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Iowa's Forest Resources in 2003

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Iowa's Forest Resources in 2003

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 in all 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 2003 will be remeasured in 2008.

In 2003, NCFIA completed measurement of the fifth panel of inventory plots in Iowa. The 2003 panel, along with those completed in 1999, 2000, 2001, and 2002 completed data collection for the fourth inventory of Iowa's forests. Previous inventories of Iowa's forest resource were completed in 1954, 1974, and 1990 (Leatherberry *et al*. 1992, Spencer and Jakes 1980, Thornton and Morgan 1959). To expedite the reporting of findings from Iowa's fourth inventory, this 2003 annual report contains summary information from the fourth forest inventory, along with 12 core tables. More tabular data from the fourth inventory of Iowa can be gathered through the FIA Mapmaker program Web site at www.ncrs.fs.fed.us/4801/fiadb/index.htm. A subsequent, comprehensive analytical report will be developed from the fourth Iowa inventory, addressing issues of concern and identifying trends in the State's forest resources.

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. To estimate growth, removal, and mortality, the 1990 inventory was processed using estimation/summary routines for the 1999–2003 inventory. Although these changes allow limited comparison of inventory estimates among separate inventories in this report, it is appropriate to directly compare portions of the 1999-2003 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). Timberland[1]—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 accounts for 96 percent of all forest land in Iowa (table 2). The remaining 4 percent (100

[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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thousand acres) of forest land that is not timberland is classified (1) Reserved forest land: land restricted from harvesting by statute, administrative regulation, or designation (conservation areas, etc.), or (2) Other forest land: land not capable of growing trees at a rate of 20 cubic feet per acre per year.

Timberland area in Iowa declined from the 1950s and reached its nadir during the 1970s. Since then, it has increased (fig. 1). The rebound in timberland area occurred because of the decline in the farm economy in the 1970s and 1980s that resulted in pastures and marginal agricultural lands reverting 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 2003, timberland area in Iowa slightly exceeded what was present in 1954 (fig. 1).

Private ownerships hold nearly 9 of every 10 acres of timberland in Iowa (table 2). The remaining timberland area is publicly owned. Although there are far fewer public acres of timberland, those lands provide a number of societal benefits, including land for public hunting and other recreation, wildlife habitat, watershed protection.

Iowa's timberland supports a largely hardwood forest—96 percent of all timberland area is classified as hardwood forest type groups (table 2). The State's timberland is largely classed in the oak/hickory, the elm/ash/cottonwood, and the maple/beech/birch forest type groups (table 3, fig. 2). In the oak/hickory group, the white oak/red oak/hickory forest type (565 thousand acres) predominates, followed by the mixed upland hardwoods (405 thousand acres). In the elm/ash/cottonwood group, the forest type sugarberry/hackberry/elm/green ash (293 thousand acres) predominates. The sugar maple/beech/yellow birch (144 thousand acres) and hard maple/basswood (157 thousand acres) forest types dominate in the maple/beech/birch group. Eastern redcedar is the dominant coniferous species in Iowa's forest, but the eastern redcedar type accounts for only 1 percent (32 thousand acres) of the total timberland area. However, eastern redcedar often is mixed in with hardwoods in the oak/pine forest type group. In total, eastern redcedar has a significant presence in an estimated 69 thousand acres of timberland in Iowa.

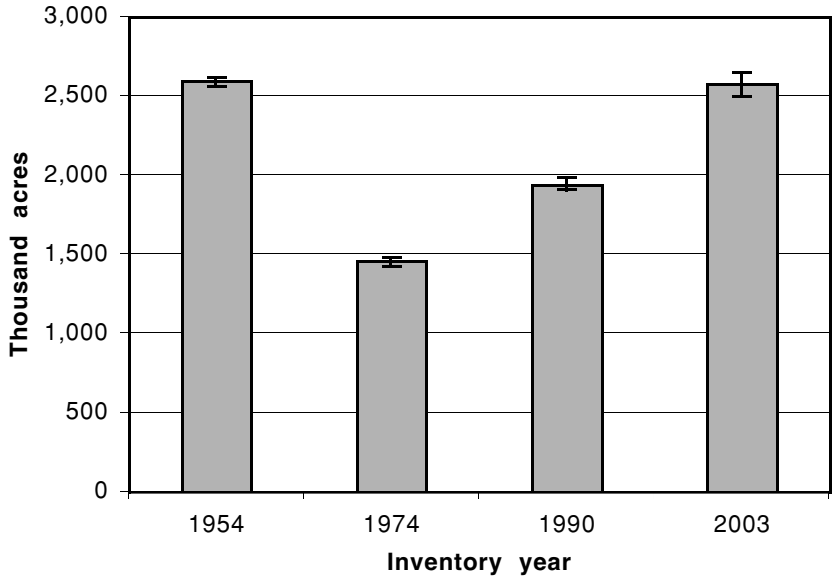

Figure 1.—Area of timberland in Iowa by inventory year, 1954–2003. (The vertical line at the top of each bar represents the sample error associated with each inventory.)

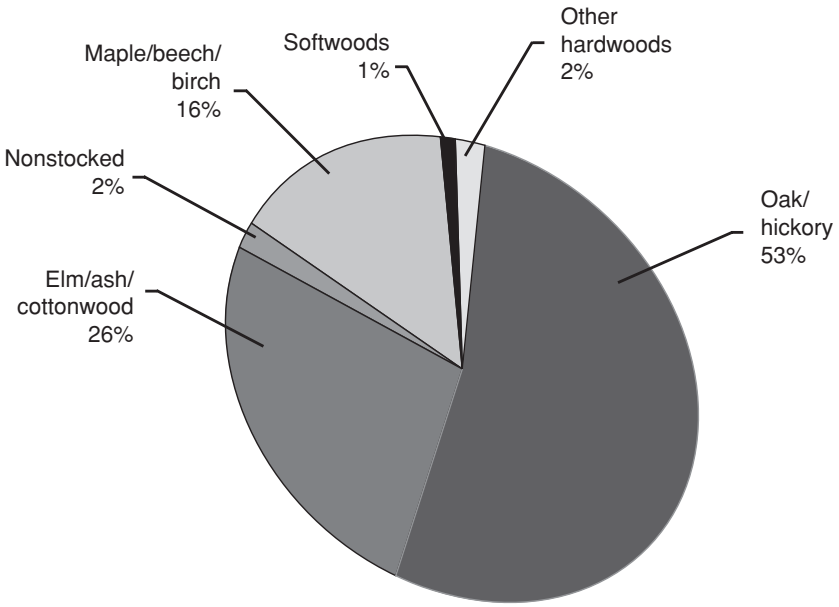

Figure 2.—*Area of timberland in Iowa by forest type group, 2003.*

Stand-size class, a measure of the average diameter of the dominant trees in a stand, 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—accounts for 64 percent of the timberland area in Iowa (table 3. Although timberland area increased in Iowa, the area of sapling/seedling stands remained virtually unchanged between inventories, and in 2003 accounted for 11 percent of timberland area (fig. 3).

The substantive sawtimber area is indicative of a mature forest. However, the relatively high proportion of sapling/seedling area in the eastern redcedar and the eastern redcedar/hardwood types is indicative of an expanding eastern redcedar resource.

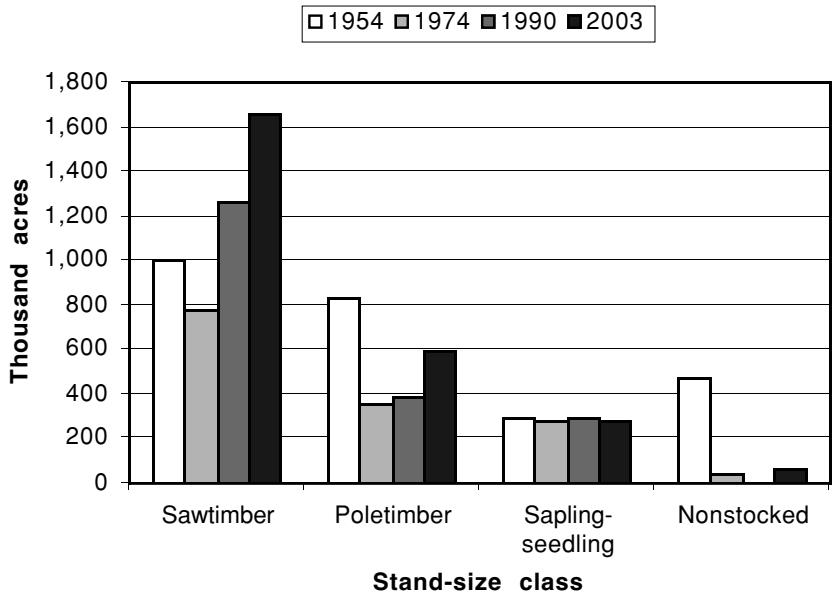

Figure 3.—Area of timberland in Iowa by stand-size class, 1954–2003.

Volume

Total net volume of all live trees on forest land in Iowa is 3.8 billion cubic feet, which equates to nearly 1,433 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 (86 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 bur oaks, white oaks, and northern red oaks.

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 2.9 billion cubic feet, representing 76 percent of the total live volume (table 5). Twenty-two percent of volume of all live trees on timberland is in live cull trees—844.6 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 94 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.

One-half of total 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, 99 percent of all growing-stock volume is accounted for (table 6). Growing-stock volume present in the softwoods amounts to less than 1 percent (11.7 million cubic feet) of Iowa's growing-stock volume. However, growing-stock volume for all softwood species amoounts to 1 percent (30.8 million cubic feet) of total growing-stock volume because softwoods are sometimes present in hardwood stands (table 6).

Seventy-eight percent of growing-stock volume is in trees that are 11 inches d.b.h. and larger (table 7). Twenty-three 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, eastern cottonwoods have significant volume in large diameter trees—70 percent of eastern cottonwood growing-stock volume is in trees that are 21 inches d.b.h. and larger. Cottonwoods account for 34 percent of total volume in trees 21 inches d.b.h. and larger.

Since the 1974 inventory, 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 increase in volume. For example, between 1990 and 2003, growing-stock volume in trees with diameters 19 inches or greater increased from 414 million cubic feet to 929 million cubic feet.

Sawtimber volume, a subset of growing-stock volume, 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 10.5 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 55 percent of the sawtimber volume in Iowa: eastern cottonwood with 1.5 billion board feet; silver maple with 1.1 billion cubic feet; white oak with just under 1.2 billion board feet; northern red oak with 1.0 billion board feet; and

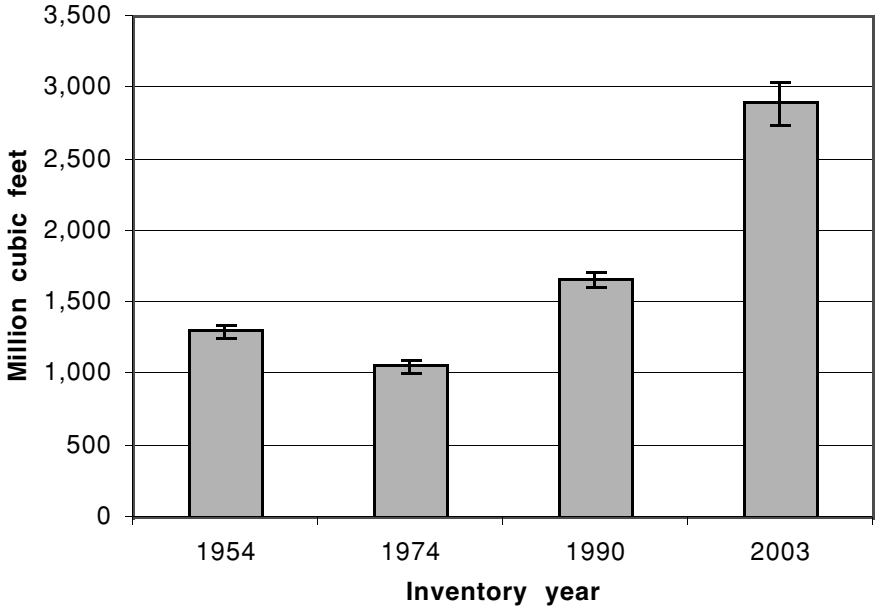

Figure 4.—Growing-stock volume on timberland in Iowa, 1954—2003. (The vertical line at the top of each bar represents the sample error associated with each inventory.)

bur oak with 950.1 million board feet. Of total sawtimber volume, 29 percent is in trees with diameters of 21 inches d.b.h. or larger. And, among trees of those diameter classes, eastern cottonwoods alone account for 35 percent of net volume of sawtimber on timberland.

Biomass

Live aboveground tree biomass in Iowa's timberland area was estimated to be 104.2 million dry tons (an average of 40 dry tons per acre of timberland) in 1999–2003. 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). Sixty-nine percent of tree biomass is in growing-stock trees, with an additional 25 percent in non-growing-stock trees and the remaining 6 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 boles. The remaining aboveground biomass is in the stumps, tops, and limbs. Ninety-nine percent (103 million dry tons) of all live aboveground tree biomass is in 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 volume on Iowa's timberland grew an average, 117.5 million cubic feet per year between 1990 and 2003 (table 10). Hardwood growth accounts for virtually all (98 percent) of the total average annual growth of growing stock. Softwood growth was nearly 1.9 million cubic feet per year. Other eastern soft hardwoods, the species group that contains hackberry and elms, had a growth rate of 23.3 million cubic feet per year. Two of the other fastest growing species groups in Iowa were select white oaks at 21 million cubic feet per year and soft maple at 15.3 million cubic feet per year.

Average annual removals of growing stock on timberland totaled 25.5 million cubic feet per year (table 11). Hardwood removals were 25.2 million cubic feet per year. Softwood removals were 250 thousand cubic feet per year, or about 1 percent of the total. Removals from private ownerships totaled 24.5 million cubic feet per year, virtually all of the removals. Select red oaks had the highest average annual removals, at 6.2 million cubic feet per year followed by select white oaks at 4.1 million cubic feet per year.

Average annual mortality of all growing stock on timberland from 1990 to 2003 was 24.5 million cubic feet per year (table 12). Ninety-nine percent of the total, or 24.3 million cubic feet per year was among hardwooods, while the remaining 171 thousand cubic feet per year was in softwoods.

Across all species groups, the other eastern soft hardwoods group that contains elm species had the most mortality at 7.9 million cubic feet per year, or 32 percent of total mortality. The amount of mortality in this group is probably a result of Dutch elm disease that has expanded throughout the State. The oak species groups accounted for 20 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 2003, white oak decline increased in 19 counties of northeast Iowa. White oak decline was identified as the most serious forest health concern in the region. This situation is being investigated through a joint Iowa Department of Natural Resources and USDA Forest Service study. Crown and stem samples were collected and are being analyzed for various fungi at the plant diagnostic laboratory at Iowa State University.

In 2003, oak wilt infection continued to be a problem, especially in southeast Iowa. 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. 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), cutting or killing roots of infected trees, and killing oak trees surrounding the infected trees all appear to have some use in management and prevention. Sanitation of dying and dead oaks before oak wilt fruiting bodies appear in 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.

The gypsy moth, an exotic species that defoliates trees and shrubs, increased significantly in Iowa during 2003. During 2003, over 3,500 field traps yielded 159 moths, an increase over 2002. Although gypsy moth is not yet widespread as viable breeding populations in Iowa, increasing activity points to the need to continue to treat and eradicate early moth arrivals.

Dutch elm disease caused by the fungus continues to be present 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.

The exact cause of ash dieback/decline is not known. Drought conditions over much of Iowa in 2003 affected trees, especially in southwest Iowa where an extensive area of oak appears to be stressed.

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 the Department of Forestry at Iowa State University, and the 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 started 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 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 2003) are available at: www.ncrs.fs.fed.us/4801/fiadb/index.htm.

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 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 2003 or for 2002 through 2006. Sampling error estimates for the 2003 inventory results are area of forest land, 2.8 percent; area of timberland, 2.9 percent; number of growing-stock trees on timberland, 4.9 percent; volume of growing stock on timberland, 5.2 percent; and volume of sawtimber on timberland, 6.1 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 sample sizes. Therefore, caution should be used when comparing the results of this inventory with those of the past. Additionally, all conclusions based on this inventory must be tempered by the sampling errors that correspond with all estimates from this inventory.

Other significant changes between inventories include new remote sensing technology, a new field plot design, and additional remotely sensed and field 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 the precision of estimates. Previous inventories in Iowa used manual interpretation of aerial photos to stratify the sample (1954, 1974, and 1990).

New algorithms were used in 2003 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 nonstocked, and names given to the forest types changed with the new algorithms. As a result, comparisons between the published 2003 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 2003 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 measured the traditional FIA suite of mensurational variables, and the

third phase focused on a suite of variables related to the health of the forest.

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

Phase 1

The 2003 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 boundary formed two additional strata—forest edge and nonforest edge. 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 nonoverlapping hexagons, each of which contains 5,937 acres (McRoberts 1999). An array of field plots was established by selecting one plot from each hexagon based on the following rules: (1) if a Forest Health Monitoring (FHM) plot (Mangold 1998) fell within a hexagon, it was selected; (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, nonoverlapping subsamples or panels. Each year the plots in a single panel are measured, and panels are selected on a 5-year, rotating basis (McRoberts 1999). For estimation purposes, the measurement of each panel of plots may be considered an independent systematic sample of all land in a State. Field crews measure vegetation on plots forested at the time of the last inventory and on plots currently classified as forest by trained photointerpreters using aerial photos or digital orthoquads.

Phase 3

NCFIA has two categories of field plot measurements—phase 2 field plots (standard FIA plots) and phase 3 plots (forest health plots)—to optimize our ability to collect data when available for measurement. Both types of plot are uniformly distributed both geographically and temporally. Phase 3 plots are measured with the full suite of FHM vegetative and health variables (Mangold 1998) collected as well as the full suite of measures associated with phase 2 plots. Phase 3 plots must be measured between June 1 and August 30 to accommodate the additional measurement of nonwoody understory vegetation, ground cover, soils, and other variables. The 1999-2003 annual inventory results represent field measures on 526 phase 2 forested plots and 28 phase 3 field plots.

The new national FIA plot design (fig. 5) was first used for data collection in Iowa in 1999, the first annual inventory year. This design was also used in the 2000-2003 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 changes in forest type, stand-size class, land use, ownership, and density. Each condition that occurs anywhere on any of the subplots is identified, described, and mapped if the area of the condition meets or exceeds 1 acre in size.

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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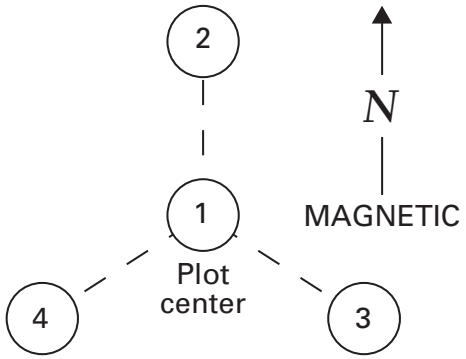

Figure 5.—Current NCFIA field plot design.

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TABLE TITLES

Table 1.—*Area of forest land by forest type group, forest type, and owner category, Iowa, 2003*

Table 2.—*Area of timberland by major forest type group, stand origin, and owner category, Iowa, 1999–2003*

Table 3.—*Area of timberland by forest type group, forest type, and stand-size class, Iowa, 1999–2003*

Table 4.—*Net volume of all live trees on forest land by species group, species, and owner category, Iowa, 1999-2003*

Table 5.—*Net volume of all live trees and salvable dead trees on timberland by class of timber and softwood/hardwood category, Iowa, 1999–2003*

Table 6.—*Net volume of growing stock on timberland by forest type group, forest type, and softwood/hardwood species category, Iowa, 1999–2003*

Table 7.—*Net volume of growing stock on timberland by species group, species, and diameter class, Iowa, 1999–2003*

Table 8.—*Net volume of sawtimber on timberland by species group, species, and diameter class, Iowa, 1999–2003*

Table 9.—*All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Iowa, 1999–2003*

Table 10.—*Average annual net growth of growing stock on timberland by species group and owner category, Iowa, 1990 to 1999-2003*

Table 11.—*Average annual removals of growing stock on timberland by species group and owner category, Iowa, 1990 to 1999–2003*

Table 12.—*Average annual mortality of growing stock on timberland by species group and owner category, Iowa, 1990 to 1999–2003*

TABLES

Table 1. -- Area of forest land by forest type group, forest type, and owner category, Iowa, 1999-2003

(In thousand acres)

Forest type group/ forest type	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Pinyon / juniper group				
Eastern redcedar	38.0	1.4	36.6	- -
All forest types	38.0	1.4	36.6	- -
All softwood groups	38.0	1.4	36.6	- -
Hardwood type groups				
Oak / pine group				
Eastern redcedar / hardwood	45.4	5.0	40.4	- -
All forest types	45.4	5.0	40.4	- -
Oak / hickory group				
Oak / hickory group	1.9	- -	1.9	- -
Post oak / blackjack oak	12.2	- -	12.2	- -
White oak / red oak / hickory	592.0	47.2	544.8	- -
White oak	161.2	38.8	122.5	- -
Northern red oak	50.8	17.6	33.2	- -
Bur oak	115.6	2.5	113.0	- -
Black walnut	59.7	19.3	40.4	- -
Black locust	11.2	- -	11.2	- -
Mixed upland hardwoods	412.6	21.8	390.8	- -
All forest types	1,417.1	147.2	1,270.0	- -
Elm / ash / cottonwood group				
Elm / ash / cottonwood group	1.5	- -	1.5	- -
Black ash / American elm / red maple	16.5	3.8	12.7	- -
River birch / sycamore	53.1	- -	53.1	- -
Cottonwood	83.8	15.3	68.6	- -
Willow	15.9	6.0	9.9	- -
Sycamore / pecan / American elm	6.5	1.1	5.4	- -
Sugarberry / hackberry / elm / green ash	300.7	34.5	266.2	- -
Silver maple / American elm	161.2	18.1	143.1	- -
Cottonwood / willow	26.8	- -	26.8	- -
All forest types	665.9	78.8	587.1	- -

(Table 1 continued on next page)

(Table 1 continued)

Forest type group/ forest type	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwood type groups				
Maple / beech / birch group				
Maple / beech / birch group	1.3	1.3	- -	- -
Sugar maple / beech / yellow birch	144.4	15.9	128.6	- -
Black cherry	2.3	- -	2.3	- -
Cherry / ash / yellow-poplar	10.7	1.4	9.2	- -
Hard maple / basswood	157.4	27.0	130.4	- -
Elm / ash / locust	86.3	14.3	72.0	- -
All forest types	402.5	60.0	342.5	- -
Aspen / birch group				
Aspen	12.0	- -	12.0	- -
All forest types	12.0	- -	12.0	- -
Exotic hardwoods group				
Other exotic hardwoods	10.7	4.8	5.9	- -
All forest types	10.7	4.8	5.9	- -
All hardwood groups	2,553.7	295.7	2,258.0	- -
Nonstocked	73.3	11.5	61.8	- -
All forest groups	2,665.1	308.7	2,356.4	- -

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, Iowa, 1999-2003

(In thousand acres)

Major forest type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	31.9	1.4	30.5	- -
All softwood types	31.9	1.4	30.5	- -
Hardwood type groups				
Natural	2,468.7	258.5	2,210.2	- -
Planted	16.7	- -	16.7	- -
All hardwood types	2,485.4	258.5	2,226.8	- -
Nonstocked	61.3	5.5	55.8	- -
All groups	2,578.6	265.5	2,313.1	- -

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

Table 3. -- Area of timberland by forest type group, forest type, and stand-size class, Iowa, 1999-2003

(In thousand acres)

Forest type group/ forest type	Stand-size class				
	All stands	Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Softwood type groups					
Pinyon / juniper group					
Eastern redcedar	31.9	10.0	6.3	15.7	- -
All forest types	31.9	10.0	6.3	15.7	- -
All softwood groups	31.9	10.0	6.3	15.7	- -
Hardwood type groups					
Oak / pine group					
Eastern redcedar / hardwood	37.5	11.0	8.9	17.5	- -
All forest types	37.5	11.0	8.9	17.5	- -
Oak / hickory group					
Oak / hickory group	1.9	- -	1.3	0.6	- -
Post oak / blackjack oak	12.2	10.7	1.5	- -	- -
White oak / red oak / hickory	565.0	357.3	141.0	66.7	- -
White oak	161.2	151.8	9.4	- -	- -
Northern red oak	50.8	49.3	1.5	- -	- -
Bur oak	100.9	97.0	3.9	- -	- -
Black walnut	59.7	53.0	6.6	- -	- -
Black locust	11.2	5.1	6.1	- -	- -
Mixed upland hardwoods	404.8	165.4	170.0	69.5	- -
All forest types	1,367.8	889.6	341.4	136.8	- -
Elm / ash / cottonwood group					
Elm / ash / cottonwood group	1.5	- -	1.5	- -	- -
Black ash / American elm / red maple	16.5	10.4	5.3	0.8	- -
River birch / sycamore	53.1	40.3	6.7	6.1	- -
Cottonwood	83.8	71.7	5.2	6.9	- -
Willow	15.9	4.0	5.8	6.1	- -
Sycamore / pecan / American elm	6.5	6.2	0.3	- -	- -
Sugarberry / hackberry / elm / green ash	292.6	179.3	93.2	20.1	- -
Silver maple / American elm	161.2	152.0	7.8	1.5	- -
Cottonwood / willow	26.8	13.5	13.3	- -	- -
All forest types	657.9	477.3	139.1	41.5	- -
Maple / beech / birch group					
Maple / beech / birch group	1.3	1.3	- -	- -	- -
Sugar maple / beech / yellow birch	144.4	67.5	56.2	20.7	- -
Black cherry	2.3	- -	- -	2.3	- -
Cherry / ash / yellow-poplar	10.7	1.8	- -	8.9	- -
Hard maple / basswood	157.4	136.4	19.6	1.4	- -
Elm / ash / locust	83.4	39.4	14.9	29.0	- -
All forest types	399.5	246.5	90.7	62.4	- -
Aspen / birch group					
Aspen	12.0	6.0	6.0	- -	- -
All forest types	12.0	6.0	6.0	- -	- -

(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					
Exotic hardwoods group					
Other exotic hardwoods	10.7	5.9	- -	4.8	- -
All forest types	10.7	5.9	- -	4.8	- -
All hardwood groups	2,485.4	1,636.3	586.1	263.0	- -
Nonstocked	61.3	- -	- -	- -	61.3
All forest groups	2,578.6	1,646.3	592.3	278.7	61.3

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, Iowa, 1999-2003

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines				
Scotch pine	51	- -	51	- -
All species	51	- -	51	- -
Eastern white and red pines				
Red pine	885	429	455	- -
All species	885	429	455	- -
Other eastern softwoods				
Eastern redcedar	35,871	2,946	32,925	- -
Larch spp.	478	- -	478	- -
Tamarack (native)	242	- -	242	- -
Ponderosa pine	3,429	644	2,785	- -
All species	40,019	3,589	36,430	- -
Total softwoods	40,955	4,018	36,936	- -
Hardwoods				
Select white oaks				
White oak	369,557	74,683	294,874	- -
Swamp white oak	3,103	75	3,027	- -
Bur oak	399,471	10,380	389,090	- -
Chinkapin oak	4,549	2,346	2,203	- -
All species	776,680	87,485	689,195	- -
Select red oaks				
Northern red oak	271,671	63,959	207,713	- -
All species	271,671	63,959	207,713	- -
Other white oaks				
Post oak	551	- -	551	- -
All species	551	- -	551	- -
Other red oaks				
Northern pin oak	29,455	3,115	26,339	- -
Shingle oak	28,860	59	28,801	- -
Pin oak	21,449	1,248	20,200	- -
Black oak	86,793	7,289	79,504	- -
All species	166,556	11,711	154,845	- -
Hickory				
Bitternut hickory	82,825	7,041	75,784	- -
Pignut hickory	1,715	852	863	- -
Shellbark hickory		- -		- -
Shagbark hickory	162,271	9,957	152,314	- -
Mockernut hickory	1,496	604	892	- -
All species	248,307	18,454	229,853	- -
Yellow birch				
Yellow birch		- -		- -
All species		- -		- -
Hard maple				
Black maple	40,917	236	40,681	- -
Sugar maple	57,785	17,525	40,260	- -
All species	98,702	17,761	80,941	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Soft maple				
Red maple	2,272	776	1,496	- -
Silver maple	413,442	57,401	356,041	- -
All species	415,714	58,177	357,537	- -
Ash				
White ash	56,943	4,440	52,503	- -
Black ash	3,380	1,261	2,119	- -
Green ash	62,828	13,258	49,570	- -
All species	123,151	18,959	104,192	- -
Cottonwood and aspen				
Eastern cottonwood	338,751	94,509	244,242	- -
Bigtooth aspen	16,255	- -	16,255	- -
Quaking aspen	2,791	- -	2,791	- -
All species	357,796	94,509	263,288	- -
Basswood				
American basswood	165,236	31,706	133,530	- -
All species	165,236	31,706	133,530	- -
Black walnut				
Black walnut	222,318	27,200	195,118	- -
All species	222,318	27,200	195,118	- -
Other eastern soft hardwoods				
Boxelder	93,831	2,945	90,886	- -
Ohio buckeye	8,688	108	8,580	- -
River birch	4,925	- -	4,925	- -
Paper birch	2,769	- -	2,769	- -
Northern catalpa	377	- -	377	- -
Hackberry	165,875	8,816	157,059	- -
Butternut	2,950	- -	2,950	- -
American sycamore	939	177	762	- -
Black cherry	49,232	1,174	48,058	- -
Black willow	51,700	1,307	50,393	- -
White willow	459	- -	459	- -
American elm	230,979	25,984	204,995	- -
Siberian elm	12,938	304	12,634	- -
Slippery elm	103,840	11,109	92,731	- -
All species	729,502	51,925	677,578	- -
Other eastern hard hardwoods				
Common persimmon		- -		- -
Honeylocust	93,808	15,816	77,992	- -
White mulberry	444	- -	444	- -
Red mulberry	28,835	4,873	23,962	- -
Black locust	36,588	5,958	30,631	- -
Rock elm	116	- -	116	- -
All species	159,791	26,646	133,145	- -

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Eastern noncommercial hardwoods				
Ailanthus	163	- -	163	- -
Serviceberry spp.	117	117	- -	- -
American hornbeam, musclewood		- -	- -	- -
Eastern redbud	622	- -	622	- -
Hawthorn spp.	2,762	- -	2,762	- -
Cockspur hawthorn	741	- -	741	- -
Downy hawthorn	58	- -	58	- -
Osage-orange	20,551	161	20,389	- -
Apple spp.	329	- -	329	- -
Eastern hophornbeam	14,126	1,497	12,630	- -
Chokecherry		- -	- -	- -
American plum		- -		- -
Willow spp.	406	239	167	- -
Peachleaf willow	319	76	243	- -
Russian-olive	2,148	- -	2,148	- -
All species	42,341	2,090	40,251	- -
Total hardwoods	3,778,318	510,581	3,267,736	- -
All species groups	3,819,273	514,600	3,304,673	- -

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 5. -- Net volume of all live trees and salvable dead trees on timberland by class of timber and softwood/hardwood species category, Iowa, 1999-2003

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	1,989,359	16,977	1,972,382
Upper stem portion	269,641	2,639	267,002
Total	2,259,000	19,616	2,239,384
Poletimber	635,204	11,140	624,064
All growing-stock trees	2,894,204	30,756	2,863,448
Cull trees			
Rough trees[1]			
Sawtimber size	581,640	5,543	576,097
Poletimber size	204,710	4,155	200,555
Total	786,350	9,698	776,652
Rotten trees[1]			
Sawtimber size	50,626	- -	50,626
Poletimber size	7,781	- -	7,781
Total	58,407	- -	58,407
All live cull trees	844,757	9,698	835,059
All live trees	3,738,961	40,454	3,698,507
Salvable dead trees			
Sawtimber size	60,208	1,020	59,188
Poletimber size	33,659	692	32,968
All salvable dead trees	93,867	1,712	92,155
All classes	3,832,828	42,166	3,790,663

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, Iowa, 1999-2003

(In thousand cubic feet)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Softwood type groups			
Pinyon / juniper group			
Eastern redcedar	11,712	9,180	2,532
All forest types	11,712	9,180	2,532
All softwood groups	11,712	9,180	2,532
Hardwood type groups			
Oak / pine group			
Eastern redcedar / hardwood	6,885	2,269	4,616
All forest types	6,885	2,269	4,616
Oak / hickory group			
Oak / hickory group	1,834	- -	1,834
Post oak / blackjack oak	24,585	- -	24,585
White oak / red oak / hickory	612,152	5,256	606,897
White oak	276,410	552	275,859
Northern red oak	87,413	- -	87,413
Bur oak	142,425	- -	142,425
Black walnut	67,800	92	67,708
Black locust	3,101	- -	3,101
Mixed upland hardwoods	234,293	4,086	230,207
All forest types	1,450,013	9,985	1,440,028
Elm / ash / cottonwood group			
Black ash / American elm / red maple	18,687	- -	18,687
River birch / sycamore	40,499	- -	40,499
Cottonwood	261,564	644	260,920
Willow	3,813	- -	3,813
Sycamore / pecan / American elm	6,903	- -	6,903
Sugarberry / hackberry / elm / green ash	227,942	1,245	226,697
Silver maple / American elm	313,842	2,556	311,286
Cottonwood / willow	45,745	- -	45,745
All forest types	918,996	4,445	914,551
Maple / beech / birch group			
Maple / beech / birch group		- -	
Sugar maple / beech / yellow birch	140,505	2,632	137,873
Black cherry		- -	
Cherry / ash / yellow-poplar	3,693	- -	3,693
Hard maple / basswood	285,413	1,210	284,204
Elm / ash / locust	55,491	- -	55,491
All forest types	485,103	3,842	481,261
Aspen / birch group			
Aspen	12,758	157	12,601
All forest types	12,758	157	12,601

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Exotic hardwoods group			
Other exotic hardwoods	5,400	505	4,895
All forest types	5,400	505	4,895
All hardwood groups	2,879,156	21,203	2,857,953
Nonstocked	3,336	373	2,963
All forest groups	2,894,204	30,756	2,863,448

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 7. -- Net volume of growing stock on timberland by species group, species, and diameter class, Iowa, 1999-2003

(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	51	51	- -	- -	- -	- -	- -	- -	- -	- -	- -
All species	51	51	- -	- -	- -	- -	- -	- -	- -	- -	- -
Eastern white and red pines											
Red pine	885	- -	155	274	455	- -	- -	- -	- -	- -	- -
All species	885	- -	155	274	455	- -	- -	- -	- -	- -	- -
Other eastern softwoods											
Eastern redcedar	25,996	5,639	5,067	6,709	4,495	3,277	810	- -	- -	- -	- -
Larch spp.	395	- -	- -	395	- -	- -	- -	- -	- -	- -	- -
Ponderosa pine	3,429	92	137	552	418	2,230	- -	- -	- -	- -	- -
All species	29,820	5,730	5,204	7,656	4,913	5,507	810	- -	- -	- -	- -
Total softwoods	30,756	5,781	5,359	7,931	5,368	5,507	810	- -	- -	- -	- -
Hardwoods											
Select white oaks											
White oak	311,104	5,691	13,212	32,670	34,619	44,669	36,773	37,248	39,964	58,629	7,627
Swamp white oak	2,811	176	178	301	567	- -	- -	1,590	- -	- -	- -
Bur oak	239,769	4,035	10,069	14,928	21,250	25,501	19,571	26,528	38,181	64,898	14,809
Chinkapin oak	2,116	309	447	927	434	- -	- -	- -	- -	- -	- -
All species	555,800	10,211	23,906	48,827	56,870	70,170	56,344	65,366	78,144	123,526	22,436
Select red oaks											
Northern red oak	235,896	4,038	4,774	13,875	24,320	26,203	26,160	42,604	20,036	57,314	16,570
All species	235,896	4,038	4,774	13,875	24,320	26,203	26,160	42,604	20,036	57,314	16,570
Other white oaks											
Post oak	551	- -	295	256	- -	- -	- -	- -	- -	- -	- -
All species	551	- -	295	256	- -	- -	- -	- -	- -	- -	- -
Other red oaks											
Northern pin oak	25,769	616	814	1,172	5,880	1,815	5,983	- -	1,895	7,592	- -
Shingle oak	23,108	3,194	4,214	4,195	1,474	2,890	2,313	4,829	- -	- -	- -
Pin oak	21,237	503	399	329	597	921	- -	5,443	2,079	3,661	7,305
Black oak	75,097	2,632	3,000	6,908	8,494	16,918	13,436	7,296	11,446	4,967	- -
All species	145,212	6,945	8,428	12,604	16,445	22,544	21,732	17,567	15,421	16,220	7,305
Hickory											
Bitternut hickory	70,232	8,339	12,532	10,810	12,297	11,278	2,443	6,365	2,213	3,955	- -
Pignut hickory	1,524	- -	350	323	- -	852	- -	- -	- -	- -	- -
Shagbark hickory	143,587	14,328	22,180	24,374	23,852	22,990	15,191	7,435	7,245	5,991	- -
Mockernut hickory	1,496	519	- -	372	- -	604	- -	- -	- -	- -	- -
All species	216,839	23,186	35,063	35,879	36,149	35,723	17,635	13,800	9,459	9,945	- -
Yellow birch											
Yellow birch		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
All species		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Hard maple											
Black maple	31,062	1,726	1,929	6,376	7,248	2,824	5,123	5,836	- -	- -	- -
Sugar maple	52,954	2,975	8,102	4,343	5,423	2,502	6,421	6,987	7,125	9,076	- -
All species	84,016	4,701	10,030	10,719	12,671	5,326	11,544	12,823	7,125	9,076	- -
Soft maple											
Red maple	1,328	- -	- -	776	552	- -	- -	- -	- -	- -	- -
Silver maple	289,609	4,269	10,887	20,628	31,020	40,333	32,914	34,303	39,662	43,795	31,797
All species	290,937	4,269	10,887	21,404	31,573	40,333	32,914	34,303	39,662	43,795	31,797
Ash											
White ash	46,780	2,504	5,936	8,447	4,052	12,211	3,520	- -	3,348	- -	6,761
Black ash	2,892	332	326	- -	- -	973	- -	1,261	- -	- -	- -
Green ash	51,679	5,040	8,378	10,610	3,362	8,449	10,648	3,199	1,992	- -	- -
All species	101,350	7,877	14,640	19,057	7,415	21,634	14,168	4,460	5,339	- -	6,761

(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											
Cottonwood and aspen											
Eastern cottonwood	326,087	816	4,419	6,834	11,287	17,957	10,224	17,029	27,828	108,259	121,435
Bigtooth aspen	16,255	370	743	2,165	2,297	2,483	4,537	3,660	- -	- -	- -
Quaking aspen	2,483	335	1,369	387	392	- -	- -	- -	- -	- -	- -
All species	344,825	1,521	6,532	9,386	13,975	20,440	14,761	20,689	27,828	108,259	121,435
Basswood											
American basswood	140,750	5,268	10,186	12,799	10,200	15,728	16,152	20,767	10,460	39,190	- -
All species	140,750	5,268	10,186	12,799	10,200	15,728	16,152	20,767	10,460	39,190	- -
Black walnut											
Black walnut	190,344	5,514	8,896	17,332	23,483	38,961	38,621	28,308	10,573	18,656	- -
All species	190,344	5,514	8,896	17,332	23,483	38,961	38,621	28,308	10,573	18,656	- -
Other eastern soft hardwoods											
Boxelder	19,851	2,602	3,192	4,431	3,424	2,470	1,008	- -	- -	2,724	- -
Ohio buckeye	6,599	659	385	853	448	1,614	1,080	1,559	- -	- -	- -
River birch	4,185	282	765	697	- -	1,407	1,033	- -	- -	- -	- -
Paper birch	2,736	447	- -	289	- -	851	1,149	- -	- -	- -	- -
Northern catalpa	245	245	- -	- -	- -	- -	- -	- -	- -	- -	- -
Hackberry	135,196	10,558	14,636	22,324	13,989	18,825	23,637	14,830	5,982	10,413	- -
Butternut	1,469	69	272	- -	- -	1,127	- -	- -	- -	- -	- -
American sycamore	939	370	569	- -	- -	- -	- -	- -	- -	- -	- -
Black cherry	34,360	3,526	4,363	6,517	5,936	6,573	3,313	4,132	- -	- -	- -
Black willow	21,042	418	377	1,520	1,103	1,701	- -	7,153	6,454	2,318	- -
White willow	136	- -	136	- -	- -	- -	- -	- -	- -	- -	- -
American elm	165,958	23,059	30,178	24,366	20,813	20,693	16,782	12,161	5,564	12,342	- -
Siberian elm	6,182	512	1,038	304	414	- -	1,234	- -	- -	2,679	- -
Slippery elm	75,662	7,658	9,927	10,626	10,093	13,636	6,925	4,768	2,134	9,895	- -
All species	474,560	50,407	65,839	71,927	56,220	68,898	56,161	44,603	20,134	40,371	- -
Other eastern hard hardwoods											
Common persimmon		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Honeylocust	49,020	3,212	5,098	7,714	5,884	10,634	6,225	6,224	4,029	- -	- -
Red mulberry	3,170	1,015	448	745	962	- -	- -	- -	- -	- -	- -
Black locust	30,061	1,487	2,471	4,279	2,729	3,177	5,606	2,453	5,020	2,839	- -
Rock elm	116	116	- -	- -	- -	- -	- -	- -	- -	- -	- -
All species	82,367	5,830	8,018	12,738	9,574	13,812	11,830	8,677	9,049	2,839	- -
Total hardwoods	2,863,448	129,766	207,493	286,804	298,896	379,771	318,022	313,967	253,231	469,193	206,306
All species groups	2,894,204	135,547	212,852	294,735	304,265	385,277	318,832	313,967	253,231	469,193	206,306

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 8. -- Net volume of sawtimber on timberland by species group, species, and diameter class, Iowa, 1999-2003

(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+
Eastern white and red pines									
Red pine	3,545	1,360	2,185	- -	- -	- -	- -	- -	- -
All species	3,545	1,360	2,185	- -	- -	- -	- -	- -	- -
Other eastern softwoods									
Eastern redcedar	79,806	37,095	23,103	15,862	3,745	- -	- -	- -	- -
Larch spp.	1,891	1,891	- -	- -	- -	- -	- -	- -	- -
Ponderosa pine	15,919	2,652	2,054	11,213	- -	- -	- -	- -	- -
All species	97,616	41,639	25,157	27,075	3,745	- -	- -	- -	- -
Total softwoods	101,161	42,999	27,342	27,075	3,745	- -	- -	- -	- -
Hardwoods									
Select white oaks									
White oak	1,199,833	- -	170,072	215,253	174,343	173,416	181,774	256,857	28,118
Swamp white oak	10,255	- -	2,801	- -	- -	7,454	- -	- -	- -
Bur oak	950,066	- -	103,673	122,452	92,085	123,174	173,455	277,648	57,578
Chinkapin oak	2,110	- -	2,110	- -	- -	- -	- -	- -	- -
All species	2,162,264	- -	278,656	337,705	266,427	304,044	355,229	534,505	85,696
Select red oaks									
Northern red oak	1,040,522	- -	120,470	130,707	130,870	212,640	99,080	273,738	73,016
All species	1,040,522	- -	120,470	130,707	130,870	212,640	99,080	273,738	73,016
Other red oaks									
Northern pin oak	112,366	- -	29,189	9,029	29,644	- -	9,259	35,245	- -
Shingle oak	56,770	- -	7,257	14,339	11,418	23,755	- -	- -	- -
Pin oak	89,829	- -	2,931	4,553	- -	26,650	9,946	16,860	28,888
Black oak	308,975	- -	42,257	84,215	66,659	35,771	56,040	24,034	- -
All species	567,940	- -	81,633	112,136	107,721	86,176	75,245	76,140	28,888
Hickory									
Bitternut hickory	191,776	- -	61,137	56,220	12,153	31,612	10,946	19,708	- -
Pignut hickory	4,249	- -	- -	4,249	- -	- -	- -	- -	- -
Shagbark hickory	400,946	- -	115,439	111,461	73,575	36,107	35,231	29,132	- -
Mockernut hickory	2,922	- -	- -	2,922	- -	- -	- -	- -	- -
All species	599,893	- -	176,577	174,852	85,728	67,719	46,177	48,840	- -
Hard maple									
Black maple	100,188	- -	34,631	13,324	24,435	27,798	- -	- -	- -
Sugar maple	175,655	- -	25,916	11,886	30,618	33,096	33,330	40,809	- -
All species	275,844	- -	60,546	25,211	55,054	60,894	33,330	40,809	- -
Soft maple									
Red maple	2,399	- -	2,399	- -	- -	- -	- -	- -	- -
Silver maple	1,092,309	- -	134,494	176,669	144,554	150,509	173,312	187,593	125,177
All species	1,094,708	- -	136,893	176,669	144,554	150,509	173,312	187,593	125,177
Ash									
White ash	134,850	- -	18,279	56,633	16,581	- -	15,972	- -	27,386
Black ash	10,518	- -	- -	4,529	- -	5,989	- -	- -	- -
Green ash	129,167	- -	15,218	39,160	50,075	15,213	9,502	- -	- -
All species	274,535	- -	33,497	100,322	66,656	21,202	25,473	- -	27,386
Cottonwood and aspen									
Eastern cottonwood	1,477,565	- -	52,891	86,239	50,282	85,100	140,904	539,058	523,090
Bigtooth aspen	63,488	- -	10,669	12,077	22,495	18,247	- -	- -	- -
Quaking aspen	1,678	- -	1,678	- -	- -	- -	- -	- -	- -
All species	1,542,731	- -	65,238	98,316	72,777	103,347	140,904	539,058	523,090
Basswood									
American basswood	553,896	- -	51,617	79,191	80,732	102,742	51,323	188,293	- -
All species	553,896	- -	51,617	79,191	80,732	102,742	51,323	188,293	- -
Black walnut									
Black walnut	750,794	- -	113,088	188,440	184,832	132,496	48,763	83,174	- -
All species	750,794	- -	113,088	188,440	184,832	132,496	48,763	83,174	- -

(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	43,662	- -	15,759	11,354	4,596	- -	- -	11,953	- -
Ohio buckeye	21,419	- -	2,059	7,389	4,948	7,022	- -	- -	- -
River birch	11,186	- -	- -	6,433	4,753	- -	- -	- -	- -
Paper birch	9,204	- -	- -	3,930	5,275	- -	- -	- -	- -
Hackberry	390,477	- -	65,529	86,212	106,791	64,862	25,489	41,594	- -
Butternut	5,227	- -	- -	5,227	- -	- -	- -	- -	- -
Black cherry	91,242	- -	27,341	30,164	15,096	18,640	- -	- -	- -
Black willow	81,093	- -	4,802	7,463	- -	31,888	27,779	9,162	- -
American elm	397,027	- -	97,500	94,727	75,743	54,203	23,718	51,136	- -
Siberian elm	18,483	- -	1,850	- -	5,499	- -	- -	11,134	- -
Slippery elm	213,724	- -	47,155	63,177	31,412	20,759	9,174	42,047	- -
All species	1,282,745	- -	261,996	316,075	254,114	197,375	86,160	167,025	- -
Other eastern hard hardwoods									
Honeylocust	150,004	- -	27,014	48,594	28,352	28,118	17,926	- -	- -
Red mulberry	4,444	- -	4,444	- -	- -	- -	- -	- -	- -
Black locust	99,515	- -	12,582	14,659	25,837	11,187	22,694	12,556	- -
All species	253,964	- -	44,041	63,253	54,189	39,305	40,620	12,556	- -
Total hardwoods	10,399,834	- -	1,424,252	1,802,878	1,503,654	1,478,449	1,175,617	2,151,730	863,254
All species groups	10,500,995	42,999	1,451,593	1,829,953	1,507,399	1,478,449	1,175,617	2,151,730	863,254

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

[1] International 1/4-inch rule.

Table 9. -- All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Iowa, 1999-2003

(In dry tons)

Owner category and softwood/hardwood category	Tree biomass component							
			Growing-stock trees			Non-growing-stock trees		
	All components	All live 1-5 inch trees	Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	110,756	36,418	58,832	43,340	15,492	15,506	10,862	4,645
Hardwoods	12,617,733	805,940	9,919,942	7,371,732	2,548,209	1,891,852	1,382,793	509,059
Total	12,728,490	842,358	9,978,774	7,415,073	2,563,701	1,907,358	1,393,654	513,704
Private								
Softwoods	875,698	83,241	578,345	418,719	159,627	214,112	152,600	61,513
Hardwoods	90,630,362	4,952,667	61,736,927	45,178,871	16,558,055	23,940,768	17,620,505	6,320,263
Total	91,506,060	5,035,909	62,315,272	45,597,590	16,717,682	24,154,880	17,773,104	6,381,776
All ownerships								
Softwoods	986,455	119,659	637,178	462,059	175,119	229,618	163,461	66,157
Hardwoods	103,248,095	5,758,607	71,656,868	52,550,603	19,106,265	25,832,620	19,003,297	6,829,322
Total	104,234,550	5,878,266	72,294,046	53,012,662	19,281,383	26,062,238	19,166,758	6,895,479

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 1999-2003

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines	7	- -	7	- -
Other eastern softwoods	1,845	18	1,828	- -
Total softwoods	1,852	18	1,834	- -
Hardwoods				
Select white oaks	20,967	980	19,987	- -
Select red oaks	6,142	514	5,628	- -
Other red oaks	5,835	337	5,498	- -
Hickory	8,091	10	8,082	- -
Hard maple	3,898	- -	3,898	- -
Soft maple	15,270	650	14,620	- -
Ash	5,102	1,005	4,096	- -
Cottonwood and aspen	8,703	316	8,387	- -
Basswood	4,515	498	4,017	- -
Black walnut	9,043	335	8,708	- -
Other eastern soft hardwoods	23,274	886	22,388	- -
Other eastern hard hardwoods	4,795	- -	4,795	- -
Total hardwoods	115,636	5,533	110,103	- -
All species groups	117,488	5,550	111,938	- -

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 1999-2003

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other eastern softwoods	250	- -	250	- -
Total softwoods	250	- -	250	- -
Hardwoods				
Select white oaks	4,124	- -	4,124	- -
Select red oaks	6,167	- -	6,167	- -
Other red oaks	1,349	- -	1,349	- -
Hickory	537	- -	537	- -
Soft maple	2,540	700	1,841	- -
Ash	741	- -	741	- -
Cottonwood and aspen	2,193	289	1,903	- -
Basswood	2,844	- -	2,844	- -
Black walnut	2,815	- -	2,815	- -
Other eastern soft hardwoods	1,824	- -	1,824	- -
Other eastern hard hardwoods	111	- -	111	- -
Total hardwoods	25,244	989	24,255	- -
All species groups	25,494	989	24,505	- -

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 1999-2003

(In thousand cubic feet per year)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other eastern softwoods	171	- -	171	- -
Total softwoods	171	- -	171	- -
Hardwoods				
Select white oaks	1,824	732	1,092	- -
Select red oaks	890	- -	890	- -
Other red oaks	2,359	143	2,216	- -
Hickory	1,200	- -	1,200	- -
Hard maple	- -	- -	- -	- -
Soft maple	2,822	378	2,443	- -
Ash	388	- -	388	- -
Cottonwood and aspen	3,404	336	3,068	- -
Basswood	772	412	360	- -
Black walnut	2,396	- -	2,396	- -
Other eastern soft hardwoods	7,907	253	7,654	- -
Other eastern hard hardwoods	364	- -	364	- -
Total hardwoods	24,327	2,255	22,072	- -
All species groups	24,497	2,255	22,242	- -

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.

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Reports the initial results of all five annual panels (1999-2003) of the fourth inventory of Iowa's forest resources, the first annual inventory of the State. Includes information on forest area; volume; biomass; growth, mortality, and removals; and health.

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

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