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Nebraska's Forest Resources in 2003

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The North Central Research Station's Forest Inventory and Analysis (NCFIA) program began fieldwork for the fourth forest inventory of Nebraska in 2001, in partnership with the Nebraska Forest Service, University of Nebraska, Lincoln. 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 Nebraska, the field plots measured in 2001 will be remeasured in 2006.

In 2003, NCFIA continued the annual inventory effort with the third panel of the fourth forest inventory. Reports of previous inventories of Nebraska are dated 1955, 1983, and 1994. This fourth inventory of Nebraska's forest resources will be completed in 2005. However, because each year's sample is a systematic sample of the State's forest and because timely information is needed about Nebraska's forest resources, estimates have been prepared from data gathered during the first 3 years of the inventory. Estimates presented in this report are based on measurements from approximately 60 percent of the field plots (or three panels) for a complete inventory. The underlying data are a combination of measurements for the first year's panel in 2001, measurements for the second year's panel in 2002, and measurements for the third year's panel in 2003. Due to the limited number of field plots, sampling errors are large and estimates in this report should be used with caution. Future estimates that incorporate these data may change when ensuing panels are completed and all data are compiled. The results presented are estimates based on sampling techniques; estimates were compiled assuming the 2001–2003 data represent one sample. As additional panels are completed, the precision of the estimates will increase and additional data will be released.

Estimates from new inventories are often compared with estimates from earlier inventories to determine trends in forest resources. However, for the comparison to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have occurred since the last Nebraska inventory in 1994 (Schmidt and Wardle 1998) (See appendix). Some of these changes make it inappropriate to directly compare portions of the 2003 estimates with those published for earlier inventories.

RESULTS

Area

Nebraska is perhaps best known as a land of grains and grasses, with fertile agricultural soils and extensive prairies (Stone and Bagley 1961). However, it is also a State with an expanding and productive forest resource. Nebraska's forests are unique in that they combine aspects of eastern hardwood, western coniferous, and northern boreal forests. Forests in the eastern third of Nebraska are dominated by deciduous species that extend across nearly all soil types, landforms, and physiographic classes (Schmidt and Wardle 1998). Towards the west, the area of forest

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land declines sharply. The majority of western forests are dominated by stands of ponderosa pine associated with escarpments of the Pine Ridge. Although the soils themselves are nutrient-rich and productive, the distribution and extent of forest species in the central and western portions of the State are limited by the harsh continental climate and the lack of available moisture. Native forests are located primarily along water corridors and in lowland sites; more than five times as many native woody species are found in eastern Nebraska as in the western part of the State (Schmidt and Wardle 1998).

Despite the current dominance of prairie and agricultural lands today, Nebraska was once covered by a forest of boreal white spruce following the retreat of the Pleistocene ice sheets approximately 10,000 years ago (Wright 1970). Evidence of these prehistoric boreal forests can still be found today in the stands of paper birch and aspen scattered across the northern part of Nebraska. Changing climate and the extensive use of fire by Native Americans eventually pushed the edge of these early forests eastward, leaving trees primarily along the natural firebreaks formed by rivers and streams (Schmidt and Wardle 1986).

Following the arrival of European settlers, government programs designed to promote settlement in the Great Plains often encouraged forestry as well. For example, the Timber Culture Act of 1873 provided 160 acres of land free to settlers who planted 40 acres of trees as part of their homestead (Schmidt and Wardle 1986). Some of these plantings are still evident today. The ecological and economic importance of Nebraska's forested lands later came into sharp focus during the Dust Bowl of the 1930s, during which a legacy of aggressive agricultural practices and an extended drought combined to produce vast dust storms that covered homes and buildings with drifts of eroded topsoil (Croker 1991). In response to the enormity of this disaster, President Franklin Roosevelt instituted the Prairie States Forestry Project, a system of shelterbelts stretching from Texas to the Canadian border that included more than 4,100 miles of windbreaks in Nebraska alone (Stone and Bagley 1961).

Yet, despite Nebraska's early nickname, the "Tree Planter's State," increasing settlement and the high value of agricultural soils led to a general decline in forest land for much of the time since European settlement. Between the first (1955) and second (1983) inventories of Nebraska's forests, a period of just 28 years, the area of forest land in the State decreased from 903 thousand acres to 718 thousand acres as forest lands were shifted to agricultural uses (Raile 1986, Schmidt and Wardle 1998). This downward trend made a dramatic turnaround in the latter part of the 20th century, with a 32-percent increase in the area of forest land (from 718 to 948 thousand acres) between the 1983 and 1994 inventories (Schmidt and Wardle 1998). The 2003 data are consistent with this continuing trend, with the area of forest land currently estimated at 1,274.8 thousand acres, or 2.4 percent of the State's total land area (table 1). However, caution needs to be taken in comparing these estimates, because of a definitional change of "forest land." In previous inventories, forest lands that had been grazed or used as shelterbelts were classified as "nonforest with trees." In the 2003 inventory, these lands were classified as forest land if they met the standards for size, width, and stocking. This may account for a portion of the increase in forest land since 1994.

Eighty-six percent of forest land is owned by private landowners (table 1). There are three components to forest land: (1) Timberland[1] —forest land that is not restricted from

[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 decisions that consider economic, environment, and social factors.*

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 maximum annual increment; (2) Reserved forest land—land that is restricted from harvesting by statute, administrative regulation, or designation (i.e., national parks); and (3) Other forest land—low productivity forest land that is not capable of growing trees at a rate of 20 cubic feet per acre per year.

In Nebraska, 91 percent of the forest land is currently timberland. Although timberland is predominant, the 111.7 thousand acres of other forest land is a significant resource. Some acres of other forest land have been set aside as reserves. Other acres, largely because of the combined effects of climate and low soil productivity, do not support rigorous tree growth. As a consequence, some forest land contains trees that are of poor form, small size, or inferior quality. However, trees on other forest land are important ecologically because they enhance biodiversity in an environment where trees are relatively scarce.

There were an estimated 1,163.1 thousand acres of timberland in Nebraska in 2003 (table 2). Timberland area has more than doubled since 1984 (fig. 1). According to Schmidt and Wardle (1998), much of the increase in timberland area between 1983 and 1998 stemmed from the decrease in the number of farm operations, changes in livestock grazing management schemes, and lack of annual soil disturbance on former cropland. We suspect that these factors continue to play a role in the expansion of timberland in Nebraska.

Like many of the Plains States, Nebraska has both eastern hardwoods and western softwoods within its borders (Stone and Bagley 1961). Hardwood stands occupied 756,700 acres or 65 percent of all timberland area within the State in 2003 (fig. 2, table 3). The majority of timberland hardwood stands are associated with the elm/ash/cottonwood group

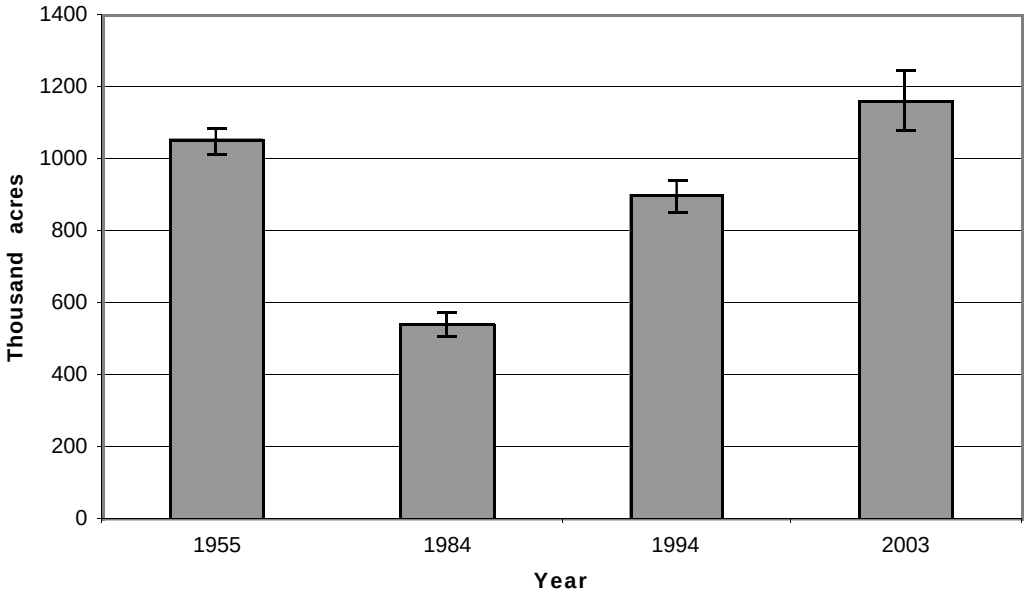

Figure 1. — Area of timberland in Nebraska, 1955–2003. The vertical line at the top of each bar represents the sample error associated with each inventory.

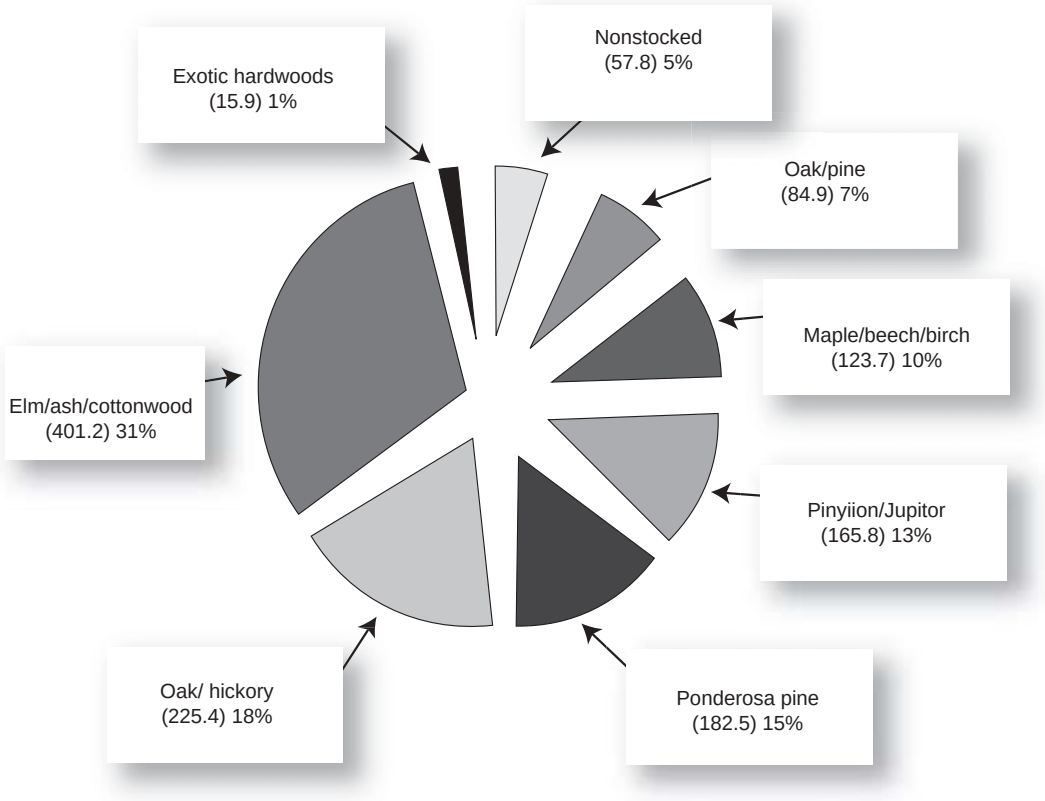

Figure 2. — *Area of timberland (thousand acres in parentheses) by forest type in Nebraska, 2001–2003.*

(378,900 acres), followed by the oak/hickory (184,500 acres) and maple/beech/birch (111,300 acres) groups. Forests in the western part of the State are largely dominated by conifers, with ponderosa pine found on 182,500 acres in northwestern Nebraska, accounting for nearly 16 percent of all timberland.

The distribution of Nebraska's timberland area by stand-size class in 2001-2003 generally agreed with that of the 1994 inventory, with the majority of timberland dominated by trees in larger size classes. Initial estimates based on the 2003 inventory indicate that sawtimber stands occupied 722,000 acres, or almost two-thirds (62 percent) of all timberland (fig. 3, table 3). Sawtimber refers to a live tree that is 11.0 inches d.b.h. (diameter at breast height) for hardwoods or 9.0 inches d.b.h. for conifers and contains at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer. An additional one-quarter of timberland is classified in the next largest size class, poletimber, which consists of trees at least 5.0 inches d.b.h. Seedlings and sapling stands (seedlings at least 12 inches tall up to 1 inch d.b.h. and young trees between 1.0 and 5.0 inches d.b.h.) account for 8 percent of timberland area. Between 1994 and 2002, the area of timberland classified as nonstocked increased from 1 to nearly 5 percent of timberland area. Nonstocked timberland is land that has forests as its primary land use but that did not have a sufficient number of trees present during the inventory to be classified into a specific forest type.

Volume

Historically, the FIA program has reported volume as either growing stock or sawtimber volume. However, wood volume in noncommercial trees, rotten trees, and

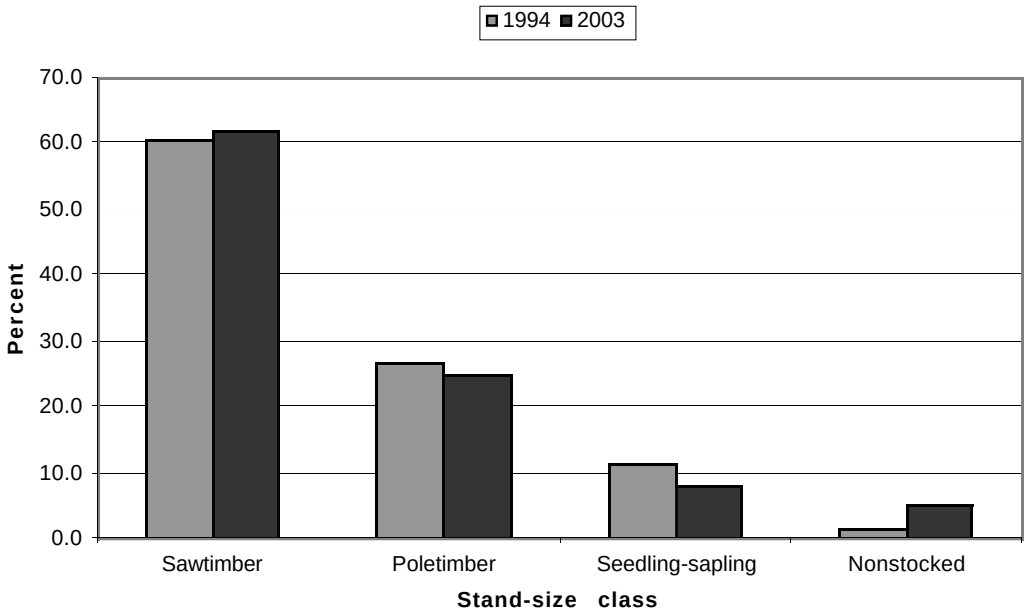

Figure 3. — *Stand-size class as a percentage of total timberland area in Nebraska, 1994 and 2003.*

rough trees does not qualify as growing stock. Volume from non-growing-stock trees is often utilized for wood fiber and fuelwood. Non-growing-stock volume is also an important ecological component of the landscape because it provides wildlife habitat and protects soil and water. With the annual inventory system and with an increased interest in FIA data from an ecological perspective, more emphasis has been placed on all live tree volume. There were an estimated 1,879,539 thousand cubic feet of all live volume on the 1,274,800 acres of forest land in Nebraska in 2003 (table 4) or an average of more than 1,474 cubic feet of all live tree volume for each forest land acre. On the 1,163.1 thousand acres of timberland, there were an estimated 1,812,413 thousand cubic feet of all live tree volume (table 5) or the equivalent of 1,558 cubic feet for each timberland acre in Nebraska. Although relatively small, the difference in all live tree volume on forest land and on timberland reflects the characteristics of the land on which trees are growing. Typically, trees on timberland, or the more productive sites, will have better growth characteristics than trees on the less productive sites.

The increase in timberland area between 1983 and 2003 is reflected in the estimated increase in growing-stock volume of both hardwood and softwood species. Growing-stock volume refers to the amount of solid wood on timberland in trees 5 inches d.b.h. or greater, from 1 foot above the ground to a minimum 4-inch top diameter, with deductions made for poor form or defect. Hardwood stands represented 78 percent of the total growing-stock volume on timberland in 2003 (table 6). The majority of the growing-stock volume is in the elm/ash/cottonwood species groups (50 percent), followed by the oak/hickory group (17 percent) and the maple/beech/birch group (8 percent). Almost 71 percent of total volume

in the softwood type groups is associated with ponderosa pine stands (table 6). Many stands are a mix of species, sometimes with hardwoods and softwoods intermixed. For instance, almost 6 percent (16.4 million cubic feet) of the growing-stock volume in the softwood type groups is contained in hardwood species. In the hardwood type groups, less than 3 percent (28.1 million cubic feet) of growing-stock volume is in softwood species.

For hardwood species, estimated growing-stock volume increased by more than 281 percent, from 285.8 million cubic feet in 1984 to 1,090.7 million cubic feet in 2003 (fig. 4). During this same time period, growing-stock volume of softwood species increased by about 71 percent, from 170.3 million cubic feet to 291.1 million cubic feet (fig. 5).

Fifty-four percent of all growing-stock volume is in trees that are 15 inches d.b.h. and larger (table 7). Thirty-three percent of all growing-stock volume is in trees that are 21 inches and larger; most of this volume is in cottonwood trees. The cottonwood and aspen species group accounts for 38 percent of all growing-stock volume.

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 Nebraska totaled almost 5.4 billion board feet (table 8). Seventy-nine percent of the sawtimber volume is in hardwood trees. Almost half (46 percent) of sawtimber volume is in the cottonwood and aspen species group. Ponderosa pine, Rocky Mountain juniper, and eastern redcedar together account for more than 99 percent of softwood sawtimber volume and more than 21 percent of total sawtimber volume.

Biomass

Live aboveground tree biomass in Nebraska's timberland area was estimated to be 40.8 million dry tons. 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. Almost 72 percent of tree biomass is in growing-stock trees, with an additional 24 percent in non-growing-stock trees, and the remaining 4 percent in trees 1- to 5-inches d.b.h. (table 9). For both

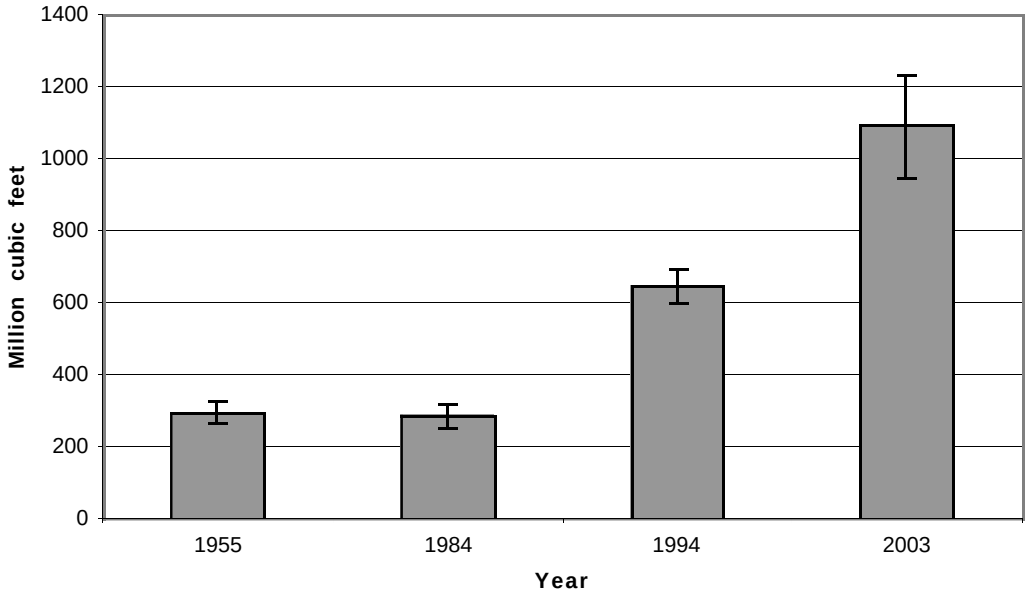

Figure 4. — Hardwood growing-stock volume in Nebraska, 1955–2003. The vertical line at the top of each bar represents the sample error associated with each inventory.

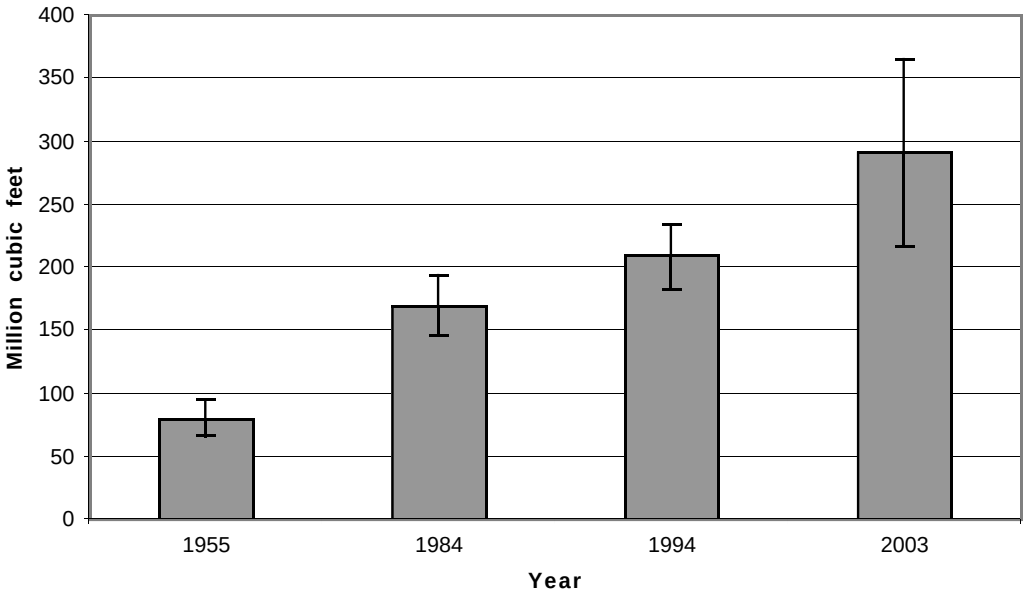

Figure 5. — Softwood growing-stock volume in Nebraska, 1955–2003. The vertical line at the top of each bar represents the sample error associated with each inventory.

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. About 84 percent (34.2 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.

Forest Health

The following information presented about pathogens and insects affecting Nebraska forests was adapted from the National Forest Health Monitoring Program (FHM) Web page (Harrell *et al*. 2004) at: http://www.na.fs.fed.us/spfo/fhm/fhh/fhh-03/ne/ne_03.pdf.

Severe drought is affecting all tree species in Nebraska. Engraver beetles (*Ips* spp.) remained active in jack pine stands defoliated by jack pine budworm on the Bessie Ranger District of the Nebraska National Forest; up to 25 percent of the trees had *Ips* beetle attacks. An aerial survey estimated that almost 9,000 pines on 3,000 acres were killed in this district in 2003. In the Pine Ridge area, a significant level of mortality caused by *Ips* was noted, with about 12,000 pines killed on 6,500 acres. If drought conditions continue, *Ips* populations will likely remain very active. Bagworm populations continued to be higher than normal in some areas of eastern redcedar in eastern Nebraska. Reports of European pine sawfly damage to Scotch pine were quite common from landowners and Christmas tree growers in eastern Nebraska. Ash/lilac borer is consistently a problem for young green ash in urban and rural plantingsthroughout Nebraska. Pine tip moths were found on Austrian, Scotch, and ponderosa pines throughout Nebraska and cause chronic tip damage in windbreaks, plantations, and landscape plantings. Oak wilt continues to be a problem in bur and red oaks in forests along the eastern edge of Nebraska. The incidence of pine wilt (pinewood nematode) on Scotch and Austrian pines was high in 2003; heavy

mortality was found frequently throughout southeastern Nebraska, mostly affecting Scotch pine. Cercospora blight of juniper is severely defoliating and killing junipers and redcedars in windbreaks in central and eastern Nebraska. Sphaeropsis (Diplodia) blight continues to be a serious problem in Austrian and ponderosa pine windbreaks and landscape plantings in eastern Nebraska. Tubakia leaf spot commonly causes defoliation and twig dieback on bur oaks in eastern Nebraska. Oak decline on bur oak in eastern and northern Nebraska appears to be caused by changes in site conditions related to grazing and human activities.

SUMMARY

The results from the first 3 years of the annual inventory of Nebraska completed in 2003 are consistent with the trend of increasing forest land and increasing growing-stock volume observed throughout the second half of the 20th century. As additional data become available under the annual inventory system, a clearer picture of the status and direction of Nebraska's forests will emerge. Additional data related to the three most recent periodic inventories of Nebraska (1994, 1983, 1955) are available at: www.ncrs.fs.fed.us/4801/fiadb/index.htm.

APPENDIX

Inventory Methods

Since the 1994 inventory of Nebraska, several changes have been made in the NCFIA inventory methods to improve the quality of the inventory as well as meet the increasing demands for timely forest resource information. The most significant change between the inventories has been the change from periodic inventories to annual inventories. Historically, NCFIA 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. Nebraska was one of the first States in the North Central region, and one of the first States in the Nation, to be inventoried with this new system, beginning with the 2001 inventory.

With an annual inventory system, approximately one-fifth of all field plots are measured in any single year. After 5 years, the entire inventory will be completed. After the initial 5-year period, NCFIA will report and analyze results as a moving 5-year average. For example, NCFIA will be able to generate inventory results for 2001 through 2005 or for 2002 through 2006. Although there are great advantages for an annual inventory, one difficulty is reporting on results in the first 4 years. With the 2003 inventory, 60 percent of all field plots have been measured. Sampling error estimates for the 2003 inventory are 6.81 percent for forest land area, 7.23 percent for timberland area, 20.62 percent for number of growing-stock trees on timberland, 11.69 percent for volume of growing stock on timberland, and 13.45 percent for volume of sawtimber on timberland. These sampling error estimates are much higher than those for the last periodic inventory completed in 1994 (i.e., 4.8 percent for timberland area and 6.1 percent for growing-stock volume) because of the smaller sample sizes. 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, implementation of a new field plot design, development of new volume equations, and gathering of additional remotely sensed and field data. The advent of remote sensing technology since the previous inventory in 1994 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 Nebraska before 2001 used manual interpretation of aerial photos to stratify the sample (1994, 1983, and 1955).

New algorithms were used in 2001–2003 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 in the 1994 inventory when it is updated. This will be done so that changes in forest type and stand-size class will reflect actual changes in the forest and not changes in how values are computed. The list of recognized forest types, groupings of these forest types for reporting purposes, equations used to assign stocking values to individual trees, definition of nonstocked, 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 previous inventories may not be valid. For additional details about algorithms used in previous inventories, please contact NCFIA.

Sampling Phases

The 2003 Nebraska 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, while 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 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 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 Nebraska. 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 1994 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 Nebraska is funded by the Federal government. The State of Nebraska provides additional support for the inventory measurements by supplying field crews.

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. We anticipate that in Nebraska the complete 5-year annual inventory will involve about 30 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 Nebraska, the complete 5-year annual inventory is expected to involve about 400 phase 2 forested plots. The 1999-2003 annual inventory results represent field measures on 240 phase 2 forested plots and 16 phase 3 field plots.

The new national FIA 4-point cluster plot design (fig. 6) was first used for data collection during the 2001 inventory of Nebraska and will be used in subsequent years. The national plot design requires mapping forest conditions on each plot. Due to the small sample size (20 percent) each year, precision associated with change factors such as mortality will be relatively low. Consequently, we will not report change estimates until at least three annual panels have been measured, and even then we anticipate that estimates of change will be limited in detail. When the complete annual inventory has been implemented in 2005, the full range of change variables will be available.

The overall plot layout for the new design consists of four subplots. The centers of subplots 2, 3, and 4 are located 120 feet from the center of subplot 1. The azimuths to subplots 2, 3, and 4 are 0, 120, and 240 degrees, respectively. The center of the new plot is located at the same point as the center of the previous plot if a previous plot existed within the sample unit. Trees with diameter at breast height (d.b.h., or 4.5 feet above ground level) 5 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 at 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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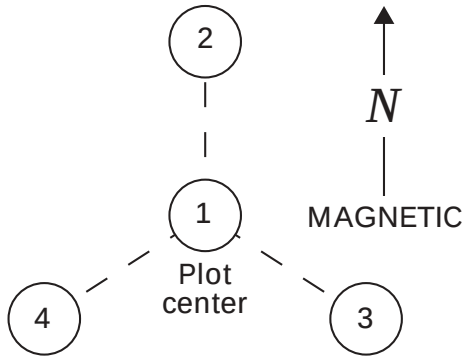

Figure 6. — *Current NCFIA field plot design.*

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TABLE TITLES

TABLES

Table 1. -- Area of forest land by forest type group, forest type, and owner category, Nebraska, 2001-2003

(In thousand acres)

Forest type group/ forest type	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Pinyon / juniper group				
Eastern redcedar	155.9	22.6	133.3	--
Rocky Mountain juniper	10.0	--	10.0	--
All forest types	165.8	22.6	143.3	--
Ponderosa pine group				
Ponderosa pine	182.5	29.2	153.3	--
All forest types	182.5	29.2	153.3	--
All softwood groups	348.3	51.8	296.5	--
Hardwood type groups				
Oak / pine group				
Eastern redcedar / hardwood	84.9	1.7	83.3	--
All forest types	84.9	1.7	83.3	--
Oak / hickory group				
White oak / red oak / hickory	12.0	--	12.0	--
Bur oak	96.7	--	96.7	--
Mixed upland hardwoods	116.7	21.7	95.0	--
All forest types	225.4	21.7	203.7	--
Elm / ash / cottonwood group				
Elm / ash / cottonwood group	2.3	--	2.3	--
River birch / sycamore	4.4	--	4.4	--
Cottonwood	160.2	59.0	101.1	--
Willow	12.3	--	12.3	--
Sycamore / pecan / American elm	13.8	--	13.8	--
Sugarberry / hackberry / elm / green ash	135.2	9.0	126.2	--
Silver maple / American elm	13.3	--	13.3	--
Cottonwood / willow	59.6	9.9	49.8	--
All forest types	401.2	77.9	323.3	--

(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				
Sugar maple / beech / yellow birch	9.6	--	9.6	--
Hard maple / basswood	26.9	--	26.9	--
Elm / ash / locust	87.2	7.4	79.8	--
All forest types	123.7	7.4	116.3	--
Exotic hardwoods group				
Other exotic hardwoods	15.9	--	15.9	--
All forest types	15.9	--	15.9	--
All hardwood groups	851.1	108.7	742.5	--
Nonstocked	75.3	11.2	64.1	--
All forest groups	1,274.8	171.7	1,103.1	--

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 2. -- Area of timberland by major forest type group, stand origin, and owner category, Nebraska 2001 - 2003

(In thousand acres)

Major forest type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	322.1	29.2	292.9	- -
Planted	25.3	22.6	2.7	- -
All softwood types	347.4	51.8	295.6	- -
Hardwood type groups				
Natural	756.7	103.7	652.9	- -
All hardwood types	756.7	103.7	652.9	- -
Nonstocked	59.1	2.2	56.8	- -
All groups	1,163.1	157.8	1,005.3	- -

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.

Tables continued on next page.

Table 3. -- Area of timberland by forest type group, forest type, and stand-size class, Nebraska, 2001-2003

(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	154.9	19.5	108.4	27.0	--
Rocky Mountain juniper	10.0	10.0	--	--	--
All forest types	164.9	29.5	108.4	27.0	--
Ponderosa pine group					
Ponderosa pine	182.5	163.9	9.6	9.0	--
All forest types	182.5	163.9	9.6	9.0	--
All softwood groups	347.4	193.4	118.0	36.0	--
Hardwood type groups					
Oak / pine group					
Eastern redcedar / hardwood	66.1	31.7	22.3	12.1	--
All forest types	66.1	31.7	22.3	12.1	--
Oak / hickory group					
White oak / red oak / hickory	12.0	12.0	--	--	--
Bur oak	75.8	36.0	39.8	--	--
Mixed upland hardwoods	96.7	83.2	13.5	--	--
All forest types	184.5	131.3	53.3	--	--
Elm / ash / cottonwood group					
Elm / ash / cottonwood group	2.3	--	2.3	--	--
River birch / sycamore	4.4	4.4	--	--	--
Cottonwood	147.8	137.9	9.9	--	--
Willow	12.3	2.4	--	9.9	--
Sycamore / pecan / American elm	13.8	6.2	7.7	--	--
Sugarberry / hackberry / elm / green ash	135.2	96.0	17.4	21.8	--
Silver maple / American elm	13.3	13.3	--	--	--
Cottonwood / willow	49.7	49.7	--	--	--
All forest types	378.9	309.9	37.2	31.7	--

(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					
Maple / beech / birch group					
Sugar maple / beech / yellow birch	9.6	--	9.6	--	--
Hard maple / basswood	26.9	26.9	--	--	--
Elm / ash / locust	74.8	25.2	47.2	2.5	--
All forest types	111.3	52.1	56.7	2.5	--
Exotic hardwoods group					
Other exotic hardwoods	15.9	3.9	--	12.0	--
All forest types	15.9	3.9	--	12.0	--
All hardwood groups	756.7	528.8	169.5	58.3	--
Nonstocked	59.1	--	--	--	59.1
All forest groups	1,163.1	722.2	287.5	94.3	59.1

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

Table 4. -- Net volume of all live trees on forest land by species group, species, and owner category, Nebraska, 2001-2003

(In thousand cubic feet)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines				
Scotch pine	968	968	--	--
All species	968	968	--	--
Other eastern softwoods				
Rocky Mountain juniper	23,702	528	23,174	--
Eastern redcedar	127,163	11,083	116,081	--
Norway spruce	201	--	201	--
Ponderosa pine	203,655	32,750	170,905	--
All species	354,720	44,360	310,360	--
Total softwoods	355,688	45,328	310,360	--
Hardwoods				
Select white oaks				
Bur oak	260,176	13,882	246,293	--
Chinkapin oak	6,810	625	6,185	--
All species	266,986	14,508	252,478	--
Select red oaks				
Northern red oak	6,599	775	5,824	--
All species	6,599	775	5,824	--
Other red oaks				
Black oak	6,060	--	6,060	--
All species	6,060	--	6,060	--
Hickory				
Bitternut hickory	4,701	353	4,348	--
All species	4,701	353	4,348	--
Soft maple				
Silver maple	26,466	3,264	23,202	--
All species	26,466	3,264	23,202	--
Ash				
Green ash	128,405	14,025	114,380	--
All species	128,405	14,025	114,380	--

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Cottonwood and aspen				
Eastern cottonwood	610,888	217,434	393,455	--
Plains cottonwood	8,282	--	8,282	--
All species	619,170	217,434	401,736	--
Basswood				
American basswood	39,089	--	39,089	--
All species	39,089	--	39,089	--
Black walnut				
Black walnut	21,594	2,179	19,415	--
All species	21,594	2,179	19,415	--
Other eastern soft hardwoods				
Boxelder	50,358	1,935	48,423	--
Northern catalpa	900	--	900	--
Hackberry	78,219	9,382	68,836	--
Black cherry	611	--	611	--
Black willow	27,585	4,555	23,030	--
American elm	65,237	10,358	54,880	--
Siberian elm	29,367	89	29,278	--
Slippery elm	31,547	1,056	30,491	--
All species	283,824	27,374	256,449	--
Other eastern hard hardwoods				
Honeylocust	28,814	--	28,814	--
Kentucky coffeetree	6,983	--	6,983	--
Mulberry spp.	5,174	--	5,174	--
White mulberry	182	--	182	--
Red mulberry	54,399	16,524	37,876	--
Black locust	9,114	--	9,114	--
All species	104,666	16,524	88,143	--

(Table 4 continued on next page)

(Table 4 continued)

Species group/ species	Owner category			
	All owners	Public	Private	Unidentified owner
Hardwoods				
Eastern noncommercial hardwoods				
American hornbeam, musclewood		--		--
Osage-orange	2,709	165	2,544	--
Eastern hophornbeam	5,600	205	5,395	--
American plum		--		--
Willow spp.	4,812	--	4,812	--
Peachleaf willow	1,967	375	1,593	--
Russian-olive	1,202	--	1,202	--
All species	16,291	745	15,546	--
Total hardwoods	1,523,851	297,180	1,226,671	--
All species groups	1,879,539	342,508	1,537,031	--

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, Nebraska, 2001-2003

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	990,717	201,220	789,497
Upper stem portion	111,139	29,658	81,482
Total	1,101,857	230,878	870,979
Poletimber	284,985	74,447	210,538
All growing-stock trees	1,386,842	305,325	1,081,517
Cull trees			
Rough trees[1]			
Sawtimber size	252,053	31,471	220,582
Poletimber size	93,746	10,644	83,103
Total	345,799	42,115	303,685
Rotten trees[1]			
Sawtimber size	41,086	--	41,086
Poletimber size	3,974	--	3,974
Total	45,060	--	45,060
All live cull trees	390,859	42,115	348,744
All live trees	1,777,701	347,439	1,430,262
Salvable dead trees			
Sawtimber size	19,553	4,995	14,558
Poletimber size	15,159	2,471	12,687
All salvable dead trees	34,712	7,467	27,245
All classes	1,812,413	354,906	1,457,507

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, Nebraska, 2001-2003

(In thousand cubic feet)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Softwood type groups			
Pinyon / juniper group			
Eastern redcedar	84,535	73,697	10,838
All forest types	84,535	73,697	10,838
Ponderosa pine group			
Ponderosa pine	206,518	201,002	5,516
All forest types	206,518	201,002	5,516
All softwood groups	291,053	274,699	16,354
Hardwood type groups			
Oak / pine group			
Eastern redcedar / hardwood	44,719	20,753	23,967
All forest types	44,719	20,753	23,967
Oak / hickory group			
White oak / red oak / hickory	11,643	- -	11,643
Bur oak	96,212	4,021	92,191
Mixed upland hardwoods	123,054	871	122,183
All forest types	230,909	4,892	226,017

(Table 6 continued on next page)

(Table 6 continued)

Forest type group/ forest type	All species	Softwood species	Hardwood species
Hardwood type groups			
Elm / ash / cottonwood group			
Elm / ash / cottonwood group	8,591	--	8,591
River birch / sycamore	1,195	--	1,195
Cottonwood	396,923	1,022	395,901
Willow	7,004	--	7,004
Sycamore / pecan / American elm	2,658	--	2,658
Sugarberry / hackberry / elm / green ash	123,017	--	123,017
Silver maple / American elm	22,174	--	22,174
Cottonwood / willow	132,959	--	132,959
All forest types	694,520	1,022	693,498
Maple / beech / birch group			
Sugar maple / beech / yellow birch	7,117	--	7,117
Hard maple / basswood	48,316	--	48,316
Elm / ash / locust	56,441	1,089	55,352
All forest types	111,874	1,089	110,785
Exotic hardwoods group			
Other exotic hardwoods	8,669	350	8,319
All forest types	8,669	350	8,319
All hardwood groups	1,090,691	28,105	1,062,587
Nonstocked	5,097	2,521	2,576
All forest groups	1,386,842	305,325	1,081,517

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, Nebraska, 2001-2003

(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	781	121	--	--	660	--	--	--	--	--	--
All species	781	121	--	--	660	--	--	--	--	--	--
Other eastern softwoods											
Rocky Mountain juniper	10,535	805	2,107	1,579	1,436	4,608	--	--	--	--	--
Eastern redcedar	98,476	24,976	22,753	17,236	16,930	11,393	3,157	2,031	--	--	--
Norway spruce	201	201	--	--	--	--	--	--	--	--	--
Ponderosa pine	195,332	7,775	15,709	28,621	43,742	34,533	27,302	16,022	18,193	3,435	--
All species	304,544	33,757	40,569	47,436	62,108	50,534	30,459	18,054	18,193	3,435	--
Total softwoods	305,325	33,877	40,569	47,436	62,767	50,534	30,459	18,054	18,193	3,435	--
Hardwoods											
Select white oaks											
Bur oak	163,613	8,760	15,220	24,974	20,902	17,490	8,412	17,651	12,004	30,694	7,506
Chinkapin oak	6,810	--	--	1,454	1,913	--	--	3,443	--	--	--
All species	170,424	8,760	15,220	26,427	22,816	17,490	8,412	21,094	12,004	30,694	7,506
Select red oaks											
Northern red oak	6,599	--	1,120	--	--	--	--	2,655	2,824	--	--
All species	6,599	--	1,120	--	--	--	--	2,655	2,824	--	--
Other red oaks											
Black oak	6,060	--	--	--	876	1,412	--	--	3,772	--	--
All species	6,060	--	--	--	876	1,412	--	--	3,772	--	--
Hickory											
Bitternut hickory	4,572	583	310	1,970	--	1,708	--	--	--	--	--
All species	4,572	583	310	1,970	--	1,708	--	--	--	--	--
Soft maple											
Silver maple	17,604	1,120	685	2,394	3,290	3,429	--	2,674	3,811	--	--
All species	17,604	1,120	685	2,394	3,290	3,429	--	2,674	3,811	--	--
Ash											
Green ash	91,118	8,780	16,708	18,047	15,044	10,995	7,781	--	2,687	11,077	--
All species	91,118	8,780	16,708	18,047	15,044	10,995	7,781	--	2,687	11,077	--
Cottonwood and aspen											
Eastern cottonwood	521,354	1,833	4,836	10,772	22,093	15,942	31,735	23,046	39,026	186,297	185,775
Plains cottonwood	591	591	--	--	--	--	--	--	--	--	--
All species	521,945	2,424	4,836	10,772	22,093	15,942	31,735	23,046	39,026	186,297	185,775
Basswood											
American basswood	29,801	425	2,571	1,377	3,678	4,334	6,355	2,685	3,850	4,528	--
All species	29,801	425	2,571	1,377	3,678	4,334	6,355	2,685	3,850	4,528	--

(Table 7 continued on next page)

(Table 7 continued)

Species group/ species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Hardwoods											
Black walnut											
Black walnut	16,613	864	1,933	1,442	1,535	3,104	--	--	3,161	4,575	--
All species	16,613	864	1,933	1,442	1,535	3,104	--	--	3,161	4,575	--
Other eastern soft hardwoods											
Boxelder	21,114	966	1,135	3,582	1,579	1,379	--	--	3,285	9,188	--
Northern catalpa	900	--	455	445	--	--	--	--	--	--	--
Hackberry	40,554	5,256	5,755	2,972	4,938	1,188	3,675	--	6,592	10,178	--
Black willow	19,344	1,636	3,162	1,441	2,068	2,394	6,142	2,501	--	--	--
American elm	40,419	6,055	7,397	8,772	8,101	6,960	3,135	--	--	--	--
Siberian elm	21,808	1,528	3,279	2,660	1,416	4,236	6,063	2,625	--	--	--
Slippery elm	22,414	970	2,340	2,593	4,116	6,529	3,391	2,476	--	--	--
All species	166,553	16,411	23,522	22,464	22,219	22,687	22,405	7,602	9,877	19,366	--
Other eastern hard hardwoods											
Honeylocust	11,528	1,258	1,983	958	974	--	--	2,771	3,584	--	--
Kentucky coffeetree	6,650	--	605	529	1,324	2,428	1,764	--	--	--	--
Mulberry spp.	4,774	286	945	720	1,166	1,657	--	--	--	--	--
Red mulberry	19,614	2,795	4,094	2,510	6,107	2,507	1,601	--	--	--	--
Black locust	7,663	531	1,677	483	3,324	--	1,648	--	--	--	--
All species	50,229	4,871	9,303	5,200	12,895	6,592	5,013	2,771	3,584	--	--
Total hardwoods	1,081,517	44,239	76,206	90,094	104,445	87,692	81,700	62,727	84,597	256,537	193,281
All species groups	1,386,842	78,116	116,775	137,530	167,212	138,226	112,159	80,780	102,789	259,972	193,281

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, Nebraska, 2001-2003

(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+
Softwoods									
Other yellow pines									
Scotch pine	2,995	--	2,995	--	--	--	--	--	--
All species	2,995	--	2,995	--	--	--	--	--	--
Other eastern softwoods									
Rocky Mountain juniper	37,263	7,545	6,844	22,874	--	--	--	--	--
Eastern redcedar	260,066	93,639	86,779	55,673	14,736	9,238	--	--	--
Ponderosa pine	846,963	132,763	210,838	169,581	137,614	83,102	95,434	17,631	--
All species	1,144,292	233,948	304,461	248,128	152,350	92,340	95,434	17,631	--
Total softwoods	1,147,287	233,948	307,456	248,128	152,350	92,340	95,434	17,631	--
Hardwoods									
Select white oaks									
Bur oak	563,651	--	98,511	83,596	40,431	85,904	59,585	156,169	39,456
Chinkapin oak	26,442	--	9,193	--	--	17,249	--	--	--
All species	590,094	--	107,704	83,596	40,431	103,153	59,585	156,169	39,456
Select red oaks									
Northern red oak	27,740	--	--	--	--	13,348	14,393	--	--
All species	27,740	--	--	--	--	13,348	14,393	--	--
Other red oaks									
Black oak	29,333	--	3,908	6,597	--	--	18,828	--	--
All species	29,333	--	3,908	6,597	--	--	18,828	--	--
Hickory									
Bitternut hickory	8,441	--	--	8,441	--	--	--	--	--
All species	8,441	--	--	8,441	--	--	--	--	--
Soft maple									
Silver maple	58,832	--	13,662	14,770	--	12,898	17,502	--	--
All species	58,832	--	13,662	14,770	--	12,898	17,502	--	--
Ash									
Green ash	214,710	--	62,715	47,716	35,386	--	12,893	56,001	--
All species	214,710	--	62,715	47,716	35,386	--	12,893	56,001	--
Cottonwood and aspen									
Eastern cottonwood	2,479,335	--	97,007	72,168	150,817	114,778	198,236	978,842	867,488
All species	2,479,335	--	97,007	72,168	150,817	114,778	198,236	978,842	867,488
Basswood									
American basswood	135,790	--	18,885	22,693	33,699	14,478	20,923	25,112	--
All species	135,790	--	18,885	22,693	33,699	14,478	20,923	25,112	--

(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									
Black walnut									
Black walnut	59,592	--	6,749	14,435	--	--	15,546	22,863	--
All species	59,592	--	6,749	14,435	--	--	15,546	22,863	--
Other eastern soft hardwoods									
Boxelder	69,915	--	6,516	6,007	--	--	14,856	42,536	--
Hackberry	123,632	--	22,569	5,250	17,201	--	30,697	47,915	--
Black willow	55,172	--	8,439	9,670	26,107	10,956	--	--	--
American elm	80,744	--	35,534	31,262	13,949	--	--	--	--
Siberian elm	66,520	--	6,195	19,784	28,307	12,234	--	--	--
Slippery elm	75,614	--	18,774	30,052	15,649	11,139	--	--	--
All species	471,597	--	98,027	102,024	101,212	34,329	45,554	90,451	--
Other eastern hard hardwoods									
Honeylocust	32,396	--	4,057	--	--	12,234	16,105	--	--
Kentucky coffeetree	23,373	--	5,525	10,233	7,616	--	--	--	--
Mulberry spp.	11,887	--	4,844	7,043	--	--	--	--	--
Red mulberry	43,076	--	26,384	10,690	7,002	--	--	--	--
Black locust	21,170	--	13,880	--	7,290	--	--	--	--
All species	131,902	--	53,689	27,967	21,907	12,234	16,105	--	--
Total hardwoods	4,207,368	--	462,346	400,407	383,452	306,217	419,565	1,329,437	906,945
All species groups	5,354,655	233,948	769,802	648,535	535,802	397,557	514,998	1,347,069	906,945

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, Nebraska, 2001-2003

(In dry tons)

Owner category and softwood/hardwood category	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Non-growing-stock trees		
			Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	974,671	159,792	752,178	589,228	162,950	62,701	46,403	16,298
Hardwoods	5,550,218	134,514	4,189,947	3,163,381	1,026,565	1,225,757	895,100	330,656
Total	6,524,889	294,307	4,942,124	3,752,609	1,189,515	1,288,458	941,503	346,955
Private								
Softwoods	6,135,034	580,396	4,782,388	3,730,165	1,052,223	772,249	575,118	197,132
Hardwoods	28,140,855	988,640	19,348,988	14,227,567	5,121,422	7,803,227	5,692,972	2,110,254
Total	34,275,889	1,569,036	24,131,376	17,957,732	6,173,644	8,575,476	6,268,090	2,307,386
All ownerships								
Softwoods	7,109,704	740,189	5,534,566	4,319,393	1,215,172	834,950	621,520	213,430
Hardwoods	33,691,073	1,123,154	23,538,935	17,390,948	6,147,987	9,028,984	6,588,073	2,440,911
Total	40,800,777	1,863,343	29,073,501	21,710,341	7,363,159	9,863,934	7,209,593	2,654,341

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.

Moser, W. Keith; Brand, Gary J.; Hansen, Mark H.; Lovett, William R.
2005. **Nebraska's forest resources in 2003.** Resour. Bull. NC-242. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 30 p.

Reports results of the first three yearly panels (2001-2003) of the fourth inventory of Nebraska's forest resources. Includes information on forest area; volume; biomass; growth, removals, and mortality; and forest health.

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

The Forest inventory and Analysis web site is:
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