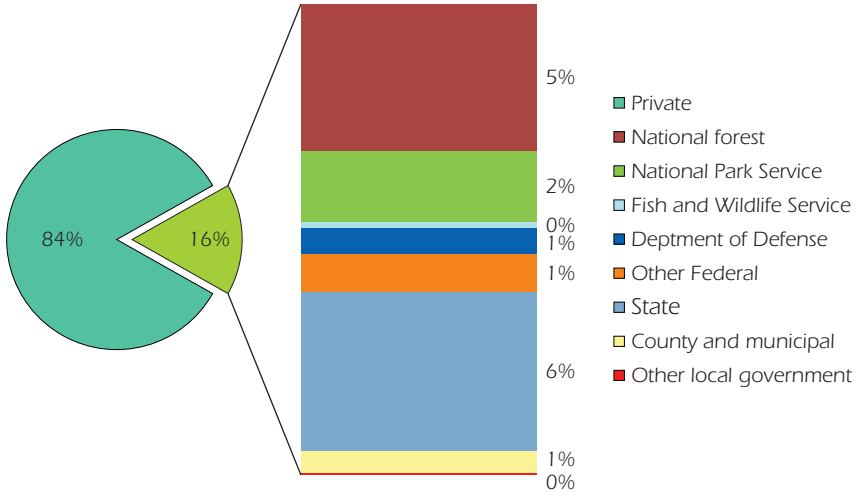


Figure 2—Area of forest land by ownership, Tennessee, 2011.

Common Trees

The most common tree species in 2011, ranked by the estimated size of the population (number of trees) across all forest land in Tennessee was red maple (table 3). Red maple accounted for over 9 percent of all trees in Tennessee forests. Yellow-poplar, the State tree, accounted for 5.9 percent of all trees on forest land in the State and sweetgum was the third most common tree species with an estimated 443 million trees (5.5 percent). All oak species combined accounted for 11 percent (905 million trees) of all trees across Tennessee.

While red maple was the most common tree species observed, a greater proportion of the red maple population was found in subordinate, overtopped crown positions (fig. 3). Contrastingly, the populations of all oak species combined and yellow-polar were represented by greater numbers of trees in dominant and codominant positions within the forest canopy.

If you were to rank the importance of tree species in Tennessee by standing volume (≥5 inches d.b.h.), yellow-poplar would rank as the most important tree (table 4) in the 2011 inventory. Yellow-poplar represented 11 percent of all standing tree volume in forests of Tennessee in 2011. White oak, chestnut oak, red maple, and scarlet oak followed in importance. Since yellow-poplar is second on the list of tree population (table 3) and first on the list of volume (table 4), this indicates that yellow-poplar was represented by fewer but larger specimens. Conversely, these results suggest that red maple, while numerous, was generally represented by smaller trees when found and coincides with the fact that a large number of red maple stems are in overgrown or suppressed canopy positions (fig. 3).

In terms of both estimated population and estimated standing volume, 17 of the 20 top species are hardwood species. Eastern redcedar, loblolly pine, and Virginia pine are the only softwoods found on each list. Tennessee has long been considered a State where hardwoods are the predominate forest; these results indicate that is still the case today.

Table 3—The 20 most common trees (ranked by estimated number of trees ≥1.0-inch d.b.h.) on forest land, Tennessee, 2011

Species	Trees	
	- - number - -	*percent*
Red maple	770,529,369	9.6
Yellow-poplar	476,748,818	5.9
Sweetgum	443,234,158	5.5
Blackgum	424,803,532	5.3
Sugar maple	422,013,808	5.3
Eastern redcedar	399,722,642	5.0
Sourwood	375,570,681	4.7
White oak	289,357,658	3.6
Winged elm	281,270,189	3.5
Loblolly pine	261,809,878	3.3
Flowering dogwood	236,617,766	3.0
Virginia pine	229,728,353	2.9
Eastern hophornbeam	214,351,326	2.7
American beech	191,534,150	2.4
Black cherry	189,977,392	2.4
Pignut hickory	175,525,107	2.2
Chestnut oak	169,602,795	2.1
Sassafras	148,872,596	1.9
Eastern redbud	135,930,513	1.7
Mockernut hickory	126,919,554	1.7

d.b.h. = diameter at breast height.

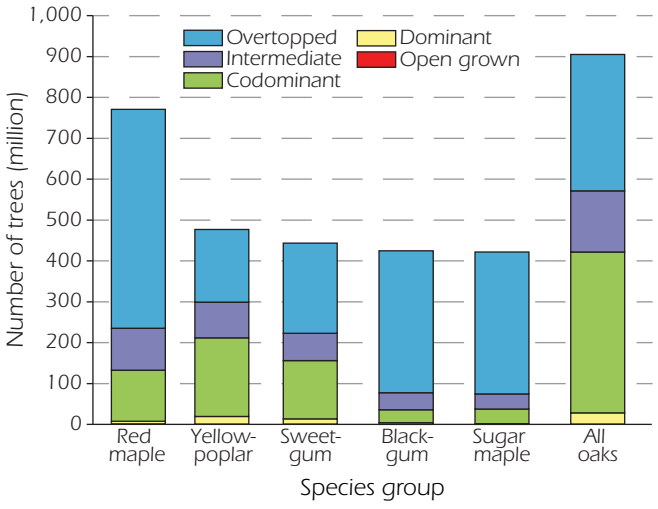


Figure 3—Number of trees by species group and crown class, Tennessee, 2011.

Table 4—The 20 most common trees (ranked by standing live volume of all trees ≥5.0-inch d.b.h.) on forest land, Tennessee, 2011

Species	Live volume	Saw-timber	
	- - cubic feet - -	*- - percent - -*	
Yellow-poplar	3,283,859,936	11.1	84.8
White oak	2,998,246,640	10.2	80.2
Chestnut oak	2,587,835,067	8.8	83.9
Red maple	1,629,923,117	5.5	59.3
Scarlet oak	1,172,155,855	4.0	86.7
Sweetgum	1,147,199,903	3.9	67.6
Pignut hickory	1,103,553,266	3.7	71.5
Sugar maple	939,004,025	3.2	62.4
Loblolly pine	902,031,033	3.1	63.9
Northern red oak	870,002,058	3.0	89.9
Black oak	843,877,602	2.9	87.4
Southern red oak	793,701,066	2.7	86.2
Mockernut hickory	622,430,345	2.1	68.9
Virginia pine	622,379,799	2.1	74.1
Eastern redcedar	614,051,661	2.1	54.8
American beech	585,920,226	2.0	82.1
Shagbark hickory	556,339,747	1.9	69.8
Eastern white pine	509,202,072	1.7	89.6
Green ash	447,711,940	1.5	74.5
White ash	445,204,495	1.5	70.9

d.b.h. = diameter at breast height.

Forest Land Composition

In 2011, the oak-hickory forest-type group represented nearly three-fourths (72 percent) of all forests across the State with 10.1 million acres (fig. 4). The oak-pine forest-type group was the second largest group with an estimated 1.0 million acres distributed across Tennessee. The loblolly-shortleaf pine and elm-ash-cottonwood forest-type groups were found on 936,000 and 761,000 acres, respectively.

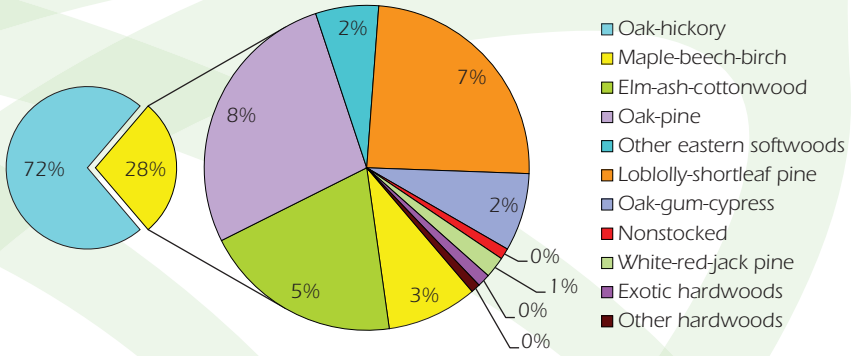
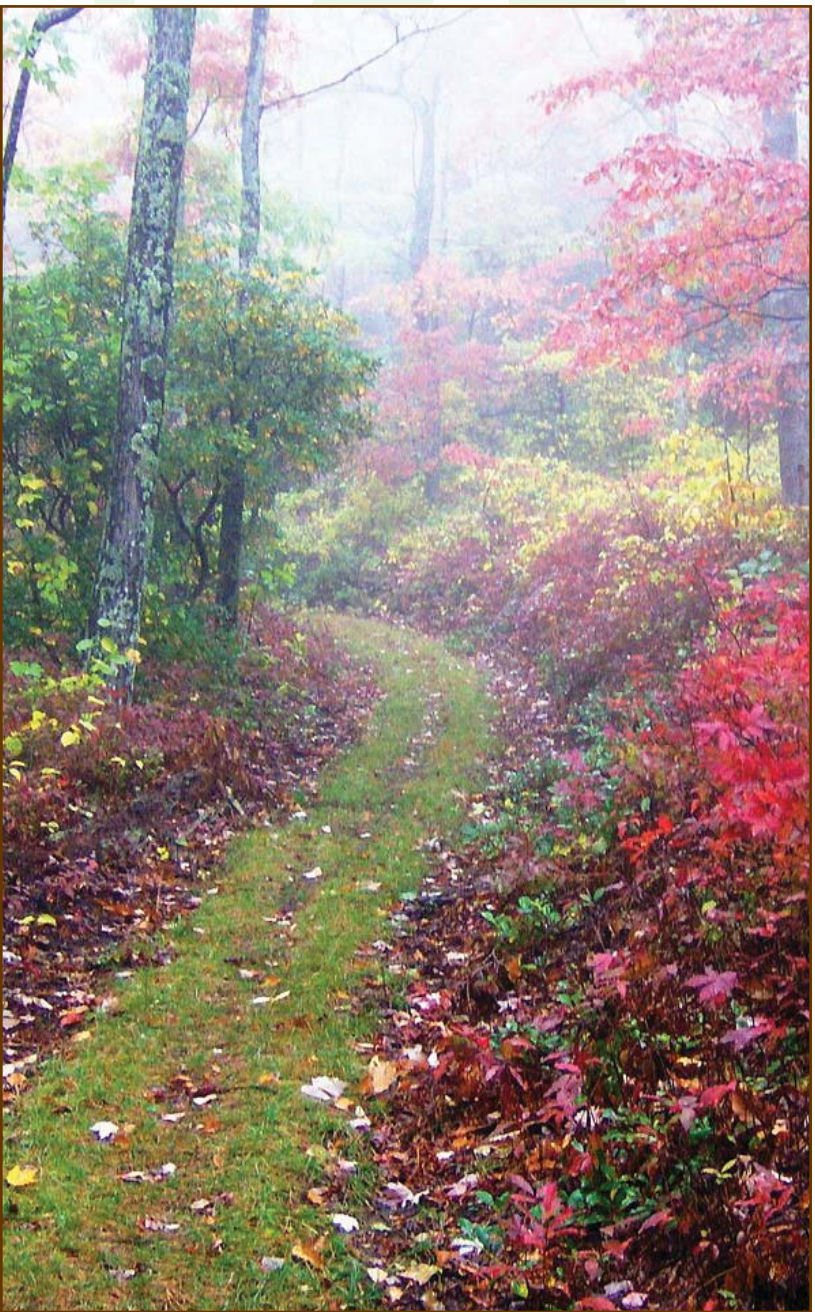


Figure 4—Area of forest land by forest-type group, Tennessee, 2011.

Mixed forest along the Cove Mountain Trail, Sevier County, Tennessee. (photo by Brian Stansberry, Wikimedia.org)



Inventory Volume

In 2011 there was an estimated 29 billion cubic feet of standing tree wood volume distributed across Tennessee forests. An overwhelming 88 percent of the standing volume in Tennessee is represented by hardwood species. Pine species and other softwood species accounted for 12 percent of the total standing tree wood volume. Select white oaks accounted for the greatest live-tree volume on forest land across all species groups (fig. 5). Yellow-poplar accounted for the greatest sawtimber volume (board feet) on timberland (forest land available for timber production) across Tennessee (fig. 6).

Where tree grade was collected, grade 3 tree volume (saw-log portion) comprised the largest grade class across and within all major species groups (fig. 7) on Tennessee timberland. Grade 1 tree volume accounted for 23 percent of graded trees in the other softwoods species group. Volume in grade 1 trees accounted for 20, 8, and 7 percent of the saw-log volume in the pine, soft hardwood, and hard hardwood species groups, respectively.

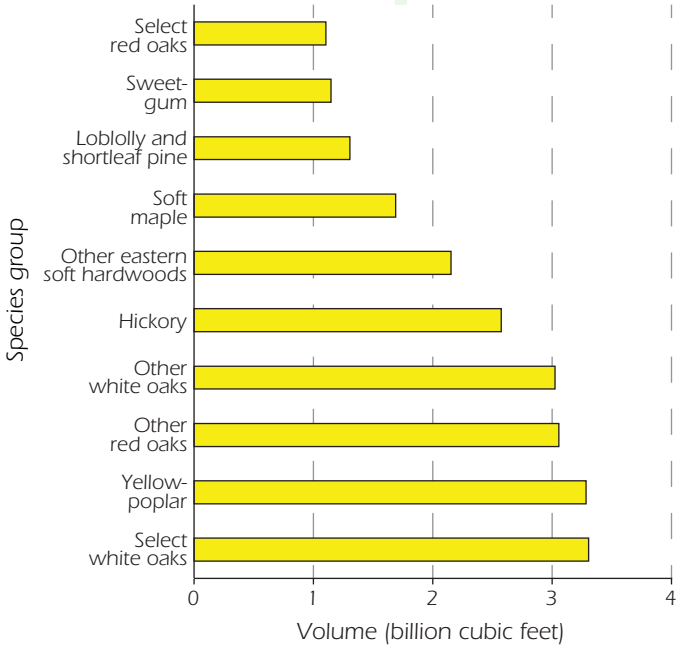


Figure 5—Standing live-tree volume (≥5.0 inches d.b.h.) for the top 10 species groups on forest land, Tennessee, 2011.

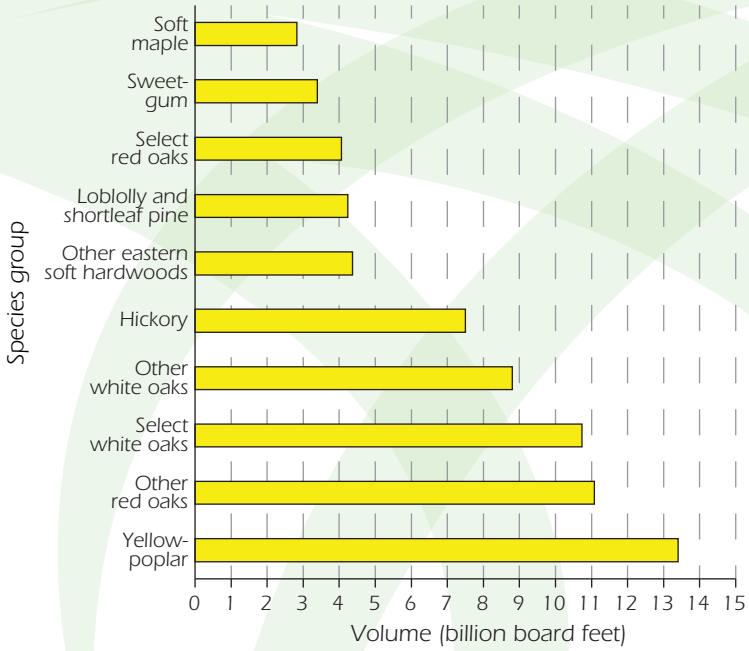


Figure 6—Sawtimber tree volume (≥5.0 inches d.b.h.) for the top 10 species groups on timberland, Tennessee, 2011.

Stand Origin

In 2011, only 5 percent (722,000 acres) of forests across the State were of artificial origin (planted). Ninety-five percent of all forests in the State originated through natural reproduction (fig. 8). The number of acres observed by FIA as originating from planting activity has remained between 4 and 5 percent of all forest land acreage in recent years (1999–2011).

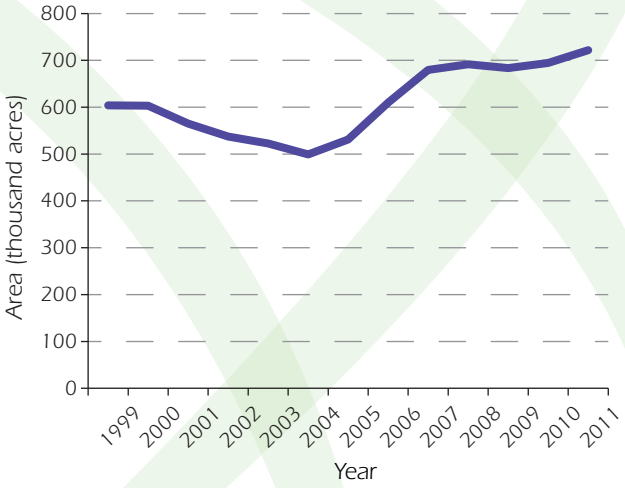


Figure 8—Area of forest land with clear evidence of artificial regeneration (planted) by year, Tennessee.

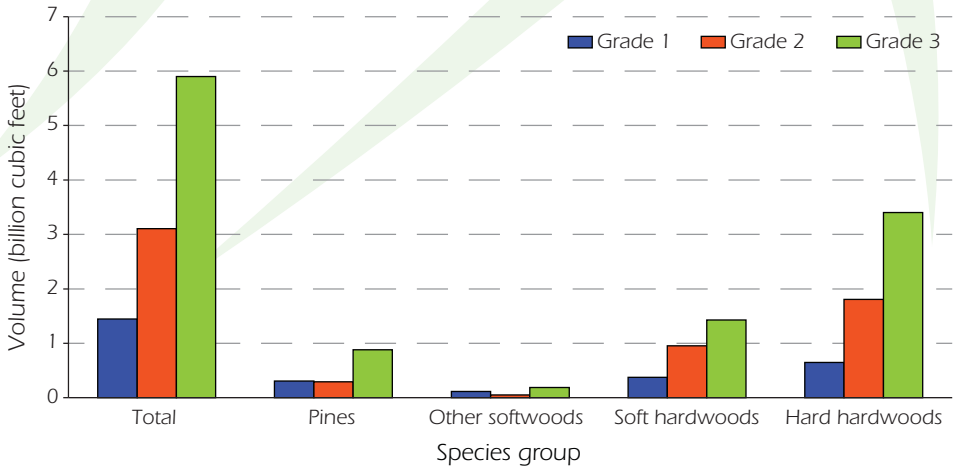


Figure 7—Net volume of the saw-log portion of sawtimber trees by tree grade and species group on timberland, Tennessee, 2011.

Average Annual Net Growth, Removals, and Mortality

Average annual net growth of all-live volume on forest land has declined since 2010 (table 1). Average annual net growth (gross growth minus mortality) declined an estimated 7 percent. Average removals increased an estimated 5 percent and average annual mortality increased approximately 5 percent from 2010 to 2011.

Net growth (*ft ^{3}/year*)
- Total = 700,735,486
- Pines = 118,155,082
- Other softwoods = 23,475,001
- Soft hardwoods = 231,371,830
- Hard hardwoods = 327,733,573

Mortality (*ft ^{3}/year*)
- Total = 274,955,089
- Pines = 33,207,423
- Other softwoods = 15,435,205
- Soft hardwoods = 81,389,310
- Hard hardwoods = 144,923,152

Removals (*ft ^{3}/year*)
- Total = 439,850,571
- Pines = 80,236,411
- Other softwoods = 7,547,467
- Soft hardwoods = 106,302,046
- Hard hardwoods = 245,764,648

Note: This data was accessed and compiled from the FIA Database (FIADB) on January 28, 2013. Publicly available data from the FIADB is regularly updated when data collection and/or processing anomalies are found and corrected. Additionally, new data are added on a regular basis which may be reflected by small changes in the past or current estimates.

References

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Additional Tennessee Inventory Information

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Fort Patrick Henry Lake. (photo courtesy of Wikimedia.org)

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