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Wisconsin's Forest Resources in 2002

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Wisconsin's Forest Resources in 2002

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 and compiling 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.

In 2002, fieldwork continued with the measurement of the third panel of the sixth inventory. The sixth inventory of Wisconsin's forest resources will be complete in 2004. However, because each year's panel is a systematic sample of the State's forest and timely information is needed about Wisconsin's forest resources, estimates have been prepared from data gathered in the first 3 years of the sixth inventory. Data and statistics prepared for this report represent 60 percent of the field plots (or three panels) for the complete inventory and are a combination of the first, second, and third panels. Because of the limited number of field plots measured, sampling errors are large at this point and the data in this report should be used with caution. Future estimates that incorporate data in this report are subject to change when ensuing annual inventories are completed and data compiled. Results presented are estimates based on sampling techniques. As additional annual inventories are completed, the precision of the estimates will increase and additional data will be released.

Reports of previous inventories of Wisconsin are dated 1936, 1956, 1968, 1983, and 1996. 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 occurred since the last inventory of Wisconsin in 1996 (Schmidt 1998). Some of these changes make it inappropriate to directly compare portions of the 2002 data with data published for 1996.

RESULTS

Area

The total land area of Wisconsin is 34.8 million acres. About 46 percent or 16.0 million acres were forested at the time of the fifth inventory (Schmidt 1998). Forest land area has remained stable at about 16.0 million acres since 1996. Timberland area, forest land that is capable of growing at least 20 cubic feet of industrial wood per acre at the culmination of mean annual increment and that is not reserved by statute from timber harvest, has increased slightly (fig. 1). The sampling errors associated with both the 1996 and 2002 estimates indicate that this increase may not be statistically significant. In other words, the difference between these two estimates may be due to statistical variation rather than an actual physical change. As additional data are collected, the precision of estimates made from the annual inventories will increase.

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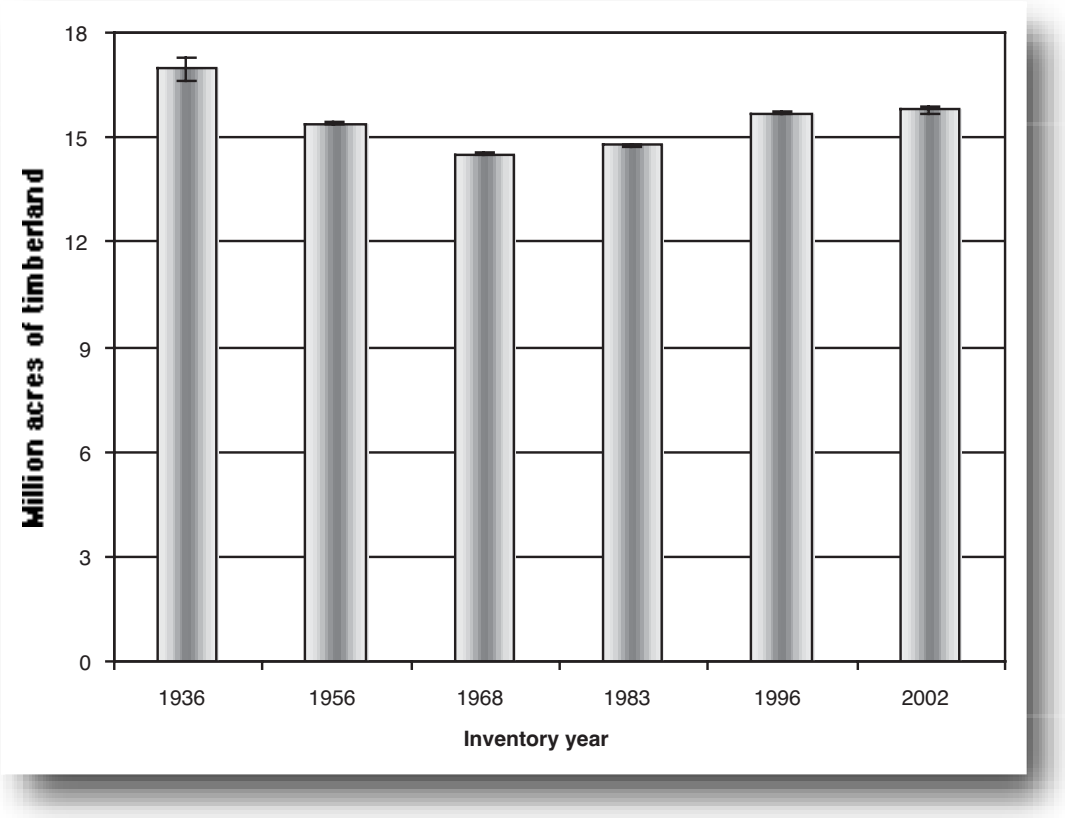

Figure 1.—*Area of timberland in Wisconsin by inventory year. The vertical line at the top of each bar represents the sample error associated with each inventory.*

Covering more than 5.1 million acres, the maple-beech-birch forest type group remains the dominant forest type group in the State (fig. 2). Together, hardwood forest types have decreased about 30 thousand acres since the 1996 inventory. The timberland area of softwood forest types has increased almost 86 thousand acres since 1996.

Since 1996, the area of timberland owned by private individuals and corporations has decreased by about 341 thousand acres while the area under public control has increased by about 433 thousand acres (fig. 3). Despite this change, about 68 percent of Wisconsin's timberland is privately owned.

The timberland area occupied by the seedling-sapling stand-size class has decreased by 24 percent since 1996 (fig. 4). The area occupied by the poletimber stand-size class has decreased by about 3 percent, while the area occupied by sawtimber has increased by 30 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. As additional panels of annual data are collected and current procedures are used to update the 1996 estimates, comparisons and trends will become clearer.

Volume

In previous inventories, the volume of all live trees greater than 5.0 inches diameter at 4.5 feet above the ground (d.b.h.) 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. Analyses focused on growing-stock and sawtimber volumes. The volume of all live

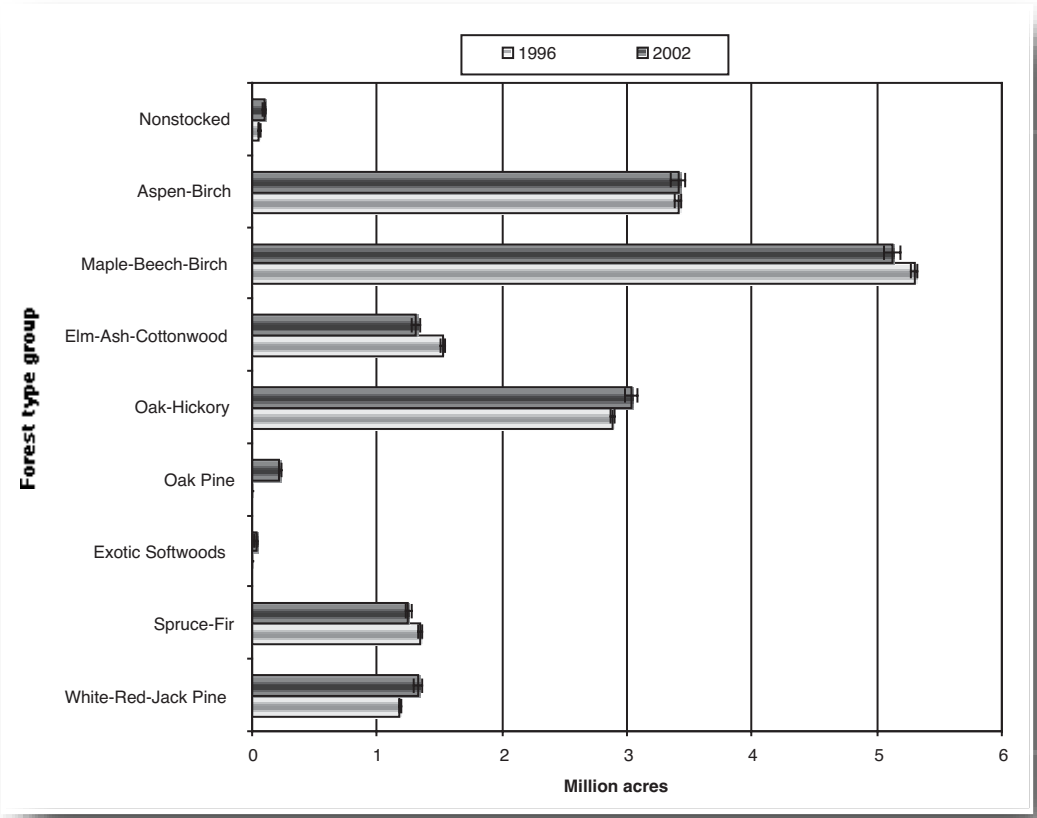

Figure 2.—*Area of timberland in Wisconsin in 1996 and 2002 by forest type group. The vertical line at the end of each bar represents the sample error associated with each inventory.*

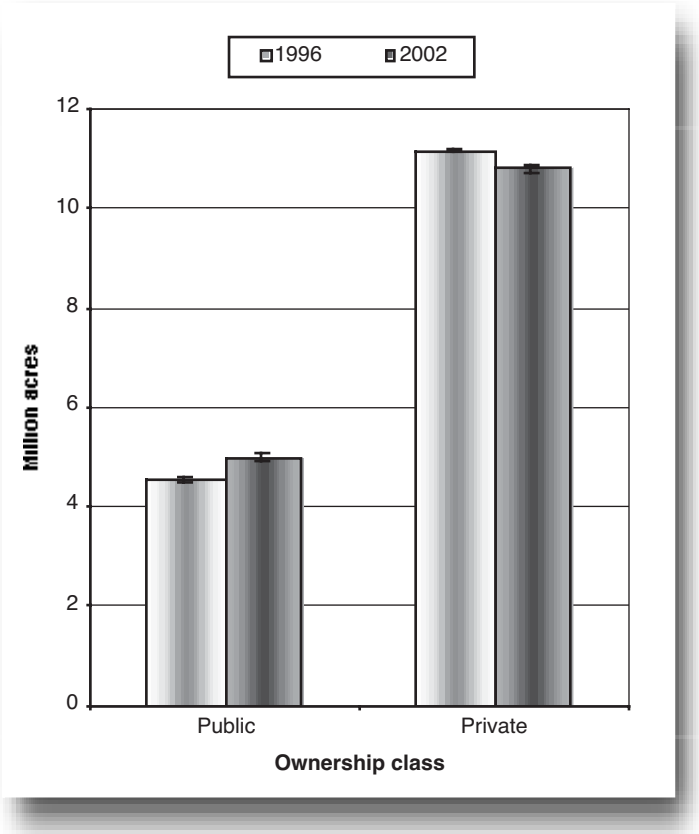

Figure 3.—*Area of timberland in Wisconsin by owner category. The vertical line at the top of each bar represents the sample error associated with each inventory.*

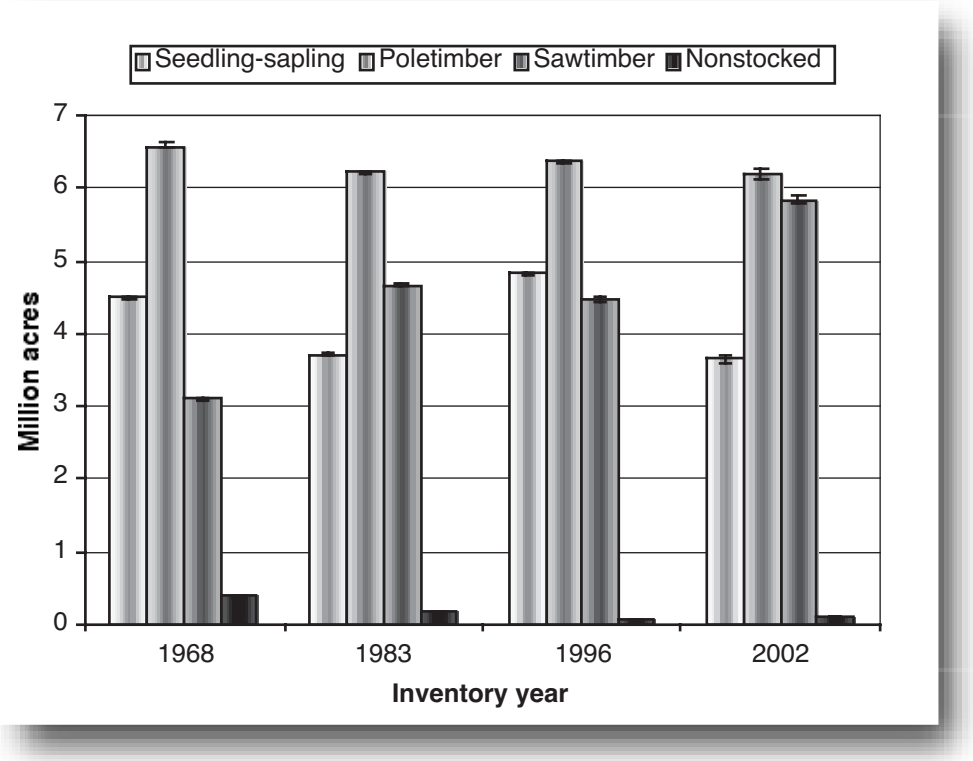

Figure 4.—*Area of timberland in Wisconsin by stand-size class and inventory year. The vertical line at the top of each bar represents the sample error associated with each inventory.*

trees on reserved and other forest land was not reported. With the 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 live tree volume on all forested land. In 2002, the volume of all live trees on forest land in Wisconsin was 22.2 billion cubic feet. However, 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 2002, the volume of growing stock on timberland in Wisconsin was 19.5 billion cubic feet (fig. 5). Hardwood species accounted for 74 percent of the growing-stock volume and 66 percent of the sawtimber volume (fig. 6). Cottonwood and aspen was the hardwood species group with the greatest growing-stock volume; the select red oak group had the largest sawtimber volume.

The growing-stock volume of softwood species totaled 5.1 billion cubic feet in 2002. Eastern white and red pines accounted for 51 percent of the softwood growing-stock volume and 62 percent of the softwood sawtimber volume.

Biomass

Biomass, the aboveground weight of live trees 1.0 inch d.b.h. and larger on timberland, is an important estimate 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 as nearly 598 million dry tons. Of the total biomass, 82 percent was hardwood species and 18 percent was softwoods species. Fifty-seven percent of the total biomass was in the boles of growing-stock trees. Private lands accounted for 70 percent of the total biomass in Wisconsin, and public lands contained 30 percent.

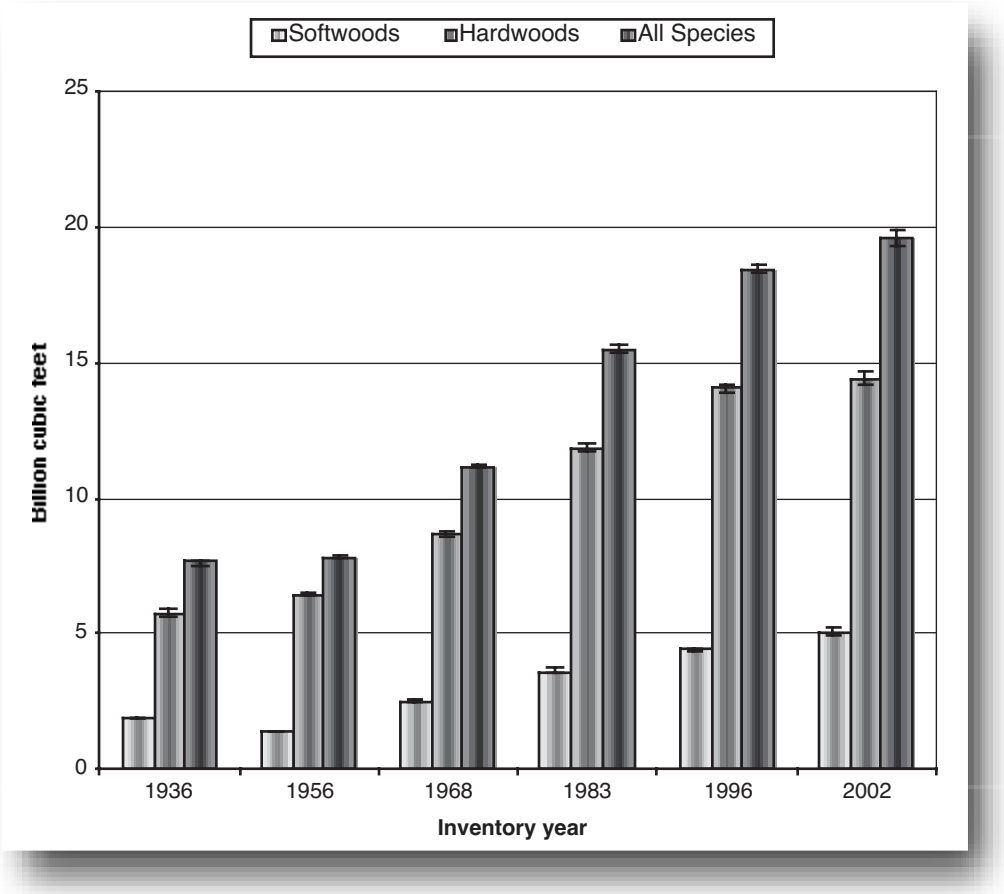

Figure 5.—*Growing-stock volume in Wisconsin by inventory year. The vertical line at the top of each bar represents the sample error associated with each inventory.*

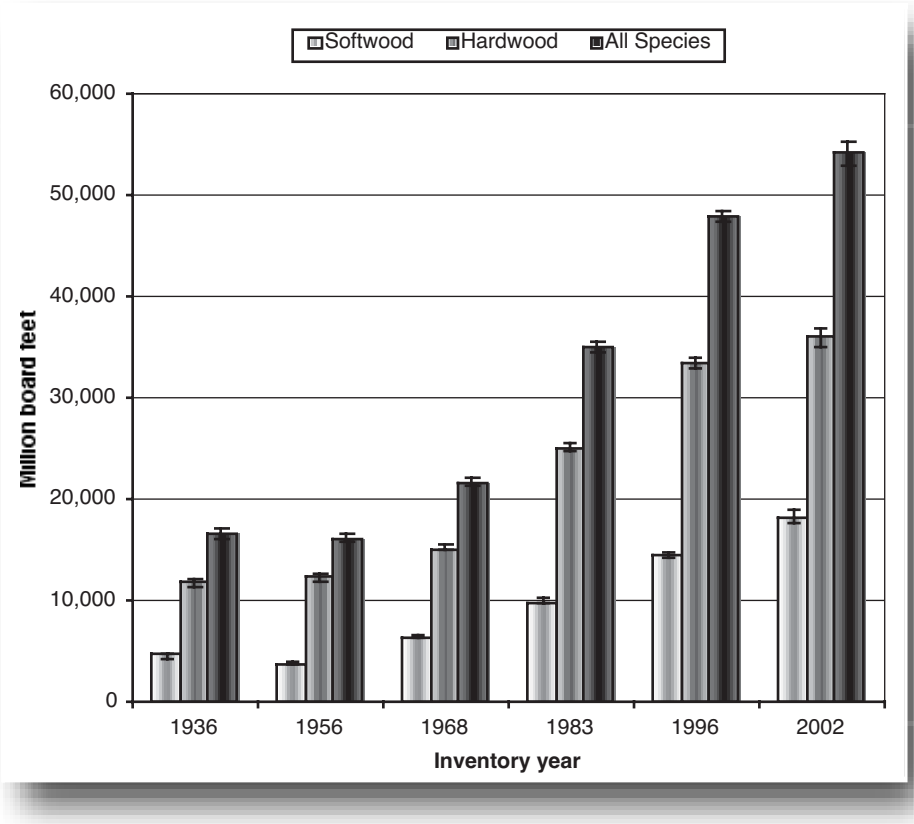

Figure 6.—*Sawtimber volume in Wisconsin by inventory year. The vertical line at the top of each bar represents the sample error associated with each inventory.*

Forest Health

Insects, pathogens, weather, and fire cause damage to Wisconsin's forests each year. The following are among the most serious threats.

Gypsy Moth (*Lymantria dispar*)—The gypsy moth threat to Wisconsin's forests continues to grow. The population is increasing in eastern Wisconsin, and a few communities have begun to experience defoliation, particularly in oak-dominated parkland. Patches of defoliation greater than 5 acres were seen in 12 counties (including new defoliation in central and southern Wisconsin), with 2,700 acres of heavy defoliation in Marinette and Menominee Counties. In 2002, statewide defoliation was approximately 3,700 acres, nearly all of which was in Marinette County.

Trap catch of males indicates populations continue to increase in eastern counties. Numbers are particularly high in north-central and shoreline Marinette County, in the Fox River Cities, and northwest of Milwaukee.

Forest Tent Caterpillar (*Melanocarpa disstria*)—Scattered heavy defoliation on oak, aspen, ash, birch, and crabapple trees was observed in Lincoln, Oneida, and Vilas Counties. Reports of migrating caterpillars were also received from Florence, Forest, and Langlade Counties. Some areas have been infested since 1998. By 2002, over 5 million acres were defoliated in Wisconsin. Defoliated trees produced a second set of leaves by early summer, using valuable nutrient reserves and causing stress to trees.

Twolined Chestnut Borer (*Agrilus bilineatus*)—Mortality of mature oak by a native beetle, the twolined chestnut borer, was observed throughout northern Wisconsin, especially in Vilas, Oneida, and Lincoln Counties in the northeast and in Douglas, Sawyer, Bayfield and northern Washburn Counties in the northwest. Normally a weak secondary invader of oaks injured by drought or defoliation, the twolined chestnut borer attacked trees this year that had been defoliated by the forest tent caterpillar. Multiple years of defoliation, coupled with dry weather and sandy soils, can make defoliated trees much more vulnerable to attack. The larval stage of this flat-headed beetle mines the cambium of stressed oaks, eventually killing them. Infested trees often show browning and dieback of leaves starting in the upper crown and progressing downward.

Bronze birch borer (*Agrilus anxius*)—Dieback and mortality of birch were also noticed in Lincoln, Oneida, and Vilas Counties. Many of these trees were infested by the bronze birch borer. Adult beetles primarily attack birches that are weakened or stressed by drought, old age, insect defoliation, soil compaction, or a stem or root injury. Attacked birches in northern Wisconsin were weakened by repeated years of heavy defoliation by the forest tent caterpillar. As with the twolined chestnut borer, the drop in forest tent caterpillar populations after 2002 will probably mean increased survival of birches.

Oak Wilt (*Ceratocystis fagacearum*)—More oak wilt pockets were found this summer in Spread Eagle, Florence County. All of the new sites were located within 1 mile from the sites that were detected in 1999. The presence of oak wilt in Florence County was first confirmed in 1999. Barron County sustained its first confirmed report of oak wilt in 2002. Approximately 10 trees in a wooded residential lot on the west shore of Prairie Lake showed symptoms of oak wilt.

Tubakia Leaf Disease (*Tubakia dryina*)—A leaf disease caused by the fungus *Tubakia dryina* has recently been observed infecting bur and white oak throughout southern Wisconsin. Bur oaks are more commonly infected; white oaks are only occasionally infected. This disease has been observed on an annual basis for many decades but has increased in incidence and severity since 1999. Infected bur oaks have been observed throughout southern Wisconsin and

as far north as Portage County. Symptoms first appear in late July and consist of small, necrotic spots on leaves in the lower crown. Throughout August, spots expand, coalesce, and can eventually turn the whole leaf brown. Infected trees often have full crowns of shriveled, necrotic leaves in middle to late August. Bur oaks on a wide variety of sites and of all ages have been infected. Bur oaks that are already under stress from drought or compaction are showing signs of dieback. Samples collected from declining trees have revealed the presence of the twolined chestnut borer. If these high levels of infection continue, further pressure by the twolined chestnut borer is expected and that could lead to mortality.

Ash Yellows (phytoplasma)—Ash yellows was confirmed in two new locations in the forests of Wisconsin this year. This disease was observed initiating decline and killing large pole to small saw log white ash trees in a 5-acre woodlot in Ozaukee County. Brooms or masses of densely clustered branches were common on infected trees. The presence of these brooms has not previously been a common sign of infection in Wisconsin's forests. Ash yellows was also confirmed in Calumet County. This stand was a privately owned woodlot with a mix of ash, sugar maple, and black cherry. Symptoms such as thin crowns, chlorotic leaves, epicormic branches, and brooms were common in the stand. Ash yellows is a relatively recently discovered disease and is caused by a phytoplasma. This organism invades the tree's phloem and causes dieback and eventual mortality. These two new locations bring the total observations to six. Ash yellows has now been confirmed in the following counties: Calumet, Marathon, Manitowoc, Ozaukee, Sheboygan, and Waukesha.

White pine blister rust—The question of the validity of risk zone maps for white pine blister rust was addressed this year in a comparison study of disease incidence across Wisconsin's four risk zones (Van Arsdel 1968). Stem cankers occurred on an average of 4.8 percent of surveyed trees, while branch cankers were observed on another 3 percent. Levels of rust were significantly higher for trees bordering the edge of plantations where the alternate host, *Ribes*, was present in adjacent woods or fencerows. The proximity of Ribes proved to be the most significant determinant of rust levels, whereas risk zone was not significant. The average incidence of blister rust was significantly higher in risk zone 4 but varied widely within each of the three lower risk zones. Habitat type was a good predictor of rust incidence probably because of the occurrence of Ribes on predominantly mesic sites and its almost total absence on drier sites.

This information contributed to the rewriting of the management guidelines for white pine blister rust in the DNR silviculture handbook. Further work is planned in the upcoming field season and will focus on risk zone 3.

Annosus root rot (*Heterobasidion annosum*)—This root disease was first reported in 1993 as a cause of mortality in a red pine plantation in Adams County. Ten counties are confirmed with this root rot disease. The new counties were Buffalo, Green, La Crosse, Marquette, Trempealeau, and Walworth.

Red Pine Pocket Decline—Red pine pocket decline was first reported in Wisconsin in 1975 but was a relatively insignificant problem until about 5 years ago. This disease is actually a complex involving several species of root and lower stem-feeding insects along with their fungal symbiants. A sequence of events is initiated that creates circumscribed areas or "pockets" of progressive mortality of one to several trees.

As for geographic distribution, there does seem to be an important difference in disease incidence and severity between northern and southern Wisconsin. The number of pockets, as well as the average and maximum size of pockets per stand is lower in northern Wisconsin. The red turpentine beetle (*Dendroctonus*

valens) and *Leptographium* spp. co-occur in the vast majority of pockets. *D. valens* and *L. terebrantis* may play an aggressive role in pocket expansion and possibly in pocket initiation. Thinning of stands may play a role in this disease. For instance, a primary feeding site for these beetles is freshly cut stumps as well as healthy trees nearby. Pockets are almost nonexistent in unthinned stands, and very high numbers of *D. valens* are in recently thinned stands.

European Buckthorn (*Rhamnus cathartica*)—This exotic brush species continues to invade oak woodlots in the southeastern and south central counties where it displaces many species of native wild flowers and understory shrubs and prevents reproduction of native tree species.

Wind and Hail Storms—On May 12, 2000, a wind and hailstorm hit southern Waushara, northern Marquette, and central Manitowoc Counties. Meteorologists called it a thunderstorm super cell moist micro burst. Golf ball-sized hail and winds up to 110 mph were reported. Damage to oak, aspen, sugar maple, red and white pine, and bottomland hardwoods was scattered throughout approximately 167,000 acres. The large hailstones caused multiple wounds and stripping of the bark. Seedling and sapling-size trees were typically injured to such an extent that they died within 2 months following the storm. Ten- to twenty-year-old conifers also suffered significantly and started to die late in the summer. Pole- and sawtimber-sized trees of all species also incurred a significant number of hail wounds. Red pines desiccated quickly, and browning foliage was commonly observed 2 months after the storm. Many of the affected red pines are expected to die within the next year. White pines appeared to have withstood the multiple injuries better. Some browning of foliage was observed, but more white pines than red pines are expected to survive through the winter.

The fungus, *Sphaeropsis sapinea*, known to proliferate on hail-damaged red pine, was observed in Waushara County approximately 2 months after the storm. Red pines that do survive will be faced with the threat of dieback and cankers initiated by *S. sapinea*. The frequent rains that came throughout the summer helped prevent the buildup of bark beetles. No outbreaks or significant damage from bark beetles were observed.

Surveys conducted in 2001 in storm-damaged areas showed an average 30 percent increase in crown dieback, in overstory trees on both the lowland and upland sites, and a similar decrease in transparency. Apparently most new growth was concentrated on the few healthy branches and badly damaged limbs died off. Only 1 in 30 trees had died on the lowland plot and 2 of 30 had died on the upland site.

In a Waushara County red and white pine stand, tree health improved dramatically. Lateral branches had taken over in 92 percent of trees with dead leaders in 2001. Height growth had improved significantly as well: about 66 percent higher overall with an increase of over 230 percent for white pine. Dieback, which had averaged about 40 percent in 2000, was 25 percent in 2001. This stand seems to have recovered quite well.

High-speed straight-line winds also ripped through central Juneau County, just north of New Lisbon, on June 1, 2000. Hardwoods, including oak and aspen, were damaged through main stem breakage or uprooting. Approximately 90 percent of the damaged trees were hardwoods and 10 percent were conifers (white and red pine). The path of the storm covered approximately 6,215 acres. Damage was discontinuous throughout the affected area.

On August 14, 2000, a similar storm, also with golf ball-sized hail, damaged timber on approximately 25,500 acres in Douglas County. Winds

as high as 60 mph were recorded. The damage, scattered throughout the 25,500 acres, injured species including red, jack, and white pines and aspen. Because this storm hit later in the growing season, buds were tougher and damage to the buds appears to be less severe than from the spring storm. Other injuries included multiple stem wounds on all affected species, loss of foliage, and some branch breakage. Much of the damaged area was harvested.

Summary

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

APPENDIX

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, the NCFIA inventoried each State on a cycle that averaged about 15 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 an annual inventory system, approximately one-fifth of all field plots are measured in any single year. After 5 years, the entire inventory will be completed. After the initial 5-year period, NCFIA will report and analyze results as a moving 5-year average. For example, NCFIA will be able to generate inventory results for 2000 through 2005 or for 2001 through 2006. Although there are great advantages for an annual inventory, one difficultly is reporting on results in the first 4 years. With the 2002 inventory, only 60 percent of all field plots have been measured. Sampling error estimates for the 2002 inventory are 0.73 percent for timberland area and 1.45 percent for growing-stock volume. Thus, caution should be used when drawing conclusions based on this limited data set. As ensuing measurements are completed, we will have additional confidence in our results because of the increased number of field plots measured. As each measurement year is completed, the quantity and quality of the results will expand.

Other significant changes between inventories include the implementation of new remote sensing technology, implementation of a new field plot 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 computer-assisted 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. Previous inventories used manual interpretation of aerial photographs to stratify the sample.

New algorithms were used in 2002 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, equations 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 2000-2002 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 2002 Wisconsin survey used a two-phase sample for stratification that included remeasuring inventory plots from the 1996 inventory and new field plots. Two-phase sampling, also called double sampling, consists

of a phase 1 sample used to estimate area by strata and a phase 2 sample used to estimate the average value of parameters of interest within the strata. The estimated population total is the sum across all strata of each stratum's estimated area multiplied by its estimated mean per unit area.

The only land that could not be sampled was private land where field personnel could not obtain permission to measure a phase 2 plot and plots that could not be accessed because of a hazard or danger to field personnel. The methods used in the preparation of this report made the necessary adjustments to account for sites where access was denied or hazardous. Fortunately, there were only 198 denied access or hazardous plots in the 2002 Wisconsin survey.

Phase 1

The Wisconsin inventory used a computer-assisted 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 edge formed two additional strata—forest/nonforest and nonforest/forest. Forest pixels within 60 m of the boundary on the forest side were classified as forest/nonforest. Pixels within 60 m of the boundary on the nonforest side were classified into the nonforest/forest strata. An overlay of all national forest land was used to identify all lands owned by the Chequamegon and Nicolet National Forests. These national forest lands were treated separately but were also stratified into one of the above four strata. Stratification and estimation were conducted at the State level for national forest lands and at the FIA Inventory Unit level for other lands. In the national forest stratum, forest and forest/nonforest strata were combined.

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 established a grid that divides the entire United States into non-overlapping hexagons, each of which contains 5,937 acres (McRoberts 1999). A grid 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 near the hexagon center (McRoberts 1999). This grid 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.

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—to optimize our ability to collect data when available for measurement. 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 non-woody understory vegetation, ground cover, soils, and other variables. We anticipate

that in Wisconsin the complete 5-year annual inventory will involve about 160 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 is expected to involve about 4,830 phase 2 forested plots. In the 2001/2002 inventory, measurements were made on 1,186 timberland, 7 other forest land, 12 reserved forest land, and 1,522 nonforest plots. This intensification was accomplished with additional resources provided by the State of Wisconsin.

The national FIA 4-point cluster plot design (fig. 7) was first used for data collection in Wisconsin in 2000 and will be used in subsequent years. The national plot design requires mapping of all forest conditions found at each plot. Because of the small sample size each year, precision associated with components of change such as mortality will be relatively low. Consequently, we will report estimates of components of change only after multiple annual panels have been measured. Even then, we anticipate that estimates of change will be limited in detail. When the complete annual inventory has been implemented in 2004, the full range of change estimates will be available.

The overall plot layout for the new design 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 within the sample unit. Trees with diameter at breast height (d.b.h. or 4.5 feet above ground level) 5.0 inches 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

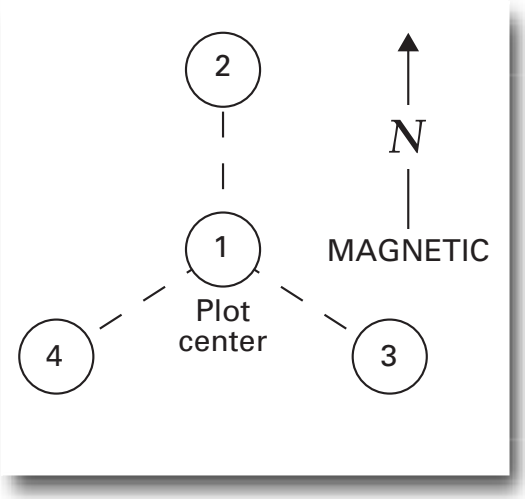

Figure 7.—*Current NCFIA field plot design.*

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 generated from a single year's data is limited. However, as additional annual inventories are completed, the number of tables will increase until year 5, when all statewide inventory summary tables will be available in both printed and electronic formats.

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TABLE TITLES

TABLES

Table 1. -- Area of forest land by forest type group and owner category, Wisconsin, 2000 - 2002

(In thousand acres)

Forest type group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
White / red / jack pine	1,342.8	565.7	777.1	- -
Spruce / fir	1,300.9	565.2	735.7	- -
Pinyon / juniper	3.8	3.8	- -	- -
Exotic softwood	26.2	4.1	22.0	- -
All softwood types	2,673.6	1,138.8	1,534.8	- -
Hardwood type groups				
Oak / pine	223.5	66.6	156.9	- -
Oak / hickory	3,062.5	542.1	2,520.5	- -
Elm / ash / cottonwood	1,343.9	347.1	996.9	- -
Maple / beech / birch	5,181.1	1,601.0	3,580.1	- -
Aspen / birch	3,426.0	1,414.8	2,011.2	- -
All hardwood types	13,237.1	3,971.6	9,265.6	- -
Nonstocked	94.7	30.7	64.0	- -
All forest types	16,005.4	5,141.0	10,864.4	- -

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, 2000 - 2002

(In thousand acres)

Major forest type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	1,893.8	793.6	1,100.2	- -
Planted	715.4	302.6	412.7	- -
All softwood types	2,609.2	1,096.3	1,512.9	- -
Hardwood type groups				
Natural	12,900.5	3,766.5	9,134.0	- -
Planted	191.9	88.4	103.5	- -
All hardwood types	13,092.4	3,854.9	9,237.5	- -
Nonstocked	93.3	29.3	64.0	- -
All groups	15,794.9	4,980.4	10,814.4	- -

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 3. -- Area of timberland by forest type group, forest type, and stand-size class, Wisconsin, 2000 - 2002

(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	339.0	79.7	128.4	130.9	- -
Red pine	639.1	359.1	197.9	82.2	- -
Eastern white pine	305.3	229.7	36.5	39.1	- -
Eastern hemlock	48.5	48.5	0.1	- -	- -
All forest types	1,332.0	717.0	362.8	252.2	- -
Spruce / fir group					
Balsam fir	206.5	9.5	70.9	126.1	- -
White spruce	62.0	11.9	33.0	17.1	- -
Black spruce	383.0	14.6	90.6	277.8	- -
Tamarack	275.1	10.9	163.1	101.1	- -
Northern white-cedar	324.4	133.4	175.2	15.7	- -
All forest types	1,251.1	180.3	532.9	537.9	- -
Exotic softwood group					
Exotic softwood	17.4	8.8	7.5	1.1	- -
Scotch pine	8.7	- -	- -	8.7	- -
All forest types	26.2	8.8	7.5	9.8	- -
All softwood groups	2,609.2	906.1	903.1	799.9	- -
Hardwood type groups					
Oak / pine group					
Oak / pine	2.8	0.5	1.1	1.3	- -
White pine / red oak / white ash	90.2	43.0	28.1	19.1	- -
Eastern redcedar / hardwood	11.5	5.6	- -	5.8	- -
Other pine / hardwood	119.0	45.0	32.6	41.3	- -
All forest types	223.5	94.2	61.8	67.5	- -
Oak / hickory group					
Oak / hickory	1,847.1	1,126.0	450.1	270.9	- -
Post oak / blackjack oak	171.5	84.7	43.0	43.8	- -
White oak / red oak / hickory	521.5	291.4	183.4	46.6	- -
White oak	41.6	41.6	- -	- -	- -
Northern red oak	178.5	157.1	21.4	- -	- -
Bur oak	65.6	33.8	10.5	21.4	- -
Black walnut	12.9	12.9	- -	- -	- -
Black locust	4.9	- -	4.9	- -	- -
Chestnut oak / black oak / scarlet oak	26.3	22.0	2.5	1.7	- -
Red maple / oak	32.5	11.0	17.1	4.4	- -
Mixed upland hardwoods	127.1	43.1	46.6	37.4	- -
All forest types	3,029.5	1,823.7	779.6	426.2	- -

(Table 3 continued on next page)

(Table 3 continued)

Forest type group/ forest type	Stand-size class				
	All stands	Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Hardwood type groups					
Elm / ash / cottonwood group					
Elm / ash / cottonwood	872.4	213.8	436.1	222.5	- -
Black ash / American elm / red maple	253.7	26.4	154.1	73.2	- -
Cottonwood	3.8	3.8	- -	- -	- -
Willow	8.9	1.0	6.8	1.1	- -
Sycamore / pecan / American elm	33.0	4.8	24.9	3.3	- -
Sugarberry / hackberry / elm / green ash	28.7	- -	22.6	6.1	- -
Silver maple / American elm	56.2	22.7	13.0	20.4	- -
Red maple / lowland	57.5	7.2	18.3	32.0	- -
Cottonwood / willow	3.0	3.0	- -	- -	- -
All forest types	1,317.3	282.7	675.9	358.7	- -
Maple / beech / birch group					
Maple / beech / birch	3,575.6	1,535.5	1,561.0	479.1	- -
Sugar maple / beech / yellow birch	708.2	374.7	274.4	59.0	- -
Black cherry	26.3	- -	6.0	20.3	- -
Cherry / ash / yellow-poplar	29.5	7.7	7.4	14.5	- -
Hard maple / basswood	508.6	318.8	183.0	6.8	- -
Elm / ash / locust	63.7	6.3	32.8	24.6	- -
Red maple / upland	202.3	34.6	154.4	13.3	- -
All forest types	5,114.2	2,277.6	2,219.0	617.6	- -
Aspen / birch group					
Aspen / birch	6.3	- -	5.0	1.2	- -
Aspen	2,902.9	397.7	1,215.8	1,289.4	- -
Paper birch	463.7	58.4	325.1	80.2	- -
Balsam poplar	35.0	5.7	10.6	18.7	- -
All forest types	3,407.8	461.7	1,556.5	1,389.6	- -
All hardwood groups	13,092.4	4,940.0	5,292.8	2,859.6	- -
Nonstocked	93.3	- -	- -	- -	93.3
All forest groups	15,794.9	5,846.1	6,195.9	3,659.5	93.3

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 4. -- Net volume of all live trees on forest land by species group, species, and owner category, Wisconsin, 2000 - 2002

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines				
Scotch pine	15,023	1,704	13,320	- -
All species	15,023	1,704	13,320	- -
Eastern white and red pines				
Red pine	1,347,570	611,836	735,733	- -
Eastern white pine	1,370,172	469,549	900,622	- -
All species	2,717,741	1,081,386	1,636,356	- -
Jack pine				
Jack pine	300,892	102,472	198,419	- -
All species	300,892	102,472	198,419	- -
Spruce and balsam fir				
Balsam fir	408,867	165,195	243,672	- -
White spruce	257,718	148,247	109,471	- -
Black spruce	207,474	110,893	96,581	- -
All species	874,059	424,335	449,723	- -
Eastern hemlock				
Eastern hemlock	461,526	169,963	291,562	- -
All species	461,526	169,963	291,562	- -
Other eastern softwoods				
Fraser fir	187	- -	187	- -
Eastern redcedar	31,412	1,894	29,518	- -
Larch (introduced)	1,449	75	1,374	- -
Tamarack (native)	265,625	83,302	182,324	- -
Norway spruce	11,597	4,859	6,739	- -
Austrian pine	109	- -	109	- -
Northern white-cedar	697,467	269,248	428,219	- -
All species	1,007,846	359,377	648,469	- -
Total softwoods	5,377,087	2,139,238	3,237,850	- -
Hardwoods				
Select white oaks				
White oak	827,159	76,314	750,846	- -
Swamp white oak	33,124	14,564	18,560	- -
Bur oak	401,456	39,685	361,771	- -
Chinkapin oak	2,640	682	1,958	- -
All species	1,264,380	131,244	1,133,135	- -
Select red oaks				
Northern red oak	1,841,872	466,803	1,375,068	- -
Shumard oak	117	- -	117	- -
All species	1,841,988	466,803	1,375,185	- -
Other white oaks				
Chestnut oak	- -	- -	- -	- -
All species	- -	- -	- -	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Other red oaks				
Northern pin oak	451,731	118,448	333,283	- -
Blackjack oak	170	- -	170	- -
Pin oak	3,263	916	2,347	- -
Black oak	485,727	69,076	416,651	- -
All species	940,890	188,440	752,450	- -
Hickory				
Water hickory	- -	- -	- -	- -
Bitternut hickory	112,902	6,649	106,253	- -
Pignut hickory	- -	- -	- -	- -
Shagbark hickory	156,651	4,931	151,721	- -
Mockernut hickory	863	- -	863	- -
All species	270,417	11,580	258,837	- -
Yellow birch				
Yellow birch	364,298	147,455	216,844	- -
All species	364,298	147,455	216,844	- -
Hard maple				
Black maple	2,306	2,306	- -	- -
Sugar maple	2,526,702	967,674	1,559,029	- -
All species	2,529,009	969,980	1,559,029	- -
Soft maple				
Red maple	2,249,436	734,823	1,514,614	- -
Silver maple	233,559	134,988	98,571	- -
All species	2,482,996	869,811	1,613,185	- -
Beech				
American beech	29,588	2,570	27,018	- -
All species	29,588	2,570	27,018	- -
Ash				
White ash	417,393	108,676	308,716	- -
Black ash	577,061	205,768	371,293	- -
Green ash	269,326	51,218	218,108	- -
Blue ash	- -	- -	- -	- -
All species	1,263,779	365,662	898,117	- -
Cottonwood and aspen				
Balsam poplar	39,053	10,176	28,877	- -
Eastern cottonwood	63,138	8,538	54,600	- -
Bigtooth aspen	747,277	234,960	512,317	- -
Plains cottonwood	50	50	- -	- -
Quaking aspen	1,914,744	798,806	1,115,938	- -
Narrowleaf cottonwood	56	56	- -	- -
All species	2,764,317	1,052,586	1,711,731	- -
Basswood				
Basswood spp.	705	82	624	- -
American basswood	1,213,831	383,118	830,713	- -
All species	1,214,537	383,199	831,337	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Black walnut				
Black walnut	99,788	3,104	96,684	- -
All species	99,788	3,104	96,684	- -
Other eastern soft hardwoods				
Boxelder	122,347	7,809	114,539	- -
River birch	16,418	7,058	9,360	- -
Paper birch	773,737	271,114	502,623	- -
Hackberry	14,535	2,152	12,383	- -
Butternut	18,600	1,282	17,318	- -
Black cherry	272,466	49,988	222,478	- -
Black willow	25,531	4,453	21,078	- -
Winged elm	1,589	- -	1,589	- -
American elm	344,386	32,442	311,944	- -
Siberian elm	2,542	344	2,198	- -
Slippery elm	82,907	3,162	79,745	- -
All species	1,675,058	379,803	1,295,254	- -
Other eastern hard hardwoods				
Sweet birch	100	- -	100	- -
Flowering dogwood	- -	- -	- -	- -
Honeylocust	623	- -	623	- -
Red mulberry	3,939	676	3,263	- -
Black locust	21,365	806	20,559	- -
Rock elm	4,954	1,110	3,843	- -
All species	30,980	2,593	28,387	- -
Eastern noncommercial hardwoods				
Mountain maple	- -	- -	- -	- -
Mimosa / silktree	53	- -	53	- -
Serviceberry	317	90	228	- -
American hornbeam, musclewood	264	- -	264	- -
Hawthorn	5,112	201	4,911	- -
Apple spp.	7,956	- -	7,956	- -
Eastern hophornbeam	49,934	5,111	44,823	- -
Cherry and plum spp.	- -	- -	- -	- -
Pin cherry	970	142	827	- -
Chokecherry	132	- -	132	- -
Canada plum	157	157	- -	- -
Wild plum	345	- -	345	- -
Willow	2,438	- -	2,438	- -
Peachleaf willow	1,005	149	856	- -
American mountain-ash	- -	- -	- -	- -
All species	68,684	5,850	62,834	- -
Total hardwoods	16,840,708	4,980,682	11,860,026	- -
All species groups	22,217,795	7,119,920	15,097,876	- -

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 5. -- Net volume of all live trees and salvable dead trees on timberland
by class of timber and softwood/hardwood species category, Wisconsin, 2000 - 2002

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	8,776,831	3,060,982	5,715,849
Upper stem portion	2,644,930	431,905	2,213,024
Total	11,421,760	3,492,887	7,928,873
Poletimber	8,119,894	1,606,756	6,513,139
All growing-stock trees	19,541,655	5,099,642	14,442,012
Cull trees			
Rough trees [1]			
Sawtimber size	1,515,899	132,421	1,383,478
Poletimber size	664,490	50,248	614,242
Total	2,180,389	182,669	1,997,720
Rotten trees [1]			
Sawtimber size	142,233	19,275	122,957
Poletimber size	35,116	4,287	30,829
Total	177,348	23,563	153,786
All live cull trees	2,357,738	206,231	2,151,506
All live trees	21,899,392	5,305,874	16,593,519
Salvable dead trees			
Sawtimber size	170,589	58,133	112,456
Poletimber size	167,016	43,546	123,470
All salvable dead trees	337,605	101,679	235,926
All classes	22,236,998	5,407,553	16,829,445

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates that 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, 2000 - 2002

(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	239,025	212,213	26,811
Red pine	1,239,490	1,174,864	64,626
Eastern white pine	721,258	634,971	86,287
Eastern hemlock	145,946	116,902	29,044
All forest types	2,345,719	2,138,951	206,768
Spruce / fir group			
Balsam fir	122,033	96,022	26,011
White spruce	78,796	69,341	9,455
Black spruce	183,159	173,186	9,973
Tamarack	208,420	194,650	13,770
Northern white-cedar	539,388	460,110	79,277
All forest types	1,131,796	993,310	138,486
Exotic softwood group			
Exotic softwood	17,490	15,576	1,914
Scotch pine	424	424	- -
All forest types	17,913	15,999	1,914
All softwood groups	3,495,428	3,148,260	347,169
Hardwood type groups			
Oak / pine group			
White pine / red oak / white ash	138,490	82,694	55,795
Eastern redcedar / hardwood	16,366	2,667	13,699
Other pine / hardwood	121,019	64,487	56,532
All forest types	275,875	149,848	126,027
Oak / hickory group			
Oak / hickory	2,382,840	156,001	2,226,839
Post oak / blackjack oak	158,698	14,060	144,639
White oak / red oak / hickory	674,634	33,877	640,756
White oak	65,248	1,700	63,548
Northern red oak	377,484	9,882	367,602
Bur oak	47,594	1,804	45,789
Black walnut	24,954	- -	24,954
Black locust	6,800	- -	6,800
Chestnut oak / black oak / scarlet oak	30,202	7,244	22,958
Red maple / oak	34,320	713	33,606
Mixed upland hardwoods	105,879	6,556	99,322
All forest types	3,908,653	231,840	3,676,813

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Elm / ash / cottonwood group			
Elm / ash / cottonwood	870,927	158,401	712,526
Black ash / American elm / red maple	208,211	46,049	162,162
Cottonwood	7,130	- -	7,130
Willow	4,900	- -	4,900
Sycamore / pecan / American elm	18,239	3,597	14,642
Sugarberry / hackberry / elm / green ash	33,417	504	32,913
Silver maple / American elm	38,474	73	38,401
Red maple / lowland	28,737	2,572	26,164
Cottonwood / willow	4,416	- -	4,416
All forest types	1,214,452	211,196	1,003,256
Maple / beech / birch group			
Maple / beech / birch	5,152,615	682,349	4,470,267
Sugar maple / beech / yellow birch	1,075,415	117,628	957,787
Black cherry	4,108	- -	4,108
Cherry / ash / yellow-poplar	14,915	2,483	12,432
Hard maple / basswood	956,483	12,109	944,374
Elm / ash / locust	32,721	- -	32,721
Red maple / upland	293,905	24,279	269,626
All forest types	7,530,161	838,847	6,691,314
Aspen / birch group			
Aspen / birch	8,085	7,095	990
Aspen	2,553,505	419,304	2,134,201
Paper birch	513,005	83,250	429,755
Balsam poplar	35,989	7,801	28,188
All forest types	3,110,585	517,450	2,593,135
All hardwood groups	16,039,725	1,949,181	14,090,545
Nonstocked	6,501	2,202	4,299
All forest groups	19,541,655	5,099,642	14,442,012

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 7. -- Net volume of growing stock on timberland by species group, species, and diameter class, Wisconsin, 2000 - 2002

(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	13,008	1,667	1,864	1,491	1,490	1,920	1,839	1,103	1,633	- -	- -
All species	13,008	1,667	1,864	1,491	1,490	1,920	1,839	1,103	1,633	- -	- -
Eastern white and red pines											
Red pine	1,334,037	113,653	227,642	303,475	235,349	154,319	112,966	86,181	49,370	51,081	- -
Eastern white pine	1,290,315	50,032	83,980	108,879	120,733	138,790	150,827	119,240	109,687	314,900	93,247
All species	2,624,352	163,685	311,623	412,354	356,082	293,109	263,793	205,421	159,057	365,981	93,247
Jack pine											
Jack pine	291,360	47,754	87,757	82,618	49,613	16,489	7,128	- -	- -	- -	- -
All species	291,360	47,754	87,757	82,618	49,613	16,489	7,128	- -	- -	- -	- -
Spruce and balsam fir											
Balsam fir	401,874	144,830	134,247	78,430	24,705	12,722	3,161	- -	1,642	2,137	- -
White spruce	252,173	30,465	44,564	41,510	35,058	40,795	29,279	19,724	10,779	- -	- -
Black spruce	204,144	87,721	68,404	30,063	14,664	1,559	1,732	- -	- -	- -	- -
All species	858,191	263,016	247,214	150,003	74,427	55,077	34,172	19,724	12,421	2,137	- -
Eastern hemlock											
Eastern hemlock	433,779	13,621	26,499	33,536	57,378	47,552	56,845	62,964	42,671	92,713	- -
All species	433,779	13,621	26,499	33,536	57,378	47,552	56,845	62,964	42,671	92,713	- -
Other eastern softwoods											
Fraser fir	187	- -	187	- -	- -	- -	- -	- -	- -	- -	- -
Eastern redcedar	23,829	8,173	5,682	5,897	440	2,845	792	- -	- -	- -	- -
Larch (introduced)	1,449	384	825	240	- -	- -	- -	- -	- -	- -	- -
Tamarack (native)	255,723	81,227	86,395	48,373	25,636	9,623	4,469	- -	- -	- -	- -
Norway spruce	11,597	2,046	3,902	2,749	1,475	651	775	- -	- -	- -	- -
Northern white-cedar	586,168	101,861	151,376	124,637	96,521	52,716	34,675	8,328	9,935	6,118	- -
All species	878,953	193,690	248,366	181,896	124,072	65,836	40,710	8,328	9,935	6,118	- -
Total softwoods	5,099,642	683,433	923,322	861,899	663,063	479,982	404,488	297,540	225,718	466,950	93,247
Hardwoods											
Select white oaks											
White oak	712,717	26,345	55,075	76,456	101,648	114,084	93,640	74,370	46,486	116,572	8,040
Swamp white oak	31,233	1,870	4,056	2,752	5,056	4,970	5,922	1,499	3,317	1,792	- -
Bur oak	292,905	13,735	21,858	30,961	37,508	36,343	24,328	30,006	22,749	58,424	16,993
Chinkapin oak	1,958	- -	269	447	- -	- -	- -	1,242	- -	- -	- -
All species	1,038,814	41,951	81,258	110,616	144,212	155,397	123,890	107,118	72,552	176,788	25,033
Select red oaks											
Northern red oak	1,641,314	42,914	89,717	166,006	231,279	257,714	238,385	196,689	118,798	240,772	59,040
Shumard oak	117	- -	117	- -	- -	- -	- -	- -	- -	- -	- -
All species	1,641,430	42,914	89,833	166,006	231,279	257,714	238,385	196,689	118,798	240,772	59,040
Other white oaks											
Chestnut oak	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
All species	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods											
Other red oaks											
Northern pin oak	346,320	22,119	44,175	59,393	66,368	52,726	39,464	18,927	21,240	21,910	- -
Blackjack oak	170	- -	170	- -	- -	- -	- -	- -	- -	- -	- -
Pin oak	2,111	559	317	305	930	- -	- -	- -	- -	- -	- -
Black oak	368,844	18,066	40,798	54,511	64,187	60,979	40,093	44,253	18,258	27,699	- -
All species	717,445	40,744	85,460	114,208	131,485	113,705	79,557	63,180	39,498	49,609	- -
Hickory											
Bitternut hickory	102,225	15,580	21,192	21,912	15,466	14,244	9,632	- -	1,854	2,345	- -
Pignut hickory	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Shagbark hickory	142,073	15,374	22,443	26,157	26,025	27,643	7,869	8,046	6,567	1,949	- -
Mockernut hickory	863	- -	- -	863	- -	- -	- -	- -	- -	- -	- -
All species	245,161	30,954	43,635	48,933	41,491	41,887	17,500	8,046	8,421	4,295	- -
Yellow birch											
Yellow birch	280,449	32,690	40,145	53,153	43,566	39,503	19,903	14,831	10,665	21,920	4,073
All species	280,449	32,690	40,145	53,153	43,566	39,503	19,903	14,831	10,665	21,920	4,073
Hard maple											
Black maple	2,306	133	- -	- -	634	- -	- -	1,539	- -	- -	- -
Sugar maple	2,189,898	239,611	374,565	468,129	374,443	226,359	168,378	113,807	90,303	130,651	3,652
All species	2,192,204	239,743	374,565	468,129	375,077	226,359	168,378	115,346	90,303	130,651	3,652
Soft maple											
Red maple	1,913,356	316,342	426,582	416,623	303,579	212,143	120,665	67,957	28,001	21,465	- -
Silver maple	174,295	2,947	9,612	18,153	16,321	21,396	20,205	14,404	16,343	40,928	13,985
All species	2,087,651	319,290	436,194	434,776	319,900	233,539	140,870	82,361	44,344	62,393	13,985
Beech											
American beech	26,453	2,372	3,559	4,359	3,757	3,225	2,629	- -	- -	2,108	4,445
All species	26,453	2,372	3,559	4,359	3,757	3,225	2,629	- -	- -	2,108	4,445
Ash											
White ash	383,157	22,755	33,296	54,643	78,413	57,497	61,314	28,398	22,018	24,823	- -
Black ash	531,669	119,196	141,941	119,619	71,802	40,989	20,692	14,107	3,323	- -	- -
Green ash	241,943	32,007	43,889	47,877	33,172	34,977	15,474	8,469	10,049	16,029	- -
All species	1,156,769	173,957	219,126	222,138	183,388	133,463	97,481	50,974	35,390	40,852	- -
Cottonwood and aspen											
Balsam poplar	37,594	3,763	7,313	7,748	9,982	6,158	- -	2,629	- -	- -	- -
Eastern cottonwood	55,230	278	381	1,514	1,196	4,392	6,124	2,660	6,962	22,904	8,819
Bigtooth aspen	714,788	62,660	80,066	113,575	152,251	154,501	82,332	35,500	18,674	15,231	- -
Plains cottonwood	50	50	- -	- -	- -	- -	- -	- -	- -	- -	- -
Quaking aspen	1,718,389	296,297	330,920	361,551	307,756	207,493	130,942	54,564	10,934	17,932	- -
Narrowleaf cottonwood	56	56	- -	- -	- -	- -	- -	- -	- -	- -	- -
All species	2,526,106	363,103	418,680	484,387	471,185	372,543	219,398	95,353	36,570	56,068	8,819
Basswood											
Basswood spp.	705	82	- -	- -	- -	624	- -	- -	- -	- -	- -
American basswood	1,098,627	65,784	133,905	216,824	234,217	179,344	104,930	76,621	31,281	55,722	- -
All species	1,099,332	65,865	133,905	216,824	234,217	179,967	104,930	76,621	31,281	55,722	- -

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods											
Black walnut											
Black walnut	92,196	5,550	8,222	12,926	12,267	16,241	10,493	16,861	2,657	6,979	- -
All species	92,196	5,550	8,222	12,926	12,267	16,241	10,493	16,861	2,657	6,979	- -
Other eastern soft hardwoods											
Boxelder	39,096	8,142	8,886	8,332	4,040	3,147	1,418	2,246	1,204	1,682	- -
River birch	10,842	1,352	1,854	1,982	2,372	1,852	- -	1,431	- -	- -	- -
Paper birch	682,212	118,332	190,277	189,513	108,544	43,031	21,455	11,061	- -	- -	- -
Hackberry	14,199	1,884	2,179	3,226	3,140	1,467	1,090	1,214	- -	- -	- -
Butternut	9,965	1,489	942	1,972	2,084	- -	1,982	- -	1,495	- -	- -
Black cherry	204,041	31,606	45,333	38,636	25,158	26,862	17,094	11,529	7,822	- -	- -
Black willow	6,104	250	726	1,563	1,165	621	1,780	- -	- -	- -	- -
Winged elm	961	47	- -	914	- -	- -	- -	- -	- -	- -	- -
American elm	273,656	52,572	59,261	56,702	33,559	29,991	17,718	7,102	11,528	5,221	- -
Siberian elm	1,631	672	137	510	312	- -	- -	- -	- -	- -	- -
Slippery elm	72,501	8,896	12,369	16,362	9,124	8,969	5,903	4,218	3,454	3,206	- -
All species	1,315,207	225,242	321,965	319,711	189,498	115,940	68,439	38,801	25,503	10,108	- -
Other eastern hard hardwoods											
Sweet birch	100	100	- -	- -	- -	- -	- -	- -	- -	- -	- -
Honeylocust	574	76	- -	498	- -	- -	- -	- -	- -	- -	- -
Red mulberry	810	102	146	562	- -	- -	- -	- -	- -	- -	- -
Black locust	17,057	3,052	4,471	3,917	- -	1,531	1,518	2,567	- -	- -	- -
Rock elm	4,254	1,076	1,246	805	400	727	- -	- -	- -	- -	- -
All species	22,795	4,406	5,864	5,782	400	2,258	1,518	2,567	- -	- -	- -
Total hardwoods	14,442,012	1,588,781	2,262,410	2,661,948	2,381,722	1,891,741	1,293,372	868,748	515,980	858,264	119,046
All species groups	19,541,655	2,272,214	3,185,732	3,523,847	3,044,784	2,371,723	1,697,860	1,166,289	741,698	1,325,215	212,293

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 8. -- Net volume of sawtimber on timberland by species group, species, and diameter class, Wisconsin, 2000 - 2002

(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	49,821	7,249	7,449	9,901	9,880	6,036	9,307	- -	- -
All species	49,821	7,249	7,449	9,901	9,880	6,036	9,307	- -	- -
Eastern white and red pines									
Red pine	5,226,254	1,528,057	1,208,879	813,722	614,075	480,834	281,734	298,953	- -
Eastern white pine	6,089,027	495,972	569,049	681,284	770,822	628,914	594,881	1,785,587	562,518
All species	11,315,281	2,024,028	1,777,928	1,495,006	1,384,898	1,109,748	876,615	2,084,539	562,518
Jack pine									
Jack pine	760,517	394,617	243,662	84,160	38,077	- -	- -	- -	- -
All species	760,517	394,617	243,662	84,160	38,077	- -	- -	- -	- -
Spruce and balsam fir									
Balsam fir	599,669	374,762	122,054	64,831	16,692	- -	9,143	12,188	- -
White spruce	951,659	210,702	182,641	220,049	162,892	112,371	63,004	- -	- -
Black spruce	252,458	155,810	78,267	8,586	9,795	- -	- -	- -	- -
All species	1,803,786	741,274	382,961	293,465	189,380	112,371	72,147	12,188	- -
Eastern hemlock									
Eastern hemlock	2,076,474	161,995	276,602	237,558	294,236	337,803	235,213	533,067	- -
All species	2,076,474	161,995	276,602	237,558	294,236	337,803	235,213	533,067	- -
Other eastern softwoods									
Eastern redcedar	52,306	30,046	2,284	15,511	4,466	- -	- -	- -	- -
Larch (introduced)	1,104	1,104	- -	- -	- -	- -	- -	- -	- -
Tamarack (native)	448,867	240,205	132,739	51,271	24,652	- -	- -	- -	- -
Norway spruce	27,274	12,863	7,090	3,243	4,078	- -	- -	- -	- -
Northern white-cedar	1,700,494	618,470	487,868	273,173	184,665	45,408	55,512	35,398	- -
All species	2,230,046	902,687	629,981	343,199	217,861	45,408	55,512	35,398	- -
Total softwoods	18,235,924	4,231,852	3,318,583	2,463,289	2,134,331	1,611,365	1,248,794	2,665,191	562,518
Hardwoods									
Select white oaks									
White oak	2,536,488	- -	411,952	496,842	425,069	349,734	223,597	586,594	42,700
Swamp white oak	101,634	- -	20,720	21,838	26,898	7,106	16,118	8,954	- -
Bur oak	1,055,744	- -	152,587	158,518	110,275	141,277	109,666	294,078	89,342
Chinkapin oak	5,911	- -	- -	- -	- -	5,911	- -	- -	- -
All species	3,699,778	- -	585,258	677,199	562,243	504,028	349,381	889,626	132,042
Select red oaks									
Northern red oak	6,192,562	- -	936,577	1,121,402	1,088,519	928,838	577,435	1,221,608	318,182
All species	6,192,562	- -	936,577	1,121,402	1,088,519	928,838	577,435	1,221,608	318,182
Other red oaks									
Northern pin oak	992,032	- -	271,795	232,059	182,208	90,020	103,904	112,046	- -
Pin oak	3,881	- -	3,881	- -	- -	- -	- -	- -	- -
Black oak	1,160,405	- -	264,700	269,860	184,664	211,736	88,684	140,760	- -
All species	2,156,318	- -	540,376	501,920	366,873	301,756	192,588	252,807	- -

(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									
Hickory									
Bitternut hickory	176,518	- -	57,451	57,522	41,453	- -	8,849	11,243	- -
Shagbark hickory	322,749	- -	97,254	114,020	34,532	36,803	30,801	9,338	- -
All species	499,267	- -	154,705	171,541	75,986	36,803	39,650	20,582	- -
Yellow birch									
Yellow birch	739,895	- -	188,876	185,364	97,146	74,677	54,930	116,220	22,682
All species	739,895	- -	188,876	185,364	97,146	74,677	54,930	116,220	22,682
Hard maple									
Black maple	10,055	- -	2,742	- -	- -	7,313	- -	- -	- -
Sugar maple	5,035,526	- -	1,548,791	1,014,562	788,284	549,353	447,044	668,004	19,489
All species	5,045,581	- -	1,551,533	1,014,562	788,284	556,666	447,044	668,004	19,489
Soft maple									
Red maple	3,300,060	- -	1,240,488	935,058	556,868	322,646	136,625	108,376	- -
Silver maple	681,078	- -	65,630	94,385	92,165	68,344	78,807	207,099	74,648
All species	3,981,138	- -	1,306,118	1,029,442	649,033	390,990	215,432	315,475	74,648
Beech									
American beech	81,172	- -	16,330	15,340	13,042	- -	- -	11,280	25,181
All species	81,172	- -	16,330	15,340	13,042	- -	- -	11,280	25,181
Ash									
White ash	1,229,175	- -	322,882	254,719	283,326	135,491	107,965	124,791	- -
Black ash	687,224	- -	311,466	190,440	98,919	69,660	16,739	- -	- -
Green ash	533,001	- -	136,570	154,222	71,227	40,479	49,204	81,299	- -
All species	2,449,400	- -	770,918	599,382	453,472	245,630	173,908	206,091	- -
Cottonwood and aspen									
Balsam poplar	81,942	- -	41,835	27,427	- -	12,681	- -	- -	- -
Eastern cottonwood	251,574	- -	4,388	17,751	26,352	11,922	32,221	112,859	46,081
Bigtooth aspen	2,090,021	- -	650,855	705,466	390,026	172,167	93,320	78,187	- -
Quaking aspen	3,275,029	- -	1,302,861	941,123	618,409	265,996	54,425	92,215	- -
All species	5,698,566	- -	1,999,939	1,691,767	1,034,787	462,766	179,965	283,261	46,081
Basswood									
Basswood spp.	2,814	- -	- -	2,814	- -	- -	- -	- -	- -
American basswood	3,103,248	- -	988,976	810,778	493,232	370,825	155,073	284,364	- -
All species	3,106,062	- -	988,976	813,591	493,232	370,825	155,073	284,364	- -
Black walnut									
Black walnut	311,583	- -	53,022	75,358	50,597	82,934	13,469	36,201	- -
All species	311,583	- -	53,022	75,358	50,597	82,934	13,469	36,201	- -

(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									
Other eastern soft hardwoods									
Boxelder	62,556	- -	16,707	14,081	6,589	10,806	5,915	8,457	- -
River birch	25,768	- -	10,223	8,447	- -	7,097	- -	- -	- -
Paper birch	778,473	- -	439,676	188,808	98,056	51,934	- -	- -	- -
Hackberry	29,440	- -	12,557	6,310	4,995	5,578	- -	- -	- -
Butternut	25,981	- -	8,901	- -	9,611	- -	7,469	- -	- -
Black cherry	395,363	- -	103,763	119,466	79,353	54,715	38,066	- -	- -
Black willow	14,044	- -	4,130	2,439	7,475	- -	- -	- -	- -
American elm	450,749	- -	132,134	126,926	78,458	32,850	54,608	25,773	- -
Siberian elm	1,254	- -	1,254	- -	- -	- -	- -	- -	- -
Slippery elm	151,257	- -	35,462	37,881	26,341	19,365	16,399	15,808	- -
All species	1,934,884	- -	764,807	504,359	310,877	182,345	122,457	50,039	- -
Other eastern hard hardwoods									
Black locust	26,495	- -	- -	6,823	7,256	12,416	- -	- -	- -
Rock elm	4,665	- -	1,546	3,120	- -	- -	- -	- -	- -
All species	31,160	- -	1,546	9,942	7,256	12,416	- -	- -	- -
Total hardwoods	35,927,365	- -	9,858,981	8,411,169	5,991,348	4,150,672	2,521,333	4,355,559	638,305
All species groups	54,163,289	4,231,852	13,177,564	10,874,458	8,125,680	5,762,037	3,770,127	7,020,750	1,200,823

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.

[1] International 1/4-inch rule.

Table 9. -- All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree component, Wisconsin, 2000 - 2002

(In dry tons)

Owner category and softwood/hardwood category	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Non-growing-stock trees		
			Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	41,389,883	5,018,363	34,444,228	27,502,642	6,941,586	1,927,293	1,461,171	466,121
Hardwoods	140,418,021	16,196,804	107,877,286	77,629,977	30,247,309	16,343,931	11,927,834	4,416,097
Total	181,807,904	21,215,167	142,321,514	105,132,619	37,188,895	18,271,224	13,389,006	4,882,218
Private								
Softwoods	64,207,481	6,977,830	54,619,126	43,685,881	10,933,245	2,610,525	1,999,053	611,472
Hardwoods	351,653,639	32,533,653	267,168,504	193,144,003	74,024,500	51,951,483	38,131,113	13,820,370
Total	415,861,120	39,511,483	321,787,630	236,829,884	84,957,745	54,562,008	40,130,166	14,431,842
All ownerships								
Softwoods	105,597,364	11,996,193	89,063,354	71,188,523	17,874,831	4,537,818	3,460,224	1,077,593
Hardwoods	492,071,660	48,730,457	375,045,790	270,773,980	104,271,810	68,295,414	50,058,947	18,236,467
Total	597,669,025	60,726,650	464,109,143	341,962,503	122,146,640	72,833,232	53,519,172	19,314,060

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 dry ton. Columns and rows may not add to their totals due to rounding.

The Forest and Analysis web site is:
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Vissage, John S.; Brand, Gary J.; Mielke, Manfred E.

2004. **Wisconsin's forest resources in 2002.** Resour. Bull. NC-237. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 31 p.

Results of the 2002 annual inventory of Wisconsin show about 16.0 million acres of forest land, over 22.2 billion cubic feet of live volume on forest land, and nearly 598 million dry tons of all live aboveground tree biomass on timberland. Gypsy moth, forest tent caterpillar, twolined chestnut borer, bronze birch borer, ash yellows, and white pine blister rust were among the pests of Wisconsin forests.

KEY WORDS: Annual inventory, forest area, forest type, volume, biomass, Wisconsin

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