United States
Department of
Agriculture

Forest Service

**Northern
Research Station**

Resource Bulletin-NRS-2

Wisconsin's Forest Resources, 2005

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Abstract

The annual forest inventory of Wisconsin continues, and this document reports 2001-05 moving averages for most variables and comparisons between 2000 and 2005 for growth, removals, and mortality. Other resource tables can be generated through the Forest Inventory Mapmaker website at http://ncrs2.fs.fed.us/4801/fiadb/index.htm. Estimates from this inventory show a total of 16.1 million acres of forest land in the State. The estimate of total net volume of all-live trees on forest land is 22.3 billion cubic feet (ft^3). In Wisconsin, timberland area totals 15.9 million acres, and net growing-stock volume on timberland is 20.0 billion ft^3. All-live, aboveground tree biomass on timberland is estimated at 597 million dry tons. Between 2000 and 2005, the average annual net growth of growing stock on timberland was 605.7 million ft^3 per year. Average annual removals of growing stock totaled 362.5 million ft^3 per year. Mortality was 176.4 million ft^3 per year. These estimates generally show a healthy, growing forest despite more than 222,000 acres of forest that were defoliated by the jack pine budworm in 2005.

Cover Photo

Northern Wisconsin, paper birch and red maple. Courtesy of Steven Katovich, U.S. Forest Service, www.forestryimages.org.

Manuscript received for publication 17 October 2006

Published by:
USDA FOREST SERVICE
11 CAMPUS BLVD SUITE 200
NEWTOWN SQUARE PA 19073-3294

November 2006

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INTRODUCTION

The Northern Research Station's Forest Inventory and Analysis Program (NRS-FIA) in partnership with the Wisconsin Department of Natural Resources (DNR) began fieldwork for the seventh inventory of Wisconsin's forest resources in 2005. This initiated the second cycle of the 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 cycle consists of measuring, compiling, and reporting data for five panels. Since all five panels have been measured, the 2005 data are remeasurements of the plots visited 5 years ago (2000). The field plot measurements for this inventory were completed in September of 2005. The data can be accessed at http://ncrs2.fs.fed.us/4801/fiadb/index.htm.

This document summarizes the last 5 years of the annual inventory (2001-05). The data and statistics in this report represent 93 percent of the forested plots for the complete inventory; the remaining 7 percent were too hazardous to visit or access was denied. Results presented here are estimates based on sampling techniques assuming the 2001, 2002, 2003, 2004, and 2005 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 (Schmidt 1998; Kotar et al. 1999). Annual reports are available for 2000 through 2004 (Vissage 2002; Vissage et al. 2003, 2004, 2005; Perry 2006). Data from new inventories often are compared with data from earlier inventories to determine trends in forest resources. However, the procedures used in the two inventories must be similar for the comparison to be valid. As a result of ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have been implemented since the periodic inventory of Wisconsin that was completed in 1996. Although these changes have little impact on statewide estimates of forest area, timber volume, and tree biomass, they may have a 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 2001-05 data with data published for 1996. However, rolling averages from 2001-05 can be compared with 2000-04 data. All of the tables in this report and others can be generated at 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, was forested in the fifth inventory (Schmidt 1998). Since 1996, total forest-land[1] area has remained relatively stable at about 16.1 million acres (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).

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

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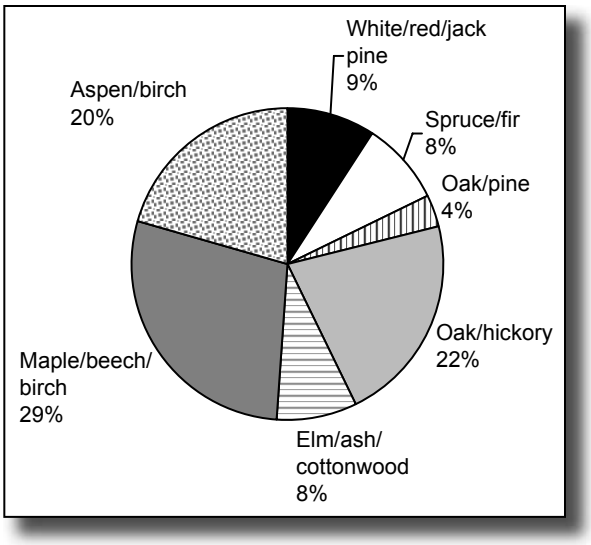

Figure 1.—Area of forest land by forest-type group, Wisconsin, 2001-05.

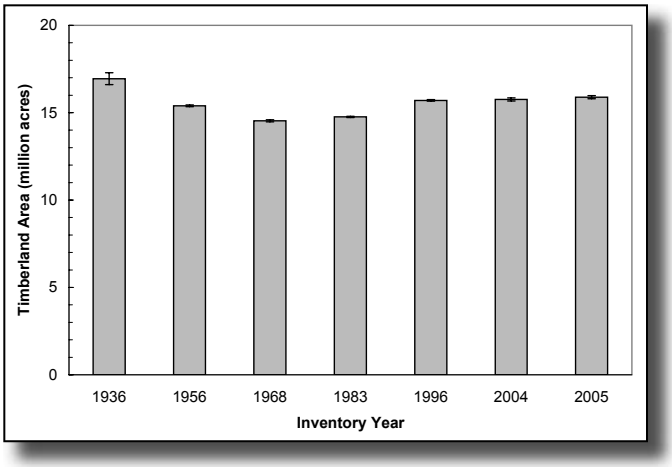

Figure 2.—Area of timberland by inventory year, Wisconsin (error bars represent 66-percent confidence intervals around the estimate).

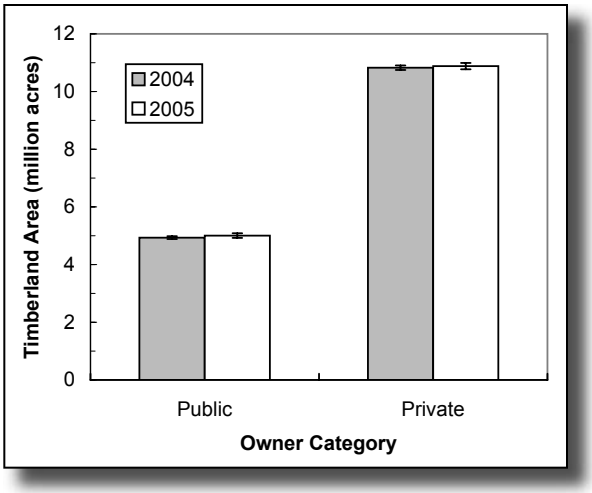

Figure 3.—Area of timberland by owner category, Wisconsin (error bars represent 66-percent confidence intervals around the estimate).

Forest land has three components:

1. Timberland[2]—Forest land that is not restricted from harvesting by statute, administrative regulation, or designation, and is capable of growing trees at a rate of 20 cubic feet (ft^3) per acre per year.

2. Reserved forest land—Land that is restricted from harvesting by statute, administrative regulation, or designation (National Parks and Lakeshores, and Federal Wilderness Areas).

3. Other forest land—Land that is not capable of growing trees at a rate of 20 ft^3/acre/yr and not restricted from harvesting.

Timberland area increased slightly since 1996 (Fig. 2). This increase was not detected with the 2000-04 estimates but the more recent data of 2001-05.

The balance of forest ownership remained unchanged since 2004 (Fig. 3, Table 2). Nearly 70 percent of Wisconsin's timberland remains in private ownership.

Covering nearly 4.5 million acres, maple-beech-birch remains the dominant forest-type group in the State (Table 3). There have been few changes since the 2004 inventory. Apparent increases in the area of eastern redcedar and oak pine forest-type groups are not statistically significant.

Although total timberland area is essentially the same since 2004, the area occupied by

[2]Timberland 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 on owner decisions that consider economic, environmental, legal, and social factors.

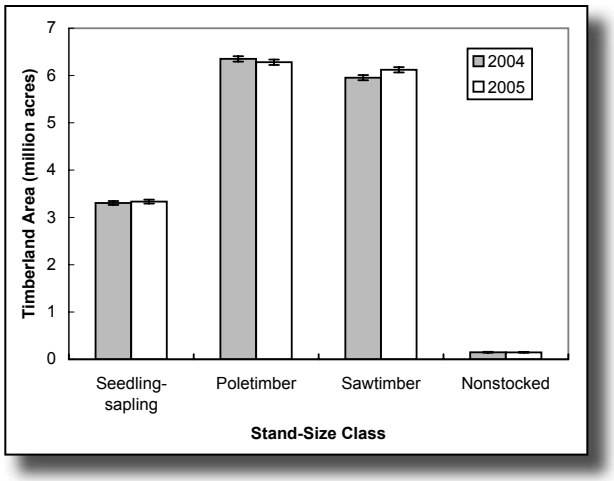

Figure 4.—Area of timberland by stand-size class and inventory year, Wisconsin (error bars represent 66-percent confidence intervals around the estimate).

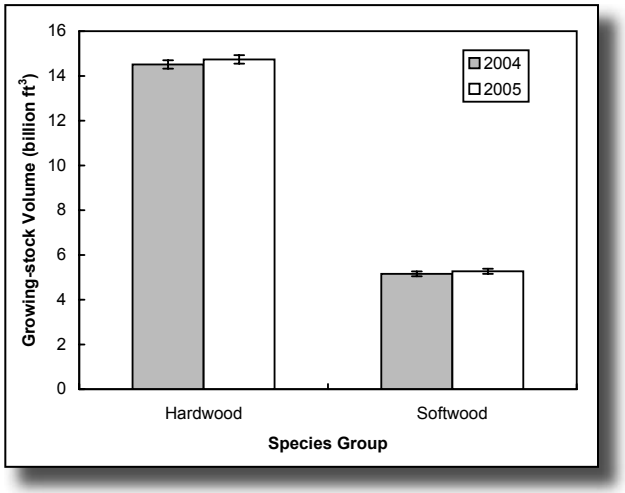

Figure 5.—Net volume of growing stock on timberland by inventory year, Wisconsin (error bars represent 66-percent confidence intervals around the estimate).

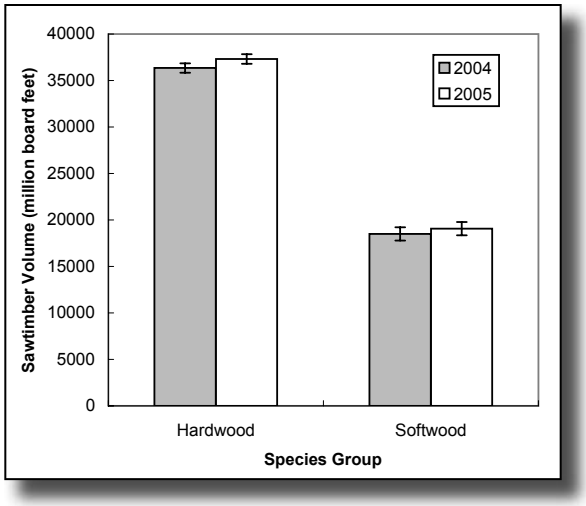

Figure 6.—Net sawtimber volume (International ¼-inch rule) on timberland by inventory year, Wisconsin (error bars represent 66-percent confidence intervals around the estimate).

the sawtimber stand-size class increased by 4 percent (Fig. 4, Table 3).

Volume

In previous inventories, the volume of all live trees greater than or equal to 5 inches in diameter at breast height (d.b.h.), or 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 inches d.b.h. for softwoods and 11 inches d.b.h. for hardwoods -- was classified as sawtimber. The volume of live trees on reserved and other forest land was not reported. Examining live-tree volume on all forested land provides the opportunity to address questions about wildlife habitat, soil and water protection, aesthetics, and other important forest values. In 2005, the volume of all-live trees on forest land in Wisconsin was 22.3 billion ft^3 (Table 4). Coincidentally, the volume of all-live trees and salvageable dead trees on timberland also is 22.3 billion ft^3 (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 2005, the net volume of growing stock on timberland in Wisconsin was 20 billion ft^3 (Table 6) with no significant change since 2004. Hardwoods species accounted for 74 percent of the net volume of growing stock (Fig. 5, Table 7) and 66 percent of the net volume of sawtimber (Fig. 6, Table 8). Cottonwood and 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 5.3 billion ft^3 in 2005 (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).

Biomass

Biomass is defined here as the aboveground weight of live trees 1 inch and larger in d.b.h. on timberland. The estimate of biomass can be used to address questions related to wildlife habitat, carbon sequestration, availability of wood fiber for fuel, and other important values. The estimated aboveground weight of tree biomass on timberland in Wisconsin was more than 597.1 million dry tons (Table 9). Eighty-two percent of the total biomass was in hardwood species while softwoods species accounted for 18 percent (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, Mortality

The three components of change (growth, removals, and mortality) provide trend information that helps describe forest changes between inventories. Change in the current inventory is determined by comparing observations collected in 2000 with remeasurements on the same plots in 2005.

NRS-FIA slightly modified the method for calculating growth since the completion of the last inventory in 2004; the algorithms now more closely match growth calculations in other regions of the country. Average annual net growth is equal to gross growth less mortality over the period between inventories divided by the number of growing seasons in the period. The net growth of growing stock is equivalent to the biological change observed in current growing-stock trees. The average annual net growth of growing stock

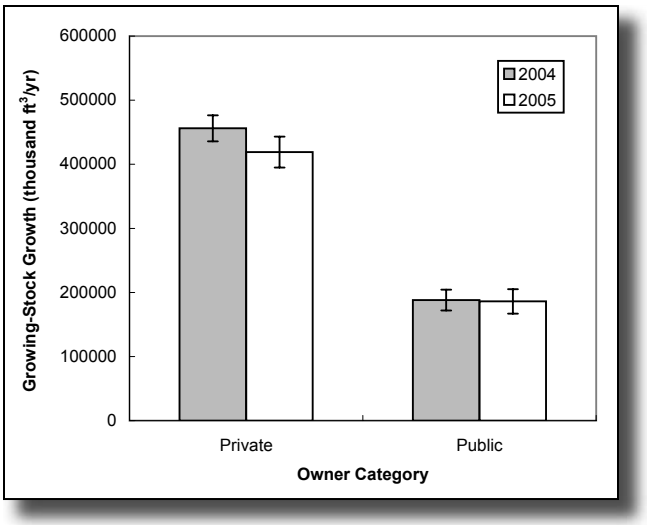

Figure 7.—Average annual net growth of growing stock on timberland by owner category, Wisconsin, 1996 to 2000-04 and 2000 to 2005 (error bars represent 66-percent confidence intervals around the estimate).

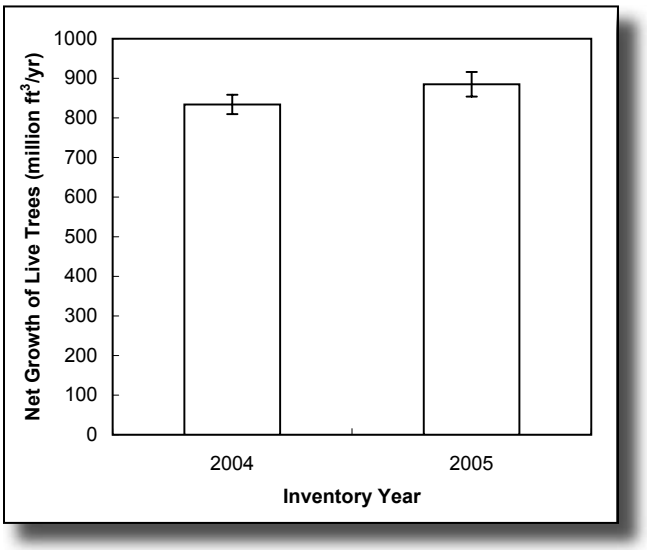

Figure 8. – Average annual net growth of live trees on forest land, Wisconsin, 1996 to 2000-04 and 2000 to 2005 (error bars represent 66-percent confidence intervals around the estimate).

from 2000 to 2005 was 605.7 million ft^3 (Table 10); this is consistent with the measurements during the 1996 to 2000-04 period. Net growth is unchanged in both the private and public owner categories (Fig. 7). Net growth of live trees on forest land is an ecological reference point that does not focus exclusively on economically valuable trees such as growing stock. A comparison of live-tree growth between 2004 and 2005 suggests that growth rates have remained stable (Fig. 8).

Average annual removals from growing stock includes both trees cut or killed due to timber harvesting and those removed from the timberland base due to land-use change. Average annual removals from growing stock from 2000 to 2005 totaled 362.5 million ft^3/yr (Table 11), or about 2 percent of the current growing-stock inventory.

Average annual mortality includes trees that died over the period from insects, diseases, and other causes. Trees killed by timber harvesting are included in the estimate of average annual removals. From 2000 to 2005, average annual mortality of growing stock was about 176.4 million ft^3/yr (Table 12), or nearly 1 percent of the current growing-stock inventory.

FOREST HEALTH

Forest health was summarized by the Wisconsin Department of Natural Resources Division of Forestry (2005):

> This year, both native and exotic insects and diseases presented challenges for the Forest Health Protection personnel. Populations of the jack pine budworm dramatically increased in northwest Wisconsin, causing over 222,000 acres of defoliation. This insect is also on the rise in west-central Wisconsin, feeding primarily on jack pine but also occasionally on red pine. Surveys for exotics including sudden oak death, emerald ash borer and beech bark disease were all negative for the presence of these organisms. Defoliation of oak by the gypsy moth was rare; no large-scale defoliation was detected. A biological control survey for gypsy moth was initiated in cooperation with the US Dept. of Agriculture. A cooperative research project on red pine pocket mortality entered its second year. Ash yellows was confirmed in 2 new counties: Taylor and Burnett, and Annosum root rot was confirmed in Waushara County. A survey of tamarack stands in eastern Wisconsin revealed scattered mortality. A summer deficit in precipitation continued to stress trees in localized areas.

Additional details are available at http://fhm.fs.fed.us/fhh/fhh-05/wi/wi_05.pdf.

SUMMARY

The forest resources of Wisconsin appear to be in good condition. As additional data become available from ensuing annual panels, a clearer picture of the direction of the State's forests will emerge. Additional data related to Wisconsin inventories in 2004, 1996 and 1983 are available at http://ncrs2.fs.fed.us/4801/fiadb/index.htm.

APPENDIX
Accuracy of the Inventory

Sampling errors measure the uncertainty in estimates that occurs when not every member of the population is observed. In the case of 2001-05 Wisconsin forest inventory, 6,478 sample plots were observed on forest land across the entire State, an intensity of one plot for every 2,476 acres of forest land. Sampling errors for the estimates of statewide totals in this report are:

Table no.	Variable	Estimate	Sampling error
			Percent
1	Area of forest land (thousand acres)	16,119.3	0.55
2	Area of timberland (thousand acres)	15,886.8	0.57
4	All-live volume on forest land (thousand ft^3)	22,324,591	1.04
5	All-live volume on timberland (thousand ft^3)	22,290,307	1.05
6	Growing-stock volume on timberland (thousand ft^3)	20,007,820	1.09
8	Sawtimber volume on timberland (thousand board feet)	56,389,138	1.57
9	All-live aboveground biomass on timberland (thousand dry tons)	597,113	0.97
10	Growing-stock growth on timberland (thousand ft^3/yr)	605,684	4.73
11	Growing-stock removals on timberland (thousand ft^3/yr)	362,516	10.29
12	Growing-stock mortality on timberland (thousand ft^3/yr)	176,415	7.11

The chances are two in three that if a 100-percent inventory had been taken using the same methods, the results would have been within the sampling errors indicated. These 67-percent sampling errors also can be used to create confidence intervals around estimates. For example, the estimated volume of all-live trees on forest land in the State is 22.324 billion ft^3 with a sampling error of ± 1.04 percent (± 232.17 million ft^3).

As inventory data are divided 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 Wisconsin. 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, the error on the area of forest land in the maple-beech-birch type for the State is computed as follows:

Total statewide area of maple-beech-birch type on forest land (Table 1) = 4,524,500 acres.

Total statewide area of all forest land = 16,119,300 acres.

The State total error for forest-land area = 0.55 percent.

Using the preceding formula:

$$E = \frac{(0.0055)\sqrt{16119.3}}{\sqrt{4524.5}}$$

where E = 0.0103 or 1.03 percent sampling error for the maple-beech-birch forest type in Wisconsin.

Inventory Methods

Vissage (2002) described the annualized inventory methods for Wisconsin. Since the 1996 inventory, several changes in the FIA inventory methods have improved the quality of the inventory and have met increasing demands for timely forest-resource information. The most significant change between inventories has been the shift from periodic to annual inventories. Historically, FIA inventoried each state on a cycle that averaged about 12 years. However, the need for timely and consistent data across large geographical regions along with national legislative mandates resulted in FIA implementing an annual inventory. This system was initiated in Wisconsin in 2000.

With the NRS-FIA annual inventory system, about 20 percent of all field plots are measured in a single year. After 6 years, the entire inventory is completed and remeasurement has begun. NRS-FIA now is reporting and analyzing results using a moving 5-year average. For example, NRS-FIA will be able to generate inventory results for 2000 through 2005 or for 2001 through 2006.

Other significant changes between inventories include implementing new remote-sensing technology as well as a new field plot configuration and sample design, and gathering additional remotely sensed and field data. The use of new remote-sensing technology allows NRS-FIA to use classifications of Multi-Resolution Land Characterization data and other remote-sensing products to stratify the total area of Wisconsin and to improve estimates.

New algorithms were used in 2001-05 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. As a result, changes in forest type and stand-size class will reflect actual changes in the forest and not changes due to differences between 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 2001-05 results and those published for the 1996 inventory may be invalid. Contact NRS-FIA for additional information on the algorithms used in both inventories.

Sampling Phases

The 2005 Wisconsin survey was conducted in three phases. In the first phase, satellite imagery was used to stratify the State and aerial photography was used to select plots for measurement. The second phase entailed measuring the traditional suite of mensurational variables; the third phase focused on a suite of variables related to forest health.
Land that could not be sampled included private tracts where field personnel were unable to obtain permission to measure a Phase 2 plot and plots that were inaccessible because of a hazard or danger to field personnel. The methods used in preparing this report were adjusted to account for such sites.

Phase 1

For the Wisconsin inventory, FIA used a classification of satellite imagery for stratification. The imagery was used 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 as nonforest edge. 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 about every 6,000 acres. FIA has tessellated the entire United States using 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 an 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 2000-02 and 2004, an additional plot was established and measured in each hexagon. The measurement of this intensified sample was funded by the State.

The total Federal base sample was divided systematically 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 can 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

NRS-FIA has two categories of field measurements: Phase 3 (formally FHM plots) and Phase 2 field plots. Both types are distributed systematically 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 taken 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 4-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 all forest

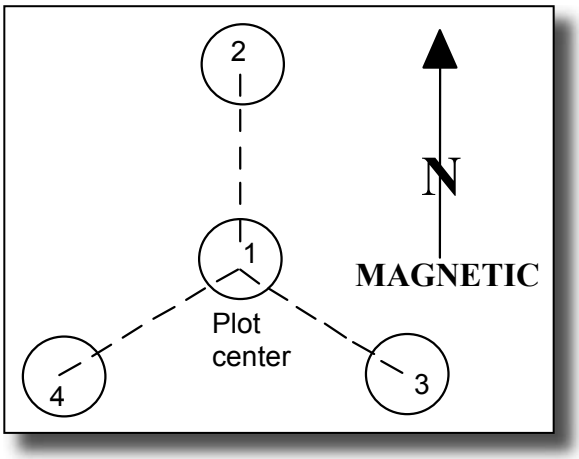

Figure 9. —Current NRS-FIA field plot design.

conditions on each plot. Due 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. With completion of the annual inventory in 2004, the full range of change estimates now 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 that are 5 inches and larger in d.b.h. are measured on a 24-foot-radius (1/24-acre) circular subplot. All trees less than 5 inches d.b.h. are measured on a 6.8-foot-radius (1/300-acre) circular microplot located 12 feet due east of the center of each of the four subplots. Forest conditions 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 on one of the subplots is identified, described, and mapped so long as the area of the condition is at least 1 acre.

Field plot measurements are combined with Phase 1 estimates in the compilation process and table production. The number of tables presented here is limited but other tables can be generated at http://ncrs2.fs.fed.us/4801/fiadb/index.htm. For additional information, contact: Program Manager, Northern Research Station, Forest Inventory and Analysis, 1992 Folwell Avenue, St Paul, MN 55108, or: State Forester, Wisconsin Department of Natural Resources, Division of Forestry, 101 S. Webster Street, Madison, WI 53707.

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Table 6.—Net volume of growing stock on timberland by forest-type group, forest type, and softwood/hardwood species categories, Wisconsin, 2001-05

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Table 8.—Net volume of sawtimber on timberland by species group, species, and diameter class, Wisconsin, 2001-05

Table 9.—All-live aboveground biomass on timberland by owner category, softwood/ hardwood species category, and tree-biomass component, Wisconsin, 2001-05

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

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

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

Table 1. -- Area of forest land by forest-type group, forest type, and owner category, Wisconsin, 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	355.9	162.2	193.7	- -
Red pine	672.3	259.7	412.6	- -
Eastern white pine	317.6	129.4	188.1	- -
White pine / hemlock	20.3	7.3	13.0	- -
Eastern hemlock	110.2	39.0	71.2	- -
All forest types	1,476.2	597.7	878.5	- -
Spruce / fir group				
Balsam fir	213.3	81.9	131.4	- -
White spruce	61.0	21.8	39.2	- -
Black spruce	357.0	205.2	151.8	- -
Tamarack	326.4	113.0	213.4	- -
Northern white-cedar	382.3	155.7	226.6	- -
All forest types	1,340.0	577.7	762.4	- -
Pinyon / juniper group				
Eastern redcedar	18.9	2.0	16.9	- -
All forest types	18.9	2.0	16.9	- -
Exotic softwoods group				
Exotic softwoods group	0.5	- -	0.5	- -
Scotch pine	17.4	1.4	16.0	- -
Other exotic softwoods	4.2	1.9	2.2	- -
All forest types	22.1	3.4	18.7	- -
All softwood groups	2,857.1	1,180.7	1,676.5	- -
Hardwood type groups				
Oak / pine group				
Oak / pine group	3.0	2.6	0.3	- -
White pine / red oak / white ash	243.1	93.6	149.5	- -
Eastern redcedar / hardwood	13.0	0.7	12.3	- -
Other pine / hardwood	305.0	114.3	190.6	- -
All forest types	564.1	211.3	352.7	- -
Oak / hickory group				
Oak / hickory group	4.7	- -	4.7	- -
Post oak / blackjack oak	467.2	132.9	334.3	- -
White oak / red oak / hickory	1,536.0	171.4	1,364.6	- -
White oak	200.3	11.1	189.2	- -
Northern red oak	560.4	147.6	412.8	- -
Bur oak	78.8	11.4	67.4	- -
Black walnut	42.3	1.8	40.5	- -
Black locust	9.3	- -	9.3	- -
Chestnut oak / black oak / scarlet oak	126.9	29.5	97.5	- -
Red maple / oak	144.7	47.5	97.2	- -
Mixed upland hardwoods	243.9	27.3	216.5	- -
All forest types	3,414.3	580.4	2,833.9	- -

(Table 1 continued)

(Table 1 continued)

Forest-type group/ forest type	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwood type groups				
Oak / gum / cypress group				
Sweetbay / swamp tupelo / red maple	1.1	- -	1.1	- -
All forest types	1.1	- -	1.1	- -
Elm / ash / cottonwood group				
Elm / ash / cottonwood group	4.5	3.0	1.4	- -
Black ash / American elm / red maple	648.8	209.0	439.8	- -
River birch / sycamore	14.8	- -	14.8	- -
Cottonwood	20.8	8.0	12.8	- -
Willow	23.2	1.4	21.8	- -
Sycamore / pecan / American elm	58.0	9.5	48.5	- -
Sugarberry / hackberry / elm / green ash	322.3	47.2	275.1	- -
Silver maple / American elm	113.7	51.9	61.8	- -
Red maple / lowland	132.2	38.2	94.0	- -
Cottonwood / willow	13.1	1.7	11.4	- -
All forest types	1,351.4	370.0	981.4	- -
Maple / beech / birch group				
Maple / beech / birch group	4.2	0.1	4.1	- -
Sugar maple / beech / yellow birch	2,333.1	762.5	1,570.6	- -
Black cherry	73.4	13.4	60.0	- -
Cherry / ash / yellow-poplar	111.4	26.7	84.7	- -
Hard maple / basswood	1,377.2	443.9	933.3	- -
Elm / ash / locust	144.7	9.0	135.7	- -
Red maple / upland	480.6	156.7	323.9	- -
All forest types	4,524.5	1,412.3	3,112.2	- -
Aspen / birch group				
Aspen / birch group	1.5	- -	1.5	- -
Aspen	2,774.3	1,194.0	1,580.4	- -
Paper birch	435.5	147.7	287.8	- -
Balsam poplar	39.3	6.1	33.2	- -
All forest types	3,250.6	1,347.8	1,902.8	- -
Exotic hardwoods group				
Other exotic hardwoods	4.6	- -	4.6	- -
All forest types	4.6	- -	4.6	- -
All hardwood groups	13,110.6	3,921.8	9,188.8	- -
Nonstocked	151.6	40.4	111.2	- -
All forest groups	16,119.3	5,142.9	10,976.4	- -

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, 2001-2005

(In thousand acres)

Major forest-type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	2,074.1	880.0	1,194.2	- -
Planted	731.6	276.7	454.9	- -
All softwood types	2,805.7	1,156.7	1,649.0	- -
Hardwood type groups				
Natural	12,767.7	3,738.6	9,029.1	- -
Planted	165.9	70.7	95.2	- -
All hardwood types	12,933.6	3,809.3	9,124.3	- -
Nonstocked	147.2	39.7	107.5	- -
All groups	15,886.6	5,005.7	10,880.9	- -

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, 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	346.1	60.0	156.9	129.2	- -
Red pine	668.5	391.2	208.3	69.0	- -
Eastern white pine	313.6	215.7	45.9	52.0	- -
White pine / hemlock	20.3	17.6	2.7	- -	- -
Eastern hemlock	110.2	107.8	2.3	- -	- -
All forest types	1,458.7	792.3	416.1	250.2	- -
Spruce / fir group					
Balsam fir	207.0	24.5	76.6	106.0	- -
White spruce	61.0	20.3	21.3	19.4	- -
Black spruce	347.1	6.9	86.6	253.5	- -
Tamarack	325.1	22.6	144.5	158.0	- -
Northern white-cedar	370.1	171.1	181.8	17.3	- -
All forest types	1,310.3	245.3	510.8	554.2	- -
Pinyon / juniper group					
Eastern redcedar	16.9	4.2	7.7	4.9	- -
All forest types	16.9	4.2	7.7	4.9	- -
Exotic softwoods group					
Exotic softwoods group	0.5	- -	0.5	- -	- -
Scotch pine	15.3	8.9	- -	6.4	- -
Other exotic softwoods	4.2	- -	4.2	- -	- -
All forest types	19.9	8.9	4.6	6.4	- -
All softwood groups	2,805.7	1,050.7	939.2	815.8	- -
Hardwood type groups					
Oak / pine group					
Oak / pine group	2.5	0.3	2.2	- -	- -
White pine / red oak / white ash	239.3	106.3	84.7	48.3	- -
Eastern redcedar / hardwood	13.0	5.6	6.7	0.7	- -
Other pine / hardwood	305.0	123.7	90.3	91.0	- -
All forest types	559.8	236.0	183.9	140.0	- -
Oak / hickory group					
Oak / hickory group	4.7	0.6	4.1	- -	- -
Post oak / blackjack oak	455.9	193.5	169.7	92.6	- -
White oak / red oak / hickory	1,519.4	891.3	518.9	109.3	- -
White oak	194.3	162.0	25.1	7.3	- -
Northern red oak	548.4	436.7	89.7	22.0	- -
Bur oak	73.8	44.3	8.7	20.8	- -
Black walnut	42.3	25.6	6.5	10.2	- -
Black locust	9.3	- -	7.5	1.8	- -
Chestnut oak / black oak / scarlet oak	126.9	72.7	36.9	17.3	- -
Red maple / oak	144.7	63.3	56.6	24.7	- -
Mixed upland hardwoods	239.2	94.1	82.2	62.9	- -
All forest types	3,358.9	1,984.1	1,005.7	369.0	- -

(Table 3 continued)

(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					
Sweetbay / swamp tupelo / red maple	1.1	1.1	- -	- -	- -
All forest types	1.1	1.1	- -	- -	- -
Elm / ash / cottonwood group					
Elm / ash / cottonwood group	4.5	0.5	0.3	3.6	- -
Black ash / American elm / red maple	621.6	86.9	419.5	115.1	- -
River birch / sycamore	14.8	5.9	6.0	2.9	- -
Cottonwood	20.8	16.5	1.0	3.3	- -
Willow	21.0	4.1	7.4	9.5	- -
Sycamore / pecan / American elm	58.0	13.8	27.1	17.2	- -
Sugarberry / hackberry / elm / green ash	322.3	113.8	136.3	72.3	- -
Silver maple / American elm	110.1	98.6	11.5	- -	- -
Red maple / lowland	129.6	20.5	56.2	52.9	- -
Cottonwood / willow	13.1	6.5	3.4	3.2	- -
All forest types	1,315.8	367.1	668.8	279.9	- -
Maple / beech / birch group					
Maple / beech / birch group	4.2	1.1	2.6	0.5	- -
Sugar maple / beech / yellow birch	2,299.2	1,058.5	1,067.7	173.0	- -
Black cherry	72.0	2.5	20.4	49.0	- -
Cherry / ash / yellow-poplar	111.4	22.9	36.2	52.3	- -
Hard maple / basswood	1,358.6	814.3	502.8	41.5	- -
Elm / ash / locust	143.4	24.7	70.4	48.2	- -
Red maple / upland	475.8	117.3	301.3	57.2	- -
All forest types	4,464.6	2,041.2	2,001.6	421.8	- -
Aspen / birch group					
Aspen / birch group	1.5	- -	1.5	- -	- -
Aspen	2,762.7	373.4	1,178.6	1,210.7	- -
Paper birch	427.8	61.2	286.5	80.0	- -
Balsam poplar	36.8	7.8	16.2	12.9	- -
All forest types	3,228.8	442.4	1,482.8	1,303.6	- -
Exotic hardwoods group					
Other exotic hardwoods	4.6	- -	- -	4.6	- -
All forest types	4.6	- -	- -	4.6	- -
All hardwood groups	12,933.6	5,071.9	5,342.7	2,519.0	- -
Nonstocked	147.2	- -	- -	- -	147.2
All forest groups	15,886.6	6,122.6	6,282.0	3,334.7	147.2

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, Wisconsin, 2001-2005

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines				
Scotch pine	17,090	2,231	14,858	- -
All species	17,090	2,231	14,858	- -
Eastern white and red pines				
Red pine	1,431,695	605,239	826,456	- -
Eastern white pine	1,325,145	457,989	867,156	- -
All species	2,756,840	1,063,228	1,693,612	- -
Jack pine				
Jack pine	311,501	123,438	188,063	- -
All species	311,501	123,438	188,063	- -
Spruce and balsam fir				
Fir spp.	193	- -	193	- -
Balsam fir	415,300	166,423	248,877	- -
White spruce	265,800	149,164	116,636	- -
Black spruce	186,507	105,863	80,644	- -
All species	867,800	421,451	446,349	- -
Eastern hemlock				
Eastern hemlock	453,141	163,314	289,827	- -
All species	453,141	163,314	289,827	- -
Other eastern softwoods				
Redcedar/juniper spp.	20	- -	20	- -
Eastern redcedar	32,186	1,656	30,530	- -
Larch spp.	109	38	71	- -
Tamarack (native)	279,005	92,013	186,992	- -
Norway spruce	13,039	6,160	6,879	- -
Austrian pine	57	- -	57	- -
Douglas-fir	112	- -	112	- -
Northern white-cedar	762,458	291,921	470,537	- -
All species	1,086,986	391,788	695,198	- -
Total softwoods	5,493,357	2,165,450	3,327,907	- -
Hardwoods				
Select white oaks				
White oak	821,153	77,023	744,130	- -
Swamp white oak	34,031	14,673	19,358	- -
Bur oak	382,415	31,463	350,952	- -
Chinkapin oak	3,409	425	2,984	- -
All species	1,241,009	123,585	1,117,424	- -
Select red oaks				
Northern red oak	1,810,920	428,706	1,382,214	- -
All species	1,810,920	428,706	1,382,214	- -

(Table 4 continued)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Other red oaks				
Northern pin oak	535,107	127,470	407,637	- -
Black oak	538,426	73,468	464,958	- -
All species	1,073,533	200,938	872,595	- -
Hickory				
Bitternut hickory	107,392	8,990	98,402	- -
Shagbark hickory	160,826	6,763	154,063	- -
All species	268,218	15,753	252,465	- -
Yellow birch				
Yellow birch	337,355	130,340	207,015	- -
All species	337,355	130,340	207,015	- -
Hard maple				
Black maple	5,985	3,847	2,138	- -
Sugar maple	2,477,473	956,148	1,521,325	- -
All species	2,483,459	959,995	1,523,463	- -
Soft maple				
Red maple	2,290,726	746,708	1,544,018	- -
Silver maple	358,702	198,458	160,244	- -
All species	2,649,428	945,166	1,704,262	- -
Beech				
American beech	38,674	6,444	32,229	- -
All species	38,674	6,444	32,229	- -
Ash				
White ash	394,834	93,733	301,102	- -
Black ash	545,540	199,179	346,360	- -
Green ash	312,344	54,190	258,154	- -
All species	1,252,718	347,102	905,616	- -
Cottonwood and aspen				
Balsam poplar	42,413	11,298	31,115	- -
Eastern cottonwood	69,416	11,804	57,612	- -
Bigtooth aspen	713,896	218,953	494,943	- -
Quaking aspen	1,805,787	752,622	1,053,166	- -
Silver poplar	155	155	- -	- -
All species	2,631,667	994,832	1,636,836	- -
Basswood				
American basswood	1,128,431	375,229	753,202	- -
All species	1,128,431	375,229	753,202	- -
Black walnut				
Black walnut	96,433	8,096	88,337	- -
All species	96,433	8,096	88,337	- -

(Table 4 continued)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Other eastern soft hardwoods				
Boxelder	131,251	10,482	120,768	- -
River birch	19,724	7,743	11,981	- -
Paper birch	732,172	256,824	475,347	- -
Hackberry	17,477	2,164	15,314	- -
Walnut spp.	308	- -	308	- -
Butternut	22,388	887	21,501	- -
Black cherry	304,013	48,140	255,873	- -
Black willow	39,608	7,164	32,444	- -
White willow	1,218	- -	1,218	- -
American elm	373,651	33,214	340,437	- -
Siberian elm	2,376	- -	2,376	- -
Slippery elm	82,797	7,337	75,460	- -
All species	1,726,983	373,955	1,353,028	- -
Other eastern hard hardwoods				
Honeylocust	3,859	2,882	978	- -
White mulberry		- -		- -
Red mulberry	3,360	538	2,822	- -
Black locust	23,336	1,163	22,173	- -
Rock elm	3,177	619	2,558	- -
All species	33,732	5,202	28,530	- -
Eastern noncommercial hardwoods				
Mountain maple		- -	- -	- -
Serviceberry spp.	397	89	308	- -
Common serviceberry		- -	- -	- -
Roundleaf serviceberry		- -	- -	- -
American hornbeam, musclewood	435	41	394	- -
Hawthorn spp.	2,807	166	2,642	- -
Cockspur hawthorn	924	27	897	- -
Downy hawthorn	75	- -	75	- -
Apple spp.	5,734	- -	5,734	- -
Eastern hophornbeam	44,290	5,647	38,643	- -
Cherry and plum spp.	37	- -	37	- -
Pin cherry	1,090	154	936	- -
Chokecherry	634	- -	634	- -
American plum	267	- -	267	- -
Willow spp.	1,218	- -	1,218	- -
Peachleaf willow	633	76	557	- -
Bebb willow	68	- -	68	- -
American mountain-ash	65	- -	65	- -
All species	58,674	6,198	52,476	- -
Total hardwoods	16,831,234	4,921,541	11,909,693	- -
All species groups	22,324,591	7,086,990	15,237,601	- -

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, 2001-2005

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	9,135,786	3,201,048	5,934,738
Upper stem portion	2,736,912	448,103	2,288,809
Total	11,872,698	3,649,151	8,223,547
Poletimber	8,135,122	1,620,059	6,515,063
All growing-stock trees	20,007,820	5,269,210	14,738,610
Cull trees			
Rough trees[1]			
Sawtimber size	1,295,916	91,582	1,204,334
Poletimber size	597,615	46,748	550,867
Total	1,893,531	138,330	1,755,201
Rotten trees[1]			
Sawtimber size	92,322	12,150	80,172
Poletimber size	29,906	3,517	26,389
Total	122,228	15,667	106,561
All live cull trees	2,015,759	153,997	1,861,762
All live trees	22,023,579	5,423,207	16,600,372
Salvable dead trees			
Sawtimber size	124,337	35,189	89,148
Poletimber size	142,390	33,634	108,757
All salvable dead trees	266,727	68,822	197,905
All classes	22,290,307	5,492,030	16,798,277

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, Wisconsin, 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	233,339	207,705	25,633
Red pine	1,334,085	1,255,394	78,691
Eastern white pine	742,951	665,429	77,522
White pine / hemlock	59,616	47,574	12,042
Eastern hemlock	266,883	209,622	57,261
All forest types	2,636,873	2,385,724	251,149
Spruce / fir group			
Balsam fir	135,037	105,516	29,521
White spruce	71,157	62,248	8,909
Black spruce	154,122	146,057	8,065
Tamarack	241,990	226,850	15,139
Northern white-cedar	640,275	550,745	89,530
All forest types	1,242,580	1,091,417	151,164
Pinyon / juniper group			
Eastern redcedar	8,939	7,767	1,172
All forest types	8,939	7,767	1,172
Exotic softwoods group			
Exotic softwoods group	477	477	- -
Scotch pine	12,349	9,737	2,613
Other exotic softwoods	7,158	6,275	884
All forest types	19,985	16,488	3,496
All softwood groups	3,908,377	3,501,396	406,981
Hardwood type groups			
Oak / pine group			
Oak / pine group	3,209	1,218	1,991
White pine / red oak / white ash	378,627	232,333	146,294
Eastern redcedar / hardwood	12,455	3,916	8,538
Other pine / hardwood	305,148	171,205	133,942
All forest types	699,438	408,673	290,765

(Table 6 continued)

(Table 6 continued)

Forest-type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Oak / hickory group			
Oak / hickory group	3,609	200	3,408
Post oak / blackjack oak	457,923	42,516	415,408
White oak / red oak / hickory	1,968,175	83,288	1,884,887
White oak	301,623	8,108	293,515
Northern red oak	1,091,940	29,403	1,062,537
Bur oak	79,439	897	78,542
Black walnut	51,258	694	50,565
Black locust	7,090	- -	7,090
Chestnut oak / black oak / scarlet oak	112,854	14,153	98,701
Red maple / oak	195,864	9,564	186,300
Mixed upland hardwoods	197,319	12,875	184,444
All forest types	4,467,094	201,698	4,265,396
Oak / gum / cypress group			
Sweetbay / swamp tupelo / red maple	3,045	1,657	1,389
All forest types	3,045	1,657	1,389
Elm / ash / cottonwood group			
Elm / ash / cottonwood group	3,011	45	2,966
Black ash / American elm / red maple	646,043	148,510	497,533
River birch / sycamore	15,997	- -	15,997
Cottonwood	42,131	26	42,104
Willow	10,979	- -	10,979
Sycamore / pecan / American elm	29,508	5,052	24,456
Sugarberry / hackberry / elm / green ash	236,282	13,889	222,393
Silver maple / American elm	291,314	243	291,071
Red maple / lowland	94,616	8,084	86,532
Cottonwood / willow	15,891	- -	15,891
All forest types	1,385,770	175,849	1,209,921
Maple / beech / birch group			
Maple / beech / birch group	5,876	- -	5,876
Sugar maple / beech / yellow birch	3,340,638	385,137	2,955,501
Black cherry	22,713	2,118	20,595
Cherry / ash / yellow-poplar	75,579	6,760	68,819
Hard maple / basswood	2,482,559	48,477	2,434,082
Elm / ash / locust	93,414	3,980	89,434
Red maple / upland	603,551	53,944	549,607
All forest types	6,624,330	500,416	6,123,914
Aspen / birch group			
Aspen / birch group	4,765	4,091	674
Aspen	2,399,520	380,766	2,018,755
Paper birch	470,548	82,701	387,848
Balsam poplar	35,529	7,049	28,479
All forest types	2,910,362	474,606	2,435,756
All hardwood groups	16,090,041	1,762,899	14,327,142
Nonstocked	9,403	4,916	4,487
All forest groups	20,007,820	5,269,210	14,738,610

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, 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											
Other yellow pines											
Scotch pine	15,518	2,096	2,017	2,118	2,185	3,489	1,709	767	1,136	- -	- -
All species	15,518	2,096	2,017	2,118	2,185	3,489	1,709	767	1,136	- -	- -
Eastern white and red pines											
Red pine	1,418,182	134,372	227,700	305,188	273,327	183,397	115,480	83,254	48,356	47,108	- -
Eastern white pine	1,280,216	47,094	76,853	105,493	129,046	122,737	137,539	122,379	105,250	352,246	81,578
All species	2,698,397	181,467	304,553	410,680	402,373	306,133	253,019	205,633	153,606	399,354	81,578
Jack pine											
Jack pine	296,417	54,914	84,434	77,110	49,629	19,800	8,391	2,139	- -	- -	- -
All species	296,417	54,914	84,434	77,110	49,629	19,800	8,391	2,139	- -	- -	- -
Spruce and balsam fir											
Fir spp.	193	- -	- -	193	- -	- -	- -	- -	- -	- -	- -
Balsam fir	405,263	149,725	135,510	75,760	24,989	14,260	4,209	810	- -	- -	- -
White spruce	260,699	29,256	42,270	45,487	36,013	40,774	33,199	14,772	11,424	7,505	- -
Black spruce	183,512	82,185	59,774	25,372	10,877	2,480	- -	1,557	- -	1,268	- -
All species	849,667	261,166	237,554	146,812	71,879	57,514	37,408	17,138	11,424	8,773	- -
Eastern hemlock											
Eastern hemlock	427,949	13,754	26,414	35,986	52,878	48,613	57,456	59,509	42,926	79,876	10,537
All species	427,949	13,754	26,414	35,986	52,878	48,613	57,456	59,509	42,926	79,876	10,537
Other eastern softwoods											
Eastern redcedar	27,310	7,629	5,824	5,541	1,238	5,244	1,833	- -	- -	- -	- -
Larch spp.	109	38	71	- -	- -	- -	- -	- -	- -	- -	- -
Tamarack (native)	269,845	79,617	85,482	56,007	31,629	9,879	5,321	761	1,149	- -	- -
Norway spruce	13,039	2,266	4,290	3,133	1,980	792	578	- -	- -	- -	- -
Douglas-fir	112	- -	112	- -	- -	- -	- -	- -	- -	- -	- -
Northern white-cedar	670,848	109,091	157,271	146,403	115,402	67,255	40,753	15,464	12,892	6,317	- -
All species	981,263	198,641	253,050	211,083	150,249	83,171	48,485	16,225	14,041	6,317	- -
Total softwoods	5,269,210	712,038	908,021	883,790	729,192	518,720	406,469	301,411	223,133	494,320	92,115
Hardwoods											
Select white oaks											
White oak	689,437	23,494	48,834	70,848	96,307	112,026	100,704	78,577	48,088	96,119	14,439
Swamp white oak	30,289	1,982	3,757	4,132	4,051	4,270	4,696	2,160	2,564	2,678	- -
Bur oak	273,798	14,488	21,533	31,570	36,048	33,879	31,042	26,319	15,559	48,052	15,307
Chinkapin oak	2,414	24	167	278	- -	- -	- -	776	- -	1,169	- -
All species	995,938	39,987	74,292	106,829	136,406	150,175	136,442	107,831	66,212	148,018	29,746

(Table 7 continued)

(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											
Select red oaks											
Northern red oak	1,655,243	40,366	91,356	158,419	235,292	284,873	239,791	188,921	147,961	223,605	44,659
All species	1,655,243	40,366	91,356	158,419	235,292	284,873	239,791	188,921	147,961	223,605	44,659
Other red oaks											
Northern pin oak	423,488	26,084	52,900	71,955	73,416	64,742	49,840	31,615	25,033	26,625	1,278
Black oak	422,352	18,736	37,685	61,084	67,259	60,358	57,448	49,916	25,146	40,579	4,143
All species	845,840	44,820	90,585	133,039	140,674	125,100	107,288	81,531	50,179	67,204	5,421
Hickory											
Bitternut hickory	96,945	15,379	21,431	23,966	15,456	11,828	5,813	753	1,101	1,219	- -
Shagbark hickory	147,935	14,600	22,801	31,741	28,658	21,898	10,796	6,939	7,173	3,328	- -
All species	244,880	29,979	44,232	55,707	44,114	33,726	16,609	7,692	8,274	4,547	- -
Yellow birch											
Yellow birch	270,805	31,636	38,441	44,704	41,886	37,672	26,131	16,148	10,143	21,917	2,127
All species	270,805	31,636	38,441	44,704	41,886	37,672	26,131	16,148	10,143	21,917	2,127
Hard maple											
Black maple	5,682	314	270	562	719	401	693	958	- -	1,765	- -
Sugar maple	2,196,100	229,666	372,263	438,450	367,705	244,375	169,708	132,815	92,813	138,753	9,552
All species	2,201,782	229,980	372,533	439,012	368,423	244,776	170,401	133,773	92,813	140,518	9,552
Soft maple											
Red maple	2,002,877	307,596	439,057	426,872	323,713	223,086	124,051	69,534	35,493	51,199	2,276
Silver maple	306,430	5,765	12,512	24,041	24,033	30,368	27,125	34,154	29,818	83,782	34,834
All species	2,309,307	313,360	451,569	450,913	347,746	253,454	151,175	103,688	65,311	134,981	37,110
Beech											
American beech	33,839	3,201	4,917	3,180	3,010	5,447	2,216	473	2,773	6,103	2,518
All species	33,839	3,201	4,917	3,180	3,010	5,447	2,216	473	2,773	6,103	2,518
Ash											
White ash	370,877	21,750	39,530	58,351	67,376	58,387	54,394	31,318	20,649	19,122	- -
Black ash	503,432	114,848	138,608	112,064	70,709	40,244	14,254	7,066	2,666	2,973	- -
Green ash	283,396	36,513	53,893	60,205	45,660	36,799	17,656	8,918	7,342	16,408	- -
All species	1,157,705	173,111	232,031	230,620	183,746	135,431	86,304	47,301	30,658	38,503	- -
Cottonwood and aspen											
Balsam poplar	39,819	6,159	8,546	6,893	10,557	5,639	567	1,459	- -	- -	- -
Eastern cottonwood	63,834	1,267	902	1,598	1,472	3,605	5,356	2,784	7,361	24,706	14,782
Bigtooth aspen	692,758	64,388	83,561	107,690	136,400	140,523	91,219	38,195	19,418	11,365	- -
Quaking aspen	1,665,840	290,944	328,051	353,279	279,617	201,830	125,300	54,699	18,774	13,345	- -
Silver poplar	155	59	96	- -	- -	- -	- -	- -	- -	- -	- -
All species	2,462,406	362,817	421,155	469,461	428,045	351,598	222,442	97,137	45,553	49,417	14,782

(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											
Basswood											
American basswood	1,047,096	63,531	129,193	192,953	209,144	181,408	113,523	77,634	33,700	46,011	- -
All species	1,047,096	63,531	129,193	192,953	209,144	181,408	113,523	77,634	33,700	46,011	- -
Black walnut											
Black walnut	88,776	5,305	8,626	10,359	12,918	12,048	13,637	13,092	4,795	7,997	- -
All species	88,776	5,305	8,626	10,359	12,918	12,048	13,637	13,092	4,795	7,997	- -
Other eastern soft hardwoods											
Boxelder	53,660	10,719	13,068	11,777	5,841	2,529	1,845	2,522	751	4,608	- -
River birch	15,627	995	1,861	2,663	2,058	2,471	2,102	1,556	1,921	- -	- -
Paper birch	657,755	112,154	184,731	183,923	104,446	46,818	16,507	8,085	1,093	- -	- -
Hackberry	17,262	2,645	3,281	2,922	3,090	2,083	1,081	2,159	- -	- -	- -
Walnut spp.	308	- -	136	172	- -	- -	- -	- -	- -	- -	- -
Butternut	12,967	1,458	2,688	2,967	1,801	1,251	1,869	- -	933	- -	- -
Black cherry	240,015	41,935	50,616	44,843	34,089	29,499	20,979	9,704	1,916	6,434	- -
Black willow	24,428	527	632	2,723	2,963	2,270	1,974	3,582	943	6,408	2,405
White willow		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
American elm	302,102	61,630	69,371	59,434	38,526	28,347	18,607	11,069	8,629	6,489	- -
Siberian elm	1,793	449	653	171	520	- -	- -	- -	- -	- -	- -
Slippery elm	72,660	8,519	10,832	13,477	10,247	8,314	5,503	5,120	3,694	6,954	- -
All species	1,398,578	241,031	337,868	325,074	203,582	123,582	70,466	43,796	19,879	30,894	2,405
Other eastern hard hardwoods											
Honeylocust	3,448	186	431	1,518	236	1,076	- -	- -	- -	- -	- -
Red mulberry	828	268	242	318	- -	- -	- -	- -	- -	- -	- -
Black locust	19,432	4,235	5,261	3,705	1,918	1,324	1,082	1,909	- -	- -	- -
Rock elm	2,707	787	876	1,044	- -	- -	- -	- -	- -	- -	- -
All species	26,415	5,476	6,810	6,584	2,154	2,400	1,082	1,909	- -	- -	- -
Total hardwoods	14,738,610	1,584,601	2,303,608	2,626,854	2,357,141	1,941,692	1,357,508	920,926	578,249	919,713	148,319
All species groups	20,007,820	2,296,639	3,211,629	3,510,644	3,086,333	2,460,412	1,763,977	1,222,338	801,382	1,414,033	240,434

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, 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									
Other yellow pines									
Scotch pine	58,699	10,133	10,768	17,998	9,132	4,194	6,474	- -	- -
All species	58,699	10,133	10,768	17,998	9,132	4,194	6,474	- -	- -
Eastern white and red pines									
Red pine	5,554,385	1,536,982	1,403,387	968,823	627,947	464,423	276,129	276,693	- -
Eastern white pine	6,101,334	480,780	607,338	602,373	702,450	645,738	571,809	2,001,038	489,809
All species	11,655,718	2,017,762	2,010,725	1,571,196	1,330,396	1,110,161	847,938	2,277,731	489,809
Jack pine									
Jack pine	769,221	367,718	243,858	101,062	44,807	11,777	- -	- -	- -
All species	769,221	367,718	243,858	101,062	44,807	11,777	- -	- -	- -
Spruce and balsam fir									
Fir spp.	898	898	- -	- -	- -	- -	- -	- -	- -
Balsam fir	584,750	361,658	123,268	73,029	22,307	4,489	- -	- -	- -
White spruce	1,018,487	230,876	187,858	220,020	184,390	84,215	66,560	44,568	- -
Black spruce	220,405	131,757	58,062	13,762	- -	9,139	- -	7,685	- -
All species	1,824,541	725,189	369,188	306,811	206,697	97,843	66,560	52,252	- -
Eastern hemlock									
Eastern hemlock	2,046,877	173,496	254,944	242,498	297,792	318,933	236,731	458,679	63,803
All species	2,046,877	173,496	254,944	242,498	297,792	318,933	236,731	458,679	63,803
Other eastern softwoods									
Eastern redcedar	73,841	28,428	6,534	28,554	10,325	- -	- -	- -	- -
Tamarack (native)	534,373	277,922	163,322	52,734	29,386	4,304	6,705	- -	- -
Norway spruce	31,313	14,619	9,616	4,000	3,079	- -	- -	- -	- -
Northern white-cedar	2,069,105	727,443	583,132	348,610	217,126	84,620	71,905	36,270	- -
All species	2,708,633	1,048,412	762,604	433,898	259,915	88,924	78,609	36,270	- -
Total softwoods	19,063,690	4,342,711	3,652,089	2,673,463	2,148,739	1,631,832	1,236,313	2,824,933	553,612
Hardwoods									
Select white oaks									
White oak	2,493,871	- -	390,331	486,310	457,555	369,047	231,688	482,028	76,912
Swamp white oak	92,731	- -	16,535	18,660	21,347	10,202	12,456	13,532	- -
Bur oak	957,949	- -	146,673	148,293	141,075	123,946	75,296	241,863	80,803
Chinkapin oak	9,479	- -	- -	- -	- -	3,690	- -	5,789	- -
All species	3,554,030	- -	553,539	653,263	619,977	506,884	319,441	743,211	157,715
Select red oaks									
Northern red oak	6,266,873	- -	951,131	1,240,288	1,092,569	891,926	717,673	1,131,865	241,420
All species	6,266,873	- -	951,131	1,240,288	1,092,569	891,926	717,673	1,131,865	241,420

(Table 8 continued)

(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									
Northern pin oak	1,228,831	- -	300,211	283,928	229,330	150,664	122,494	135,371	6,834
Black oak	1,396,913	- -	277,284	266,373	264,412	238,280	122,575	205,843	22,146
All species	2,625,744	- -	577,496	550,301	493,742	388,943	245,069	341,214	28,980
Hickory									
Bitternut hickory	144,350	- -	57,224	47,596	25,089	3,345	5,254	5,843	- -
Shagbark hickory	326,255	- -	107,355	89,987	47,489	31,531	33,769	16,125	- -
All species	470,605	- -	164,579	137,583	72,578	34,875	39,022	21,968	- -
Yellow birch									
Yellow birch	747,323	- -	181,594	176,503	127,469	81,243	52,318	116,352	11,843
All species	747,323	- -	181,594	176,503	127,469	81,243	52,318	116,352	11,843
Hard maple									
Black maple	21,566	- -	2,912	1,780	3,189	4,554	- -	9,131	- -
Sugar maple	5,265,453	- -	1,519,665	1,092,140	793,624	640,866	458,176	710,027	50,956
All species	5,287,020	- -	1,522,577	1,093,921	796,813	645,420	458,176	719,158	50,956
Soft maple									
Red maple	3,653,994	- -	1,319,936	984,660	573,293	331,036	173,505	259,535	12,029
Silver maple	1,274,127	- -	96,287	133,338	124,026	161,428	144,675	424,775	189,597
All species	4,928,121	- -	1,416,223	1,117,998	697,319	492,465	318,180	684,310	201,626
Beech									
American beech	113,145	- -	13,222	25,730	10,954	2,427	14,210	32,340	14,262
All species	113,145	- -	13,222	25,730	10,954	2,427	14,210	32,340	14,262
Ash									
White ash	1,133,055	- -	277,072	257,829	251,046	149,720	101,027	96,360	- -
Black ash	624,602	- -	305,690	186,874	68,162	34,951	13,391	15,534	- -
Green ash	593,453	- -	187,172	162,776	81,643	42,633	35,997	83,232	- -
All species	2,351,110	- -	769,934	607,479	400,852	227,304	150,415	195,126	- -
Cottonwood and aspen									
Balsam poplar	79,257	- -	44,539	25,104	2,653	6,961	- -	- -	- -
Eastern cottonwood	288,063	- -	5,364	14,627	23,146	12,464	33,990	120,468	78,005
Bigtooth aspen	1,994,922	- -	580,784	640,527	431,626	186,636	96,898	58,451	- -
Quaking aspen	3,117,661	- -	1,183,560	915,670	591,392	265,559	93,108	68,371	- -
All species	5,479,903	- -	1,814,247	1,595,928	1,048,818	471,621	223,996	247,290	78,005
Basswood									
American basswood	3,014,535	- -	882,341	819,525	534,353	375,708	166,886	235,722	- -
All species	3,014,535	- -	882,341	819,525	534,353	375,708	166,886	235,722	- -

(Table 8 continued)

(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									
Black walnut									
Black walnut	307,442	--	55,866	55,810	65,546	64,547	24,054	41,619	--
All species	307,442	--	55,866	55,810	65,546	64,547	24,054	41,619	--
Other eastern soft hardwoods									
Boxelder	83,665	--	24,313	11,338	8,674	12,118	3,691	23,531	--
River birch	47,827	--	8,909	11,347	10,093	7,677	9,802	--	--
Paper birch	748,259	--	424,615	205,181	75,339	37,906	5,217	--	--
Hackberry	36,126	--	12,380	8,922	4,870	9,955	--	--	--
Butternut	27,073	--	7,671	5,674	9,064	--	4,663	--	--
Black cherry	456,676	--	140,339	130,990	97,237	46,426	9,369	32,316	--
Black willow	93,171	--	10,951	9,171	8,484	15,959	4,315	31,729	12,562
American elm	476,675	--	150,504	120,139	82,526	50,725	40,892	31,888	--
Siberian elm	1,869	--	1,869	--	--	--	--	--	--
Slippery elm	174,438	--	39,807	35,175	24,401	23,417	17,479	34,159	--
All species	2,145,778	--	821,359	537,937	320,687	204,182	95,428	153,623	12,562
Other eastern hard hardwoods									
Honeylocust	5,645	--	919	4,727	--	--	--	--	--
Black locust	28,173	--	7,904	5,944	5,065	9,260	--	--	--
All species	33,818	--	8,823	10,670	5,065	9,260	--	--	--
Total hardwoods	37,325,448	--	9,732,931	8,622,934	6,286,741	4,396,806	2,824,868	4,663,798	797,369
All species groups	56,389,138	4,342,711	13,385,020	11,296,397	8,435,480	6,028,639	4,061,180	7,488,731	1,350,980

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.

[1] 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, Wisconsin, 2001-2005

(In thousand dry tons)

Owner category and softwood/hardwood category	Tree biomass component							
			Growing-stock trees			Non-growing-stock trees		
	All components	All live 1-5 inch trees	Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	41,928	5,037	35,446	28,319	7,127	1,444	1,097	347
Hardwoods	139,387	15,978	109,462	78,909	30,552	13,948	10,174	3,774
Total	181,315	21,015	144,908	107,229	37,680	15,392	11,272	4,121
Private								
Softwoods	65,524	7,307	56,272	45,010	11,261	1,945	1,477	469
Hardwoods	350,274	31,872	273,668	197,976	75,692	44,734	32,761	11,973
Total	415,798	39,179	329,939	242,986	86,953	46,680	34,238	12,442
All ownerships								
Softwoods	107,452	12,344	91,718	73,329	18,389	3,390	2,574	816
Hardwoods	489,661	47,850	383,129	276,885	106,244	58,682	42,935	15,747
Total	597,113	60,194	474,847	350,215	124,633	62,072	45,510	16,563

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, Wisconsin, 2000 to 2005

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines	1,729	585	1,144	- -
Eastern white and red pines	122,044	42,429	79,615	- -
Jack pine	7,558	3,940	3,618	- -
Spruce and balsam fir	19,710	8,403	11,307	- -
Eastern hemlock	11,961	5,064	6,897	- -
Other eastern softwoods	30,641	10,563	20,078	- -
Total softwoods	193,642	70,983	122,659	- -
Hardwoods				
Select white oaks	22,429	5,612	16,818	- -
Select red oaks	42,594	11,618	30,976	- -
Other red oaks	19,132	4,620	14,512	- -
Hickory	7,775	223	7,552	- -
Yellow birch	3,152	1,169	1,983	- -
Hard maple	59,703	20,845	38,858	- -
Soft maple	73,502	19,693	53,808	- -
Beech	659	134	525	- -
Ash	36,493	10,213	26,280	- -
Cottonwood and aspen	73,566	30,004	43,562	- -
Basswood	21,969	4,959	17,009	- -
Black walnut	6,772	10	6,762	- -
Other eastern soft hardwoods	44,214	6,323	37,891	- -
Other eastern hard hardwoods	82	77	6	- -
Total hardwoods	412,041	115,501	296,541	- -
All species groups	605,684	186,484	419,200	- -

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, 2000 to 2005

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Eastern white and red pines	39,906	4,780	35,125	- -
Jack pine	19,429	9,433	9,996	- -
Spruce and balsam fir	10,621	2,396	8,225	- -
Eastern hemlock	3,533	345	3,189	- -
Other eastern softwoods	2,305	40	2,265	- -
Total softwoods	75,794	16,994	58,801	- -
Hardwoods				
Select white oaks	20,255	3,840	16,415	- -
Select red oaks	41,009	8,211	32,797	- -
Other red oaks	9,940	3,694	6,246	- -
Hickory	2,410	89	2,321	- -
Yellow birch	4,823	625	4,198	- -
Hard maple	43,508	5,647	37,861	- -
Soft maple	29,007	5,080	23,927	- -
Beech	539	- -	539	- -
Ash	12,639	1,491	11,148	- -
Cottonwood and aspen	87,352	19,751	67,601	- -
Basswood	13,290	3,956	9,334	- -
Black walnut	1,424	- -	1,424	- -
Other eastern soft hardwoods	20,525	6,833	13,692	- -
Total hardwoods	286,722	59,219	227,503	- -
All species groups	362,516	76,212	286,304	- -

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, 2000 to 2005

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines	46	- -	46	- -
Eastern white and red pines	10,821	2,715	8,106	- -
Jack pine	3,949	1,390	2,559	- -
Spruce and balsam fir	26,405	11,952	14,453	- -
Eastern hemlock	268	- -	268	- -
Other eastern softwoods	2,480	183	2,298	- -
Total softwoods	43,970	16,240	27,730	- -
Hardwoods				
Select white oaks	7,652	280	7,371	- -
Select red oaks	14,181	3,304	10,877	- -
Other red oaks	5,243	1,215	4,028	- -
Hickory	852	- -	852	- -
Yellow birch	2,143	318	1,825	- -
Hard maple	3,639	1,381	2,257	- -
Soft maple	9,613	3,947	5,665	- -
Ash	9,637	1,673	7,964	- -
Cottonwood and aspen	49,396	21,412	27,984	- -
Basswood	4,370	1,439	2,931	- -
Other eastern soft hardwoods	25,237	4,406	20,831	- -
Other eastern hard hardwoods	483	118	365	- -
Total hardwoods	132,445	39,493	92,952	- -
All species groups	176,415	55,733	120,682	- -

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. (Hobie); Brand, Gary J. 2007. **Wisconsin's forest resources, 2005.** Resour. Bull. NRS-2. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 32 p.

The annual forest inventory of Wisconsin continues, and this document reports 2001-05 moving averages for most variables and comparisons between 2000 and 2005 for growth, removals, and mortality. Summary resource tables can be generated through the Forest Inventory Mapmaker website at http://ncrs2.fs.fed.us/4801/fiadb/index.htm. Estimates from this inventory show a total of 16.1 million acres of forest land in the State. The estimate of total net volume of all-live trees on forest land is 22.3 billion cubic feet (ft^3). In Wisconsin, timberland area totals 15.9 million acres, and net growing-stock volume on timberland is 20.0 billion ft^3. All-live, aboveground tree biomass on timberland is estimated at 597 million dry tons. Between 2000 and 2005, the average annual net growth of growing stock on timberland was 605.7 million ft^3 per year. Average annual removals of growing stock totaled 362.5 million ft^3 per year. Mortality was 176.4 million ft^3 per year. These estimates generally show a healthy, growing forest despite more than 222,000 acres of forest that were defoliated by the jack pine budworm in 2005.

KEY WORDS: annual inventory, forest land, timberland, forest type, volume, biomass, growth, removals, mortality

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