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Wisconsin's Forest Resources in 2004

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Wisconsin's Forest Resources in 2004

The North Central Research Station's Forest Inventory and Analysis (NCFIA) program, in partnership with the Wisconsin Department of Natural Resources (DNR), began fieldwork for the sixth inventory of Wisconsin's forest resources in 2000. This initiated a new annual inventory system in which one-fifth of the field plots (considered one panel) in the State are measured each year. A complete inventory consists of measuring, compiling, and reporting data for five panels. Once all five panels have been measured, plots in each panel will be remeasured approximately every 5 years. For example, the plots measured in Wisconsin in 2000 will be remeasured in 2005. The field plot measurements for this inventory were completed in September 2004, and these measurements complete the sixth inventory of Wisconsin's forest resources. The data may be accessed at <http://ncrs2.fs.fed.us/4801/fiadb/index.htm>.

This document briefly summarizes the data in the sixth inventory, and a comprehensive 5-year analysis is now underway. Data and statistics prepared for this report represent 93 percent of the field plots (all five panels, 2000-2004) for the complete inventory; the remaining 7 percent were either too hazardous to visit or access was denied. Earlier reports are available for the 2000 panel (Vissage 2002), the combined 2000-2001 panels (Vissage *et al.* 2003), the combined 2000-2002 panels (Vissage *et al.* 2004), and the combined 2000-2003 panels (Vissage *et al.* 2005). Results presented here are estimates based on sampling techniques assuming the 2000, 2001, 2002, 2003, and 2004 panels represent one sample.

Reports of previous inventories of Wisconsin are dated 1936 (Cunningham and Moser 1938; Cunningham *et al.* 1939), 1956 (Stone

and Thorne 1961), 1968 (Spencer and Thorne 1972), 1983 (Spencer *et al.* 1988), and 1996 (Kotar *et al.* 1999, Schmidt 1998). Data from new inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparison 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 inventory of Wisconsin in 1996 (Kotar *et al.* 1999, Schmidt 1998). Although these changes have little impact on statewide estimates of forest area, timber volume, and tree biomass, they may have significant impact on plot classification variables such as forest type and stand-size class. Some of these changes make it inappropriate to directly compare portions of the 2000-2004 data with data published for 1996. All of the tables in this report and many others can be generated at our Web site: <http://ncrs2.fs.fed.us/4801/fiadb/index.htm>.

RESULTS

Area

The total land area of Wisconsin is 34.8 million acres. About 46 percent or 16.0 million acres were forested in the fifth inventory (Schmidt 1998). Total forest land¹ area has remained relatively stable at about 16.0 million acres since 1996 (table 1). The maple/beech/birch, oak/hickory, and aspen/birch forest type groups together account for about 70 percent of the forest land in Wisconsin (fig. 1).

¹Forest land is land at least 10 percent stocked by forest trees of any size, or land formerly having such tree cover, and not currently developed for a nonforest use.

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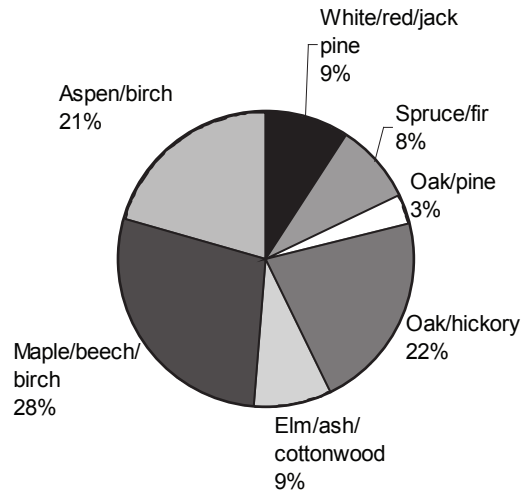


Figure 1.—Relative contributions of major forest type groups to forest land in Wisconsin, 2000-2004.

Forest land has three components:

1. Timberland²—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—land restricted from harvesting by statute, administrative regulation, or designation (i.e., national parks and lakeshores, and federal wilderness areas)
3. Other forest land—land not capable of growing trees at a rate of 20 cubic feet per acre per year and not restricted from harvesting

²Timberland may not be equivalent to the area actually available for commercial timber harvesting or other access. The actual availability of land for various uses depends upon owner decisions that consider economic, environmental, and social factors.

Timberland area increased slightly from 1996 to 2004 (fig. 2). The sampling errors associated with both the 1996 and 2004 estimates indicate the increase is not statistically significant.

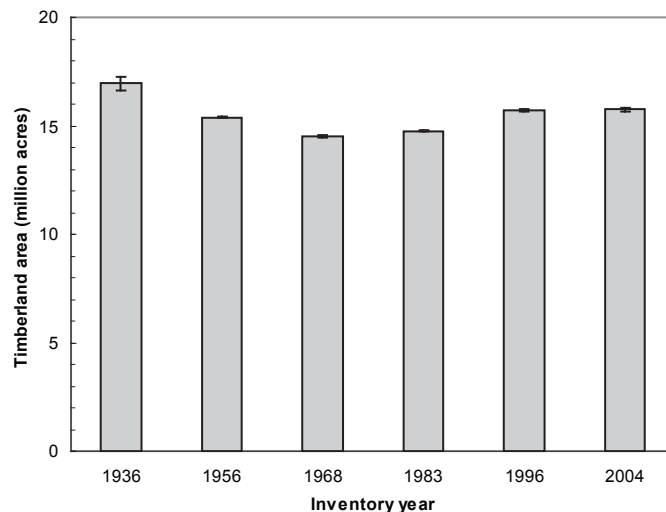


Figure 2.—Area of timberland in Wisconsin by inventory year. The error bars represent the 66-percent confidence interval around the estimate.

Since 1996, the area of timberland owned by private individuals and corporations has decreased by about 328 thousand acres (2.9 percent), while the area under public control has increased by about 388 thousand acres (8.5 percent) (fig. 3, table 2). Despite this change, about 69 percent of Wisconsin's timberland remains in private ownership.

Covering almost 4.4 million acres, the maple/beech/birch forest type group remains the dominant forest type group in the State (fig. 4, table 3). Taken together, hardwood forest types have lost about 289 thousand acres since the 1996 inventory. The timberland area of softwood forest types has increased by almost 257 thousand acres since 1996.

The timberland area occupied by the seedling-sapling stand-size class has decreased by 31 percent since 1996 (fig. 5, table 3). The area occupied by the poletimber stand-size class has remained stable, while the area occupied by sawtimber has increased by 33 percent. Although the changes in the timberland area occupied by the different stand-size classes and forest type groups seem dramatic, it is important to note that the procedures used to determine these important attributes have changed since the 1996 inventory. Comparisons and trends will become more straightforward when additional panels of annual data collected in future inventories and current procedures are used to update the 1996 estimates.

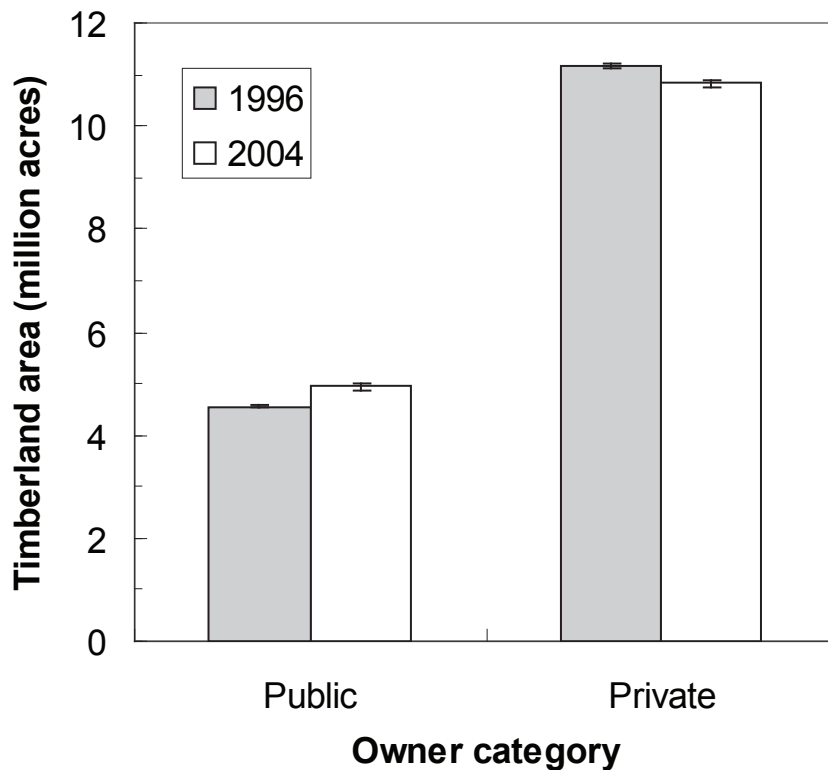


Figure 3.—Area of timberland in Wisconsin by owner category. The error bars represent the 66-percent confidence interval around the estimate.

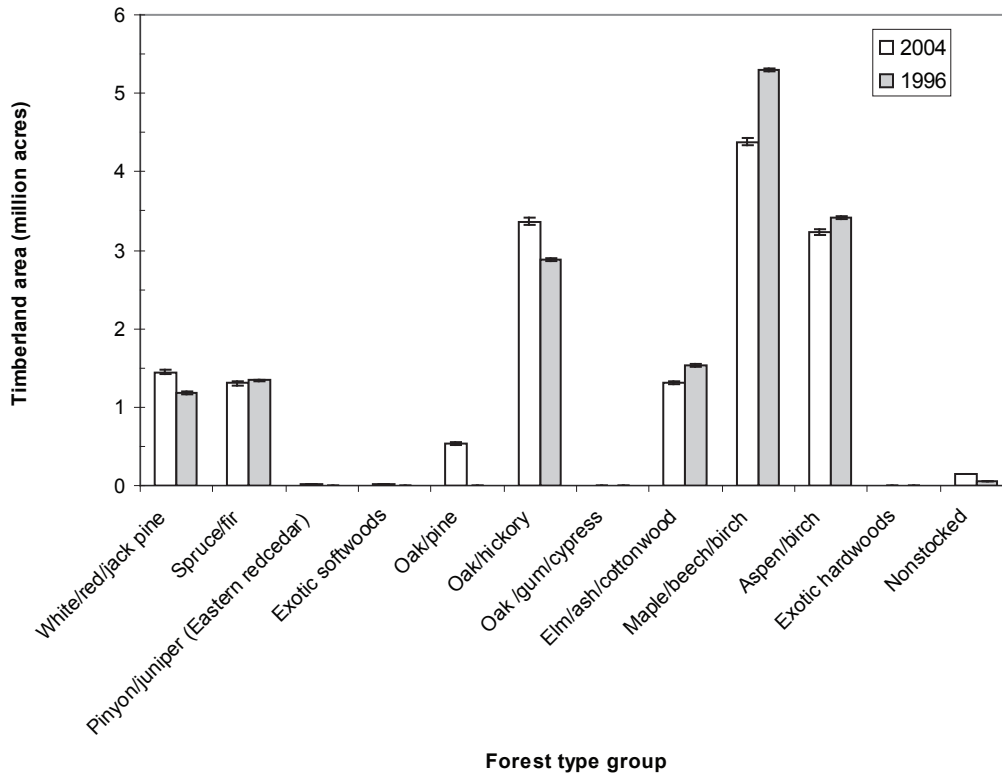


Figure 4.—Area of timberland in Wisconsin in 1996 and 2004 by forest type group. The error bars represent the 66-percent confidence interval around the estimate.

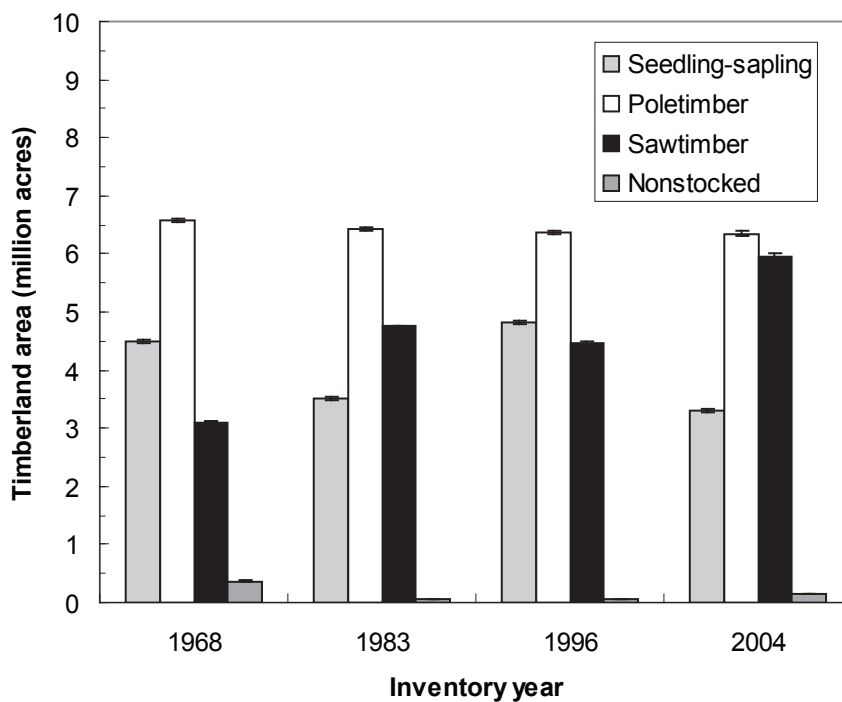


Figure 5.—Area of timberland in Wisconsin by stand-size class and inventory year. The error bars represent the 66-percent confidence interval around the estimate.

Volume

In previous inventories, the volume of all live trees greater than or equal to 5.0 inches diameter at breast height (d.b.h., 4.5 feet above the ground) on timberland was classified and reported as growing stock and cull. The board-foot volume of growing-stock trees exceeding minimum size requirements—9.0 inches d.b.h. for softwoods and 11.0 inches d.b.h. for hardwoods—was classified as sawtimber. Previous analyses focused on growing-stock and sawtimber volumes. The volume of all live trees on reserved and other forest land was not reported. With an increased interest in FIA data to address questions about wildlife habitat, soil and water protection, aesthetics, and other important forest values, greater importance has been placed on the all live tree volume on all forested land. In 2004, the volume of all live trees on forest land in Wisconsin was 22.1 billion cubic feet (table 4). Coincidentally, the volume of all live trees and salvageable dead trees on timberland was also 22.1 billion cubic feet (table 5).

Previous inventories focused on growing-stock and sawtimber volume on timberland. For this reason, trend comparisons for this report consider only growing-stock or sawtimber volume on timberland.

In 2004, the volume of growing stock on timberland in Wisconsin was 19.7 billion cubic feet (table 6). Hardwood species accounted for 74 percent of the net volume of growing stock (fig. 6, tables 6 and 7) and 66 percent of the net volume of sawtimber (fig. 7, table 8). Cottonwood/aspen was the hardwood species group with the greatest net growing-stock volume (table 7) while the select red oak group had the largest net sawtimber volume (table 8).

The net growing-stock volume of softwood species totaled 5.2 billion cubic feet in 2004 (table 7). Eastern white and red pines accounted for 51 percent of the softwood net growing-stock volume (table 7) and 61 percent of the softwood net sawtimber volume (table 8).

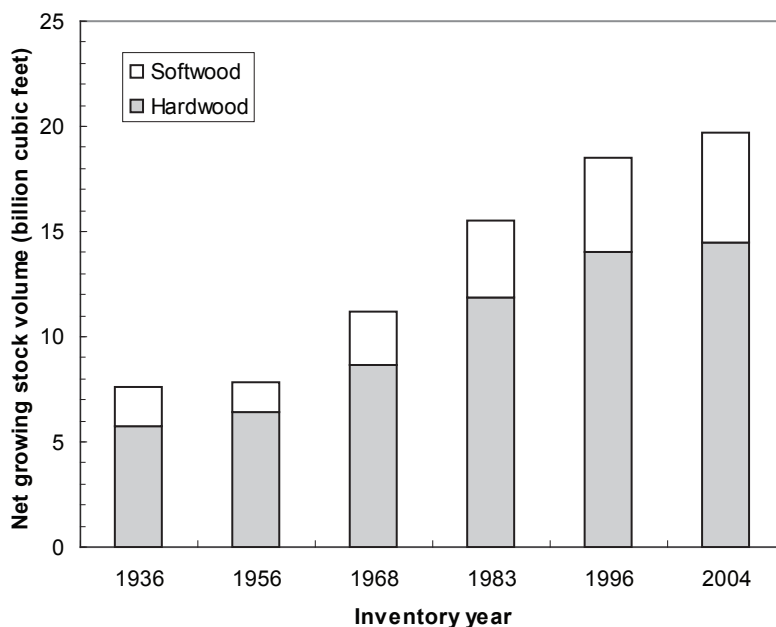


Figure 6.—Net growing-stock volume on timberland in Wisconsin by inventory year.

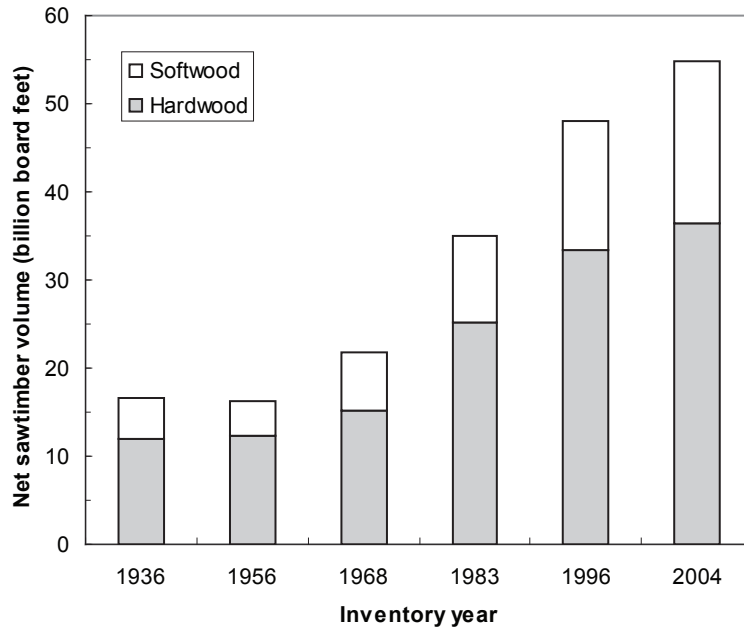


Figure 7.—Net sawtimber volume on timberland in Wisconsin by inventory year.

Biomass

Biomass is defined in the inventory as the aboveground weight of live trees 1.0 inch d.b.h. and larger on timberland. The estimate of biomass is used to address questions related to wildlife habitat, carbon sequestration, wood fiber availability for fuel, and other important values. The aboveground weight of tree biomass on timberland in Wisconsin was estimated to be more than 593 million dry tons (table 9). Of the total biomass, 82 percent was in hardwood species and

18 percent was in softwood species (table 9). Fifty-eight percent of the total biomass was in the boles of growing-stock trees (table 9). Private lands accounted for 70 percent of the total biomass in Wisconsin (table 9).

Growth, Removals, and Mortality

The three components of change (growth, removals, and mortality) provide trend information that helps describe forest changes between inventories (fig. 8).

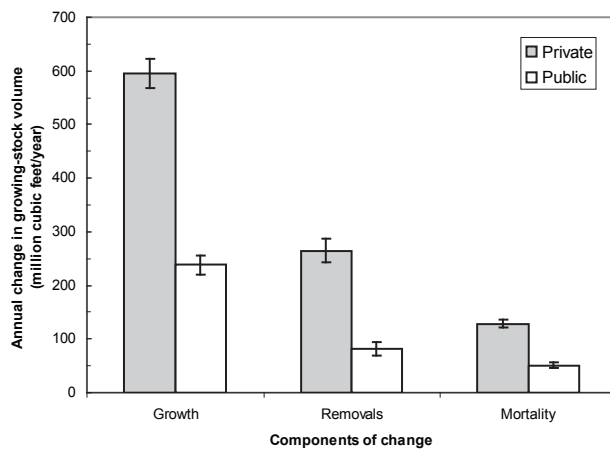


Figure 8.—Average annual change components on timberland for Wisconsin, 1996 to 2000-2004. The represented growth is the gross value before mortality is considered.

Average annual net growth between the current and previous inventories is equal to gross growth over the period less mortality over the period divided by the number of growing seasons in the period. The average annual net growth of growing stock from 1996 to 2004 was 653 million cubic feet per year (table 10) or approximately 3.3 percent of the current growing-stock inventory on timberland.

Average annual removals from growing stock include both trees cut or killed as a result of timber harvest and trees removed from the timberland base as a result of land use change. Average annual removals from growing stock from 1996 to 2004 was 346 million cubic feet per year (table 11) or about 1.8 percent of the current growing-stock inventory. Removals did not balance across all owner categories; the average removals from private land (24.67 ft³/ac/yr) are higher than removals from public land (16.71 ft³/ac/yr).

Average annual mortality includes trees that died over the period as a result of insects, disease, and other causes. Trees killed by timber harvest are included in the estimate of average annual removals. Average annual mortality of growing stock from 1996 to 2004 was about 180 million cubic feet per year (table 12) or nearly 1 percent of the current growing-stock inventory.

Average annual net growth on timberland (gross growth – mortality) generally exceeds removals on both private and public ownerships (tables 10 and 11). However, removals of jack pine growing stock exceeded net growth of jack pine growing stock across all ownerships (tables 10 and 11). Average annual net growth of select white oaks on public land is not statistically different from average annual removals of select white oaks on public land (tables 10 and 11).

Forest Health

Forest health is summarized by the Wisconsin Department of Natural Resources Division of Forestry (2004). The 2004 report includes the following summary comments:

*Average to above average precipitation brought both hardwood and coniferous forests back to a healthier state. Oak mortality that had been occurring over the past 2 years in northwest Wisconsin stabilized. Oak mortality did continue in Marinette County, where several years of defoliation by the gypsy moth, drought and infestation by the two-lined chestnut borer stressed the resource. Populations of the gypsy moth took a dramatic downturn; only 20 acres of defoliation were observed in 2004, compared to the 65,000 observed in 2003. This good fortune was due in part to a successful spray program and a cool, wet spring and early summer. The weather was favorable for organisms that infect larvae of the gypsy moth. Populations of the jack pine budworm increased in west-central and northwestern Wisconsin. Populations of this insect are expected to peak in 2005, particularly in northwestern Wisconsin. Statewide surveys for two new exotic forest pests, the Emerald Ash Borer and *Phytophthora ramorum* (the cause of Sudden Oak Death) revealed no findings of either of these organisms. (Wisconsin Department of Natural Resources Division of Forestry 2004)*

Additional details may be found in the original document, available online at: http://fhm.fs.fed.us/fhh/fhh-04/wi/wi_04.pdf.

Summary

The forest resources in Wisconsin appear to be in good condition. As additional data become available from ensuing annual panels, a clearer picture of the direction of Wisconsin forests will emerge. Additional data related to Wisconsin inventories in 1996 and 1983 are available online: <http://www.fia.fs.fed.us>.

APPENDIX

Accuracy of the Inventory

Sampling errors measure the uncertainty in estimates due to not observing every member of the population. In the 2000-2004 Wisconsin forest inventory, a total of 6,478 sample plots were observed in forest land across the entire State, an intensity of one plot every 2,476 acres of forest land. Sampling errors for the estimates of statewide totals in this report are:

Table	Variable	Estimate	Sampling error - percent -
1	Area of forest land (thousand acres)	16,037.2	0.55
2	Area of timberland (thousand acres)	15,762.0	0.57
4	All live volume on forest land (thousand cubic feet)	22,137,640	1.04
5	All live volume on timberland (thousand cubic feet)	22,134,040	1.06
6	Growing-stock volume on timberland (thousand cubic feet)	19,666,527	1.10
8	Sawtimber volume on timberland (thousand board feet)	54,846,973	1.59
9	All live aboveground biomass on timberland (thousand dry tons)	593,495	0.97
10	Growing-stock growth on timberland (thousand cubic feet per year)	653,105	3.88
11	Growing-stock removals on timberland (thousand cubic feet per year)	346,257	7.33
12	Growing-stock mortality on timberland (thousand cubic feet per year)	179,666	5.24

The chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the sampling errors indicated above. These sampling errors can also be used to create confidence intervals around estimates. For example, the estimated volume of all live trees on forest land in the State is 22.137 billion cubic feet with a sampling error of ± 1.04 percent (± 230.2 million cubic feet).

As survey data are broken down into components smaller than State totals, the sampling error increases. For example, the sampling error for timberland area in a particular county is higher than that for total timberland area in the State. To estimate sampling error for data smaller than State totals, use the following formula:

$$E = \frac{(SE)\sqrt{\text{State total volume or area}}}{\sqrt{\text{Volume or area smaller than State total}}}$$

where E is the sampling error in percent, and SE is the State total error for volume or area.

For example, to compute the error on the area of forest land in the maple/beech/birch type for the State, proceed as follows:

1. Total statewide area of maple/beech/birch type = 4,448.6 thousand acres
2. Total statewide area of all timberland = 16,037.2 thousand acres
3. The State total error for forest land area = 0.55 percent
4. Using the formula above:

$$E = \frac{(0.0055)\sqrt{16037.2}}{\sqrt{4448.6}}$$

E = 0.0104 or 1.04 percent sampling error for the maple/beech/birch forest type in Wisconsin.

Inventory Methods

Vissage (2002) provides a full description of the annualized inventory methods for Wisconsin. Since the 1996 inventory of Wisconsin, several changes have been made in the NCFIA inventory methods to improve the quality of the inventory as well as meet the increasing demands for timely forest resource information. The most significant change between the inventories has been the change from periodic to annual inventory systems. Historically, NCFIA inventoried each State on a cycle that averaged about 12 years. However, the need for timely and consistent data across large geographical regions, combined with national legislative mandates, resulted in NCFIA's implementation of an annual inventory system. The annual inventory system began in Wisconsin in 2000.

With the NCFIA annual inventory system, approximately one-fifth of all field plots are measured in any single year. After 5 years, the entire inventory is completed. After this initial 5-year period, NCFIA will report and analyze results using a moving 5-year average. For example, NCFIA will be able to generate inventory results for 2000 through 2005 or for 2001 through 2006.

Other significant changes between inventories include the implementation of new remote sensing technology, implementation of a new field plot configuration and sample design, and gathering of additional remotely sensed and field data. The use of new remote sensing technology since the previous inventory has allowed NCFIA to use classifications of Multi-Resolution Land Characterization (MRLC) data and other available remote sensing products to stratify the total area of the State and to improve estimates.

New algorithms were used in 2000-2004 to assign forest type and stand-size class to each condition observed on a plot. These algorithms are being used nationwide by

FIA to provide consistency from State to State and will be used to reassign the forest type and stand-size class of every plot in the 1996 inventory when it is updated. This will be done so that changes in forest type and stand-size class will reflect actual changes in the forest and not changes due to algorithms. The list of recognized forest types, groupings of these forest types for reporting purposes, models used to assign stocking values to individual trees, definition of nonstocked (stands with a stocking value of less than 10 percent for all live trees), and names given to the forest types changed with the new algorithms. As a result, comparisons between the published 2000-2004 results and those published for the 1996 inventory may not be valid. For additional details about algorithms used in both inventories, please contact NCFIA.

Sampling Phases

The 2004 Wisconsin survey was conducted in three phases. The first phase used satellite imagery to stratify the State and aerial photography to select plots for measurement. The second phase measured the traditional suite of mensurational variables, and the third phase focused on 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 to measure a phase 2 plot and (2) plots that could not be accessed because of a hazard or danger to field personnel. The methods used in the preparation of this report make the necessary adjustments to account for sites where access was denied or hazardous.

Phase 1

The Wisconsin inventory used a classification of satellite imagery for stratification. FIA used the imagery to form two initial strata—forest and nonforest. Pixels within 60 m (2 pixel widths) of a forest/nonforest boundary

formed two additional strata—forest edge and nonforest edge. Forest pixels within 60 m of the boundary on the forest side were classified as forest edge, and pixels within 60 m of the boundary on the nonforest side were classified into the nonforest edge stratum. In addition, all strata were divided into public or private ownership based on information available in the Protected Lands Database (DellaSala *et al.* 2001). The estimated population total for a variable is the sum across all strata of the product of each stratum's area (from the pixel count) and the variable's mean per unit area (from plot measurements) for the stratum.

Phase 2

Phase 2 of the inventory consisted of the measurement of an annual sample of field plots in Wisconsin. Current FIA precision standards for annual inventories require a sampling intensity of one plot for approximately every 6,000 acres. FIA has tessellated the entire United States using nonoverlapping 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 as the grid plot; (2) if no FHM plot fell within the hexagon, the existing NCFIA plot nearest the hexagon center was selected as the grid plot; and (3) if neither FHM nor existing NCFIA plots fell within the hexagon, a new NCFIA grid plot was established (McRoberts 1999). This array of plots is designated the Federal base sample and is considered an equal probability sample; its measurement in Wisconsin is funded by the Federal government. In 2003, two additional plots were established and measured in each hexagon. In 2000-2002 and 2004, a single additional plot was established and measured in each hexagon. The measurement of this intensified sample was funded by the State of Wisconsin.

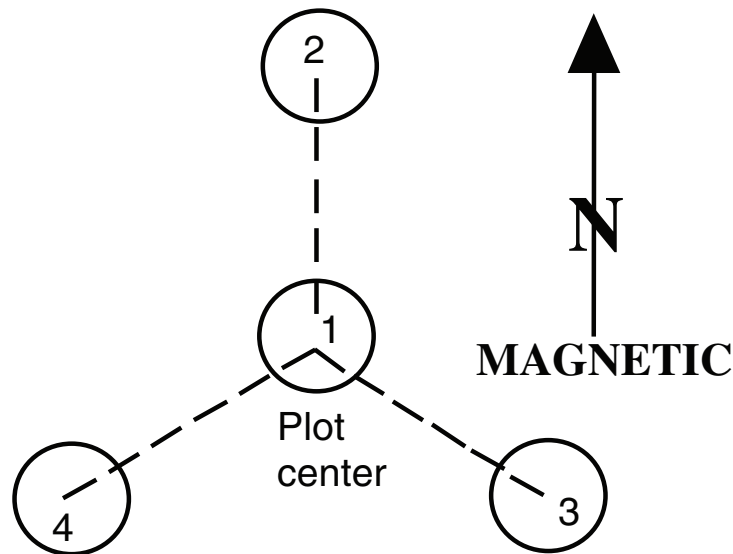
The total Federal base sample was systematically divided into five interpenetrating, non-overlapping subsamples or panels. Each year the plots in a single panel are measured and panels are selected on a 5-year, rotating basis (McRoberts 1999). For estimation purposes, the measurement of each panel of plots may be considered an independent random sample of all land in a State. Field crews measured vegetation on plots forested at the time of the last inventory and on plots classified as forest by trained photointerpreters using aerial photos or digital orthophotoquads.

Phase 3

NCFIA has two categories of field measurements—phase 3 (formally FHM plots) and phase 2 field plots. Both types of plots are systematically distributed both geographically and temporally. Phase 3 plots are measured with the full array of FHM vegetative and health variables 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 measurement of nonwoody understory vegetation, ground cover, soils, and other variables. The complete 5-year annual inventory of Wisconsin includes 165 forested phase 3 plots. On the remaining plots, only variables that can be measured throughout the entire year are collected. In Wisconsin, the complete 5-year annual inventory includes 6,478 forested phase 2 plots. In this last subcycle (2004), inventory measurements were made on 1,242 plots. Of these, 1,217 plots were established on timberland, and 10 plots were established on reserved forest land.

The national FIA four-subplot cluster configuration (fig. 9) was first used for data collection in Wisconsin in 2000 and will be used in subsequent years. The national plot configuration requires mapping of all forest conditions found at each plot. Due

Figure 9.—Current NCFIA field plot design.



to the small sample size each year, precision associated with estimates of components of change such as mortality will be relatively low. Consequently, we report estimates of components of change only after multiple annual panels have been measured. Now that the annual inventory has been completed in 2004, the full range of change estimates is available.

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. 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 location. Trees with diameters of 5.0 inches d.b.h. and larger are measured on a 24-foot-radius (1/24 acre) circular subplot. All trees less than 5.0 inches d.b.h. are measured on a 6.8-foot-radius (1/300 acre) circular microplot located 12.0 feet due east of the center of each of the four subplots. 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, regeneration status, reserved status, ownership, and density. Each condition that occurs anywhere on one of the subplots is identified, described, and mapped if the area of the condition meets or exceeds one acre in size.

Field plot measurements are combined with phase 1 estimates in the compilation process and table production. The number of tables presented here is limited. However, other tabular data can be generated at: www.fia.fs.fed.us. For additional information, contact:

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TABLE TITLES

Table 1.—Area of forest land by forest type group, forest type, and owner category, Wisconsin, 2000-2004.

Table 2.—Area of timberland by major forest type group, stand origin, and owner category, Wisconsin, 2000-2004.

Table 3.—Area of timberland by forest type group, forest type, and stand-size class, Wisconsin, 2000-2004.

Table 4.—Net volume of all live trees on forest land by species group, species, and owner category, Wisconsin, 2000-2004.

Table 5.—Net volume of all live trees and salvable dead trees on timberland by class of timber and softwood/hardwood species categories, Wisconsin, 2000-2004.

Table 6.—Net volume of growing stock on timberland by forest type group, forest type, and softwood/hardwood species categories, Wisconsin, 2000-2004.

Table 7.—Net volume of growing stock on timberland by species group, species, and diameter class, Wisconsin, 2000-2004.

Table 8.—Net volume of sawtimber on timberland by species group, species, and diameter class, Wisconsin, 2000-2004.

Table 9.—All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Wisconsin, 2000-2004.

Table 10.—Average annual net growth of growing stock on timberland by species group and owner category, Wisconsin, 1996 to 2000-2004.

Table 11.—Average annual removals of growing stock on timberland by species group and owner category, Wisconsin, 1996 to 2000-2004.

Table 12.—Average annual mortality of growing stock on timberland by species group and owner category, Wisconsin, 1996 to 2000-2004.



TABLES

Table 1. -- Area of forest land by forest type group, forest type, and owner category, Wisconsin, 2000-2004

(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	369.0	167.1	201.9	--
Red pine	652.5	253.1	399.4	--
Eastern white pine	310.5	114.5	196.0	--
White pine / hemlock	18.2	7.5	10.7	--
Eastern hemlock	111.4	36.2	75.2	--
All forest types	1,461.6	578.4	883.2	--
Spruce / fir group				
Balsam fir	218.6	88.4	130.2	--
White spruce	55.6	21.9	33.7	--
Black spruce	356.4	199.4	157.0	--
Tamarack	324.6	115.0	209.6	--
Northern white-cedar	386.9	151.7	235.1	--
All forest types	1,342.1	576.4	765.7	--
Pinyon / juniper group				
Eastern redcedar	18.3	2.0	16.3	--
All forest types	18.3	2.0	16.3	--
Exotic softwoods group				
Exotic softwoods group	0.5	--	0.5	--
Scotch pine	18.1	1.4	16.7	--
Other exotic softwoods	3.6	1.4	2.2	--
All forest types	22.2	2.9	19.3	--
All softwood groups	2,844.2	1,159.7	1,684.5	--
Hardwood type groups				
Oak / pine group				
Oak / pine group	3.5	3.2	0.4	--
White pine / red oak / white ash	227.5	89.1	138.4	--
Eastern redcedar / hardwood	10.0	0.7	9.3	--
Other pine / hardwood	302.8	113.3	189.5	--
All forest types	543.8	206.3	337.5	--
Oak / hickory group				
Oak / hickory group	8.9	0.7	8.3	--
Post oak / blackjack oak	440.3	125.8	314.5	--
White oak / red oak / hickory	1,582.2	179.2	1,403.0	--
White oak	200.1	11.7	188.4	--
Northern red oak	557.6	154.8	402.8	--
Bur oak	73.9	11.2	62.7	--
Black walnut	38.3	1.8	36.5	--
Black locust	10.0	--	10.0	--
Chestnut oak / black oak / scarlet oak	140.4	32.3	108.1	--
Red maple / oak	133.9	46.6	87.3	--
Mixed upland hardwoods	242.9	27.5	215.3	--
All forest types	3,428.6	591.6	2,837.0	--
Oak / gum / cypress group				
Sweetbay / swamp tupelo / red maple	1.1	--	1.1	--
All forest types	1.1	--	1.1	--

(Table 1 continued on next page)

(Table 1 continued)

Forest type group/ forest type	Owner category			Unidentified owner
	All owners	Public	Private	
Hardwood type groups				
Elm / ash / cottonwood group				
Elm / ash / cottonwood group	6.7	3.4	3.3	--
Black ash / American elm / red maple	688.1	208.5	459.5	--
River birch / sycamore	21.1	1.3	19.8	--
Cottonwood	22.9	7.6	15.3	--
Willow	22.3	1.6	20.7	--
Sycamore / pecan / American elm	51.3	7.2	44.1	--
Sugarberry / hackberry / elm / green ash	295.4	40.9	254.5	--
Silver maple / American elm	113.6	52.0	61.5	--
Red maple / lowland	135.0	33.2	101.8	--
Cottonwood / willow	11.1	--	11.1	--
All forest types	1,347.5	355.8	991.7	--
Maple / beech / birch group				
Maple / beech / birch group	9.1	1.6	7.5	--
Sugar maple / beech / yellow birch	2,297.8	767.7	1,530.1	--
Black cherry	64.5	16.5	48.1	--
Cherry / ash / yellow-poplar	105.1	21.5	83.7	--
Hard maple / basswood	1,355.6	426.9	928.7	--
Elm / ash / locust	142.8	9.8	133.0	--
Red maple / upland	473.7	145.8	327.8	--
All forest types	4,448.6	1,389.7	3,058.9	--
Aspen / birch group				
Aspen / birch group	5.9	0.3	5.6	--
Aspen	2,777.3	1,188.7	1,588.6	--
Paper birch	440.9	149.6	291.3	--
Balsam poplar	41.6	6.2	35.4	--
All forest types	3,265.6	1,344.8	1,920.8	--
Exotic hardwoods group				
Other exotic hardwoods	4.6	--	4.6	--
All forest types	4.6	--	4.6	--
All hardwood groups	13,039.9	3,888.1	9,151.7	--
Nonstocked	153.1	40.1	113.0	--
All forest groups	16,037.2	5,087.9	10,949.3	--

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, Wisconsin, 2000-2004
(In thousand acres)

Major forest type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	2,067.8	855.5	1,212.3	--
Planted	712.6	276.1	436.5	--
All softwood types	2,780.4	1,131.6	1,648.8	--
Hardwood type groups				
Natural	12,665.8	3,693.9	8,971.9	--
Planted	167.7	69.8	97.9	--
All hardwood types	12,833.5	3,763.7	9,069.8	--
Nonstocked	148.1	39.4	108.7	--
All groups	15,762.0	4,934.7	10,827.3	--

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, Wisconsin, 2000-2004

(In thousand acres)

Forest type group/ forest type	Stand-size class					Non- stocked
	All stands	Sawtimber	Pole/timber	Sapling- seedling		
Softwood type groups						
White / red / jack pine group						
Jack pine	359.4	72.5	163.0	123.9	--	--
Red pine	648.8	373.5	206.1	69.2	--	--
Eastern white pine	304.5	217.7	45.0	41.9	--	--
White pine / hemlock	18.2	14.8	3.4	--	--	--
Eastern hemlock	111.4	107.4	4.0	--	--	--
All forest types	1,442.4	785.9	421.6	234.9	--	--
Spruce / fir group						
Balsam fir	206.9	25.0	75.4	106.5	--	--
White spruce	55.6	18.1	20.6	17.0	--	--
Black spruce	345.2	12.3	84.8	248.1	--	--
Tamarack	320.4	17.3	147.5	155.7	--	--
Northern white-cedar	374.7	165.8	190.9	17.9	--	--
All forest types	1,302.9	238.4	519.2	545.3	--	--
Pinyon / juniper group						
Eastern redcedar	15.2	1.2	7.5	6.5	--	--
All forest types	15.2	1.2	7.5	6.5	--	--
Exotic softwoods group						
Exotic softwoods group	0.5	--	0.5	--	--	--
Scotch pine	15.9	5.9	2.9	7.1	--	--
Other exotic softwoods	3.6	--	3.6	--	--	--
All forest types	20.0	5.9	7.0	7.1	--	--
All softwood groups	2,780.4	1,031.4	955.3	793.7	--	--
Hardwood type groups						
Oak / pine group						
Oak / pine group						
Oak / pine group	3.1	0.3	2.2	0.5	--	--
White pine / red oak / white ash	223.7	104.8	73.0	45.8	--	--
Eastern redcedar / hardwood	10.0	6.4	2.9	0.7	--	--
Other pine / hardwood	298.5	104.6	93.5	100.4	--	--
All forest types	535.2	216.1	171.6	147.5	--	--
Oak / hickory group						
Oak / hickory group						
Oak / hickory group	8.9	2.1	6.1	0.7	--	--
Post oak / blackjack oak	425.0	177.8	161.3	85.9	--	--
White oak / red oak / hickory	1,568.6	917.8	527.3	123.4	--	--
White oak	188.4	155.1	24.0	9.3	--	--
Northern red oak	545.8	415.8	98.5	31.5	--	--
Bur oak	69.6	41.3	7.6	20.7	--	--
Black walnut	38.3	24.3	5.8	8.3	--	--
Black locust	10.0	--	8.2	1.8	--	--
Chestnut oak / black oak / scarlet oak	140.4	71.6	47.8	20.9	--	--
Red maple / oak	133.9	49.8	63.6	20.6	--	--
Mixed upland hardwoods	238.1	93.9	72.9	71.3	--	--
All forest types	3,367.1	1,949.5	1,023.2	394.4	--	--
Oak / gum / cypress group						
Oak / gum / cypress group						
Sweetbay / swamp tupelo / red maple	1.1	1.1	--	--	--	--
All forest types	1.1	1.1	--	--	--	--

(Table 3 continued on next page)

(Table 3 continued)

Forest type group/ forest type	Stand-size class				Non- stocked
	All stands	Sawtimber	Poletimber	Sapling- seedling	
Hardwood type groups					
Elm / ash / cottonwood group					
Elm / ash / cottonwood group	6.7	0.5	2.1	4.0	--
Black ash / American elm / red maple	641.3	85.7	433.4	122.3	--
River birch / sycamore	19.0	8.8	7.2	2.9	--
Cottonwood	22.9	17.2	--	5.7	--
Willow	22.3	3.3	7.5	11.5	--
Sycamore / pecan / American elm	51.3	13.7	26.3	11.2	--
Sugarberry / hackberry / elm / green ash	294.7	93.2	137.1	64.5	--
Silver maple / American elm	110.3	96.0	13.6	0.7	--
Red maple / lowland	129.6	18.6	61.5	49.4	--
Cottonwood / willow	11.1	7.3	3.8	--	--
All forest types	1,309.2	344.3	692.6	272.3	--
Maple / beech / birch group					
Maple / beech / birch group					
Maple / beech / birch group	8.5	1.8	6.3	0.5	--
Sugar maple / beech / yellow birch	2,257.3	1,045.6	1,049.6	162.1	--
Black cherry	64.5	2.5	18.5	43.5	--
Cherry / ash / yellow-poplar	105.1	22.8	31.0	51.3	--
Hard maple / basswood	1,335.6	764.5	535.7	35.5	--
Elm / ash / locust	141.4	25.2	73.1	43.1	--
Red maple / upland	468.9	115.0	295.1	58.9	--
All forest types	4,381.5	1,977.4	2,009.4	394.7	--
Aspen / birch group					
Aspen / birch group					
Aspen / birch group	5.9	0.5	4.6	0.7	--
Aspen	2,760.3	361.2	1,187.9	1,211.2	--
Paper birch	429.7	66.2	290.7	72.8	--
Balsam poplar	38.9	7.7	17.2	14.0	--
All forest types	3,234.8	435.6	1,500.5	1,298.7	--
Exotic hardwoods group					
Other exotic hardwoods					
Other exotic hardwoods	4.6	--	--	4.6	--
All forest types	4.6	--	--	4.6	--
All hardwood groups	12,833.5	4,924.0	5,397.3	2,512.2	--
Nonstocked	148.1	--	--	--	148.1
All forest groups	15,762.0	5,955.4	6,352.6	3,305.9	148.1

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, Wisconsin, 2000-2004

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines				
Scotch pine	15,658	1,719	13,938	--
All species	15,658	1,719	13,938	--
Eastern white and red pines				
Red pine	1,401,584	587,731	813,853	--
Eastern white pine	1,306,942	441,230	865,712	--
All species	2,708,526	1,028,961	1,679,565	--
Jack pine				
Jack pine	318,714	124,797	193,916	--
All species	318,714	124,797	193,916	--
Spruce and balsam fir				
Balsam fir	417,276	167,429	249,847	--
White spruce	256,846	143,598	113,248	--
Black spruce	186,885	101,034	85,851	--
All species	861,007	412,061	448,946	--
Eastern hemlock				
Eastern hemlock	447,594	157,383	290,211	--
All species	447,594	157,383	290,211	--
Other eastern softwoods				
Redcedar/juniper spp.	20	--	20	--
Eastern redcedar	29,462	1,652	27,810	--
Larch spp.	941	38	903	--
Tamarack (native)	270,635	89,514	181,120	--
Norway spruce	11,651	4,996	6,654	--
Austrian pine	56	--	56	--
Douglas-fir	110	--	110	--
Northern white-cedar	744,580	281,599	462,981	--
All species	1,057,455	377,800	679,655	--
True fir				
White fir	139	--	139	--
All species	139	--	139	--
Total softwoods	5,409,092	2,102,721	3,306,371	--
Hardwoods				
Select white oaks				
White oak	827,607	80,108	747,499	--
Swamp white oak	31,125	12,826	18,298	--
Bur oak	377,637	30,046	347,591	--
Chinkapin oak	3,416	423	2,993	--
All species	1,239,785	123,403	1,116,381	--
Select red oaks				
Northern red oak	1,831,621	436,423	1,395,198	--
All species	1,831,621	436,423	1,395,198	--
Other red oaks				
Northern pin oak	512,079	122,851	389,228	--
Black oak	540,049	73,485	466,564	--
All species	1,052,128	196,336	855,792	--

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			Unidentified owner
	All owners	Public	Private	
Hardwoods				
Hickory				
Bitternut hickory	106,015	8,833	97,182	--
Shagbark hickory	160,346	6,891	153,455	--
All species	266,360	15,724	250,636	--
Yellow birch				
Yellow birch	335,515	128,565	206,930	--
All species	335,515	128,565	206,930	--
Hard maple				
Black maple	6,046	3,892	2,154	--
Sugar maple	2,471,493	932,163	1,539,330	--
All species	2,477,539	936,055	1,541,484	--
Soft maple				
Red maple	2,244,765	729,492	1,515,273	--
Silver maple	346,618	193,711	152,907	--
All species	2,591,382	923,202	1,668,180	--
Beech				
American beech	36,353	6,311	30,042	--
All species	36,353	6,311	30,042	--
Ash				
White ash	388,924	92,021	296,903	--
Black ash	547,266	195,539	351,727	--
Green ash	299,183	54,924	244,258	--
Blue ash	--	--	--	--
All species	1,235,373	342,485	892,888	--
Cottonwood and aspen				
Balsam poplar	43,887	11,103	32,783	--
Eastern cottonwood	62,456	8,468	53,988	--
Bigtooth aspen	723,114	218,489	504,625	--
Quaking aspen	1,831,506	747,568	1,083,938	--
Silver poplar	147	147	--	--
All species	2,661,110	985,776	1,675,334	--
Basswood				
American basswood	1,119,064	366,507	752,557	--
All species	1,119,064	366,507	752,557	--
Black walnut				
Black walnut	91,545	8,010	83,535	--
All species	91,545	8,010	83,535	--

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category				Unidentified owner
	All owners	Public	Private		
Hardwoods					
Other eastern soft hardwoods					
Boxelder	123,684	8,542	115,142	--	--
River birch	18,314	7,535	10,779	--	--
Paper birch	748,678	259,205	489,474	--	--
Hackberry	16,507	1,800	14,707	--	--
Walnut spp.	304	--	304	--	--
Butternut	20,208	888	19,320	--	--
Black cherry	292,722	46,586	246,136	--	--
Black willow	33,850	5,754	28,096	--	--
White willow	1,212	--	1,212	--	--
American elm	359,574	32,056	327,518	--	--
Siberian elm	2,022	182	1,840	--	--
Slippery elm	79,709	7,596	72,113	--	--
All species	1,696,784	370,142	1,326,641	--	--
Other eastern hard hardwoods					
Flowering dogwood	--	--	--	--	--
Honeylocust	3,738	2,866	872	--	--
White mulberry	--	--	--	--	--
Red mulberry	3,378	490	2,888	--	--
Black locust	23,499	1,180	22,320	--	--
Rock elm	4,536	588	3,948	--	--
All species	35,151	5,124	30,027	--	--
Eastern noncommercial hardwoods					
Mountain maple	--	--	--	--	--
Serviceberry spp.	396	89	308	--	--
Common serviceberry	--	--	--	--	--
American hornbeam, musclewood	447	41	405	--	--
Hawthorn spp.	3,268	191	3,077	--	--
Cockspur hawthorn	525	--	525	--	--
Downy hawthorn	45	--	45	--	--
Apple spp.	5,360	--	5,360	--	--
Eastern hophornbeam	44,987	5,697	39,290	--	--
Cherry and plum spp.	37	--	37	--	--
Pin cherry	958	105	853	--	--
Chokecherry	433	--	433	--	--
Canada plum	80	80	--	--	--
American plum	314	--	314	--	--
Willow spp.	1,222	--	1,222	--	--
Peachleaf willow	702	76	626	--	--
Bebb willow	--	--	--	--	--
American mountain-ash	65	--	65	--	--
All species	58,839	6,279	52,560	--	--
Total hardwoods	16,728,548	4,850,362	11,878,186	--	--
All species groups	22,137,640	6,953,084	15,184,557	--	--

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, Wisconsin, 2000-2004

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber	8,887,847	3,107,750	5,780,097
Saw log portion	2,669,843	436,118	2,233,725
Upper stem portion	11,557,689	3,543,867	8,013,822
Total	8,108,838	1,610,669	6,498,168
Poletimber	19,666,527	5,154,537	14,511,990
All growing-stock trees			
Cull trees			
Rough trees ¹			
Sawtimber size	1,366,217	106,861	1,259,356
Poletimber size	621,912	47,118	574,794
Total	1,988,130	153,979	1,834,151
Rotten trees ¹			
Sawtimber size	117,283	15,367	101,916
Poletimber size	34,050	4,165	29,885
Total	151,333	19,532	131,801
All live cull trees	2,139,463	173,511	1,965,952
All live trees	21,805,990	5,328,048	16,477,942
Salvable dead trees			
Sawtimber size	157,656	47,310	110,347
Poletimber size	170,394	40,996	129,398
All salvable dead trees	328,050	88,306	239,745
All classes	22,134,040	5,416,353	16,717,687

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.

¹Includes noncommercial species.

Table 6. -- Net volume of growing stock on timberland by forest type group, forest type, and softwood/hardwood species category, Wisconsin, 2000-2004

(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	244,778	219,132	25,646
Red pine	1,302,174	1,227,013	75,161
Eastern white pine	743,519	658,435	85,084
White pine / hemlock	58,302	46,290	12,012
Eastern hemlock	269,204	209,731	59,473
All forest types	2,617,978	2,360,602	257,375
Spruce / fir group			
Balsam fir	137,266	104,530	32,736
White spruce	68,389	57,936	10,453
Black spruce	159,133	149,285	9,848
Tamarack	230,603	216,244	14,359
Northern white-cedar	632,480	543,359	89,122
All forest types	1,227,871	1,071,354	156,518
Pinyon / juniper group			
Eastern redcedar	6,575	5,803	772
All forest types	6,575	5,803	772
Exotic softwoods group			
Exotic softwoods group	478	478	--
Scotch pine	9,957	7,345	2,612
Other exotic softwoods	5,282	4,973	309
All forest types	15,716	12,796	2,921
All softwood groups	3,868,140	3,450,555	417,585
Hardwood type groups			
Oak / pine group			
Oak / pine group	3,209	1,218	1,991
White pine / red oak / white ash	353,472	211,679	141,793
Eastern redcedar / hardwood	10,944	3,164	7,780
Other pine / hardwood	279,381	157,925	121,456
All forest types	647,006	373,986	273,020

(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	10,160	198	9,962
Post oak / blackjack oak	428,628	36,717	391,911
White oak / red oak / hickory	1,986,895	88,982	1,897,913
White oak	286,595	7,709	278,885
Northern red oak	1,060,656	28,070	1,032,586
Bur oak	73,825	788	73,037
Black walnut	47,393	692	46,701
Black locust	7,584	--	7,584
Chestnut oak / black oak / scarlet oak	124,632	17,404	107,228
Red maple / oak	169,246	9,760	159,486
Mixed upland hardwoods	188,202	12,905	175,297
All forest types	4,383,816	203,227	4,180,589
Oak / gum / cypress group			
Sweetbay / swamp tupelo / red maple	3,049	1,659	1,390
All forest types	3,049	1,659	1,390
Elm / ash / cottonwood group			
Elm / ash / cottonwood group	4,322	44	4,278
Black ash / American elm / red maple	640,395	136,702	503,693
River birch / sycamore	17,039	--	17,039
Cottonwood	35,057	26	35,031
Willow	7,948	1,643	6,305
Sycamore / pecan / American elm	28,903	5,385	23,518
Sugarberry / hackberry / elm / green ash	206,158	12,767	193,390
Silver maple / American elm	280,858	189	280,669
Red maple / lowland	94,211	8,026	86,185
Cottonwood / willow	15,326	--	15,326
All forest types	1,330,218	164,784	1,165,434
Maple / beech / birch group			
Maple / beech / birch group	12,047	436	11,611
Sugar maple / beech / yellow birch	3,321,413	372,843	2,948,570
Black cherry	21,090	1,782	19,308
Cherry / ash / yellow-poplar	68,810	5,155	63,654
Hard maple / basswood	2,410,939	46,651	2,364,288
Elm / ash / locust	89,280	3,370	85,910
Red maple / upland	588,454	49,931	538,523
All forest types	6,512,032	480,167	6,031,865

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Aspen / birch group			
Aspen / birch group	10,973	5,676	5,297
Aspen	2,381,949	380,527	2,001,423
Paper birch	482,569	81,291	401,278
Balsam poplar	37,446	7,648	29,798
All forest types	2,912,938	475,142	2,437,796
All hardwood groups	15,789,059	1,698,964	14,090,095
Nonstocked	9,328	5,018	4,310
All forest groups	19,666,527	5,154,537	14,511,990

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, Wisconsin, 2000-2004
(In thousand cubic feet)

Species group/ species	All classes	Diameter class (inches at breast height)								21.0-20.9	29.0+
		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		
Softwoods											
Other yellow pines											
Scotch pine	13,478	1,916	1,953	2,006	1,376	2,647	1,699	758	1,123	--	--
All species	13,478	1,916	1,953	2,006	1,376	2,647	1,699	758	1,123	--	--
Eastern white and red pines											
Red pine	1,388,285	129,004	230,653	300,532	260,219	175,639	113,830	81,836	49,638	46,935	--
Eastern white pine	1,251,765	46,394	78,828	102,476	125,299	127,496	136,205	116,984	109,403	331,117	77,604
All species	2,640,050	175,398	309,481	403,008	385,517	303,095	250,035	198,819	159,041	378,052	77,604
Jack pine	302,776	54,473	90,031	79,625	49,304	19,512	8,385	1,445	--	--	--
All species	302,776	54,473	90,031	79,625	49,304	19,512	8,385	1,445	--	--	--
Spruce and balsam fir											
Balsam fir	403,323	146,122	133,663	75,925	26,945	13,785	4,158	801	826	1,100	--
White spruce	251,809	28,822	41,305	42,490	34,380	41,237	31,399	14,610	10,114	7,451	--
Black spruce	183,741	81,613	60,004	26,248	10,710	1,970	1,147	796	--	1,253	--
All species	838,873	256,557	234,972	144,663	72,035	56,991	36,703	16,207	10,940	9,805	--
Eastern hemlock											
Eastern hemlock	420,498	14,874	26,862	35,020	53,959	46,889	54,683	59,048	41,356	77,285	10,523
All species	420,498	14,874	26,862	35,020	53,959	46,889	54,683	59,048	41,356	77,285	10,523
Other eastern softwoods											
Eastern redcedar	23,126	7,291	5,095	4,960	601	4,001	1,177	--	--	--	--
Larch spp.	941	230	563	149	--	--	--	--	--	--	--
Tamarack (native)	261,232	78,458	82,826	53,260	30,798	9,360	4,620	752	1,158	--	--
Norway spruce	11,651	2,084	4,258	2,625	1,381	791	511	--	--	--	--
Douglas-fir	110	--	110	--	--	--	--	--	--	--	--
Northern white-cedar	641,663	108,141	154,957	140,459	108,173	61,917	36,587	14,777	11,475	5,178	--
All species	938,723	196,205	247,809	201,453	140,953	76,069	42,894	15,529	12,633	5,178	--
True fir											
White fir	139	--	139	--	--	--	--	--	--	--	--
All species	139	--	139	--	--	--	--	--	--	--	--
Total softwoods	5,154,537	699,422	911,247	865,775	703,145	505,203	394,400	291,805	225,092	470,319	88,127
Hardwoods											
Select white oaks											
White oak	690,317	24,719	50,894	73,495	95,388	115,188	94,179	78,159	48,430	95,515	14,350
Swamp white oak	29,328	1,981	3,589	4,198	3,757	4,698	3,641	2,118	4,441	905	--
Bur oak	273,520	13,957	20,390	30,708	37,804	33,756	26,473	28,236	17,996	50,856	13,344
Chinkapin oak	2,419	24	166	277	--	--	774	--	--	1,177	--
All species	995,584	40,681	75,040	108,679	136,948	153,641	124,292	109,287	70,867	148,454	27,695
Select red oaks											
Northern red oak	1,657,973	41,042	93,755	164,806	240,064	284,734	241,142	181,045	143,253	221,486	46,646
All species	1,657,973	41,042	93,755	164,806	240,064	284,734	241,142	181,045	143,253	221,486	46,646
Other red oaks											
Northern pin oak	399,839	25,899	52,128	68,359	68,100	62,387	46,711	28,045	23,697	24,513	--
Black oak	421,423	18,786	40,179	61,239	66,043	60,871	61,433	48,241	22,278	40,506	1,847
All species	821,263	44,685	92,307	129,598	134,144	123,258	108,144	76,285	45,975	65,019	1,847
Hickory											
Bitternut hickory	96,043	15,232	21,739	23,263	14,638	12,073	6,768	--	1,112	1,228	--
Shagbark hickory	145,840	14,548	21,806	32,951	27,255	22,619	9,591	7,675	7,237	2,159	--
All species	241,883	29,780	43,545	56,214	41,893	34,692	16,349	7,675	8,349	3,386	--
Yellow birch											
Yellow birch	259,700	31,780	39,411	45,486	40,486	35,708	22,909	15,459	8,202	18,156	2,103
All species	259,700	31,780	39,411	45,486	40,486	35,708	22,909	15,459	8,202	18,156	2,103
Hard maple											
Black maple	5,724	384	190	587	1,088	--	734	954	--	1,778	--
Sugar maple	2,172,595	231,633	372,146	435,598	358,962	235,208	168,812	125,293	90,882	146,716	7,345
All species	2,178,320	232,027	372,337	436,185	360,049	235,208	169,546	126,246	90,882	148,494	7,345

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	Diameter class (inches at breast height)										29.0+
	All classes	5.0-5.9	7.0-7.9	9.0-9.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-23.9	
Hardwoods											
Soft maple											
Red maple	1,943,922	309,856	435,478	416,189	309,505	218,824	115,332	66,706	32,628	37,156	2,248
Silver maple	292,771	5,479	12,709	24,218	23,823	27,607	24,950	30,413	28,650	79,993	34,929
All species	2,236,693	315,335	448,187	440,407	333,328	246,431	140,282	97,119	61,277	117,148	37,177
Beech											
American beech	31,907	3,204	4,299	3,696	2,437	5,080	2,226	473	2,776	5,173	2,544
All species	31,907	3,204	4,299	3,696	2,437	5,080	2,226	473	2,776	5,173	2,544
Ash											
White ash	360,454	22,017	38,313	57,343	69,434	53,968	53,799	27,070	21,865	16,645	--
Black ash	502,130	114,945	137,312	112,505	69,709	38,297	15,440	9,111	1,867	2,943	--
Green ash	271,035	34,123	50,557	55,071	43,082	38,994	17,680	8,737	9,352	13,440	--
All species	1,133,619	171,085	226,182	224,918	182,225	131,260	86,919	44,919	33,084	33,028	--
Cottonwood and aspen											
Balsam poplar	41,108	6,005	8,665	6,873	11,465	5,226	568	2,306	--	--	--
Eastern cottonwood	57,501	877	827	1,722	1,253	3,584	5,649	4,386	5,999	21,177	12,028
Bigtooth aspen	696,370	63,185	83,970	112,274	137,626	144,260	86,195	36,492	21,047	11,321	--
Quaking aspen	1,661,488	289,631	331,225	358,357	285,829	197,394	121,386	50,677	12,879	14,109	--
Silver poplar	147	56	90	--	--	--	--	--	--	--	--
All species	2,456,614	359,755	424,778	479,227	436,173	350,463	213,797	93,861	39,925	46,807	12,028
Basswood											
American basswood	1,029,807	63,293	128,609	194,879	208,164	175,128	107,697	75,347	32,251	44,437	--
All species	1,029,807	63,293	128,609	194,879	208,164	175,128	107,697	75,347	32,251	44,437	--
Black walnut											
Black walnut	84,381	4,866	8,074	10,264	11,772	12,905	12,008	13,083	4,558	6,851	--
All species	84,381	4,866	8,074	10,264	11,772	12,905	12,008	13,083	4,558	6,851	--
Other eastern soft hardwoods											
Boxelder	46,267	9,200	11,492	10,489	5,023	2,884	1,366	1,808	750	3,256	--
River birch	13,783	1,099	2,031	2,630	2,302	1,698	1,547	1,554	923	--	--
Paper birch	667,154	114,090	188,067	186,312	106,186	43,779	18,989	8,641	1,091	--	--
Hackberry	16,255	2,665	2,956	2,667	3,440	1,286	1,082	2,159	--	--	--
Walnut spp.	304	--	135	170	--	--	--	--	--	--	--
Butternut	11,212	1,425	2,484	2,233	2,109	373	1,701	--	886	--	--
Black cherry	228,125	38,612	49,565	40,979	32,330	29,224	19,484	9,785	4,112	4,035	--
Black willow	16,671	452	550	2,621	2,787	1,883	2,500	2,152	944	2,783	--
White willow	--	--	--	--	--	--	--	--	--	--	--
American elm	286,621	58,814	67,243	58,342	35,322	26,212	17,378	9,616	7,464	6,230	--
Siberian elm	807	466	165	175	--	--	--	--	--	--	--
Slippery elm	69,425	7,948	10,862	13,631	8,075	8,109	5,609	4,512	3,703	6,975	--
All species	1,356,625	234,770	335,549	320,250	197,573	115,448	69,657	40,228	19,872	23,278	--
Other eastern hard hardwoods											
Honeylocust	3,394	109	435	1,528	238	1,084	--	--	--	--	--
Red mulberry	653	153	181	320	--	--	--	--	--	--	--
Black locust	19,829	4,304	5,165	3,906	1,920	1,300	1,882	1,352	--	--	--
Rock elm	3,746	997	1,070	211	451	--	--	--	--	--	--
All species	27,623	5,563	6,799	2,370	2,834	1,882	1,352	--	--	--	--
Total hardwoods											
	14,511,990	1,577,866	2,298,870	2,621,432	2,327,626	1,906,791	1,316,851	882,380	561,271	881,519	137,385
All species groups	19,666,527	2,277,288	3,210,117	3,487,207	3,030,771	2,411,995	1,711,251	1,174,185	786,363	1,361,837	225,512

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, Wisconsin, 2000-2004
(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										
Other yellow pines										
Scotch pine	49,725	9,647	6,833	13,628	9,078	4,143	6,396	--	--	--
All species	49,725	9,647	6,833	13,628	9,078	4,143	6,396	--	--	--
Eastern white and red pines										
Red pine	5,411,062	1,513,126	1,335,986	927,413	618,896	456,564	283,485	275,593	--	--
Eastern white pine	5,934,076	466,814	589,731	625,429	695,605	616,963	593,892	1,880,228	465,414	--
All species	11,345,139	1,979,940	1,925,717	1,552,842	1,314,501	1,073,527	877,377	2,155,820	465,414	--
Jack pine										
Jack pine	774,612	379,932	242,174	99,700	44,816	7,990	--	--	--	--
All species	774,612	379,932	242,174	99,700	44,816	7,990	--	--	--	--
Spruce and balsam fir										
Balsam fir	603,568	362,596	133,089	70,539	22,036	4,439	4,598	6,272	--	--
White spruce	978,055	215,700	179,103	222,353	174,440	83,289	58,923	44,247	--	--
Black spruce	222,959	136,205	57,148	10,832	6,484	4,690	--	7,599	--	--
All species	1,804,583	714,501	369,341	303,724	202,961	92,418	63,520	58,118	--	--
Eastern hemlock										
Eastern hemlock	1,998,668	169,108	260,283	234,188	283,390	316,480	228,061	443,436	63,723	--
All species	1,998,668	169,108	260,283	234,188	283,390	316,480	228,061	443,436	63,723	--
Other eastern softwoods										
Eastern redcedar	57,042	25,425	3,171	21,787	6,658	--	--	--	--	--
Larch spp.	685	--	--	--	--	--	--	--	--	--
Tamarack (native)	510,074	264,465	159,093	50,007	25,498	4,252	6,760	--	--	--
Norway spruce	25,721	12,324	6,710	3,995	2,692	--	--	--	--	--
Northern white-cedar	1,935,695	698,182	546,938	321,064	194,913	80,825	64,018	29,755	--	--
All species	2,529,216	1,001,081	715,912	396,853	229,762	88,077	70,778	29,755	--	--
Total softwoods	18,501,943	4,254,208	3,520,280	2,600,935	2,084,508	1,579,634	1,246,132	2,687,130	529,137	--
Hardwoods										
Select white oaks										
White oak	2,470,334	--	386,469	500,237	427,863	366,991	233,264	479,082	76,428	--
Swamp white oak	88,506	--	15,319	20,502	16,492	9,992	21,576	4,525	--	--
Bur oak	967,350	--	153,725	147,508	119,858	132,777	86,921	256,142	70,420	--
Chinkapin oak	9,514	--	--	--	--	3,683	--	5,831	--	--
All species	3,535,705	--	555,512	668,347	564,213	513,444	341,761	745,579	146,848	--
Select red oaks										
Northern red oak	6,232,180	--	970,526	1,239,267	1,099,728	854,893	694,852	1,120,695	252,218	--
All species	6,232,180	--	970,526	1,239,267	1,099,728	854,893	694,852	1,120,695	252,218	--
Other red oaks										
Northern pin oak	1,142,210	--	278,764	273,727	215,301	133,518	116,068	124,831	--	--
Black oak	1,378,078	--	272,062	268,891	282,749	230,516	108,467	205,550	9,843	--
All species	2,520,288	--	550,826	542,618	498,051	364,034	224,536	330,381	9,843	--
Hickory										
Bitternut hickory	143,244	--	54,286	48,610	29,153	--	5,308	5,886	--	--
Shagbark hickory	316,539	--	101,953	93,070	42,146	34,838	34,042	10,491	--	--
All species	459,782	--	156,239	141,680	71,299	34,838	39,350	16,377	--	--
Yellow birch										
Yellow birch	682,978	--	175,753	167,329	111,752	77,813	42,270	96,351	11,711	--
All species	682,978	--	175,753	167,329	111,752	77,813	42,270	96,351	11,711	--
Hard maple										
Black maple	21,602	--	4,495	--	3,377	4,532	--	9,199	--	--
Sugar maple	5,168,092	--	1,483,442	1,051,765	789,639	604,577	448,894	750,571	39,203	--
All species	5,189,694	--	1,487,938	1,051,765	793,016	609,108	448,894	759,770	39,203	--
Soft maple										
Red maple	3,435,974	--	1,262,262	964,488	532,236	317,565	159,158	188,383	11,883	--
Silver maple	1,208,659	--	95,373	121,190	113,976	143,644	138,883	405,465	190,129	--
All species	4,644,634	--	1,357,635	1,085,677	646,212	461,208	298,041	593,848	202,012	--

(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															
Beech															
American beech	104,171	--	10,663	24,017	11,000	2,427	14,228	27,427	14,410						
All species	104,171	--	10,663	24,017	11,000	2,427	14,228	27,427	14,410						
Ash															
White ash	1,093,125	--	285,611	238,586	248,536	129,631	107,094	83,667	--						
Black ash	623,275	--	301,831	177,710	73,902	45,057	9,401	15,374	--						
Green ash	585,962	--	176,638	172,078	81,571	41,709	45,732	68,235	--						
All species	2,302,362	--	764,080	588,375	404,008	216,397	162,226	167,277	--						
Cottonwood and aspen															
Balsam poplar	85,388	--	48,349	23,310	2,656	11,073	--	--	--						
Eastern cottonwood	258,363	--	4,823	14,524	24,328	19,672	27,800	103,948	63,469						
Bigtooth aspen	1,994,640	--	587,020	657,876	408,488	178,116	104,954	58,186	--						
Quaking aspen	3,060,346	--	1,209,693	895,236	572,702	246,551	63,970	72,195	--						
All species	5,398,737	--	1,849,886	1,590,945	1,008,174	455,412	196,724	234,328	63,469						
Basswood															
American basswood	2,929,487	--	879,192	791,789	506,926	364,542	159,694	227,344	--						
All species	2,929,487	--	879,192	791,789	506,926	364,542	159,694	227,344	--						
Black walnut															
Black walnut	291,420	--	50,914	59,881	57,627	64,419	22,968	35,611	--						
All species	291,420	--	50,914	59,881	57,627	64,419	22,968	35,611	--						
Other eastern soft hardwoods															
Boxelder	69,202	--	20,952	12,971	6,422	8,664	3,684	16,509	--						
River birch	37,724	--	9,995	7,797	7,490	7,667	4,774	--	--						
Paper birch	756,182	--	431,813	191,962	86,658	40,542	5,207	--	--						
Hackberry	34,154	--	13,800	5,519	4,878	9,956	--	--	--						
Butternut	23,411	--	9,007	1,710	8,268	--	4,426	--	--						
Black cherry	440,305	--	133,140	129,832	90,170	46,693	20,011	20,468	--						
Black willow	55,655	--	10,280	7,580	10,643	9,593	4,317	13,242	--						
American elm	436,498	--	138,496	111,126	76,930	44,142	35,307	30,498	--						
Slippery elm	162,864	--	31,310	34,267	24,995	20,583	17,525	34,184	--						
All species	2,015,994	--	798,793	502,765	316,454	187,841	95,251	114,891	--						
Other eastern hard hardwoods															
Honeylocust	5,688	--	928	4,760	--	--	--	--	--						
Black locust	29,161	--	7,914	5,818	8,888	6,541	--	--	--						
Rock elm	2,748	--	814	1,934	--	--	--	--	--						
All species	37,597	--	9,656	12,511	8,888	6,541	--	--	--						
Total hardwoods	36,345,030	--	9,617,412	8,466,967	6,097,347	4,212,916	2,740,794	4,469,879	739,714						
All species groups	54,846,973	4,254,208	13,137,672	11,067,901	8,181,855	5,792,551	3,986,925	7,157,009	1,268,851						

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.

¹International 1/4-inch rule.

Table 9. -- All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Wisconsin, 2000-2004
(In thousand dry tons)

Owner category and softwood/hardwood category	Tree biomass component											
	All components			All live 1-5 inch trees			Growing-stock trees			Non-growing-stock trees		
Public												
Softwoods	40,612	4,840	34,108	27,250	6,859	1,664	1,264	400				
Hardwoods	137,824	16,006	106,565	76,740	29,824	15,254	11,152	4,101				
Total	178,436	20,846	140,673	103,990	36,683	16,918	12,417	4,501				
Private												
Softwoods	65,004	7,156	55,676	44,525	11,151	2,173	1,655	518				
Hardwoods	350,054	31,909	270,994	195,986	75,008	47,152	34,543	12,608				
Total	415,058	39,064	326,669	240,511	86,159	49,325	36,198	13,127				
All ownerships												
Softwoods	105,617	11,996	89,784	71,775	18,010	3,837	2,919	918				
Hardwoods	487,878	47,914	377,558	272,726	104,832	62,405	45,696	16,710				
Total	593,495	59,910	467,342	344,501	122,842	66,242	48,615	17,627				

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 tons. 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, Wisconsin, 1996 to 2000-2004

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines	196	63	133	--
Eastern white and red pines	87,783	26,470	61,312	--
Jack pine	6,554	2,913	3,641	--
Spruce and balsam fir	20,936	6,781	14,155	--
Eastern hemlock	9,699	1,839	7,860	--
Other eastern softwoods	36,338	12,411	23,928	--
Total softwoods	161,506	50,477	111,029	--
Hardwoods				
Select white oaks	31,212	2,081	29,131	--
Select red oaks	46,246	9,778	36,467	--
Other red oaks	22,688	5,832	16,856	--
Hickory	10,356	410	9,946	--
Yellow birch	5,505	2,094	3,411	--
Hard maple	56,076	19,744	36,332	--
Soft maple	86,228	32,447	53,781	--
Beech	994	89	905	--
Ash	39,170	8,255	30,915	--
Cottonwood and aspen	117,600	44,243	73,357	--
Basswood	23,093	5,858	17,235	--
Black walnut	4,144	--	4,144	--
Other eastern soft hardwoods	46,725	5,862	40,863	--
Other eastern hard hardwoods	1,561	-220	1,782	--
Total hardwoods	491,600	136,474	355,126	--
All species groups	653,105	186,951	466,155	--

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, Wisconsin, 1996 to 2000-2004

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Eastern white and red pines	40,239	10,838	29,401	--
Jack pine	14,157	7,317	6,840	--
Spruce and balsam fir	6,774	2,680	4,094	--
Eastern hemlock	5,051	230	4,821	--
Other eastern softwoods	5,881	269	5,612	--
Total softwoods	72,102	21,334	50,769	--
Hardwoods				
Select white oaks	15,887	2,858	13,029	--
Select red oaks	26,880	2,750	24,130	--
Other red oaks	9,478	3,377	6,101	--
Hickory	2,668	146	2,522	--
Yellow birch	3,594	574	3,020	--
Hard maple	30,628	6,796	23,832	--
Soft maple	32,034	9,526	22,508	--
Beech	237	--	237	--
Ash	14,540	6,384	8,156	--
Cottonwood and aspen	94,809	22,616	72,193	--
Basswood	12,028	2,405	9,623	--
Black walnut	401	--	401	--
Other eastern soft hardwoods	30,851	3,063	27,788	--
Other eastern hard hardwoods	120	--	120	--
Total hardwoods	274,155	60,496	213,659	--
All species groups	346,257	81,829	264,428	--

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, Wisconsin, 1996 to 2000-2004

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Eastern white and red pines	9,722	3,906	5,816	--
Jack pine	9,354	1,797	7,556	--
Spruce and balsam fir	21,347	12,521	8,825	--
Eastern hemlock	1,982	923	1,060	--
Other eastern softwoods	2,559	875	1,684	--
Total softwoods	44,964	20,022	24,941	--
Hardwoods				
Select white oaks	2,762	642	2,120	--
Select red oaks	9,590	2,540	7,050	--
Other red oaks	9,751	1,826	7,925	--
Hickory	1,861	--	1,861	--
Yellow birch	1,025	716	309	--
Hard maple	8,850	2,511	6,339	--
Soft maple	11,604	2,645	8,959	--
Ash	7,685	1,670	6,014	--
Cottonwood and aspen	43,142	11,749	31,393	--
Basswood	5,780	2,009	3,771	--
Black walnut	1,186	--	1,186	--
Other eastern soft hardwoods	31,339	4,614	26,725	--
Other eastern hard hardwoods	127	127	--	--
Total hardwoods	134,702	31,049	103,654	--
All species groups	179,666	51,071	128,595	--

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.

Perry, Charles H.

2006. **Wisconsin's forest resources in 2004.** Resour. Bull. NC-261. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 34 p.

Results of the 2000-2004 annual inventory of Wisconsin show about 16.0 million acres of forest land, more than 22.1 billion cubic feet of live volume on forest land, and nearly 593 million dry tons of all live aboveground tree biomass on timberland. Populations of jack pine budworm are increasing, and it remains a significant pest in Wisconsin forests. A complete report including more detailed analyses and the final results of the fifth inventory of Wisconsin's forest resources will be published later as a companion to this report.

KEY WORDS: Annual inventory, forest land, timberland, forest type, volume, biomass, growth, removals, mortality, Wisconsin.

The Forest Inventory and Analysis web site is: www.fia.fs.fed.us

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