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Iowa's Forest Resources in 2002

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Iowa's Forest Resources in 2002

The North Central Research Station's Forest Inventory and Analysis (NCFIA) program began fieldwork for the fourth forest inventory of Iowa's forest resources in 1999. This inventory initiated 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 consists of measuring and compiling the data for all plots (or five panels). Once all panels have been measured, each will be remeasured approximately every 5 years. For example, in Iowa, the field plots measured in 2002 will be remeasured in 2007.

In 2002, NCFIA continued the annual inventory effort with the fourth panel of the fourth Iowa forest inventory. Reports of previous inventories of Iowa are dated 1954, 1974, and 1990. This fourth inventory of Iowa's forest resources will be completed in 2003. However, because each year's sample is a systematic sample of the State's forest and because timely information is needed about Iowa's forest resources, estimates have been prepared from data gathered during the first 4 years of the inventory. Data presented in this report represent 80 percent of the field plots (or four panels) for a complete inventory and are a combination of the first year's panel from 1999, the second year's panel from 2000, the third year's panel from 2001, and the fourth year panel from 2002. Earlier reports for the 1999 panel (Boykin 2002a), the combined 1999 and 2000 panels (Boykin 2002b) and the combined 1999, 2000, and 2001 panels (Leatherberry *et al.* 2003) have also been published. The results presented are estimates based on sampling; estimates were compiled assuming that the 1999, 2000,

2001, and 2002 data represent one sample. As additional annual inventories are completed, the precision of the estimates will increase and additional data will be released.

Data from new inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have been made since the last Iowa inventory in 1990 (Leatherberry *et al.* 1992). Although these changes will have little impact on statewide estimates of forest area, timber volume, and tree biomass, they may have significant impacts 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 2002 data with those published for earlier inventories.

RESULTS

Area

There are 36 million acres of land in Iowa. Forest land totals nearly 2.7 million acres, or about 8 percent, of the State's total land area (table 1). Timberland¹—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 per acre per year—at 2.6 million acres

¹ 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 upon owner decisions that consider economic, environmental, and social factors.

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accounts for 96 percent of all forest land in Iowa (table 2). The remaining 4 percent (100 thousand acres) of forest land that is not timberland is classified reserved forest land—land that is restricted from harvesting by statute, administrative regulation, or designation (conservation areas, etc.)—or other forest land—land that is not capable of growing trees at a rate of 20 cubic feet per acre per year.

Timberland area in Iowa declined from the 1950s, reached its nadir during the 1970s, and has continued to increase since then (fig. 1). The rebound in timberland area resulted from a decline in the farm economy in the 1970s and 1980s when pasturelands and marginal agricultural lands reverted to timberland. The establishment of trees along riparian areas and initiatives such as the Conservation Reserve Program, also contributed to the increase in Iowa's timberland area. In 2002, timberland area in Iowa slightly exceeded what was present in 1954 (fig. 1).

Private ownerships hold 91 percent of the timberland in Iowa (table 2). The remaining 9 percent of the timberland area is publicly owned. Although public ownership of timberland is relatively low, those lands provide a

number of societal benefits, including recreation opportunities, wildlife habitat, watershed protections, timber, and non-timber products.

Hardwood forests predominate in Iowa—97 percent of all timberland area supports mostly hardwoods (table 2). Few acres of timberland in Iowa support forest plantations. Some hardwoods have been planted, mostly high valued species such as black walnut.

The hardwood forest of Iowa is largely classed in the oak/hickory, the elm/ash/cottonwood, and the maple/beech/birch forest type groups (table 3, fig. 2). Within those three forest type groups, the predominant forest types are white oak/red oak/hickory (676.4 thousand acres), black ash/American elm/red maple (440.4 acres), and hard maple/basswood (567.0 thousand acres). Coniferous timberlands play only a minor role in Iowa's forest; only 1 percent of the total timberland area has eastern redcedar as the dominant species. However, eastern redcedar is mixed in with hardwoods in the oak/pine forest type group. In total, eastern redcedar has a significant presence in an estimated 67.4 thousand acres of timberland in Iowa.

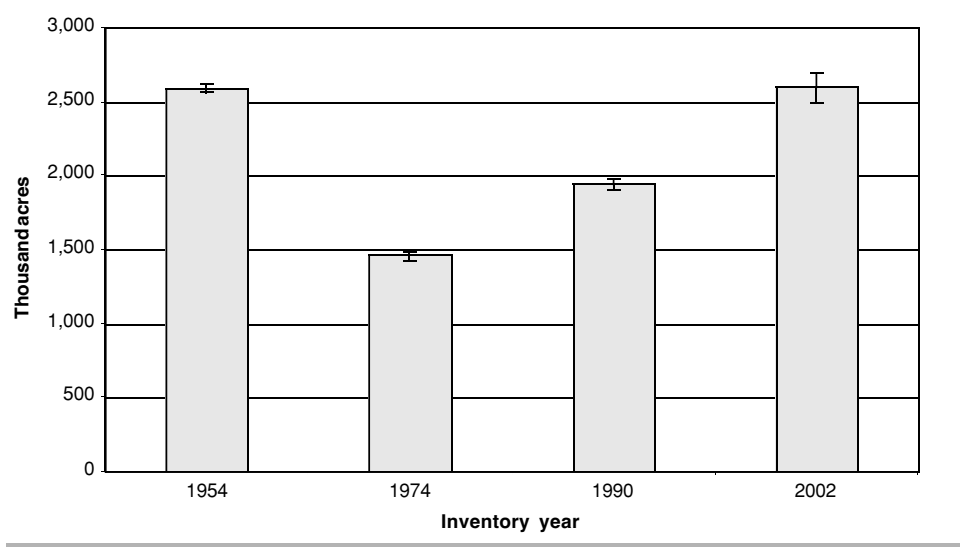


Figure 1. — Area of timberland by inventory year, Iowa, 1954-2002. (Note: The sampling error associated with an inventory estimate is represented by the vertical line at the top of its bar.)

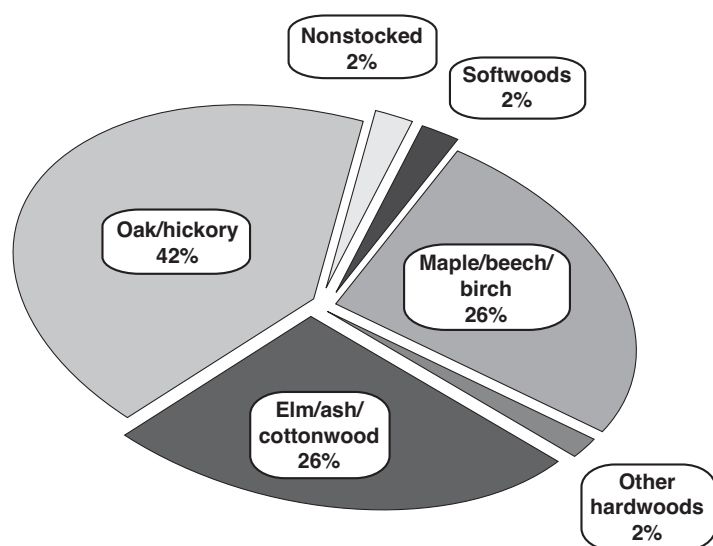


Figure 2. — Area of timberland by forest type group, Iowa, 2002.

Stand-size class is a measure of the average diameter of the dominant trees in a stand and reflects the size structure of stands. There are three stand-size classes: sawtimber, poletimber, and sapling/seedling. The area classified as sawtimber—stands with a plurality of stocking in trees more than 11.0 inches in diameter at breast height (d.b.h., 4.5 feet above ground level) for deciduous species and 9.0 inches d.b.h. for conifers—accounted for 66 percent of the timberland area in Iowa in

2002 (table 3, fig. 3). Along with an expanding timberland base, the area of timberland in each stand-size class increased between 1990 and 2002. However, as a proportion of timberland area, sapling/seedling stands declined slightly from 15 to 12 percent of timberland area during that time; the proportion of timberland area in sawtimber increased slightly, and the area in poletimber stands did not change much, staying at about one-fifth of timberland area (fig. 3).

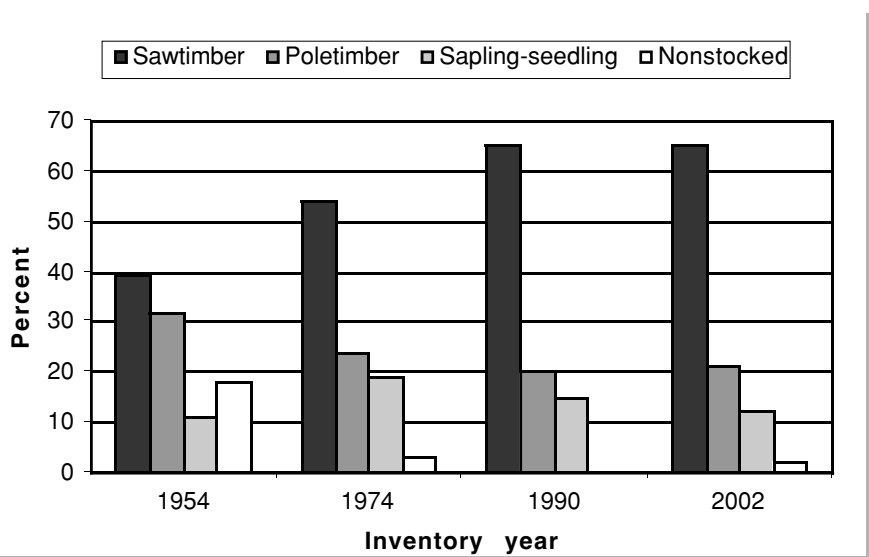


Figure 3. — Area of timberland by stand-size class, Iowa, 1954-2002.

The substantial sawtimber area is indicative of a mature forest. However, certain forest types have a higher proportion of area in smaller trees than other types. For instance, among the 567.0 thousand acres classed as hard maple/basswood forest type (in the maple/beech/birch type group), 22 percent of the area is in sapling-seedling stands. Under the oak/pine forest type group, the forest type eastern redcedar hardwood has 79 percent of area in sapling-seedling stands. In the first instance above, species associated with the maple/beech/birch type, particularly sugar maple and basswood, are prolific seed producers and are shade tolerant. When openings are created in the forest canopy, they are likely to succeed species associated with the oak types. In the second instance, although the amount of acres in the eastern redcedar/hardwood forest type is only an estimated 31.7 thousand acres, the 25.0 thousand acres that is in sapling-seedling stands points to the establishment of eastern redcedar in hardwood stands.

Volume

Total net volume of all live trees on forest land in Iowa is 3.9 billion cubic feet, which equates to nearly 1,455 cubic feet per acre of forest land (table 4). Net volume is the amount of soundwood computed from a 1-foot stump to a 4-inch top diameter outside bark for live trees at least 5 inches d.b.h. Almost 9 (87 percent) of every 10 cubic feet of live volume are on privately owned forest land. Virtually all—99 percent—of net volume of all live trees is contained in hardwoods, and 31 percent is in oak trees—mostly trees in the bur oak, white oak, and northern red oak forest types.

Growing-stock volume on timberland is a measure that has traditionally been used to ascertain wood volume useful for commercial purposes. Growing-stock volume is the amount of solid wood on timberland in commercial trees 5.0 inches d.b.h. and over, from 1 foot above ground (stump) to a minimum 4-inch top diameter with deductions made for

poor form or defect. Growing-stock volume excludes rough, rotten, and dead trees and noncommercial tree species. Iowa's growing-stock volume totals 3.0 billion cubic feet, representing 78 percent of the total live volume (table 5). Twenty-two percent of volume of all live trees on timberland is in live cull trees—827.3 million cubic feet. Cull volume is often used for commercial purposes. For instance, rough trees are sometimes used to make pallets or for chipping. Dead trees are also used for commercial purposes—they are an important source of firewood. Salvable dead trees contain 99 million cubic feet of wood volume. Salvable dead trees are also used for commercial purposes—they are an important source of firewood and are important to wildlife species such as cavity nesting birds.

Forty-four percent of growing-stock volume is in trees in the oak/hickory forest type group. When this group is combined with the elm/ash/cottonwood and the maple/beech/birch groups, 98 percent of all growing-stock volume is accounted for (table 6). Growing-stock volume present in the softwoods amounts to less than 1 percent (11.2 million cubic feet) of Iowa's growing-stock volume. However, growing-stock volume for all softwood species amounts to 1 percent (34.8 million cubic feet) of total growing-stock volume because softwoods are sometimes present in hardwood stands (table 6).

Seventy-eight percent of all growing-stock volume is in trees that are 11 inches d.b.h. and larger (table 7). Twenty-five percent of the total growing-stock volume is in trees that are 21 inches d.b.h. and larger; most of this volume is in various oak species. Also, cottonwoods have significant volume in large-diameter trees—70 percent of cottonwood growing-stock volume is in trees that are 21 inches d.b.h. and larger. Cottonwoods account for 37 percent of total volume in trees 21 inches d.b.h. and larger.

Since 1974, growing-stock volume on Iowa's timberlands has increased with each succeeding inventory (fig. 4). The increase in growing-stock volume reflects a forest where larger trees continue to put on volume. For example, between 1990 and 2002, growing-stock volume in trees with diameters 21 inches or greater increased from 413 million cubic feet to 1 billion cubic feet, a 148-percent increase.

Sawtimber volume is a subset of growing-stock volume. It is the volume of the saw log portion of live sawtimber measured in board feet. Sawtimber volume is generally measured with the International 1/4-inch rule. Sawtimber volume in Iowa totals 10.9 billion board feet (table 8). Virtually all sawtimber volume is in hardwood trees; 1 percent of sawtimber volume is in softwoods. On an individual species basis, five species account for 56 percent of the sawtimber volume in Iowa: eastern cottonwood with 1.7 billion board feet; silver maple with just over 1.2 billion cubic feet; white oak with just under 1.2 billion board feet; northern red oak with 1.1 billion board

feet; and bur oak with 964.1 billion board feet. Of total sawtimber volume, 31 percent is in trees with diameters of 21 inches d.b.h. or larger. And, among trees 21 inches d.b.h. or larger, cottonwoods alone account for 12 percent of net volume of sawtimber on timberland.

Biomass

Live aboveground tree biomass in Iowa's timberland area was estimated to be 106.1 million dry tons (an average of 41 dry tons per acre of timberland). All live aboveground tree biomass is estimated for growing-stock trees, non-growing-stock trees, and all live 1- to 5-inch d.b.h. trees (table 9). Seventy-one percent of tree biomass is in growing-stock trees, 24 percent is in non-growing-stock trees, and the remaining 5 percent in trees less than 5 inches d.b.h. For both growing-stock and non-growing-stock trees, nearly three-fourths of total aboveground biomass is in the bole of trees. The remaining aboveground biomass is in stumps, tops, and limbs. Ninety-nine percent (105 million dry tons) of all live aboveground tree biomass is in

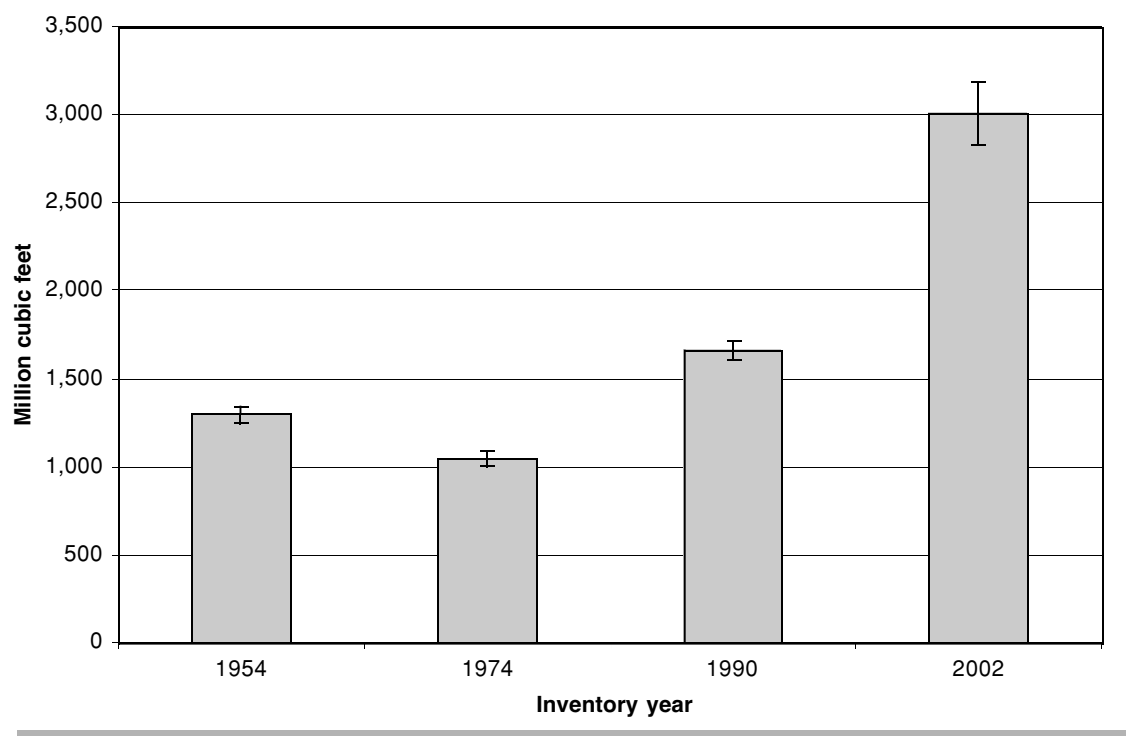


Figure 4. — Growing-stock volume on timberland, Iowa, 1954-2002. (Note: The sampling error associated with an inventory estimate is represented by the vertical line at the top of its bar.)

hardwood species. Biomass estimates are increasing in importance for analyses of questions relating to carbon sequestration, wood fiber availability for fuel, and assessment of fuel loads in forest stands.

Growth, Removals, and Mortality

The growing stock on Iowa's timberland grew, on average, 97 million cubic feet per year between 1990 and 2002 (table 10).

Hardwoods growth accounts for virtually all (99 percent) of the total average annual growth of growing stock. Softwoods growth was only 1.3 million cubic feet per year. Other eastern soft hardwoods, the species group that contains hackberry and elms, had a growth rate of 15.9 million cubic feet per year. Two of the other fastest growing species groups in Iowa were other select white oaks at 14 million cubic feet per year and black walnut at 12.3 million cubic feet per year. Black walnut and white oak are high-value commercial species, and black walnut trees are often managed to produce veneer quality logs.

Average annual removals of growing stock on timberland totaled 55.1 million cubic feet per year (table 11). Hardwood removals were 53.9 million cubic feet per year. Softwood removals were slightly under 1.3 million cubic feet per year, or about 2 percent of the total. Removals from private ownerships totaled 54.2 million cubic feet per year, virtually all removals. Select white oaks had the highest average annual removals, at 9.2 million cubic feet per year, followed by black walnut at 8.4 million cubic feet per year. Combined, both select white oaks and black walnut accounted for nearly one-third of all average annual removals.

From 1990 to 2002, total average annual removals of growing stock were 57 percent of net annual growth, up slightly from the period 1974 to 1989 when total average annual removals were 55 percent of net annual growth. During the past three decades, the

black walnut species group and the select white oak species group have been affected differently by removals. For instance, from 1974 to 1989, average annual removals of black walnut were only 25 percent of average annual growth. But from 1990 to 2002, black walnut removals climbed to 68 percent of average annual growth. For select white oak, from 1974 to 1989, average annual removals nearly matched average annual growth with removals being 95 percent of growth. But from 1990 to 2002, select white oak removals were down to 66 percent of average annual growth.

Average annual mortality of all growing stock on timberland from 1990 to 2002 was 23.2 million cubic feet per year (table 12). Ninety-eight percent of the total, or 22.9 million cubic feet per year, was among hardwoods, while the remaining 286 thousand cubic feet per year was in softwoods.

Across all species groups, other eastern soft hardwoods group that contains elm species had the most mortality at 7.7 million cubic feet per year, or 33 percent of total mortality. The amount of mortality in the other eastern soft hardwoods group is probably a result of Dutch elm disease that has expanded throughout the State. The red oak species groups—select red oak and other red oaks—combined accounted for 16 percent of total average annual mortality. Oak mortality is the result of oak wilt and general oak decline that is present in Iowa. The forest health discussion below provides more information about the causes of tree mortality in Iowa.

Forest Health

The information presented about pathogens and insects affecting Iowa's forest was obtained from the national Forest Health Monitoring (FHM) program Web site at: <http://www.na.fs.fed.us/spfo/fhm/index.htm>.

There are several forest health concerns in Iowa. In 2002, oak wilt infection was reported in 54 of Iowa's 99 counties, mostly in eastern and south central parts of the State (fig. 5). Oak wilt caused by the fungus *Ceratocystis fagacearum* invades the water conducting tissues (xylem) of oak trees and causes the foliage to wilt and die. During 2002, using a tree count rather than area count, Iowa Department of Natural Resources foresters reported 100 new acres of oak wilt infections. Although all species of oaks are susceptible, the red oak group, especially black oak, northern red oak, and pin oak, often die within weeks of infection. Bur oak was also observed with oak wilt symptoms. Oak wilt is spread via root grafts and sap-feeding nitidulid beetles. Although there is no cure for oak wilt, control strategies such as preventing tree wounds during high infection periods (March 1 to June 1), disease containment by cutting or killing roots of infected trees, and killing oak trees surrounding infected trees all appear to have some use in management and prevention. Sanitation of dying and dead oaks before oak wilt fruiting bodies appear the following spring reduces the risk of overland spread. High-value oaks can be protected through systematic injections of a fungicide, which has become more available through local tree care companies.

Dutch elm disease caused by the fungus *Ophiostoma umli/novo-umli* has expanded throughout the State. In Iowa's forest stands, Dutch elm disease occurs in trees located along small and scattered drainages. Insects spread the disease over land from infected to healthy trees.

General tree decline or dieback is a problem in some forest stands. Scattered dieback/decline in native white and green ash is a problem in about one-third of Iowa's counties, mostly in central and eastern Iowa (fig. 6). The exact cause of ash dieback/decline is not known.

Oak decline is present in about two-thirds of Iowa's counties. Only in a group of counties in southeast and southwest Iowa, and several counties in the northeastern part of the State is oak decline not prevalent (fig. 7). The exact cause of oak decline is unknown; however, a complex of insect, disease, site, and management factors may cause it. The problem has been most prevalent in white oak in eastern Iowa and with bur oak in western Iowa.

The gypsy moth (*Lymantria dispar*) is an exotic species that defoliates trees and shrubs. In an attempt to eradicate the moth, traps have been set across the State. In 2001, a small number of moths were trapped in 16 counties mostly

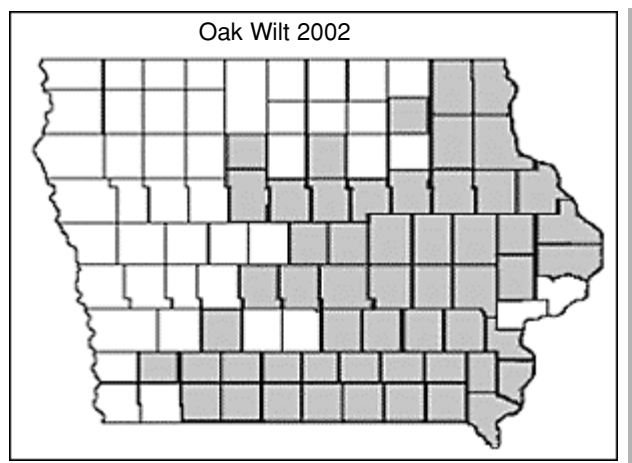


Figure 5. — Counties with oak wilt, Iowa, 2002. (Source: USDA Forest Service, State and Private Forestry Health Protection Program.)

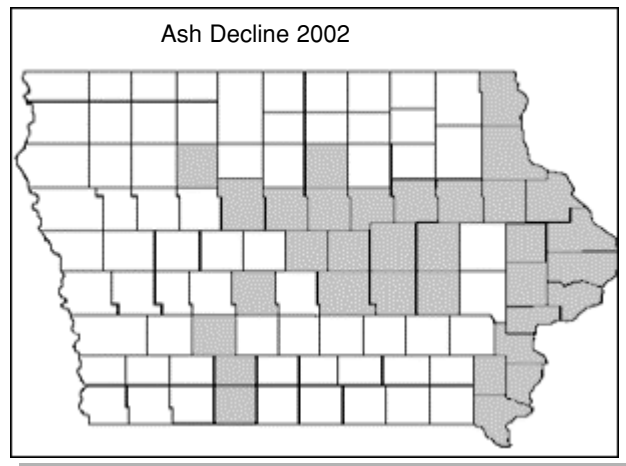


Figure 6. — Counties with ash decline, Iowa, 2002. (Source: USDA Forest Service, State and Private Forestry Health Protection Program.)

in eastern Iowa. The trappings indicate widespread infestation is not present; however, the potential exists for it. During the 2002 gypsy moth trapping season (May 1 to September 1), a total of 35 male moths were caught in 16 Iowa counties—an increase from 26 male moths caught in 2001 and a decrease from the 135 moths caught in 1999.

Invasive plant species are an emerging forest health problem in Iowa. Invasive plant species can overtake native plants and threaten ecological diversity. A woodland invasive species survey is underway in Iowa to map the location and severity of garlic mustard, buckthorn, bush honeysuckle, and multiflora rose. These four plants are currently Iowa's primary woodland invaders. The invasive species survey is being conducted through the cooperative efforts of Iowa State University, Department of

Forestry, and Iowa Department of Natural Resources, Bureau of Forestry. The project is funded through a grant from the USDA Forest Service.

Summary

Iowa's forest area is expanding, continuing a trend that began in the 1970s. Growing-stock volume is increasing as the forest continues to mature. Iowa's forest resources are reasonably healthy, but there is concern as the resource continues to age and become more susceptible to various tree maladies. Invasive insects and plants species are an emerging forest health concern in Iowa. As additional data become available from ensuing annual inventories, a more precise picture of the direction of Iowa's forests will emerge. Additional data related to the two most recent inventories of Iowa (1990 and 2002) are available at: www.ncrs.fs.fed.us/4801/fiadb/index.htm.

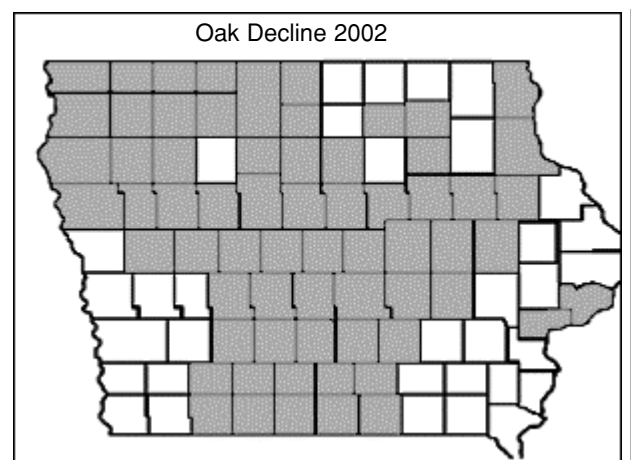


Figure 7. — Counties with oak decline, Iowa, 2002. (Source: USDA Forest Service, State and Private Forestry Health Protection Program.)



APPENDIX

Inventory Methods

Since the 1990 inventory of Iowa, several changes have been made in NCFIA inventory methods to improve the quality of the inventory as well as meet increasing demands for timely forest resource information. The most significant difference between inventories is the change from periodic inventories to annual inventories. Historically, NCFIA periodically inventoried each State on a cycle that averaged about 12 years. However, the need for timely and consistent data across large geographical regions, combined with national legislative mandates, resulted in NCFIA's implementation of an annual inventory system. Iowa was one of the first States in the North Central region, and in the Nation, to be inventoried with this new system, beginning with the 1999 inventory.

With an annual inventory system, about one-fifth of all field plots are measured each year. After 5 years, an entire inventory cycle will be completed. After the first 5 years, NCFIA will report and analyze results as a moving 5-year average. For example, NCFIA will be able to generate a report based on inventory results for 1999 through 2004 or for 2001 through 2006. While there are great advantages for an annual inventory, one difficulty is reporting on results in the first four years. With the 2002 annual measurements, 80 percent of all field plots have been measured. Sampling error estimates for the 2002 inventory results are area of forest land 3.53 percent, area of timberland 3.75 percent, number of growing-stock trees on timberland 6.37 percent, volume of growing stock on timberland 6.73 percent, and volume of sawtimber on timberland 7.91 percent. These sampling error estimates are higher than those for the last periodic inventory completed in 1990 (i.e., 1.9 percent for timberland area and 3.2 percent for growing-stock volume) because of the smaller samples. Thus, caution should

be used when drawing conclusions based on this limited data set. As we complete ensuing measurements, we will have additional confidence in our results due to the increased number of field plots measured. As each measurement year is completed, the precision of estimates will improve.

Other significant changes between inventories include the implementation of new remote sensing technology, the implementation of a new field plot design, and the gathering of additional data. The advent of remote sensing technology since the previous inventory in 1990 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. Inventories in Iowa before 1990 used manual interpretation of aerial photos to stratify the sample (1954, 1974, and 1990).

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 among States and will be used to reassign the forest type and stand-size class of every plot measured in the 1990 inventory when it is updated. This will be done so that changes in forest type and stand-size class will more accurately reflect actual changes in the forest and not changes in how values are computed. The list of recognized forest types, grouping of these forest types for reporting purposes, models used to assign stocking values to individual trees, definition of non-stocked, and names given to the forest types changed with the new algorithms. As a result, comparisons between the published 2002 inventory results and those published for the 1990 inventory may not be valid. For additional details about algorithms used in both inventories, please contact NCFIA.

Sampling Phases

The 2002 Iowa survey was based on a three-phase inventory. The first phase used classified satellite imagery to stratify the State and aerial photographs to select plots for measurement. The second phase entailed measurement of the traditional FIA set of mensurational variables, and the third phase focused on a set of variables related to the health of the forest.

The only land that could not be sampled was private land where field personnel could not obtain permission from the owner to measure the field 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 make the necessary adjustments to account for sites where access was denied or hazardous.

Phase 1

The 2002 inventory used a computer-assisted classification of satellite imagery. FIA used the imagery to form two initial strata—forest and nonforest. Pixels within 60 m (2 pixel widths) of a forest/nonforest edge formed two additional strata—forest/nonforest and nonforest/forest. Forest pixels within 60 m on the forest side of a forest/nonforest boundary were classified into a forest edge stratum. Pixels within 60 m of the boundary on the nonforest side were classified into a nonforest edge stratum. The estimated population total for a variable is the sum across all strata of the product of each stratum's estimated area and the variable's estimated mean per unit area for the stratum.

Phase 2

Phase 2 of the inventory consisted of the measurement of the annual sample of field plots in Iowa. Current FIA precision standards for annual inventories require a sampling intensity of one plot for approximately every 6,000 acres. FIA has divided the entire area of the United States into non-overlapping hexagons, each of which contains 5,937 acres (McRoberts 1999). An array of field plots was

established by selecting one plot from each hexagon based on the following rules: (1) if a Forest Health Monitoring (FHM) plot (Mangold 1998) fell within a hexagon, it was selected; (2) if no FHM plot fell within a hexagon, the existing NCFIA plot from the 1990 inventory nearest the hexagon center was selected; and (3) if neither FHM nor existing NCFIA plots fell within the hexagon, a new NCFIA plot was established in the hexagon (McRoberts 1999). This array of plots is designated the Federal base sample and is considered an equal probability sample; its measurement in Iowa is funded by the Federal government.

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

Phase 3

NCFIA has two categories of field plot measurements—phase 2 field plots (standard FIA plots) and phase 3 plots (forest health plots)—to optimize our ability to collect data when available for measurement. Both types of plot are uniformly distributed both geographically and temporally. Phase 3 plots are measured with the full set of FHM vegetative and health variables (Mangold 1998) collected as well as the full set of measures associated with phase 2 plots. Phase 3 plots must be measured between June 1 and August 30 to accommodate the additional measurement of non-woody understory vegetation, ground cover, soils, and other variables. We anticipate that in Iowa the complete 5-year annual inventory will involve about 50 phase 3 field

plots. On the remaining plots, referred to as phase 2 plots, only variables that can be measured throughout the entire year are collected. In Iowa, the complete 5-year annual inventory is expected to involve about 770 phase 2 forested plots. The 1999-2002 annual inventory results represent field measures on 604 phase 2 forested plots and 40 phase 3 field plots.

The new national FIA plot design (fig. 8) was first used for data collection in Iowa in 1999, the first annual inventory year. This design was also used in the 1999, 2000, and 2001 inventories and will be used in subsequent years. The national plot design requires mapping forest conditions on each plot.

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 a d.b.h. 5 inches and larger 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 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 in forest type, stand-size class, land use, ownership, and density. Each condition that occurs anywhere on any of the subplots is identified, described, and mapped if the area of the condition meets or exceeds 1 acre in size.

Field plot measurements are combined with phase 1 estimates in the compilation process and table production. The number of published tables generated from less than five panels of data is limited. However, at www.ncrs.fs.fed.us/4801/fiadb/index.htm other tabular data can be generated. For additional information, contact:

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Des Moines, IA 50319-0034
Web site: <http://www.iowadnr.com>

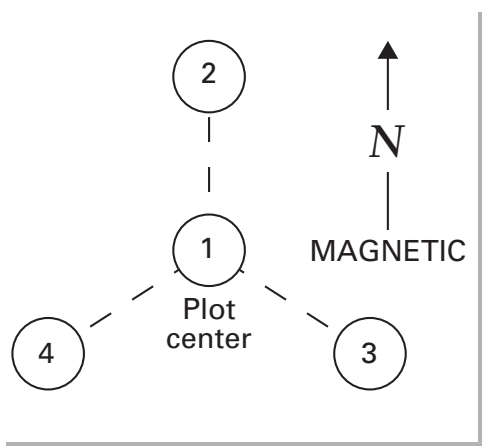


Figure 8. — Current NCFIA field plot design.

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TABLES

Table 1. -- Area of forest land by forest type group, forest type and owner category, Iowa, 1999 - 2002

(In thousand acres)

Forest type group/ forest type	Owner category		
	All owners	Public	Unidentified owner
Pinyon / juniper group			
Eastern redcedar	43.8	2.5	41.3
All forest types	43.8	2.5	41.3
All softwood groups	43.8	2.5	41.3
Hardwood type groups			
Oak / pine group			
Eastern redcedar / hardwood	31.7	--	31.7
All forest types	31.7	--	31.7
Oak / hickory group			
Oak / hickory	5.9	--	5.9
White oak / red oak / hickory	705.2	78.4	626.8
White oak	155.4	41.6	113.8
Northern red oak	9.3	--	9.3
Bur oak	147.8	4.8	143.1
Chestnut oak / black oak / scarlet oak	10.7	4.8	6.0
Mixed upland hardwoods	118.8	6.7	112.1
All forest types	1,153.3	136.3	1,017.0
Oak / gum / cypress group			
Swamp chestnut oak / cherrybark oak	7.0	--	7.0
All forest types	7.0	--	7.0
Elm / ash / cottonwood group			
Elm / ash / cottonwood	1.8	--	1.8
Black ash / American elm / red maple	459.9	54.5	405.4
River birch / sycamore	11.4	--	11.4
Cottonwood	91.1	19.8	71.3
Willow	5.4	--	5.4
Sycamore / pecan / American elm	6.1	6.1	--
Sugarberry / hackberry / elm / green ash	8.9	--	8.9
Silver maple / American elm	98.0	6.0	92.0
Cottonwood / willow	22.2	--	22.2
All forest types	704.8	86.4	618.4
Maple / beech / birch group			
Maple / beech / birch	2.0	2.0	--
Sugar maple / beech / yellow birch	16.0	--	16.0
Black cherry	2.8	--	2.8
Cherry / ash / yellow-poplar	69.5	--	69.5
Hard maple / basswood	579.5	56.1	523.3
Elm / ash / locust	22.4	--	22.4
All forest types	692.1	58.2	634.0
Aspen / birch group			
Aspen / birch	9.1	--	9.1
Aspen	9.1	--	9.1
All forest types	18.2	--	18.2
All hardwood groups	2,607.1	280.8	2,326.3
Nonstocked	47.8	9.1	38.7
All forest groups	2,698.6	292.4	2,406.3

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 thies total due to rounding.

Table 2. -- Area of timberland by major forest type group, stand origin, and owner category, Iowa, 1999 - 2002

(In thousand acres)

Major forest type group and stand origin	Owner category		
	All owners	Public	Private Unidentified owner
Softwood type groups			
Natural	35.7	2.5	33.2
All softwood types	35.7	2.5	33.2
Hardwood type groups			
Natural	2,502.6	220.0	2,282.7
Planted	21.1	--	21.1
All hardwood types	2,523.7	220.0	2,303.8
Nonstocked	38.7	--	38.7
All groups	2,598.2	222.5	2,375.7

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, Iowa, 1999 - 2002

(In thousand acres)

Forest type group/ forest type	Stand-size class				
	All stands	Sawtimber	Poletimber	Sapling- seedling	Non- stocked
Pinyon / juniper group					
Eastern redcedar	35.7	13.4	13.4	8.9	--
All forest types	35.7	13.4	13.4	8.9	--
All softwood groups	35.7	13.4	13.4	8.9	--
Hardwood type groups					
Oak / pine group					
Eastern redcedar / hardwood	31.7	--	6.8	25.0	--
All forest types	31.7	--	6.8	25.0	--
Oak / hickory group					
Oak / hickory	5.9	3.7	1.5	0.8	--
White oak / red oak / hickory	676.4	462.1	164.3	50.0	--
White oak	155.4	142.9	12.5	--	--
Northern red oak	9.3	9.3	--	--	--
Bur oak	125.3	114.2	11.1	--	--
Chestnut oak / black oak / scarlet oak	10.7	6.0	4.8	--	--
Mixed upland hardwoods	118.8	80.8	33.4	4.7	--
All forest types	1,101.9	818.9	227.5	55.5	--
Oak / gum / cypress group					
Swamp chestnut oak / cherrybark oak	7.0	7.0	--	--	--
All forest types	7.0	7.0	--	--	--
Elm / ash / cottonwood group					
Elm / ash / cottonwood	1.8	--	1.8	--	--
Black ash / American elm / red maple	440.4	304.3	104.0	32.1	--
River birch / sycamore	11.4	5.4	6.0	--	--
Cottonwood	91.1	69.9	21.2	--	--
Willow	5.4	1.4	--	4.0	--
Sycamore / pecan / American elm	6.1	--	--	6.1	--
Sugarberry / hackberry / elm / green ash	8.9	8.3	0.6	--	--
Silver maple / American elm	98.0	80.6	11.6	5.8	--
Cottonwood / willow	22.2	16.0	--	6.1	--
All forest types	685.3	485.9	145.2	54.2	--
Maple / beech / birch group					
Maple / beech / birch	2.0	2.0	--	--	--
Sugar maple / beech / yellow birch	16.0	7.2	4.5	4.2	--
Black cherry	2.8	--	--	2.8	--
Cherry / ash / yellow-poplar	69.5	35.4	1.0	33.0	--
Hard maple / basswood	567.0	321.2	119.7	126.1	--
Elm / ash / locust	22.4	13.5	8.9	--	--
All forest types	679.7	379.4	134.2	166.1	--
Aspen / birch group					
Aspen / birch	9.1	--	9.1	--	--
Aspen	9.1	--	--	--	--
All forest types	18.2	9.1	9.1	--	--
All hardwood groups	2,523.7	1,700.4	522.7	300.7	--
Nonstocked	38.7	--	--	--	38.7
All forest groups	2,598.2	1,713.8	536.1	309.6	38.7

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 thies total due to rounding.

Table 4. -- Net volume of all live trees on forest land by species group, species and owner category, Iowa, 1999 - 2002

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines				
Scotch pine	70	--	70	--
All species	70	--	70	--
Eastern white and red pines				
red pine			534	--
All species	1,222	688	534	--
Other eastern softwoods				
eastern redcedar	38,869	3,611	35,259	--
larch (introduced)	589	--	589	--
tamarack (native)	308	--	308	--
All species	39,767	3,611	36,156	--
Ponderosa and Jeffrey pines				
ponderosa pine	4,405	874	3,531	--
All species	4,405	874	3,531	--
Total softwoods	45,464	5,173	40,292	--
Hardwoods				
Select white oaks				
white oak	369,053	79,244	289,808	--
swamp white oak	4,958	121	4,837	--
bur oak	405,195	17,147	388,048	--
chinkapin oak	3,477	578	2,899	--
All species	782,683	97,091	685,592	--
Select red oaks				
northern red oak	279,835	58,865	220,970	--
All species	279,835	58,865	220,970	--
Other white oaks				
post oak	953	--	953	--
All species	953	--	953	--
Other red oaks				
northern pin oak	15,594	--	15,594	--
shingle oak	32,474	121	32,354	--
pin oak	25,581	--	25,581	--
black oak	97,705	11,050	86,655	--
All species	171,353	11,170	160,183	--
Hickory				
bitternut hickory	78,622	7,021	71,601	--
pignut hickory	3,277	1,186	2,090	--
shellbark hickory	--	--	--	--
shagbark hickory	171,869	16,478	155,391	--
mockernut hickory	2,139	1,123	1,016	--
All species	255,907	25,808	230,099	--
Yellow birch				
yellow birch	--	--	--	--
All species	--	--	--	--

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Hard maple				
black maple	50,089	408	49,682	--
sugar maple	64,318	21,922	42,396	--
All species	114,407	22,330	92,077	--
Soft maple				
red maple	3,644	1,056	2,587	--
silver maple	424,722	64,153	360,569	--
All species	428,366	65,210	363,156	--
Ash				
white ash	45,659	1,221	44,439	--
black ash	2,449	--	2,449	--
green ash	66,471	15,429	51,042	--
All species	114,579	16,649	97,930	--
Cottonwood and aspen				
eastern cottonwood	371,658	106,319	265,340	--
bigtooth aspen	20,956	--	20,956	--
quaking aspen	3,728	--	3,728	--
All species	396,343	106,319	290,024	--
Basswood				
American basswood	160,814	19,326	141,489	--
All species	160,814	19,326	141,489	--
Black walnut				
black walnut	218,206	15,146	203,060	--
All species	218,206	15,146	203,060	--
Other eastern soft hardwoods				
boxelder	104,478	3,567	100,910	--
Ohio buckeye	10,664	141	10,523	--
river birch	2,830	--	2,830	--
paper birch	981	--	981	--
northern catalpa	416	--	416	--
hackberry	164,508	7,198	157,310	--
butternut	3,145	--	3,145	--
cucumber tree	655	--	655	--
sycamore	874	284	591	--
black cherry	47,476	911	46,565	--
black willow	44,146	184	43,962	--
white willow	605	--	605	--
American elm	232,447	25,961	206,485	--
Siberian elm	15,502	393	15,109	--
slippery elm	102,792	12,184	90,608	--
All species	731,518	50,823	680,695	--

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Other eastern hard hardwoods				
common persimmon	--	--	--	--
waterlocust	2,617	2,617	--	--
honeylocust	115,221	21,140	94,081	--
white mulberry	537	--	537	--
red mulberry	27,126	1,909	25,217	--
black locust	37,363	1,997	35,366	--
rock elm	138	--	138	--
All species	183,003	27,664	155,339	--
Eastern noncommercial hardwoods				
ailanthus	195	--	195	--
American hornbeam, musclemwood	--	--	--	--
eastern redbud	735	--	735	--
hawthorn	3,153	--	3,153	--
Osage-orange	21,409	330	21,079	--
apple spp.	193	--	193	--
eastern hophornbeam	13,160	2,164	10,996	--
chokecherry	--	--	--	--
wild plum	--	--	--	--
willow	502	311	191	--
peachleaf willow	55	55	--	--
Russian-olive	2,381	--	2,381	--
All species	41,783	2,860	38,923	--
Total hardwoods	3,879,750	519,260	3,360,490	--
All species groups	3,925,214	524,433	3,400,781	--

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 this total due to rounding.

Table 5. -- Net volume of all live trees and salvageable dead trees on timberland by class of timber and softwood/hardwood species, Iowa, 1999 - 2002

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	2,077,952	19,403	2,058,549
Upper stem portion	276,062	3,046	273,016
Total	2,354,014	22,449	2,331,565
Poletimber	658,792	12,397	646,395
All growing-stock trees	3,012,806	34,845	2,977,960
Cull trees			
Rough trees ¹			
Sawtimber size	577,279	5,877	571,402
Poletimber size	197,654	3,890	193,764
Total	774,932	9,767	765,166
Rotten trees ¹			
Sawtimber size	45,809	--	45,809
Poletimber size	6,527	--	6,527
Total	52,336	--	52,336
All live cull trees	827,268	9,767	817,502
All live trees	3,840,074	44,612	3,795,462
Salvageable dead trees			
Sawtimber size	65,732	1,121	64,610
Poletimber size	33,235	1,177	32,058
All salvageable dead trees	98,966	2,298	96,668
All classes	3,939,040	46,910	3,892,130

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.

¹Includes noncommercial species.

Table 6. -- Net volume of growing stock on timberland by forest type group, forest type and softwood/hardwood species, Iowa, 1999 - 2002

(In thousand cubic feet)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Pinyon / juniper group			
Eastern redcedar	11,150	8,825	2,325
All forest types	11,150	8,825	2,325
All softwood groups	11,150	8,825	2,325
Hardwood type groups			
Oak / pine group			
Eastern redcedar / hardwood	4,141	3,175	966
All forest types	4,141	3,175	966
Oak / hickory group			
Oak / hickory	2,034	--	2,034
White oak / red oak / hickory	743,214	7,348	735,866
White oak	268,062	824	267,238
Northern red oak	9,853	--	9,853
Bur oak	169,877	160	169,717
Chestnut oak / black oak / scarlet oak	9,106	--	9,106
Mixed upland hardwoods	112,766	183	112,583
All forest types	1,314,912	8,514	1,306,398
Oak / gum / cypress group			
Swamp chestnut oak / cherrybark oak	9,823	--	9,823
All forest types	9,823	--	9,823
Elm / ash / cottonwood group			
Black ash / American elm / red maple	433,254	343	432,911
River birch / sycamore	5,736	--	5,736
Cottonwood	319,953	1,906	318,046
Willow	3,050	--	3,050
Sycamore / pecan / American elm	581	188	393
Sugarberry / hackberry / elm / green ash	5,293	--	5,293
Silver maple / American elm	178,029	3,243	174,787
Cottonwood / willow	38,488	--	38,488
All forest types	984,383	5,680	978,703
Maple / beech / birch group			
Maple / beech / birch	--	--	--
Sugar maple / beech / yellow birch	4,415	--	4,415
Black cherry	--	--	--
Cherry / ash / yellow-poplar	61,345	128	61,217
Hard maple / basswood	584,986	7,866	577,120
Elm / ash / locust	15,216	--	15,216
All forest types	665,961	7,994	657,968

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Aspen / birch group			
Aspen / birch	8,449	--	8,449
Aspen	10,743	236	10,507
All forest types	19,192	236	18,956
All hardwood groups	2,998,412	25,599	2,972,812
Nonstocked	3,244	421	2,823
All forest groups	3,012,806	34,845	2,977,960

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 thies total due to rounding.

Table 7. -- Net volume of growing stock on timberland by species group, species and diameter class, Iowa, 1999 - 2002
(In thousand cubic feet)

Species group/ species	All classes	Diameter class (inches at breast height)												29.0+
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9				
Softwoods														
Other yellow pines														
Scotch pine	70	70	--	--	--	--	--	--	--	--	--	--	--	
All species	70	70	--	--	--	--	--	--	--	--	--	--	--	
Eastern white and red pines														
red pine	1,222	--	248	440	534	--	--	--	--	--	--	--	--	
All species	1,222	--	248	440	534	--	--	--	--	--	--	--	--	
Other eastern softwoods														
eastern redcedar	28,666	5,970	5,819	7,739	4,937	2,800	1,401	--	--	--	--	--	--	
larch (introduced)	481	--	--	481	--	--	--	--	--	--	--	--	--	
All species	29,148	5,970	5,819	8,220	4,937	2,800	1,401	--	--	--	--	--	--	
Ponderosa and Jeffrey pines														
ponderosa pine	4,405	128	161	700	530	2,886	--	--	--	--	--	--	--	
All species	4,405	128	161	700	530	2,886	--	--	--	--	--	--	--	
Total softwoods	34,845	6,168	6,229	9,360	6,002	5,686	1,401	--	--	--	--	--	--	
Hardwoods														
Select white oaks														
white oak	317,668	6,117	15,058	38,260	38,328	52,212	22,086	39,197	43,230	54,723	8,457	--	--	
swamp white oak	4,512	190	307	521	745	--	--	2,749	--	--	--	--	--	
bur oak	246,351	4,659	11,331	16,431	20,290	26,251	19,034	27,198	40,188	68,142	12,828	--	--	
chinkapin oak	2,749	337	596	1,218	598	--	--	--	--	--	--	--	--	
All species	571,280	11,303	27,292	56,430	59,961	78,462	41,120	69,144	83,418	122,865	21,285	--	--	
Select red oaks														
northern red oak	244,289	2,890	4,574	16,342	23,087	29,622	27,627	34,217	21,814	59,995	24,120	--	--	
All species	244,289	2,890	4,574	16,342	23,087	29,622	27,627	34,217	21,814	59,995	24,120	--	--	
Other white oaks														
post oak	953	--	510	443	--	--	--	--	--	--	--	--	--	
All species	953	--	510	443	--	--	--	--	--	--	--	--	--	
Other red oaks														
northern pin oak	10,998	433	563	--	1,857	1,088	1,386	--	--	5,672	--	--	--	
shingle oak	27,051	3,347	4,348	5,730	2,128	2,202	3,146	6,151	--	--	--	--	--	
pin oak	25,314	621	489	393	832	900	--	4,619	3,596	4,636	9,230	--	--	
black oak	85,715	2,207	3,791	8,297	11,295	17,732	11,632	9,294	15,272	6,195	--	--	--	
All species	149,078	6,607	9,190	14,419	16,112	21,922	16,164	20,064	18,868	16,503	9,230	--	--	

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)										29.0+
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9		
Hardwoods												
Hickory												
bitternut hickory	64,266	7,694	11,367	11,135	13,441	7,274	1,445	7,595	--	4,314	--	--
pignut hickory	2,948	--	605	1,156	--	1,186	--	--	--	--	--	--
shagbark hickory	149,990	14,570	22,718	27,655	22,054	28,993	14,066	6,635	5,722	7,578	--	--
mockernut hickory	2,139	372	--	644	--	1,123	--	--	--	--	--	--
All species	219,343	22,637	34,690	40,590	35,495	38,576	15,511	14,230	5,722	11,893	--	--
Yellow birch												
yellow birch	--	--	--	--	--	--	--	--	--	--	--	--
All species	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple												
black maple	38,310	1,754	1,864	8,702	7,386	3,595	7,064	7,944	--	--	--	--
sugar maple	57,918	2,871	6,372	5,484	7,114	3,650	3,953	4,737	6,865	16,872	--	--
All species	96,228	4,625	8,236	14,187	14,500	7,245	11,017	12,682	6,865	16,872	--	--
Soft maple												
red maple	2,012	--	--	1,056	955	--	--	--	--	--	--	--
silver maple	320,217	4,575	11,501	24,425	31,317	42,405	36,084	42,620	47,804	46,335	33,152	33,152
All species	322,228	4,575	11,501	25,482	32,272	42,405	36,084	42,620	47,804	46,335	33,152	33,152
Ash												
white ash	38,722	2,531	4,991	8,065	3,711	7,770	1,482	--	--	--	10,171	--
black ash	2,174	275	435	--	--	1,464	--	--	--	--	--	--
green ash	54,018	4,827	7,846	10,708	4,309	10,528	8,205	5,179	2,417	--	--	--
All species	94,914	7,633	13,272	18,773	8,020	19,762	9,687	5,179	2,417	--	10,171	--
Cottonwood and aspen												
eastern cottonwood	369,991	684	3,947	6,637	8,243	17,159	8,346	20,247	24,776	127,274	152,677	--
bigtooth aspen	20,956	214	678	2,840	3,199	3,389	5,965	4,672	--	--	--	--
quaking aspen	3,294	430	1,801	538	525	--	--	--	--	--	--	--
All species	394,241	1,328	6,426	10,015	11,967	20,548	14,311	24,919	24,776	127,274	152,677	--
Basswood												
American basswood	128,826	4,220	9,850	10,400	10,659	14,912	13,596	11,976	8,723	44,492	--	--
All species	128,826	4,220	9,850	10,400	10,659	14,912	13,596	11,976	8,723	44,492	--	--
Black walnut												
black walnut	188,012	5,235	9,184	19,770	24,521	35,804	42,548	18,988	9,774	22,188	--	--
All species	188,012	5,235	9,184	19,770	24,521	35,804	42,548	18,988	9,774	22,188	--	--

(Table 7 continued on next page)

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)										29.0+
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9		
Hardwoods												
Other eastern soft hardwoods												
boxelder	24,768	3,266	3,851	5,944	4,075	2,905	1,258	--	--	--	3,469	--
Ohio buckeye	9,334	1,031	490	1,474	775	1,448	1,419	2,696	--	--	--	--
river birch	2,476	--	--	517	--	1,959	--	--	--	--	--	--
paper birch	935	535	--	399	--	--	--	--	--	--	--	--
northern catalpa	271	271	--	--	--	--	--	--	--	--	--	--
hackberry	131,161	10,285	15,800	19,866	13,629	19,241	24,283	12,003	7,870	8,182	--	--
butternut	1,478	--	374	--	--	1,103	--	--	--	--	--	--
cucumbertree	218	--	218	--	--	--	--	--	--	--	--	--
sycamore	874	384	490	--	--	--	--	--	--	--	--	--
black cherry	34,518	2,552	4,700	6,880	6,079	7,816	4,208	2,282	--	--	--	--
black willow	19,856	260	234	1,419	692	2,211	--	3,947	8,201	2,893	--	--
white willow	173	--	173	--	--	--	--	--	--	--	--	--
American elm	164,187	22,431	28,675	23,651	19,977	20,802	18,177	10,902	5,036	14,536	--	--
Siberian elm	7,483	378	1,135	393	525	--	1,594	--	--	3,459	--	--
slippery elm	75,497	6,969	9,208	10,133	9,293	15,604	7,184	5,924	2,383	8,798	--	--
All species	473,226	48,361	65,348	70,677	55,045	73,090	58,123	37,754	23,491	41,338	--	--
Other eastern hard hardwoods												
common persimmon	--	--	--	--	--	--	--	--	--	--	--	--
waterlocust	130	130	--	--	--	--	--	--	--	--	--	--
honeylocust	62,006	3,158	5,273	8,857	8,132	15,934	8,649	8,594	3,409	--	--	--
red mulberry	3,662	1,117	545	817	1,182	--	--	--	--	--	--	--
black locust	29,404	1,224	3,254	4,867	3,294	2,050	6,008	--	5,351	3,357	--	--
rock elm	138	138	--	--	--	--	--	--	--	--	--	--
All species	95,341	5,767	9,072	14,540	12,609	17,984	14,657	8,594	8,760	3,357	--	--
Total hardwoods	2,977,960	125,183	209,145	312,068	304,247	400,331	300,444	300,367	262,431	513,112	250,635	250,635
All species groups	3,012,806	131,351	215,373	321,428	310,249	406,017	301,845	300,367	262,431	513,112	250,635	250,635

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 thies total due to rounding.

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 this total due to rounding.

Table 8. -- Net volume of sawtimber on timberland by species group, species and diameter class, Iowa, 1999 - 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	--	--	--	--	--	--	--	--	--	--	--
All species	0	--	--	--	--	--	--	--	--	--	--
Eastern white and red pines											
red pine	4,744	2,181	2,563	--	--	--	--	--	--	--	--
All species	4,744	2,181	2,563	--	--	--	--	--	--	--	--
Other eastern softwoods											
eastern redcedar	88,167	42,842	25,307	13,543	6,475	--	--	--	--	--	--
larch (introduced)	2,301	2,301	--	--	--	--	--	--	--	--	--
All species	90,469	45,144	25,307	13,543	6,475	--	--	--	--	--	--
Ponderosa and Jeffrey pines											
ponderosa pine	20,476	3,364	2,605	14,507	--	--	--	--	--	--	--
All species	20,476	3,364	2,605	14,507	--	--	--	--	--	--	--
Total softwoods	115,689	50,689	30,475	28,050	6,475	--	--	--	--	--	--
Hardwoods											
Select white oaks											
white oak	1,194,285	--	188,290	251,613	104,837	182,413	196,643	239,312	31,176	--	--
swamp white oak	16,568	--	3,679	--	--	12,889	--	--	--	--	--
bur oak	964,128	--	99,023	125,767	89,326	126,415	182,626	290,833	50,139	--	--
chinkapin oak	2,909	--	2,909	--	--	--	--	--	--	--	--
All species	2,177,890	--	293,901	377,380	194,162	321,717	379,269	530,145	81,315	--	--
Select red oaks											
northern red oak	1,071,267	--	114,333	147,752	138,159	170,730	107,888	285,927	106,477	--	--
All species	1,071,267	--	114,333	147,752	138,159	170,730	107,888	285,927	106,477	--	--
Other white oaks											
post oak	--	--	--	--	--	--	--	--	--	--	--
All species	--	--	--	--	--	--	--	--	--	--	--
Other red oaks											
northern pin oak	47,147	--	9,145	5,410	6,884	--	--	25,708	--	--	--
shingle oak	67,156	--	10,468	10,930	15,502	30,257	--	--	--	--	--
pin oak	106,008	--	4,082	4,448	--	22,569	17,198	21,276	36,435	--	--
black oak	352,391	--	56,167	88,382	57,812	45,471	74,578	29,982	--	--	--
All species	572,702	--	79,862	109,170	80,198	98,296	91,776	76,965	36,435	--	--

(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	169,618	--	66,773	36,359	7,225	37,745	--	21,516	--
pignut hickory	5,918	--	--	5,918	--	--	--	--	--
shagbark hickory	412,255	--	106,730	140,533	68,132	32,199	27,835	36,827	--
mockernut hickory	5,432	--	--	5,432	--	--	--	--	--
All species	593,224	--	173,502	188,242	75,358	69,944	27,835	58,342	--
Yellow birch									
yellow birch	--	--	--	--	--	--	--	--	--
All species	--	--	--	--	--	--	--	--	--
Hard maple									
black maple	123,532	--	35,089	16,946	33,691	37,806	--	--	--
sugar maple	200,734	--	33,988	17,352	18,752	22,586	32,194	75,863	--
All species	324,266	--	69,077	34,298	52,443	60,392	32,194	75,863	--
Soft maple									
red maple	4,148	--	4,148	--	--	--	--	--	--
silver maple	1,203,873	--	135,909	185,758	158,496	187,123	208,994	198,220	129,373
All species	1,208,021	--	140,057	185,758	158,496	187,123	208,994	198,220	129,373
Ash									
white ash	100,901	--	16,770	35,986	6,950	--	--	--	41,195
black ash	6,812	--	--	6,812	--	--	--	--	--
green ash	143,025	--	19,510	48,794	38,562	24,632	11,528	--	--
All species	250,739	--	36,280	91,592	45,512	24,632	11,528	--	41,195
Cottonwood and aspen									
eastern cottonwood	1,685,896	--	38,433	82,868	41,292	101,474	125,898	635,259	660,672
bigtooth aspen	84,187	--	14,860	16,490	29,552	23,286	--	--	--
quaking aspen	2,248	--	2,248	--	--	--	--	--	--
All species	1,772,331	--	55,541	99,357	70,844	124,759	125,898	635,259	660,672
Basswood									
American basswood	512,635	--	53,948	75,091	67,964	59,196	42,753	213,683	--
All species	512,635	--	53,948	75,091	67,964	59,196	42,753	213,683	--
Black walnut									
black walnut	729,562	--	118,327	174,130	203,657	89,231	45,313	98,905	--
All species	729,562	--	118,327	174,130	203,657	89,231	45,313	98,905	--

Table 8 continued on next page)

(Table 8 continued on next page)

(Table 8 continued)

Species group/ species	All		Diameter class (inches at breast height)										29.0+
	classes		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				
Hardwoods													
Other eastern soft hardwoods													
boxelder	52,948	--	--	18,688	13,353	5,736	--	--	15,171	--	--	--	--
Ohio buckeye	28,837	--	--	3,560	6,635	6,499	12,142	--	--	--	--	--	--
river birch	8,960	--	--	--	8,960	--	--	--	--	--	--	--	--
paper birch	--	--	--	--	--	--	--	--	--	--	--	--	--
northern catalpa	--	--	--	--	--	--	--	--	--	--	--	--	--
hackberry	381,243	--	--	63,791	88,021	109,579	52,732	33,524	33,595	--	--	--	--
butternut	5,117	--	--	--	5,117	--	--	--	--	--	--	--	--
cucumbertree	--	--	--	--	--	--	--	--	--	--	--	--	--
sycamore	--	--	--	--	--	--	--	--	--	--	--	--	--
black cherry	93,397	--	--	28,014	35,862	19,173	10,348	--	--	--	--	--	--
black willow	77,036	--	--	3,045	9,785	--	17,503	35,267	11,436	--	--	--	--
white willow	--	--	--	--	--	--	--	--	--	--	--	--	--
American elm	401,657	--	--	93,635	95,731	81,926	48,485	21,681	60,199	--	--	--	--
Siberian elm	23,539	--	--	2,347	--	7,007	--	--	14,185	--	--	--	--
slippery elm	222,448	--	--	43,371	72,346	32,745	25,784	10,301	37,901	--	--	--	--
All species	1,295,181	--	--	256,451	335,811	262,665	166,994	100,773	172,487	--	--	--	--
Other eastern hard hardwoods													
common persimmon	--	--	--	--	--	--	--	--	--	--	--	--	--
waterlocust	--	--	--	--	--	--	--	--	--	--	--	--	--
honeylocust	203,471	--	--	37,325	72,805	39,409	38,828	15,104	--	--	--	--	--
red mulberry	5,460	--	--	5,460	--	--	--	--	--	--	--	--	--
black locust	91,336	--	--	15,183	9,448	27,676	--	24,182	14,847	--	--	--	--
rock elm	--	--	--	--	--	--	--	--	--	--	--	--	--
All species	300,267	--	--	57,968	82,252	67,086	38,828	39,286	14,847	--	--	--	--
Total hardwoods	10,808,086	--	--	1,449,247	1,900,833	1,416,544	1,411,842	1,213,506	2,360,646	1,055,468	--	--	--
All species groups	10,923,775	50,689		1,479,722	1,928,883	1,423,019	1,411,842	1,213,506	2,360,646	1,055,468			

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 thies total 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, Iowa, 1999 - 2002

(In dry tons)

Owner category and softwood/hardwood category	All components	All live 1-5 inch trees	Tree biomass component					
			Growing-stock trees			Non-growing-stock trees		
			Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	119,672	32,284	67,469	50,906	16,562	19,919	14,027	5,892
Hardwoods	11,859,816	592,839	9,769,906	7,297,518	2,472,388	1,497,072	1,102,265	394,806
Total	11,979,489	625,123	9,837,375	7,348,425	2,488,950	1,516,991	1,116,292	400,699
Private								
Softwoods	976,177	113,938	650,415	471,518	178,898	211,824	150,434	61,390
Hardwoods	93,135,724	4,776,158	64,497,803	47,257,756	17,240,047	23,861,762	17,534,099	6,327,663
Total	94,111,901	4,890,096	65,148,219	47,729,274	17,418,945	24,073,586	17,684,533	6,389,053
All ownerships								
Softwoods	1,095,850	146,222	717,884	522,424	195,460	231,743	164,461	67,282
Hardwoods	104,995,540	5,368,997	74,267,710	54,555,274	19,712,435	25,358,834	18,636,364	6,722,470
Total	106,091,390	5,515,219	74,985,594	55,077,698	19,907,896	25,590,577	18,800,826	6,789,752

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.

Table 10. -- Average annual net growth of growing stock on timberland by species group and owner category, Iowa, 1990 to 1999 - 2002

(In thousand cubic feet per year)

Species group	Owner category		
	All owners	Public	Unidentified owner
Softwoods			
Other yellow pines	10	--	10
Eastern white and red pines	28	--	28
Other eastern softwoods	1,491	23	1,467
Ponderosa and Jeffrey pines	-205	--	-205
Total softwoods	1,323	23	1,300
Hardwoods			
Select white oaks	14,047	-397	14,444
Select red oaks	6,089	582	5,507
Other red oaks	6,237	--	6,237
Hickory	7,652	8	7,644
Hard maple	4,245	--	4,245
Soft maple	10,030	108	9,923
Ash	3,372	1,092	2,279
Cottonwood and aspen	7,678	-121	7,799
Basswood	3,050	--	3,050
Black walnut	12,304	104	12,200
Other eastern soft hardwoods	15,904	1,329	14,575
Other eastern hard hardwoods	5,074	--	5,074
Total hardwoods	95,683	2,705	92,977
All species groups	97,006	2,728	94,277

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.

Table 11. -- Average annual removals of growing stock on timberland by species group and owner category, Iowa, 1990 to 1999 - 2002

(In thousand cubic feet per year)

Species group	Owner category		
	All owners	Public	Unidentified owner
Softwoods			
Eastern white and red pines	127	--	127
Other eastern softwoods	649	--	649
Ponderosa and Jeffrey pines	474	--	474
Total softwoods	1,250	--	1,250
Hardwoods			
Select white oaks	9,241	--	9,241
Select red oaks	6,226	--	6,226
Other red oaks	3,676	--	3,676
Hickory	3,531	--	3,531
Hard maple	335	--	335
Soft maple	5,201	516	4,685
Ash	1,913	--	1,913
Cottonwood and aspen	3,360	382	2,979
Basswood	4,632	--	4,632
Black walnut	8,356	--	8,356
Other eastern soft hardwoods	7,389	--	7,389
Other eastern hard hardwoods	--	--	--
Total hardwoods	53,860	898	52,962
All species groups	55,110	898	54,212

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.

Table 12. -- Average annual mortality of growing stock on timberland by species group and owner category, Iowa, 1990 to 1999 - 2002

(In thousand cubic feet per year)

Species group	Owner category		
	All owners	Public	Private Unidentified owner
Softwoods			
Other eastern softwoods	--	--	--
Ponderosa and Jeffrey pines	286	--	286
Total softwoods	286	--	286
Hardwoods			
Select white oaks	1,866	926	940
Select red oaks	1,182	--	1,182
Other red oaks	2,580	--	2,580
Hickory	1,194	--	1,194
Hard maple	--	--	--
Soft maple	2,473	--	2,473
Ash	926	--	926
Cottonwood and aspen	1,774	190	1,584
Basswood	1,044	516	528
Black walnut	1,686	--	1,686
Other eastern soft hardwoods	7,689	174	7,515
Other eastern hard hardwoods	494	--	494
Total hardwoods	22,907	1,806	21,102
All species groups	23,194	1,806	21,388

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.

Leatherberry, Earl C.; Brand, Gary J.

2004. **Iowa's forest resources in 2002**. Resour. Bull. NC-235. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 33 p.

Results of the 2002 annual inventory of Iowa show an estimated 2.7 million acres of forest land. The estimate of total all live tree volume on forest land is 3.9 billion cubic feet. Nearly 2.6 million acres of forest land in Iowa are classified as timberland. The estimate of growing-stock volume on timberland is 3.0 billion cubic feet. All live aboveground tree biomass on timberland is estimated at 106.1 million dry tons. Known pathogens and pests in Iowa's forests include oak wilt and gypsy moth.

KEY WORDS: Annual inventory, forest land, timberland, forest type, volume, biomass, Iowa.

The Forest inventory and Analysis web site is:
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