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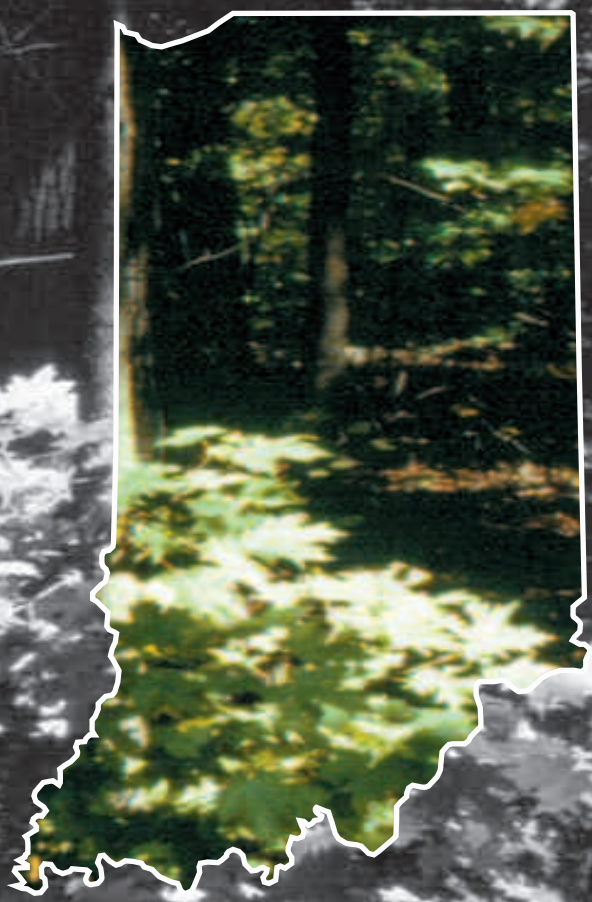
Indiana's Forest Resources 2005

Christopher Woodall, Gary Brand, and Joey Gallion



Abstract

This publication presents the results of the most recent five annual panels (2001-2005) of Indiana's forest resources. Since 2003, total forest land area has increased by approximately 175,000 acres. As in every inventory since 1950, the oak/hickory type is the largest forest type on the landscape, making up more than 58 percent of all forested land. Softwoods make up approximately 3 percent of Indiana's forested acreage. The net volume of growing stock on timberland totaled 8.2 billion cubic feet in 2005, more than triple the 2.5 billion cubic feet estimated during the 1950 inventory. The invasive tree species tree-of-heaven continues to threaten forest health, averaging at least one tree for every acre of Indiana's forest land.

The Authors

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Indiana's Forest Resources in 2005

In 2005, NCFIA completed measurement of the second panel of the second annual inventory cycle in Indiana. This sixth inventory of Indiana's forest resources will be completed in 2008. Previous inventories of Indiana's forest resources were completed in 1950, 1967, 1986, 1998, and 2003 (Hutchison 1956, Spencer 1969, Spencer *et al.* 1990, Smith and Golitz 1988, Schmidt *et al.* 2000, Woodall *et al.* 2005). Information presented in this report is based on moving average estimates that use the latest measurements of every field plot (five panels: 2001-2005) for estimates of current conditions such as area, number of trees, volume, and biomass. Because estimates of change (growth, removals, and mortality) are based on remeasured plots, for this report only the plots measured in 1999 and 2000 and then remeasured in 2004 and 2005 (two panels) provide the estimate of change. In 2006 another panel will be remeasured and estimates of change will be based on three panels of remeasured plots, and by 2008 all five panels will have been remeasured. The results presented in this report are estimates based on sampling techniques presented by Bechtold and Patterson (2005). This 2005 annual report contains summary information from the sixth forest inventory, along with 12 core tables. More tabular data from the sixth inventory of Indiana can be generated through the FIA Mapmaker program Web site at http://ncrs2.fs.fed.us/4801/fiadb/index.htm.

Data from new inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have been made since the last periodic Indiana inventory in 1998 (Schmidt *et al.* 2000). Although these changes will have little effect on statewide estimates of forest area, timber volume, and tree biomass, they may significantly affect plot classification variables such as forest type and stand-size class. Only comparisons that are appropriate and not affected by changes in procedures are discussed in this report.

RESULTS

Area

Forest land area (including reserved or low-productivity land) totaled 4.7 million acres in 2005 (table 1). More than 16 percent of forest land was owned by public agencies and 83 percent was owned by private landowners; 3 percent of the area was dominated by softwoods and 97 percent was dominated by hardwoods. Oak/hickory forests constituted 59 percent of the total hardwood forest land area. The white/red/jack pine forest group constituted 37 percent of all forest land dominated by softwoods.

Forest land has three components:

(1) Timberland—forest land not restricted from harvesting by statute, administrative regulation, or designation and capable of growing trees at a rate of 20 cubic feet per acre per year,

(2) Reserved forest land—forest land restricted from harvesting by statute, administrative regulation, or designation (e.g., state parks, national parks and lakeshores, and Federal wilderness areas), and

(3) Other forest land—forest land not capable of growing trees at a rate of 20 cubic feet per acre per year and not restricted from harvesting.

Timberland area has continued to increase since its low point in the 1967 inventory (fig. 1). Hardwoods made up 97 percent of the total acreage, 96 percent of all public timberland area, and 97 percent of all private landholdings (table 2). The area of timberland by forest type group was dominated by hardwoods (table 3), particularly by the oak/hickory group (table 3, fig. 2), although the maple/beech/birch group held a strong second place. Since 1950, the area of timberland in the sawtimber stand-size class has steadily increased (table 3, fig. 3). The area of timberland in the sapling-seedling and poletimber classes has decreased since 1950, suggesting stand development (fig. 3).

Volume

The net volume of all-live trees on forest land, which includes growing stock, rough, and rotten trees, was nearly 9.4 billion cubic feet (table 4). Hardwoods constituted nearly 9.1 billion cubic feet and softwoods made up more than 315 million cubic feet. Oaks made up nearly 2.4 billion cubic feet or 25 percent of all hardwoods. Select oaks (red and white) totaled more than 1.3 billion cubic feet or 58 percent of all oaks and 15 percent of all hardwoods (table 4). This represents a considerable increase over the 1986 inventory, which listed the total cubic foot volume of all-live trees as 6.0 billion cubic feet, all hardwoods as 5.8 billion cubic feet, all oaks as 1.7 billion cubic feet, and all select oaks as 859.0 million cubic feet (Smith and Golitz 1988).

Net volume of all-live trees with a d.b.h. (diameter at breast height) greater than or equal to 1 inch and salvable dead trees on timberland was nearly 9.2 billion cubic feet (table 5). Volume of all-live trees made up nearly 9.1 billion cubic feet or 99.0 percent. The difference between the total volume of all-live trees on timberland (table 5) and on forest land (table 4) represents more than 209 million cubic feet on land that is either reserved (e.g., parks, wilderness areas) or of low productivity (incapable of growth greater than 20 cubic feet per acre per year at the culmination of mean annual increment). Of the 8.2 billion cubic feet of volume in growing-stock trees, more than 6.5 billion cubic feet or 79.6 percent was sawtimber (fig. 4). The sawtimber percentages for softwoods and hardwoods were 75 and 80 percent, respectively (table 5). Cull tree volume, at 882 million cubic feet, was 9.7 percent of all-live tree volume. The softwood cull tree volume represented only 3.5 percent of the total softwood live tree volume, whereas hardwood cull volume represented 9.9 percent of the total hardwood volume (table 5, fig. 4).

The net volume of growing stock (trees with a d.b.h. greater than or equal to 5 inches) on timberland totaled 8.2 billion cubic feet, more than triple the 2.5 billion cubic feet estimated during the 1950 inventory (table 6, fig. 5). More than 96 percent (7.9 billion cubic feet) was in hardwood forest type groups and 3 percent (283 million cubic feet) was in the softwood groups, and the remainder was in the

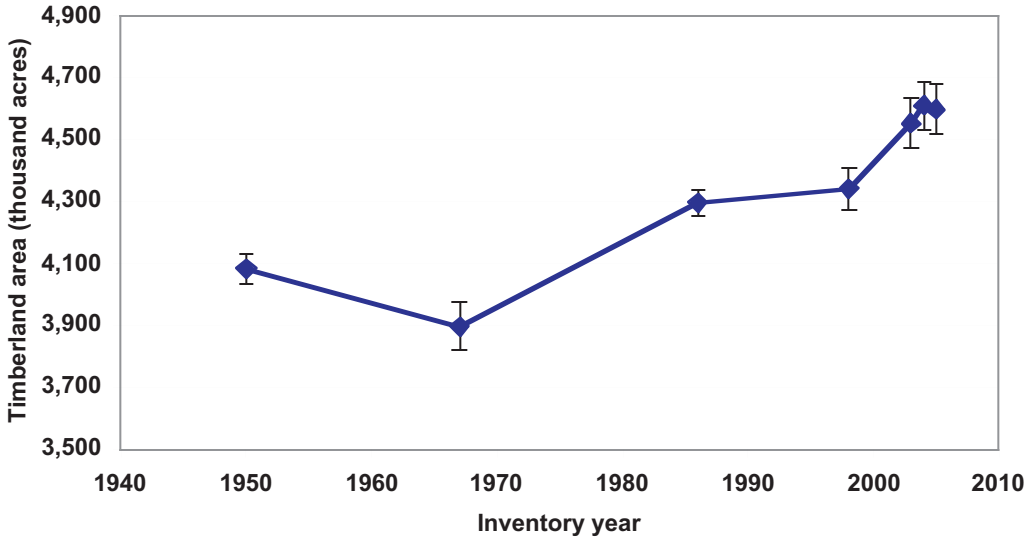

Figure 1.—Area of timberland in Indiana by inventory year, 1950-2005. The vertical line at each point represents the sample error associated with each inventory.

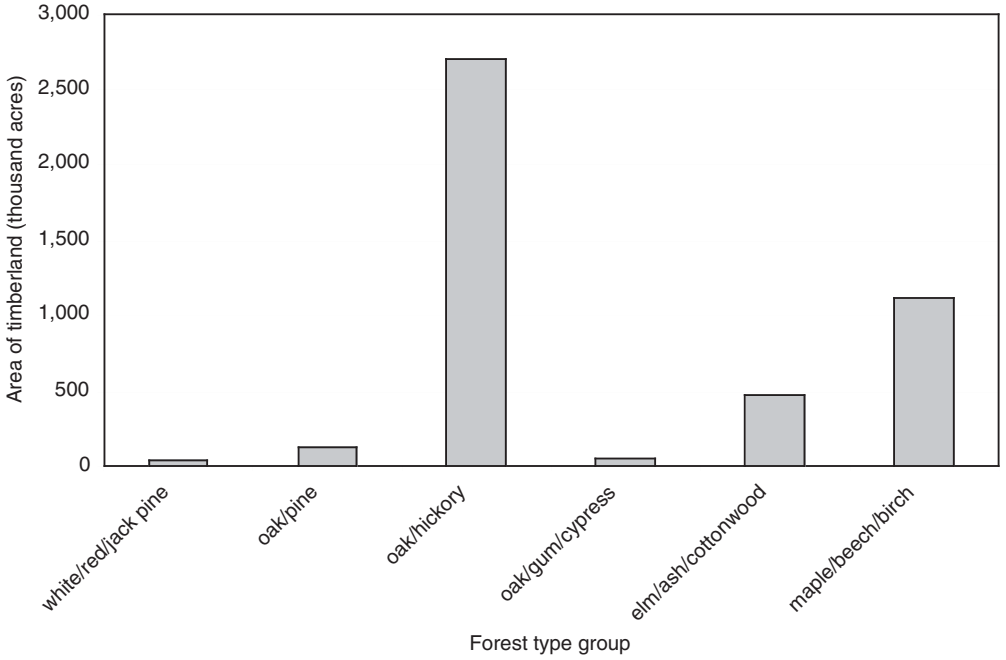

Figure 2.—Area of timberland in Indiana by selected forest type groups, 2001-2005.

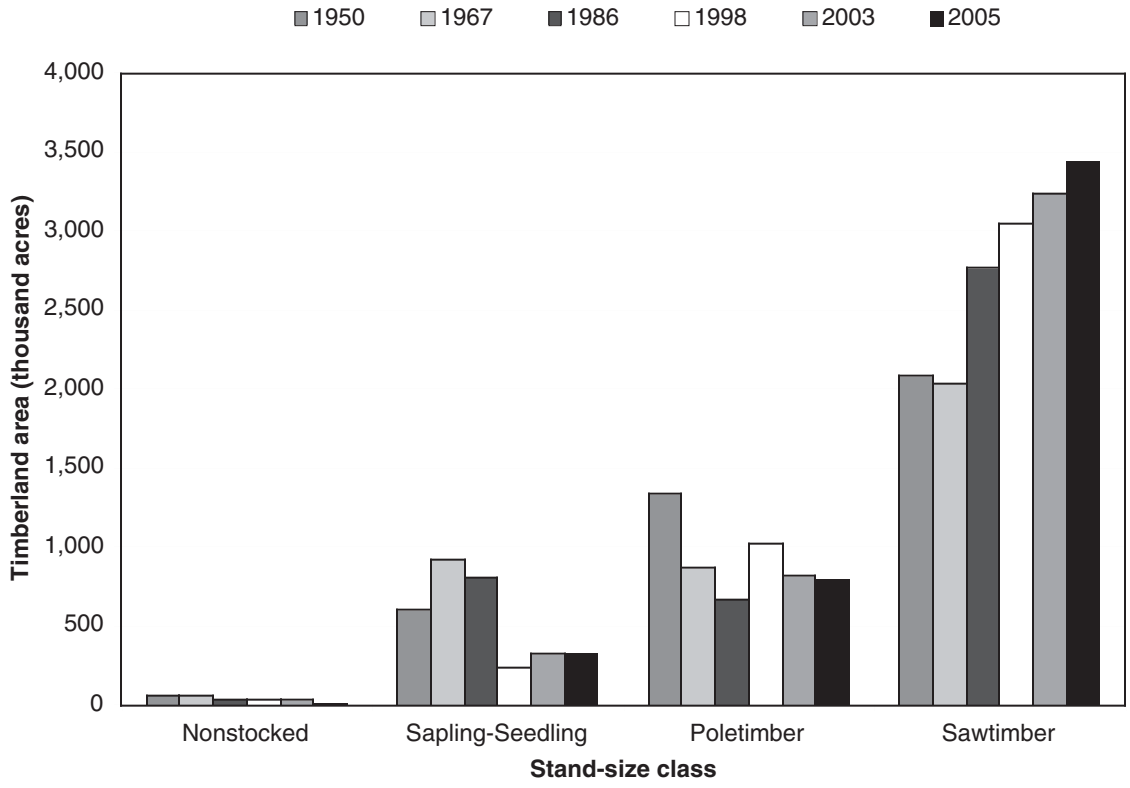

Figure 3.—Area of timberland in Indiana by stand-size class, 1950-2005.

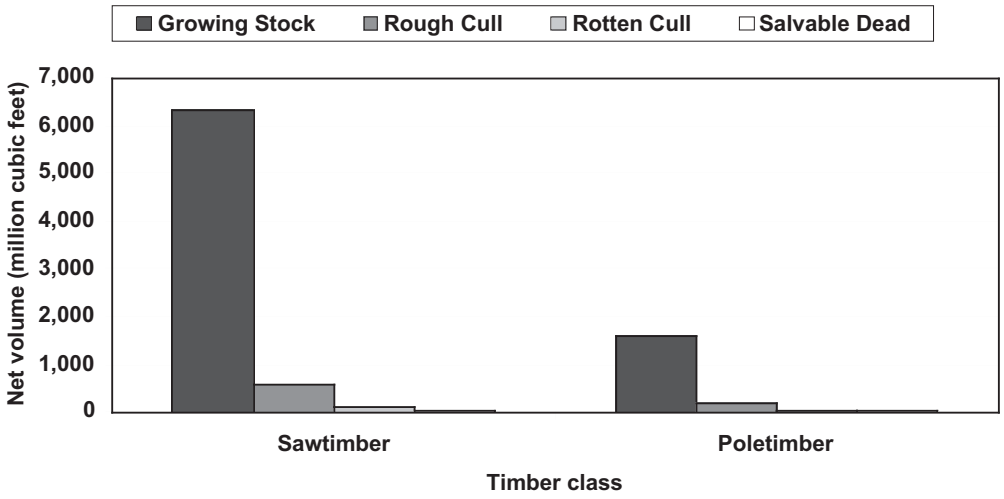

Figure 4.—Net volume of all hardwood live trees and salvable dead hardwood trees on timberland in Indiana by timber class and size class, 2000-2005.

nonstocked category. In table 6 and in figure 5, tree volumes are shown for softwoods and hardwoods for each forest type group. For example, the oak/pine group had 60.2 million cubic feet of softwoods and 109.5 million cubic feet of hardwoods.

The net volume of growing stock on timberland by diameter class varies considerably by species group (table 7, fig. 6). Total volume of oak growing stock on timberland was more than 2.1 billion cubic feet, which was 27 percent of all hardwood volume and 26 percent of all growing-stock volume. Volume in trees at least 19 inches in diameter constituted 8 percent of the net volume of softwood growing stock and 32 percent of net hardwood volume.

The net volume of sawtimber on timberland was almost 31.4 billion board feet (table 8). As with many other measures of tree coverage and abundance in Indiana, hardwoods constituted most of the sawtimber volume (97 percent or 30.3 billion board feet). Oaks totaled 9.1 billion board feet or 30 percent of the hardwood total (table 8). Yellow-poplar had the greatest net volume of all individual species at more than 4.4 billion board feet. Trees that were 19 or more inches in diameter made up nearly 11 percent of the softwood volume (115.6 million board feet) and 41 percent of the hardwood volume (12.4 billion board feet). In 1986, the proportions were 1 percent and 33 percent, respectively (Smith and Golitz 1988).

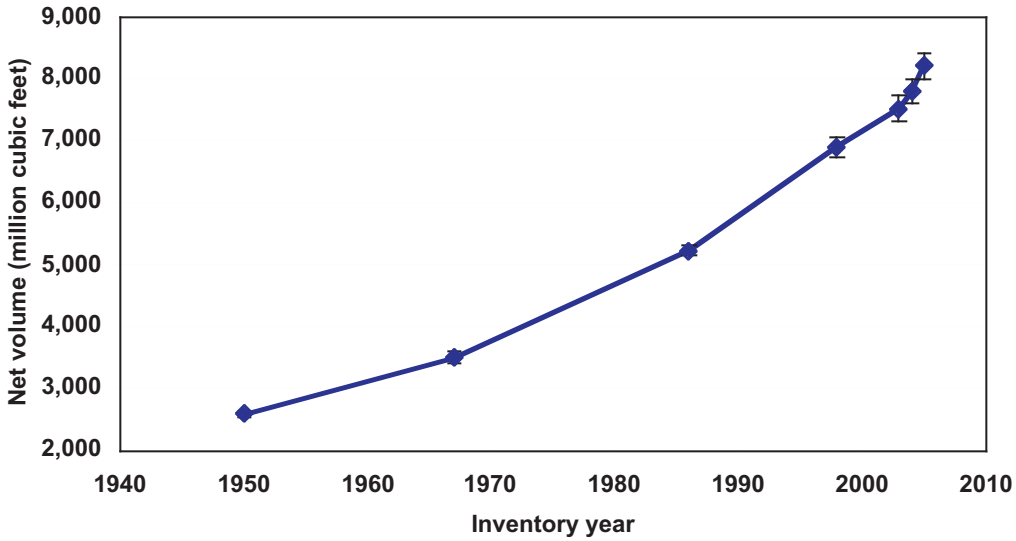

Figure 5.—Net volume of growing stock on timberland in Indiana 1950-20052. The vertical line at each point represents the sample error associated with each inventory.

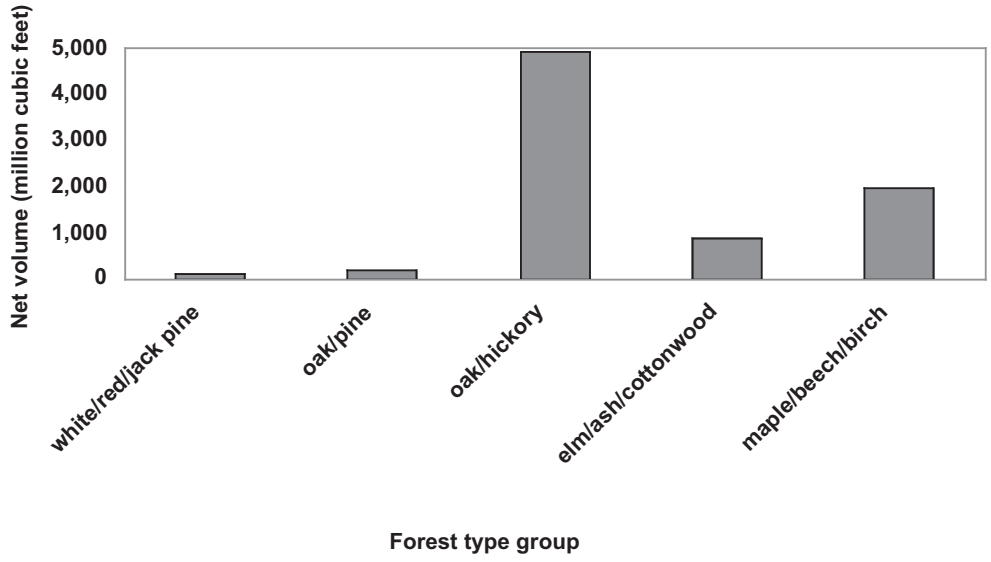

Figure 6.—Net volume of growing stock on timberland for Indiana by selected forest type, 2001-2005.

Biomass

The live aboveground biomass on timberland in Indiana totaled 245.6 million dry tons (table 9 and fig. 7). More than 5 percent of the biomass total was in 1- to 5-inch trees, 83.2 percent was in growing-stock trees, and more than 11 percent was in non-growing-stock trees. Of the total, 85 percent (208.5 million dry tons) was on private land and 15 percent (37.1 million dry tons) was on public land (table 9). Of the 204.4 million dry tons in growing-stock trees, 84 percent were on private land and 16 percent were on public land. Among biomass in non-growing-stock trees, 92 percent was on private land and 8 percent was on public land. Of the biomass in growing-stock trees, bole biomass made up 74 percent, and stumps, tops, and limbs made up the remaining 26 percent. Approximately the same proportions existed for the 27.7 million dry tons of biomass in non-growing-stock trees: 74 percent in bolewood and 26 percent in stumps, tops, and limbs (table 9).

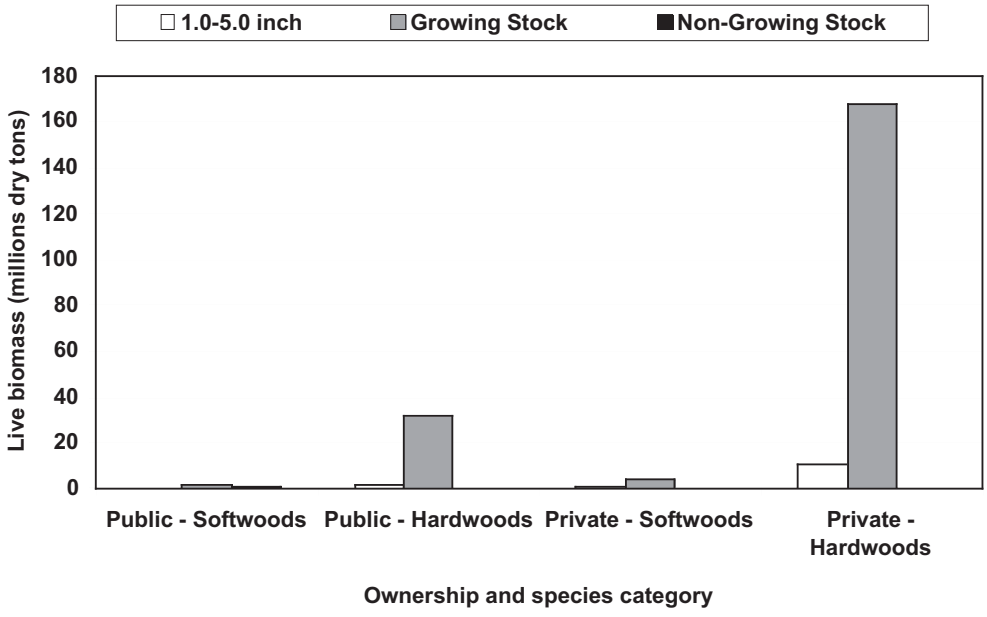

Figure 7.—Live aboveground biomass in Indiana, by ownership type and forest type, 2001-2005.

Growth, Removals, and Mortaliy

The growing stock on Indiana's timberland grew, on average, by 377.9 million cubic feet per year between the years 1999-2000 and 2004-2005 (table 10). Softwoods grew by 9.6 million cubic feet per year, while hardwoods grew by 417.5 million cubic feet per year. Hardwood growth was 98 percent of the total growth, and the hardwood growing stock in 1998 was 96 percent of the total volume (table 10). The growth of the other eastern soft hardwoods, yellow-poplar, hard maple, ash, and select white oaks species groups increased the most at 72.2, 60.2, 38.4, 37.8, and 37.6 million cubic feet per year, respectively (table 10).

Average annual removals of growing stock on timberland (table 11) totaled 70.3 million cubic feet per year, for a growth to removal ratio of more than 5. Hardwood removals were 70.2 million cubic feet per year (99.9 percent of the total removals). Removals from private timberland totaled 62.3 million cubic feet per year (88.7 percent of all removals); while removals from public land averaged 8.0 million cubic feet per year (table 11). The species group categories with the highest average annual removals were yellow-poplar (11.6 million cubic feet per year), other eastern soft and hard hardwoods (14.0 million cubic feet per year), and hickory (9.2 million cubic feet per year) (table 11).

Average annual mortality of growing stock on timberland 1999-2000 through 2004-2005 was 54.7 million cubic feet per year (table 12). Of that total, 51.2 million cubic feet per year (more than 93 percent) were from hardwoods, and the remaining 3.5 million cubic feet per year were from softwoods. Across all species groups, 11.4 percent or 6.2 million cubic feet per year, occurred on public lands. Hardwood mortality on public lands averaged 5.7 million cubic feet per year (11.2 percent of all hardwood mortality); softwood mortality on public land averaged nearly 0.5 million cubic feet per year (14.5 percent of all softwood mortality). Among hardwood species groups, the other eastern soft hardwoods group had the highest mortality rate at 12.9 million cubic feet per year or 25.2 percent of all mortality (table 12).

Tree-of-Heaven Update

The invasive tree species tree-of-heaven (*Ailanthus altissima*) was first recorded on FIA's inventory plots only a few years ago. Tree-of-heaven is native to China and was introduced to the U.S. more than 200 years ago. It is a prolific seed producer and fast growing tree that is common in disturbed forest sites, roadsides, and fence rows of the Eastern U.S. It is considered a forest health threat because of its ability to quickly establish itself on forest sites, forming thickets that prevent the recovery/regeneration of native tree species. According to anecdotal evidence, it has the potential to rapidly invade Indiana's forest lands because of its presence along many roadsides and in agricultural areas across the State. As of 1998, FIA detected no tree-of-heaven trees in the periodic inventory (fig. 8). However, annual forest inventories since 1998 have observed tree-of-heaven in Indiana's forests. As of 2005,

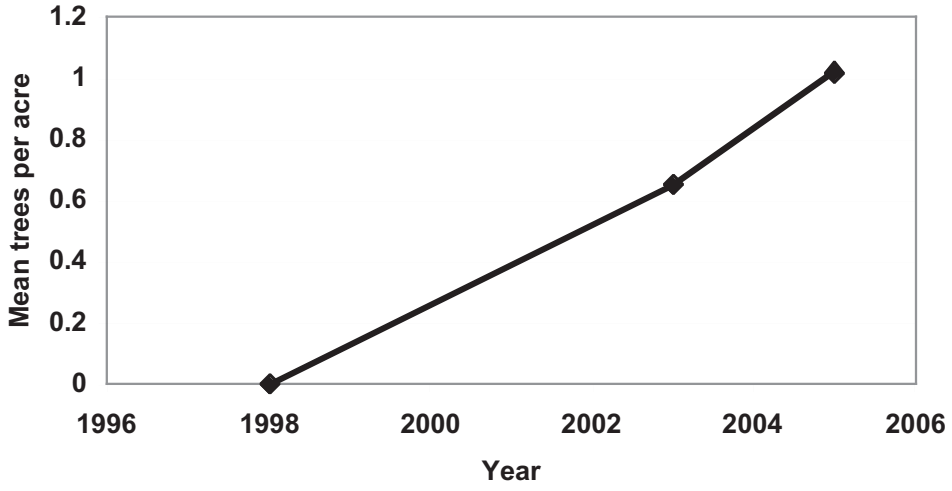

Figure 8.—Changes in mean trees per acre for tree-of-heaven in Indiana's forest land, 1998-2005.

Indiana had on average one tree-of-heaven tree per acre across the State's forest land (Note: sampling errors encompass the differences in these estimates). Nearly two-thirds of the tree-of-heaven species were detected in sugar maple/beech/ash/yellow-poplar forest types (fig. 9). Overall, the strategic-scale inventory of FIA has detected tree-of-heaven invading Indiana's native hardwood forests at a steady rate.

SUMMARY

Continuing long-term trends in Indiana, most measures of forested area and volumes show increases. Area has increased steadily since a low point in 1967, while standing volumes have continued to increase since 1950.

Hardwood forests continue to dominate the majority of Indiana's forests both in terms of acreage and volume/biomass. However, given the constant threats of invasive species (e.g., emerald ash borer and gypsy moth), the inventorying and monitoring of Indiana's hardwood forests is critical for future sustainability.

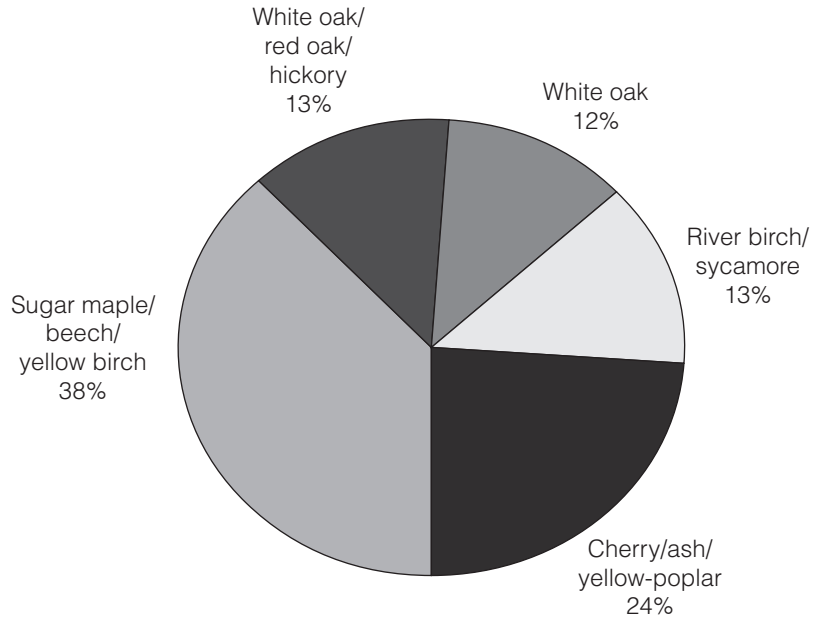

Figure 9.—Proportion of forest types in which tree-of-heaven was identified by total forest land acreage, 2001-2005.

APPENDIX

Accuracy of the Inventory

Sampling errors measure the uncertainty in estimates due to not observing every member of the population. In the case of the 2001-2005 Indiana forest inventory, a total of 982 forested plots were observed. Sampling error estimates for the 2005 inventory results are area of forest land, 1.63 percent; area of timberland, 1.72 percent; number of growing-stock trees on timberland, 3.02 percent; volume of growing stock on timberland, 2.66 percent; volume of sawtimber on timberland, 2.57 percent; growing-stock growth on timberland, 7.39 percent; growing-stock mortality on timberland, 13.02 percent; and growing-stock removals on timberland, 23.36 percent.

Inventory Methods

In the annual inventory of Indiana, about one-fifth of all field plots were measured each year. After 5 years, an entire inventory cycle was completed and summarized in a comprehensive report (Woodall *et al.* 2005). After the first 5 years, NCFIA can report and analyze results as a moving average. For example, NCFIA will be able to generate a report based on inventory results for 1999 through 2003 or for 2002 through 2006.

Inventory Phases

The 2005 Indiana survey was based on a three-phase inventory. The first phase used classified satellite imagery to stratify the State and aerial photographs to select plots for field measurement. The second phase measured the traditional FIA suite of mensurational variables, and the third phase measured a suite of variables related to the health of the forest.

The only land that could not be sampled was (1) private land where field personnel could not obtain permission from the owner to measure the field plot and (2) plots that could not be accessed because of a hazard or danger to field personnel. The methods used in preparing this report make the necessary adjustments to account for sites where access was denied or hazardous.

Phase 1

The 2005 inventory used a classification of satellite imagery. FIA used the imagery to form two initial strata—forest and nonforest. Pixels within 60 m (2 pixel widths) of a forest/nonforest edge formed two additional strata—forest/nonforest and nonforest/forest. Forest pixels within 60 m on the forest side of a forest/nonforest boundary were classified into a forest edge stratum. Pixels within 60 m of the boundary on the nonforest side were classified into a nonforest edge stratum. The estimated population total for a variable is the sum across all strata of the product of each stratum's estimated area and the variable's estimated mean per unit area for the stratum.

Phase 2

Phase 2 of the inventory consisted of the measurement of the annual sample of field plots in Indiana. Current FIA precision standards for annual inventories require a sampling intensity of one plot for approximately every 6,000 acres. FIA has divided the entire area of the United States into non-overlapping hexagons, each of which contains 5,937 acres (McRoberts 1999). An array of field plots was established by selecting one plot from each hexagon based on the following rules: (1) if a Forest Health Monitoring (FHM) plot (Mangold 1998) fell within a hexagon, it was selected; (2) if no FHM plot fell within a hexagon, the existing NCFIA plot from the 1998 inventory nearest the hexagon center was selected; and (3) if neither FHM nor existing NCFIA plots fell within the hexagon, a new NCFIA plot was established in the hexagon (McRoberts 1999). This array of plots is designated the Federal base sample and is considered an equal probability sample; its measurement in Indiana is funded by the Federal government.

The total Federal base sample of plots was systematically divided into five interpenetrating, nonoverlapping subsamples or panels. Each year the plots in a single panel are measured, and panels are selected on a 5-year, rotating basis (McRoberts 1999). For estimation purposes, the measurement of each panel of plots may be considered an independent systematic

sample of all land in a State. Field crews measure vegetation on plots forested at the time of the last inventory and on plots currently classified as forest by trained photointerpreters using aerial photos or digital orthoquads.

Phase 3

NCFIA has two categories of field plot measurements—phase 2 field plots (standard FIA plots) and phase 3 plots (forest health plots) to optimize our ability to collect data when available for measurement. Both types of plot are uniformly distributed both geographically and temporally. Phase 3 plots are measured with the full suite of FHM vegetative and health variables (Mangold 1998) collected as well as the full suite of measures associated with phase 2 plots. Phase 3 plots must be measured between June 1 and August 30 to accommodate the additional measurement of nonwoody understory vegetation, ground cover, soils, and other variables.

The overall plot layout for the new configuration consists of four subplots. The centers of subplots 2, 3, and 4 are located 120 feet from the center of subplot 1. The azimuths to subplots 2, 3, and 4 are 0, 120, and 240 degrees, respectively from the center of subplot 1. The center of the new plot is located at the same point as the center of the previous plot if a previous plot existed at the same location. Trees with a d.b.h. 5 inches and larger are measured on a 24-foot-radius (1/24 acre) circular subplot. Trees with a d.b.h. 1 inch and larger but less than 5 inches are measured on a 6.8-foot-radius (1/300 acre) circular microplot located 12 feet east of the center of each of the four subplots. Seedlings (trees less than 1 inch d.b.h. and at least 6 inches tall (softwood species) or 12 inches tall (hardwood species) are counted but not individually measured on this same microplot. Forest conditions that occur on any of the four subplots are recorded. Factors that differentiate forest conditions are changes in forest type, stand-size class, land use, ownership, and density. Each condition that occurs anywhere on any of the subplots is identified, described, and mapped if the area of the condition meets or exceeds 1 acre in size. The new national FIA plot configurtion (fig. 10) has been used for data collection in Indiana since 1999, the first annual

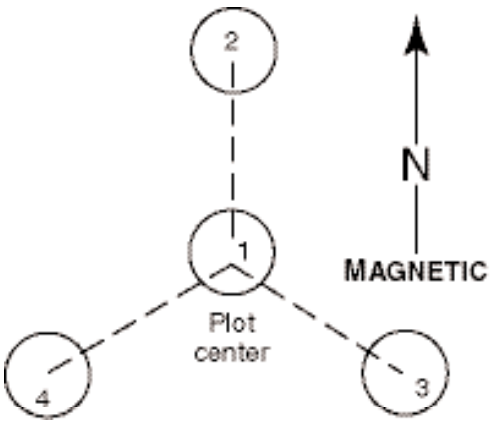

Figure 10.—Current NCFIA field plot configuration.

inventory year. Due to the small sample size (20 percent) each year, precision associated with change factors such as mortality will be relatively low.

Field plot measurements are combined with phase 1 estimates in the compilation process and table production. The number of published annual inventory tables is currently 12. However, at http://ncrs.fs.fed.us/4801/fiadb/index.htm, other tabular data can be generated.

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TABLE TITLES

Table 1.—*Area of forest land by forest type group, forest type, and owner category, Indiana, 2001-2005*

Table 2.—*Area of timberland by major forest type group, stand origin, and owner category, Indiana, 2001-2005*

Table 3.—*Area of timberland by forest type group, forest type, and stand-size class, Indiana, 2001-2005*

Table 4.—*Net volume of all live trees on forest land by species group, species, and owner category, Indiana, 2001-2005*

Table 5.—*Net volume of all live trees and salvable dead trees on timberland by class of timber and softwood/hardwood species category, Indiana, 2001-2005*

Table 6.—*Net volume of growing stock on timberland by forest type group, forest type, and softwood/hardwood species category, Indiana, 2001-2005*

Table 7.—*Net volume of growing stock on timberland by species group, species, and diameter class, Indiana, 2001-2005*

Table 8.—*Net volume of sawtimber on timberland by species group, species, and diameter class, Indiana, 2001-2005*

Table 9.—*All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Indiana, 2001-2005*

Table 10.—Average annual net growth of growing stock on timberland by species group and owner category, Indiana, 1999-2000 to 2004-2005

Table 11.—Average annual removals of growing stock on timberland by species group and owner category, Indiana, 1999-2000 to 2004-2005

Table 12.—Average annual mortality of growing stock on timberland by species group and owner category, Indiana, 1999-2000 to 2004-2005

TABLES

Table 1. -- Area of forest land by forest type group, forest type, and owner category, Indiana, 2001-2005

(In thousand acres)

Forest type group/ forest type	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
White / red / jack pine group				
Jack pine	1.6	- -	1.6	- -
Red pine	15.3	4.6	10.6	- -
Eastern white pine	30.9	10.7	20.1	- -
All forest types	47.7	15.4	32.4	- -
Loblolly / shortleaf pine group				
Shortleaf pine	10.7	10.7	- -	- -
Virginia pine	19.9	3.9	16.0	- -
All forest types	30.6	14.6	16.0	- -
Pinyon / juniper group				
Eastern redcedar	43.0	8.3	34.7	- -
All forest types	43.0	8.3	34.7	- -
Exotic softwoods group				
Scotch pine	6.3	- -	6.3	- -
All forest types	6.3	- -	6.3	- -
All softwood groups	127.6	38.2	89.4	- -
Hardwood type groups				
Oak / pine group				
White pine / red oak / white ash	22.6	5.7	16.9	- -
Eastern redcedar / hardwood	74.5	1.4	73.1	- -
Shortleaf pine / oak	15.2	10.5	4.6	- -
Virginia pine / southern red oak	19.6	7.1	12.6	- -
Other pine / hardwood	1.5	- -	1.5	- -
All forest types	133.3	24.7	108.6	- -
Oak / hickory group				
Oak / hickory group	0.9	- -	0.9	- -
Chestnut oak	66.8	22.3	44.4	- -
White oak / red oak / hickory	1,324.0	248.0	1,076.0	- -
White oak	174.6	57.7	116.8	- -
Northern red oak	33.0	6.7	26.4	- -
Yellow-poplar / white oak / red oak	211.1	30.6	180.5	- -
Sassafras / persimmon	137.0	7.4	129.6	- -
Sweetgum / yellow-poplar	97.0	22.2	74.8	- -
Bur oak	11.9	6.0	5.9	- -
Scarlet oak	9.4	3.3	6.2	- -
Yellow-poplar	78.2	8.7	69.5	- -
Black walnut	72.2	10.9	61.3	- -
Black locust	0.6	- -	0.6	- -
Chestnut oak / black oak / scarlet oak	48.0	16.4	31.6	- -
Red maple / oak	58.3	11.7	46.6	- -
Mixed upland hardwoods	448.2	47.5	400.6	- -
All forest types	2,771.4	499.6	2,271.7	- -

(Table 1 continued on next page)

(Table 1 continued)

Forest type group/ forest type	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwood type groups				
Oak / gum / cypress group				
Swamp chestnut oak / cherrybark oak	5.1	- -	5.1	- -
Sweetgum / Nuttall oak / willow oak	29.3	11.0	18.3	- -
Sweetbay / swamp tupelo / red maple	15.5	- -	15.5	- -
All forest types	49.9	11.0	38.9	- -
Elm / ash / cottonwood group				
Black ash / American elm / red maple	19.8	6.8	12.9	- -
River birch / sycamore	100.9	15.9	85.0	- -
Cottonwood	52.6	7.9	44.7	- -
Willow	9.8	- -	9.8	- -
Sycamore / pecan / American elm	53.7	15.4	38.3	- -
Sugarberry / hackberry / elm / green ash	135.3	8.7	126.7	- -
Silver maple / American elm	73.3	3.4	69.9	- -
Red maple / lowland	0.9	- -	0.9	- -
Cottonwood / willow	36.9	3.4	33.4	- -
All forest types	483.2	61.5	421.6	- -
Maple / beech / birch group				
Sugar maple / beech / yellow birch	633.4	79.5	553.9	- -
Black cherry	42.7	13.7	29.0	- -
Cherry / ash / yellow-poplar	274.2	38.6	235.6	- -
Hard maple / basswood	143.3	7.3	136.0	- -
Elm / ash / locust	44.8	5.9	38.9	- -
All forest types	1,138.5	145.1	993.4	- -
Aspen / birch group				
Aspen	6.2	4.6	1.5	- -
All forest types	6.2	4.6	1.5	- -
Exotic hardwoods group				
Other exotic hardwoods	1.6	- -	1.6	- -
All forest types	1.6	- -	1.6	- -
All hardwood groups	4,584.0	746.6	3,837.4	- -
Nonstocked	16.2	- -	16.2	- -
All forest groups	4,727.8	784.8	3,943.0	- -

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table 2. -- Area of timberland by major forest type group, stand origin, and owner category, Indiana, 2001-2005

(In thousand acres)

Major forest type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	49.0	3.7	45.3	- -
Planted	65.0	20.9	44.1	- -
All softwood types	113.9	24.6	89.4	- -
Hardwood type groups				
Natural	4,362.9	608.6	3,754.3	- -
Planted	104.5	28.1	76.3	- -
All hardwood types	4,467.4	636.8	3,830.6	- -
Nonstocked	16.2	- -	16.2	- -
All groups	4,597.5	661.3	3,936.2	- -

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table 3. -- Area of timberland by forest type group, forest type, and stand-size class, Indiana, 2001-2005

(In thousand acres)

Forest type group/ forest type	Stand-size class				
	All stands	Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Softwood type groups					
White / red / jack pine group					
Jack pine	1.6	- -	1.6	- -	- -
Red pine	15.3	9.3	6.0	- -	- -
Eastern white pine	24.2	24.2	- -	- -	- -
All forest types	41.0	33.5	7.5	- -	- -
Loblolly / shortleaf pine group					
Shortleaf pine	10.7	10.7	- -	- -	- -
Virginia pine	19.9	10.0	4.9	5.0	- -
All forest types	30.6	20.7	4.9	5.0	- -
Pinyon / juniper group					
Eastern redcedar	36.0	11.8	12.0	12.2	- -
All forest types	36.0	11.8	12.0	12.2	- -
Exotic softwoods group					
Scotch pine	6.3	- -	- -	6.3	- -
All forest types	6.3	- -	- -	6.3	- -
All softwood groups	113.9	66.0	24.5	23.5	- -
Hardwood type groups					
Oak / pine group					
White pine / red oak / white ash	22.6	16.6	6.0	- -	- -
Eastern redcedar / hardwood	74.5	30.2	34.7	9.7	- -
Shortleaf pine / oak	11.9	11.9	- -	- -	- -
Virginia pine / southern red oak	19.6	11.0	8.6	- -	- -
Other pine / hardwood	1.5	- -	- -	1.5	- -
All forest types	130.1	69.7	49.3	11.1	- -
Oak / hickory group					
Oak / hickory group	0.9	0.9	- -	- -	- -
Chestnut oak	56.7	56.7	- -	- -	- -
White oak / red oak / hickory	1,302.0	1,151.6	117.6	32.8	- -
White oak	166.3	150.2	16.1	- -	- -
Northern red oak	33.0	30.0	- -	3.0	- -
Yellow-poplar / white oak / red oak	211.1	170.9	16.5	23.8	- -
Sassafras / persimmon	132.5	74.1	40.2	18.3	- -
Sweetgum / yellow-poplar	94.5	71.6	7.9	15.0	- -
Bur oak	11.9	11.9	- -	- -	- -
Scarlet oak	9.4	9.4	- -	- -	- -
Yellow-poplar	78.2	42.2	33.3	2.7	- -
Black walnut	67.9	47.9	16.7	3.3	- -
Black locust	0.6	- -	0.6	- -	- -
Chestnut oak / black oak / scarlet oak	41.5	29.2	12.3	- -	- -
Red maple / oak	58.3	36.3	10.4	11.7	- -
Mixed upland hardwoods	435.8	225.3	155.6	54.9	- -
All forest types	2,700.9	2,108.2	427.1	165.6	- -

(Table 3 continued on next page)

(Table 3 continued)

Forest type group/ forest type	Stand-size class				
	All stands	Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Hardwood type groups					
Oak / gum / cypress group					
Swamp chestnut oak / cherrybark oak	5.1	5.1	- -	- -	- -
Sweetgum / Nuttall oak / willow oak	29.3	22.8	- -	6.5	- -
Sweetbay / swamp tupelo / red maple	15.5	15.5	- -	- -	- -
All forest types	49.9	43.4	- -	6.5	- -
Elm / ash / cottonwood group					
Black ash / American elm / red maple	19.8	14.0	5.8	- -	- -
River birch / sycamore	95.9	65.1	25.0	5.8	- -
Cottonwood	49.1	42.0	2.0	5.1	- -
Willow	9.8	3.7	4.6	1.5	- -
Sycamore / pecan / American elm	52.5	36.9	15.6	- -	- -
Sugarberry / hackberry / elm / green ash	132.8	90.0	20.4	22.4	- -
Silver maple / American elm	73.3	66.1	7.2	- -	- -
Red maple / lowland	0.9	- -	0.9	- -	- -
Cottonwood / willow	36.9	32.8	- -	4.1	- -
All forest types	471.0	350.6	81.6	38.9	- -
Maple / beech / birch group					
Sugar maple / beech / yellow birch	620.4	545.0	56.1	19.3	- -
Black cherry	37.0	15.9	13.0	8.1	- -
Cherry / ash / yellow-poplar	269.2	121.3	107.8	40.1	- -
Hard maple / basswood	141.0	119.4	14.1	7.5	- -
Elm / ash / locust	44.8	11.0	23.8	10.0	- -
All forest types	1,112.4	812.5	214.8	85.0	- -
Aspen / birch group					
Aspen	1.5	- -	- -	1.5	- -
All forest types	1.5	- -	- -	1.5	- -
Exotic hardwoods group					
Other exotic hardwoods	1.6	1.6	- -	- -	- -
All forest types	1.6	1.6	- -	- -	- -
All hardwood groups	4,467.4	3,385.9	772.8	308.7	- -
Nonstocked	16.2	- -	- -	- -	16.2
All forest groups	4,597.5	3,451.9	797.3	332.1	16.2

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table 4. -- Net volume of all live trees on forest land by species group, species, and owner category, Indiana, 2001-2005

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Loblolly and shortleaf pines				
Shortleaf pine	35,962	31,308	4,654	- -
All species	35,962	31,308	4,654	- -
Other yellow pines				
Scotch pine	2,784	- -	2,784	- -
Virginia pine	48,676	15,481	33,195	- -
All species	51,460	15,481	35,979	- -
Eastern white and red pines				
Red pine	28,407	9,012	19,395	- -
Eastern white pine	88,389	29,285	59,104	- -
All species	116,796	38,297	78,499	- -
Jack pine				
Jack pine	1,214	233	981	- -
All species	1,214	233	981	- -
Cypress				
Baldcypress			- -	- -
All species			- -	- -
Other eastern softwoods				
Eastern redcedar	105,132	17,603	87,529	- -
Tamarack (native)	949	949	- -	- -
Norway spruce	4,464	4,464	- -	- -
All species	110,545	23,016	87,529	- -
Total softwoods	315,976	108,335	207,641	- -
Hardwoods				
Select white oaks				
White oak	760,799	221,028	539,771	- -
Swamp white oak	19,967	142	19,826	- -
Bur oak	34,372	7,785	26,588	- -
Swamp chestnut oak	1,221	- -	1,221	- -
Chinkapin oak	107,388	14,824	92,564	- -
All species	923,748	243,779	679,969	- -
Select red oaks				
Cherrybark oak	3,030	- -	3,030	- -
Northern red oak	442,520	110,186	332,334	- -
Shumard oak	1,483	1,483	- -	- -
All species	447,032	111,669	335,363	- -
Other white oaks				
Chestnut oak	155,293	61,635	93,658	- -
Post oak	6,925	5,923	1,002	- -
All species	162,218	67,558	94,660	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Other red oaks				
Scarlet oak	57,555	27,467	30,088	- -
Northern pin oak	121	- -	121	- -
Shingle oak	38,188	2,455	35,733	- -
Pin oak	171,372	32,495	138,877	- -
Black oak	575,335	113,598	461,737	- -
All species	842,570	176,014	666,556	- -
Hickory				
Water hickory	1,989	- -	1,989	- -
Bitternut hickory	194,010	16,459	177,551	- -
Pignut hickory	313,935	78,322	235,613	- -
Pecan	270	- -	270	- -
Shagbark hickory	303,079	32,236	270,842	- -
Black hickory	951	- -	951	- -
Mockernut hickory	16,663	3,594	13,069	- -
All species	830,896	130,611	700,285	- -
Yellow birch				
Yellow birch	57	57	- -	- -
All species	57	57	- -	- -
Hard maple				
Black maple	356	- -	356	- -
Sugar maple	922,953	127,783	795,170	- -
All species	923,309	127,783	795,526	- -
Soft maple				
Red maple	324,429	45,643	278,786	- -
Silver maple	192,572	15,784	176,789	- -
All species	517,001	61,426	455,575	- -
Beech				
American beech	286,545	58,694	227,851	- -
All species	286,545	58,694	227,851	- -
Sweetgum				
Sweetgum	109,229	33,513	75,715	- -
All species	109,229	33,513	75,715	- -
Tupelo and blackgum				
Blackgum	65,728	10,114	55,614	- -
All species	65,728	10,114	55,614	- -
Ash				
White ash	535,161	69,741	465,420	- -
Black ash	5,864	1,805	4,058	- -
Green ash	166,403	12,948	153,454	- -
Blue ash	14,464	- -	14,464	- -
All species	721,891	84,495	637,396	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Cottonwood and aspen				
Eastern cottonwood	250,018	35,523	214,495	- -
Bigtooth aspen	36,059	20,819	15,240	- -
Swamp cottonwood	190	190	- -	- -
Quaking aspen	2,348	408	1,940	- -
All species	288,615	56,940	231,675	- -
Basswood				
American basswood	133,959	8,237	125,722	- -
All species	133,959	8,237	125,722	- -
Yellow-poplar				
Yellow-poplar	1,023,864	198,092	825,771	- -
All species	1,023,864	198,092	825,771	- -
Black walnut				
Black walnut	267,653	22,765	244,887	- -
All species	267,653	22,765	244,887	- -
Other eastern soft hardwoods				
Boxelder	56,840	6,954	49,886	- -
Ohio buckeye	8,690	814	7,876	- -
European alder	211	211	- -	- -
River birch	14,332	518	13,814	- -
Northern catalpa	14,660	- -	14,660	- -
Sugarberry	927	- -	927	- -
Hackberry	121,575	3,171	118,404	- -
Butternut	555	266	289	- -
American sycamore	400,810	47,814	352,997	- -
Black cherry	259,232	34,866	224,366	- -
Black willow	25,502	543	24,959	- -
Weeping willow	209	209	- -	- -
Sassafras	183,883	26,704	157,179	- -
Winged elm	741	284	457	- -
American elm	142,944	10,817	132,126	- -
Siberian elm	7,828	99	7,728	- -
Slippery elm	87,956	7,749	80,206	- -
All species	1,326,894	141,019	1,185,875	- -
Other eastern hard hardwoods				
Flowering dogwood	4,905	1,081	3,824	- -
Common persimmon	15,138	2,422	12,716	- -
Honeylocust	54,212	5,423	48,789	- -
Kentucky coffeetree	4,205	- -	4,205	- -
White mulberry	1,152	- -	1,152	- -
Red mulberry	12,188	219	11,969	- -
Black locust	61,351	7,290	54,061	- -
All species	153,151	16,434	136,717	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Eastern noncommercial hardwoods				
Ailanthus	4,370	35	4,335	- -
Serviceberry spp.		- -	- -	- -
Common serviceberry			- -	- -
Pawpaw		- -	- -	- -
American hornbeam, musclewood	1,126	86	1,040	- -
Eastern redbud	7,017	584	6,433	- -
Hawthorn spp.	4,168	54	4,115	- -
Cockspur hawthorn		- -		- -
Osage-orange	33,266	490	32,775	- -
Apple spp.	1,400	51	1,349	- -
Eastern hophornbeam	5,109	230	4,879	- -
Cherry and plum spp.	64	64	- -	- -
Chokecherry		- -		- -
American plum	52	- -	52	- -
Other or unknown tree	78	- -	78	- -
All species	56,650	1,595	55,055	- -
Total hardwoods	9,081,010	1,550,797	7,530,213	- -
All species groups	9,396,986	1,659,133	7,737,854	- -

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Table 5. -- Net volume of all live trees and salvable dead trees on timberland by class of timber and softwood/hardwood species category, Indiana, 2001-2005

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	5,831,543	192,345	5,639,198
Upper stem portion	710,963	20,345	690,618
Total	6,542,506	212,690	6,329,816
Poletimber	1,673,717	70,646	1,603,072
All growing-stock trees	8,216,223	283,336	7,932,888
Cull trees			
Rough trees[1]			
Sawtimber size	579,154	5,485	573,669
Poletimber size	196,392	4,559	191,832
Total	775,546	10,044	765,501
Rotten trees[1]			
Sawtimber size	93,400	207	93,193
Poletimber size	13,523	40	13,483
Total	106,923	246	106,677
All live cull trees	882,469	10,291	872,178
All live trees	9,098,692	293,626	8,805,066
Salvable dead trees			
Sawtimber size	43,611	3,938	39,673
Poletimber size	45,429	4,637	40,791
All salvable dead trees	89,040	8,576	80,464
All classes	9,187,731	302,202	8,885,529

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

[1] Includes noncommercial species.

Table 6. -- Net volume of growing stock on timberland by forest type group, forest type, and softwood/hardwood species category, Indiana, 2001-2005

(In thousand cubic feet)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Softwood type groups			
White / red / jack pine group			
Jack pine	1,395	981	413
Red pine	39,116	25,944	13,171
Eastern white pine	69,340	55,721	13,619
All forest types	109,850	82,646	27,204
Loblolly / shortleaf pine group			
Shortleaf pine	26,914	21,076	5,838
Virginia pine	35,807	29,066	6,741
All forest types	62,722	50,142	12,579
Pinyon / juniper group			
Eastern redcedar	24,035	15,069	8,966
All forest types	24,035	15,069	8,966
Exotic softwoods group			
Scotch pine	2,143	2,086	58
All forest types	2,143	2,086	58
All softwood groups	198,750	149,943	48,807
Hardwood type groups			
Oak / pine group			
White pine / red oak / white ash	38,373	14,705	23,668
Eastern redcedar / hardwood	82,215	29,325	52,890
Shortleaf pine / oak	28,246	9,370	18,876
Virginia pine / southern red oak	20,875	6,768	14,108
Other pine / hardwood		- -	- -
All forest types	169,708	60,167	109,541

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Oak / hickory group			
Oak / hickory group	1,297	- -	1,297
Chestnut oak	115,951	1,280	114,671
White oak / red oak / hickory	2,615,382	12,189	2,603,194
White oak	310,313	5,583	304,730
Northern red oak	87,712	- -	87,712
Yellow-poplar / white oak / red oak	449,243	9,754	439,490
Sassafras / persimmon	183,121	2,156	180,965
Sweetgum / yellow-poplar	212,464	2,297	210,167
Bur oak	8,391	- -	8,391
Scarlet oak	21,518	- -	21,518
Yellow-poplar	202,901	3,705	199,196
Black walnut	91,624	- -	91,624
Black locust	174	- -	174
Chestnut oak / black oak / scarlet oak	67,153	78	67,075
Red maple / oak	108,223	- -	108,223
Mixed upland hardwoods	445,331	8,764	436,568
All forest types	4,920,799	45,805	4,874,994
Oak / gum / cypress group			
Swamp chestnut oak / cherrybark oak	10,704	- -	10,704
Sweetgum / Nuttall oak / willow oak	48,065	- -	48,065
Sweetbay / swamp tupelo / red maple	26,130	- -	26,130
All forest types	84,900	- -	84,900
Elm / ash / cottonwood group			
Black ash / American elm / red maple	35,776	949	34,827
River birch / sycamore	162,444	768	161,675
Cottonwood	142,978	1,406	141,573
Willow	11,178	- -	11,178
Sycamore / pecan / American elm	86,296	- -	86,296
Sugarberry / hackberry / elm / green ash	210,419	282	210,137
Silver maple / American elm	144,422	- -	144,422
Red maple / lowland	1,963	- -	1,963
Cottonwood / willow	92,246	6,624	85,622
All forest types	887,723	10,029	877,694

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Maple / beech / birch group			
Sugar maple / beech / yellow birch	1,130,202	10,193	1,120,008
Black cherry	29,592	150	29,442
Cherry / ash / yellow-poplar	393,719	2,877	390,843
Hard maple / basswood	347,718	4,119	343,599
Elm / ash / locust	43,537	- -	43,537
All forest types	1,944,768	17,339	1,927,429
Aspen / birch group			
Aspen	1,080	53	1,027
All forest types	1,080	53	1,027
Exotic hardwoods group			
Other exotic hardwoods	6,108	- -	6,108
All forest types	6,108	- -	6,108
All hardwood groups	8,015,087	133,393	7,881,694
Nonstocked	2,386	- -	2,386
All forest groups	8,216,223	283,336	7,932,888

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Table 7. -- Net volume of growing stock on timberland by species group, species, and diameter class, Indiana, 2001-2005

(In thousand cubic feet)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Loblolly and shortleaf pines											
Shortleaf pine	29,960	666	1,992	5,177	6,377	8,092	4,792	2,865	--	--	--
All species	29,960	666	1,992	5,177	6,377	8,092	4,792	2,865	--	--	--
Other yellow pines											
Scotch pine	2,718	1,107	400	1,211	--	--	--	--	--	--	--
Virginia pine	47,958	1,622	5,033	7,114	12,787	9,824	4,929	6,649	--	--	--
All species	50,676	2,729	5,433	8,324	12,787	9,824	4,929	6,649	--	--	--
Eastern white and red pines											
Red pine	28,407	1,240	6,626	13,600	2,435	4,507	--	--	--	--	--
Eastern white pine	77,865	2,743	5,315	4,722	15,169	9,956	8,620	10,853	2,351	18,137	--
All species	106,272	3,983	11,941	18,322	17,604	14,462	8,620	10,853	2,351	18,137	--
Jack pine											
Jack pine	981	86	477	--	418	--	--	--	--	--	--
All species	981	86	477	--	418	--	--	--	--	--	--
Cypress											
Baldcypress		--	--	--	--	--	--	--	--	--	--
All species		--	--	--	--	--	--	--	--	--	--
Other eastern softwoods											
Eastern redcedar	90,033	18,343	23,837	17,563	10,133	13,544	5,879	733	--	--	--
Tamarack (native)	949	--	949	--	--	--	--	--	--	--	--
Norway spruce	4,464	56	155	--	--	--	1,237	--	--	3,016	--
All species	95,446	18,399	24,941	17,563	10,133	13,544	7,116	733	--	3,016	--
Total softwoods	283,336	25,863	44,783	49,387	47,319	45,922	25,458	21,100	2,351	21,153	--
Hardwoods											
Select white oaks											
White oak	694,730	9,236	16,444	29,709	45,550	65,504	94,639	118,152	72,979	180,621	61,896
Swamp white oak	19,967	169	679	259	636	3,247	1,107	1,558	4,565	7,748	--
Bur oak	27,329	910	1,145	2,160	600	793	2,332	1,745	6,185	11,459	--
Swamp chestnut oak	1,221	--	--	--	--	--	1,221	--	--	--	--
Chinkapin oak	94,287	4,854	7,951	9,938	18,577	8,081	8,494	8,285	3,988	24,118	--
All species	837,535	15,169	26,219	42,066	65,362	77,624	107,794	129,740	87,717	223,946	61,896
Select red oaks											
Cherrybark oak	3,030	--	--	--	656	853	--	1,522	--	--	--
Northern red oak	407,967	6,445	9,993	15,860	28,049	38,231	48,257	58,737	51,847	103,047	47,500
Shumard oak	1,483	--	--	--	--	--	610	873	--	--	--
All species	412,479	6,445	9,993	15,860	28,704	39,084	48,867	61,131	51,847	103,047	47,500

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods											
Other white oaks											
Chestnut oak	123,881	759	3,066	6,450	15,899	26,117	26,747	13,424	15,188	16,231	- -
Post oak	6,925	154	519	1,080	2,039	1,547	- -	1,586	- -	- -	- -
All species	130,805	913	3,585	7,530	17,939	27,663	26,747	15,010	15,188	16,231	- -
Other red oaks											
Scarlet oak	50,843	210	1,130	1,784	3,412	11,400	13,291	9,699	1,246	8,671	- -
Northern pin oak	121	121	- -	- -	- -	- -	- -	- -	- -	- -	- -
Shingle oak	37,487	1,886	3,799	5,052	2,941	719	2,328	3,528	2,508	7,343	7,381
Pin oak	164,549	3,449	4,487	6,485	6,785	10,185	16,238	17,583	11,566	73,513	14,257
Black oak	515,157	9,139	14,391	23,692	35,309	54,282	53,640	69,441	59,273	139,241	56,750
All species	768,157	14,804	23,808	37,013	48,447	76,586	85,498	100,252	74,593	228,767	78,388
Hickory											
Water hickory	877	- -	- -	- -	- -	877	- -	- -	- -	- -	- -
Bitternut hickory	186,413	5,721	13,378	19,568	25,173	28,046	28,252	29,886	13,887	16,720	5,782
Pignut hickory	303,676	8,052	20,121	33,504	46,862	59,230	44,387	47,334	17,310	26,875	- -
Pecan	270	86	184	- -	- -	- -	- -	- -	- -	- -	- -
Shagbark hickory	293,803	13,071	22,447	35,948	39,864	35,708	54,120	38,929	33,082	20,633	- -
Black hickory	951	- -	- -	- -	- -	951	- -	- -	- -	- -	- -
Mockernut hickory	15,694	808	1,455	1,354	1,954	3,363	4,254	2,506	- -	- -	- -
All species	801,684	27,738	57,585	90,373	113,854	128,175	131,013	118,656	64,279	64,228	5,782
Hard maple											
Black maple	356	110	245	- -	- -	- -	- -	- -	- -	- -	- -
Sugar maple	789,832	65,382	72,221	99,941	94,808	116,807	110,312	90,786	49,413	75,773	14,389
All species	790,188	65,492	72,467	99,941	94,808	116,807	110,312	90,786	49,413	75,773	14,389
Soft maple											
Red maple	279,847	19,441	34,254	36,140	28,077	24,850	25,369	31,411	24,056	40,800	15,448
Silver maple	152,052	8,456	14,805	17,769	21,350	9,821	17,528	8,563	20,390	22,367	11,004
All species	431,898	27,897	49,060	53,909	49,426	34,671	42,897	39,973	44,446	63,167	26,453
Beech											
American beech	203,969	7,758	10,487	10,088	14,532	21,708	27,617	28,555	23,477	53,754	5,993
All species	203,969	7,758	10,487	10,088	14,532	21,708	27,617	28,555	23,477	53,754	5,993
Sweetgum											
Sweetgum	104,823	4,682	7,607	11,683	17,723	18,277	13,662	14,771	12,432	3,987	- -
All species	104,823	4,682	7,607	11,683	17,723	18,277	13,662	14,771	12,432	3,987	- -
Tupelo and blackgum											
Blackgum	57,372	8,345	7,504	6,756	5,193	4,622	8,359	1,702	4,195	10,696	- -
All species	57,372	8,345	7,504	6,756	5,193	4,622	8,359	1,702	4,195	10,696	- -

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods											
Ash											
White ash	460,422	22,059	32,107	50,857	43,235	61,553	69,064	68,637	42,137	60,333	10,439
Black ash	5,614	614	1,313	2,169	724	796	- -	- -	- -	- -	- -
Green ash	135,497	7,632	13,606	20,628	14,023	20,415	10,622	19,575	9,578	19,417	- -
Blue ash	8,273	770	866	796	641	1,999	1,203	- -	1,997	- -	- -
All species	609,805	31,074	47,892	74,449	58,623	84,763	80,889	88,212	53,712	79,751	10,439
Cottonwood and aspen											
Eastern cottonwood	236,206	1,428	2,113	5,704	8,394	10,803	14,747	23,625	17,978	99,531	51,883
Bigtooth aspen	31,038	700	2,426	1,888	6,586	4,109	2,647	8,796	- -	3,886	- -
Quaking aspen	1,795	1,413	382	- -	- -	- -	- -	- -	- -	- -	- -
All species	269,039	3,541	4,921	7,592	14,979	14,912	17,394	32,421	17,978	103,417	51,883
Basswood											
American basswood	116,003	5,434	10,382	10,868	13,832	6,766	10,394	17,922	8,561	31,845	- -
All species	116,003	5,434	10,382	10,868	13,832	6,766	10,394	17,922	8,561	31,845	- -
Yellow-poplar											
Yellow-poplar	987,090	24,107	40,128	71,757	98,088	88,872	115,945	127,583	87,254	304,150	29,205
All species	987,090	24,107	40,128	71,757	98,088	88,872	115,945	127,583	87,254	304,150	29,205
Black walnut											
Black walnut	226,589	10,215	18,653	31,211	36,516	44,703	30,497	30,690	17,742	6,361	- -
All species	226,589	10,215	18,653	31,211	36,516	44,703	30,497	30,690	17,742	6,361	- -

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods											
Other eastern soft hardwoods											
Boxelder	28,162	5,353	4,970	5,263	3,633	5,321	3,622	--	--	--	--
Ohio buckeye	6,036	2,120	1,607	1,612	697	--	--	--	--	--	--
European alder	211	134	78	--	--	--	--	--	--	--	--
River birch	12,975	781	1,295	1,635	2,791	3,340	--	--	--	3,133	--
Northern catalpa	6,481	264	901	296	494	1,450	1,302	1,775	--	--	--
Sugarberry	927	98	--	322	507	--	--	--	--	--	--
Hackberry	105,413	7,815	10,073	13,887	11,360	16,956	7,505	12,516	5,985	11,345	7,972
Butternut	491	201	--	289	--	--	--	--	--	--	--
American sycamore	359,883	4,043	7,778	15,801	19,422	32,614	30,702	37,026	39,250	124,437	48,811
Black cherry	206,713	20,374	27,015	36,948	31,909	21,311	19,019	16,160	12,982	20,995	--
Black willow	20,514	1,933	3,230	1,283	796	3,509	4,552	1,678	--	3,532	--
Weeping willow	78	78	--	--	--	--	--	--	--	--	--
Sassafras	136,852	20,150	26,168	19,319	21,376	18,995	14,359	8,692	7,796	--	--
Winged elm	675	532	142	--	--	--	--	--	--	--	--
American elm	113,270	23,423	22,832	19,414	15,253	9,051	12,838	5,546	2,167	2,746	--
Siberian elm	7,772	54	99	--	--	--	--	3,008	--	4,611	--
Slippery elm	80,077	10,403	12,720	16,113	9,253	6,987	4,772	7,714	3,902	8,213	--
All species	1,086,530	97,755	118,908	132,182	117,490	119,533	98,671	94,115	72,081	179,012	56,783
Other eastern hard hardwoods											
Flowering dogwood	2,065	2,065	--	--	--	--	--	--	--	--	--
Common persimmon	13,623	2,346	2,048	2,711	1,332	2,728	2,459	--	--	--	--
Honeylocust	42,772	1,820	3,899	5,894	7,599	6,813	10,138	3,474	--	3,137	--
Kentucky coffeetree	4,205	215	--	--	--	3,990	--	--	--	--	--
White mulberry	92	92	--	--	--	--	--	--	--	--	--
Red mulberry	1,021	289	--	--	--	731	--	--	--	--	--
Black locust	35,142	4,133	5,684	8,027	5,468	5,967	1,251	2,229	2,384	--	--
All species	98,921	10,961	11,630	16,632	14,398	20,229	13,847	5,702	2,384	3,137	--
Total hardwoods	7,932,888	362,331	520,829	719,912	809,917	924,996	970,403	997,221	687,301	1,551,268	388,710
All species groups	8,216,223	388,194	565,611	769,299	857,235	970,918	995,861	1,018,322	689,652	1,572,421	388,710

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Table 8. -- Net volume of sawtimber on timberland by species group, species, and diameter class, Indiana, 2001-2005

(In thousand board feet)[1]

Species group/ species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Loblolly and shortleaf pines									
Shortleaf pine	139,130	25,345	32,144	41,465	24,946	15,229	--	--	--
All species	139,130	25,345	32,144	41,465	24,946	15,229	--	--	--
Other yellow pines									
Scotch pine	5,494	5,494	--	--	--	--	--	--	--
Virginia pine	209,950	34,714	64,254	50,321	25,604	35,056	--	--	--
All species	215,443	40,207	64,254	50,321	25,604	35,056	--	--	--
Eastern white and red pines									
Red pine	97,031	63,958	11,581	21,491	--	--	--	--	--
Eastern white pine	335,979	21,245	70,971	47,076	42,030	53,631	11,607	89,419	--
All species	433,010	85,203	82,552	68,568	42,030	53,631	11,607	89,419	--
Jack pine									
Jack pine	2,057	--	2,057	--	--	--	--	--	--
All species	2,057	--	2,057	--	--	--	--	--	--
Other eastern softwoods									
Eastern redcedar	245,043	96,811	52,197	65,609	27,256	3,170	--	--	--
Norway spruce	20,581	--	--	--	5,928	--	--	14,652	--
All species	265,624	96,811	52,197	65,609	33,185	3,170	--	14,652	--
Total softwoods	1,055,264	247,566	233,205	225,962	125,765	107,087	11,607	104,071	--
Hardwoods									
Select white oaks									
White oak	2,906,513	--	224,873	318,405	451,639	553,196	335,089	792,340	230,972
Swamp white oak	85,601	--	3,097	15,860	5,401	7,294	21,084	32,865	--
Bur oak	103,786	--	2,943	3,892	11,335	7,991	28,011	49,613	--
Swamp chestnut oak	5,849	--	--	--	5,849	--	--	--	--
Chinkapin oak	334,820	--	91,654	39,138	40,579	38,626	18,335	106,487	--
All species	3,436,569	--	322,567	377,295	514,804	607,107	402,519	981,305	230,972
Select red oaks									
Cherrybark oak	15,064	--	3,250	4,246	--	7,568	--	--	--
Northern red oak	1,807,617	--	138,400	190,165	240,296	291,658	255,869	488,863	202,366
Shumard oak	7,378	--	--	--	3,039	4,339	--	--	--
All species	1,830,059	--	141,650	194,411	243,335	303,565	255,869	488,863	202,366
Other white oaks									
Chestnut oak	573,209	--	81,405	133,390	135,500	67,629	75,900	79,386	--
Post oak	25,993	--	10,271	7,814	--	7,908	--	--	--
All species	599,202	--	91,675	141,204	135,500	75,537	75,900	79,386	--

(Table 8 continued)

Species group/ species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods									
Other red oaks									
Scarlet oak	232,613	- -	16,774	56,308	65,449	47,381	5,944	40,757	- -
Shingle oak	124,751	- -	14,530	3,540	11,532	17,285	12,101	35,087	30,676
Pin oak	701,255	- -	33,285	50,116	79,779	85,541	55,505	338,639	58,391
Black oak	2,214,409	- -	173,675	268,156	263,837	339,374	286,438	649,518	233,412
All species	3,273,029	- -	238,264	378,120	420,597	489,581	359,988	1,064,001	322,479
Hickory									
Water hickory	4,381	- -	- -	4,381	- -	- -	- -	- -	- -
Bitternut hickory	739,094	- -	125,729	140,461	141,652	149,841	69,575	83,415	28,421
Pignut hickory	1,210,062	- -	234,076	296,560	222,257	237,174	86,314	133,682	- -
Shagbark hickory	1,074,920	- -	192,230	172,442	261,685	188,359	160,241	99,963	- -
Black hickory	4,774	- -	- -	4,774	- -	- -	- -	- -	- -
Mockernut hickory	58,338	- -	9,436	16,278	20,582	12,043	- -	- -	- -
All species	3,091,571	- -	561,471	634,897	646,176	587,417	316,130	317,059	28,421
Hard maple									
Sugar maple	2,631,692	- -	456,775	565,064	532,439	435,907	234,857	349,599	57,051
All species	2,631,692	- -	456,775	565,064	532,439	435,907	234,857	349,599	57,051
Soft maple									
Red maple	819,629	- -	121,941	108,913	111,556	138,068	105,312	175,358	58,483
Silver maple	470,464	- -	92,764	43,000	77,023	37,601	89,094	95,994	34,989
All species	1,290,093	- -	214,705	151,913	188,579	175,669	194,405	271,352	93,471
Beech									
American beech	858,458	- -	73,528	109,237	138,045	141,391	114,979	254,190	27,088
All species	858,458	- -	73,528	109,237	138,045	141,391	114,979	254,190	27,088
Sweetgum									
Sweetgum	363,337	- -	80,648	83,227	61,776	66,007	55,007	16,673	- -
All species	363,337	- -	80,648	83,227	61,776	66,007	55,007	16,673	- -
Tupelo and blackgum									
Blackgum	154,669	- -	23,702	20,970	37,848	7,699	18,760	45,691	- -
All species	154,669	- -	23,702	20,970	37,848	7,699	18,760	45,691	- -
Ash									
White ash	1,664,869	- -	195,835	285,342	325,535	326,415	201,171	284,549	46,023
Black ash	6,984	- -	3,309	3,675	- -	- -	- -	- -	- -
Green ash	437,160	- -	63,531	94,590	50,018	93,110	45,721	90,189	- -
Blue ash	27,379	- -	2,922	9,290	5,640	- -	9,528	- -	- -
All species	2,136,392	- -	265,598	392,897	381,192	419,525	256,420	374,738	46,023

(Table 8 continued on next page)

(Table 8 continued)

Species group/ species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods									
Cottonwood and aspen									
Eastern cottonwood	1,135,493	- -	39,684	52,855	74,020	120,867	93,635	508,071	246,361
Bigtooth aspen	128,118	- -	31,522	20,517	13,575	44,567	- -	17,937	- -
All species	1,263,611	- -	71,206	73,372	87,594	165,434	93,635	526,007	246,361
Basswood									
American basswood	437,735	- -	69,957	34,041	51,927	88,756	42,007	151,048	- -
All species	437,735	- -	69,957	34,041	51,927	88,756	42,007	151,048	- -
Yellow-poplar									
Yellow-poplar	4,456,507	- -	496,185	457,582	606,474	674,378	465,482	1,608,384	148,022
All species	4,456,507	- -	496,185	457,582	606,474	674,378	465,482	1,608,384	148,022
Black walnut									
Black walnut	800,480	- -	178,221	217,838	147,691	146,318	82,588	27,824	- -
All species	800,480	- -	178,221	217,838	147,691	146,318	82,588	27,824	- -
Other eastern soft hardwoods									
Boxelder	57,069	- -	16,519	24,177	16,372	- -	- -	- -	- -
Ohio buckeye	3,220	- -	3,220	- -	- -	- -	- -	- -	- -
River birch	41,720	- -	12,718	15,243	- -	- -	- -	13,759	- -
Northern catalpa	22,815	- -	2,256	6,654	5,920	7,985	- -	- -	- -
Sugarberry	2,417	- -	2,417	- -	- -	- -	- -	- -	- -
Hackberry	323,251	- -	53,742	79,510	34,648	56,652	26,630	45,501	26,568
American sycamore	1,587,768	- -	90,642	154,252	144,645	180,664	191,911	600,631	225,024
Black cherry	550,204	- -	145,962	97,140	86,378	72,870	57,706	90,149	- -
Black willow	63,990	- -	3,704	16,214	20,779	7,368	- -	15,925	- -
Sassafras	322,366	- -	97,198	86,455	65,284	38,914	34,515	- -	- -
American elm	219,875	- -	72,596	42,385	59,088	24,496	9,665	11,645	- -
Siberian elm	32,240	- -	- -	- -	- -	13,349	- -	18,891	- -
Slippery elm	186,397	- -	44,197	33,064	22,068	34,875	16,899	35,294	- -
All species	3,413,332	- -	545,171	555,094	455,182	437,172	337,326	831,794	251,592
Other eastern hard hardwoods									
Common persimmon	29,626	- -	6,068	12,351	11,208	- -	- -	- -	- -
Honeylocust	141,613	- -	34,814	31,048	46,256	15,707	- -	13,788	- -
Kentucky coffeetree	18,105	- -	- -	18,105	- -	- -	- -	- -	- -
Red mulberry	3,356	- -	- -	3,356	- -	- -	- -	- -	- -
Black locust	78,552	- -	25,036	27,274	5,711	9,936	10,595	- -	- -
All species	271,254	- -	65,918	92,134	63,175	25,643	10,595	13,788	- -
Total hardwoods	30,307,990	- -	3,897,239	4,479,295	4,712,334	4,847,106	3,316,464	7,401,704	1,653,847
All species groups	31,363,254	247,566	4,130,444	4,705,257	4,838,099	4,954,193	3,328,072	7,505,775	1,653,847

(Table 8 continued)

Species group/ species	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods									

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand board feet. Columns and rows may not add to their totals due to rounding.

International 1/4-inch rule.

Table 9. -- All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Indiana, 2001-2005

(In thousand dry tons)

Owner category and softwood/hardwood category	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Non-growing-stock trees		
			Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	1,602	44	1,523	1,260	263	35	27	8
Hardwoods	35,532	1,797	31,492	23,332	8,160	2,244	1,667	576
Total	37,134	1,841	33,015	24,592	8,423	2,279	1,695	584
Private								
Softwoods	4,583	656	3,719	2,916	803	208	149	59
Hardwoods	203,895	11,033	167,684	124,055	43,629	25,179	18,662	6,516
Total	208,478	11,689	171,403	126,971	44,431	25,387	18,812	6,575
All ownerships								
Softwoods	6,185	700	5,242	4,177	1,065	243	177	66
Hardwoods	239,427	12,829	199,176	147,387	51,789	27,422	20,330	7,093
Total	245,613	13,529	204,418	151,563	52,854	27,666	20,507	7,159

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the aboveground tree biomass rounds to less than 1 thousand dry ton. Columns and rows may not add to their totals due to rounding.

Table 10. -- Average annual net growth of growing stock on timberland by species group and owner category, Indiana, 1999-2000 to 2004-2005

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Loblolly and shortleaf pines	749	992	-244	- -
Other yellow pines	3,504	2,440	1,064	- -
Eastern white and red pines	2,097	402	1,695	- -
Jack pine	-354	- -	-354	- -
Other eastern softwoods	3,623	103	3,519	- -
Total softwoods	9,618	3,938	5,680	- -
Hardwoods				
Select white oaks	37,585	8,597	28,987	- -
Select red oaks	12,961	2,858	10,104	- -
Other white oaks	4,781	1,500	3,281	- -
Other red oaks	32,121	4,354	27,767	- -
Hickory	35,593	3,459	32,134	- -
Yellow birch	- -	- -	- -	- -
Hard maple	38,404	3,709	34,695	- -
Soft maple	37,270	1,305	35,965	- -
Beech	6,366	1,211	5,155	- -
Sweetgum	4,264	2,149	2,115	- -
Tupelo and blackgum	2,242	-40	2,283	- -
Ash	37,763	1,620	36,144	- -
Cottonwood and aspen	5,843	815	5,028	- -
Basswood	6,542	301	6,241	- -
Yellow-poplar	60,209	5,575	54,634	- -
Black walnut	18,259	1,849	16,410	- -
Other eastern soft hardwoods	72,165	4,569	67,596	- -
Other eastern hard hardwoods	5,179	375	4,804	- -
Total hardwoods	417,547	44,203	373,343	- -
All species groups	427,164	48,141	379,023	- -

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Table 11. -- Average annual removals of growing stock on timberland by species group and owner category, Indiana, 1999-2000 to 2004-2005

(In thousand cubic feet per year)

Species group	Owner **category**			
	All owners	Public	Private	**Unidentified owner**
Softwoods				
Other eastern softwoods	53	- -	53	- -
Total softwoods	53	- -	53	- -
Hardwoods				
Select white oaks	9,102	2,124	6,978	- -
Select red oaks	4,618	4,548	70	- -
Other red oaks	2,255	- -	2,255	- -
Hickory	9,222	1,087	8,134	- -
Hard maple	4,036	- -	4,036	- -
Soft maple	638	- -	638	- -
Beech	3,210	- -	3,210	- -
Sweetgum	214	- -	214	- -
Tupelo and blackgum	78	78	- -	- -
Ash	8,996	- -	8,996	- -
Cottonwood and aspen	720	- -	720	- -
Basswood	627	- -	627	- -
Yellow-poplar	11,627	40	11,587	- -
Black walnut	669	- -	669	- -
Other eastern soft hardwoods	13,961	88	13,873	- -
Other eastern hard hardwoods	255	- -	255	- -
Total hardwoods	70,228	7,966	62,263	- -
All species groups	70,281	7,966	62,315	- -

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Table 12. -- Average annual mortality of growing stock on timberland by species group and owner category, Indiana, 1999-2000 to 2004-2005

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Loblolly and shortleaf pines	401	122	279	- -
Other yellow pines	1,239	60	1,179	- -
Eastern white and red pines	1,214	89	1,125	- -
Jack pine	383	- -	383	- -
Other eastern softwoods	273	237	36	- -
Total softwoods	3,510	508	3,002	- -
Hardwoods				
Select white oaks	988	100	888	- -
Select red oaks	236	170	65	- -
Other white oaks	50	- -	50	- -
Other red oaks	3,297	1,362	1,936	- -
Hickory	8,587	252	8,335	- -
Hard maple	3,010	85	2,925	- -
Soft maple	1,121	224	897	- -
Beech	- -	- -	- -	- -
Sweetgum	1,061	537	524	- -
Tupelo and blackgum	199	- -	199	- -
Ash	3,778	- -	3,778	- -
Cottonwood and aspen	5,341	515	4,825	- -
Basswood	108	- -	108	- -
Yellow-poplar	8,399	666	7,733	- -
Black walnut	115	115	- -	- -
Other eastern soft hardwoods	12,913	1,348	11,565	- -
Other eastern hard hardwoods	1,996	340	1,656	- -
Total hardwoods	51,201	5,714	45,486	- -
All species groups	54,710	6,222	48,488	- -

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Woodall, Christopher; Brand, Gary; Gallion, Joey.

2006. **Indiana's forest resources in 2005.** Resour. Bull. NRS-3. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 36 p.

Reports the initial results of five annual panels (2001-2005) of the inventory of Indiana's forest resources and two panels (2004 and 2005) of growth, removals, and mortality. Includes information on forest area, number of trees, volume, biomass, growth, removals, mortality, and forest health.

Keywords: annual inventory, forest area, forest type, volume, biomass, Indiana.

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