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Nebraska's Forest Resources in 2002

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CONTENTS

Results **1**

Area 1

Volume 4

Biomass 7

Forest Health 7

Summary 8

Appendix **9**

Inventory Methods 9

Sampling Phases 10

Phase 1 10

Phase 2 10

Phase 3 10

Literature Cited . . . . . **.11**

Table Titles . . . . . **.12**

Tables . . . . . **.13**

Nebraska's Forest Resources in 2002

The North Central Research Station's Forest Inventory and Analysis (NCFIA) program began fieldwork for the fourth forest inventory of 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 2002, NCFIA continued the annual inventory effort with the second 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 2 years of the inventory. Data presented in this report represent 40 percent of the field plots (or two panels) for a complete inventory and are a combination of the first year's panel from 2001 and the second year's panel from 2002. Due to the limited number of field plots measured at this point, sampling errors are large and data in this report should be used with caution. Future estimates that incorporate data in this report are subject to change when ensuing annual inventories are completed and data compiled. The results presented are estimates based on sampling techniques; estimates were compiled assuming the 2001-2002 data represent one sample. As additional inventories are completed, the precision of the estimates will increase and additional data will be released.

Data from new inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the 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 been made 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 2002 data 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). Toward the west, the area of forest land declines sharply. The majority of western forests are dominated by stands of ponderosa pine

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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 scarcity of 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 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 duststorms 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 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 (Schmidt and Wardle 1998, Raile 1986). 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 2002 data are consistent with this increase; the area of forest land is currently estimated at 1,346.5 thousand acres, or 2.5 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 2002 inventory, these lands are classified as forest land if they meet the definitional standards for size, width, and stocking. This may account for a portion of the increase in forest land since 1994.

Nearly 9 out of every 10 acres of forest land (87 percent) are held by private landowners (table 1). There are three components to forest land: (1) Timberland[1]—forest land that is not restricted from harvesting by statute, administrative regulation, or designation and

[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.*

is capable of growing trees at a rate of 20 cubic feet per acre per year; (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, 96 percent of the forest land is timberland. Although timberland is predominant, the 49 thousand acres of other forest land is a significant resource. Some acres of other forest land are set aside as reserves and other acres, largely because 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 is an estimated 1,297.4 thousand acres of timberland in Nebraska (table 2). Timberland area has more than doubled since 1983 (fig. 1). According to Schmidt and Wardle (1998), much of the increase in timberland area between 1983 and 1998 came from a decrease in the number of farm operations, changes in livestock grazing management schemes, and the 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.

Nebraska is one of the few States to have both eastern hardwoods and western softwoods within its borders (Stone and Bagley 1961). Hardwood stands occupy 889,300 ± 88,100 acres or 68 percent of all timberland area within the State (fig. 2, table 3). The majority of timberland hardwood stands are associated with the elm-ash-cottonwood group (389,200 ± 58,300 acres), followed by the oak-hickory (225,800 ± 44,400 acres) and maple-beech-birch (178,900 ± 39,500 acres) groups. Forests in the western part of the State are

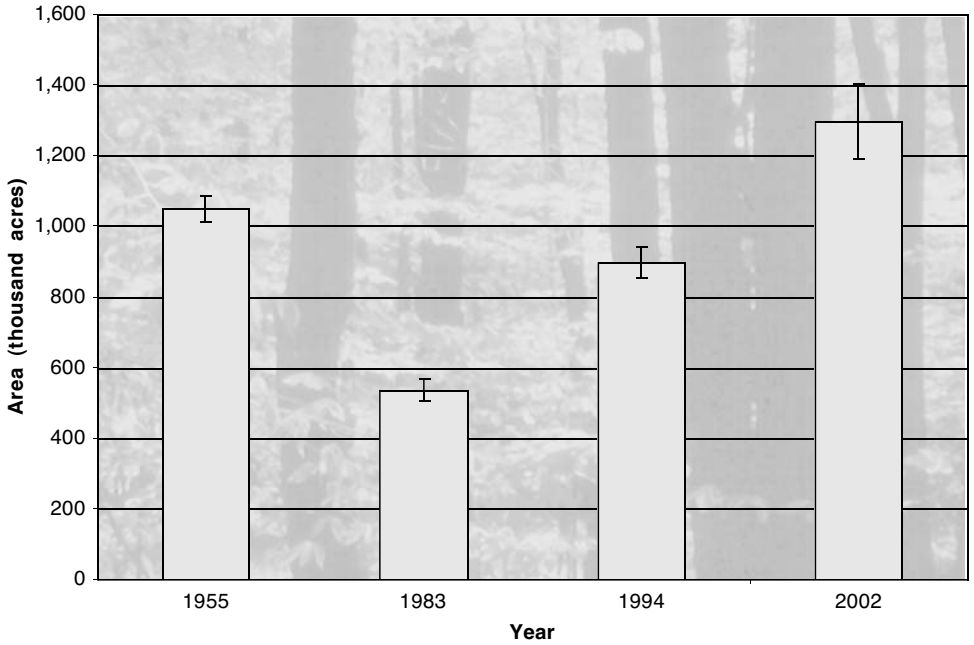

Figure 1. — Area of timberland, Nebraska, 1955-2002. (Note: The sampling error associated with an inventory is represented by the vertical line at the top of its bar.)

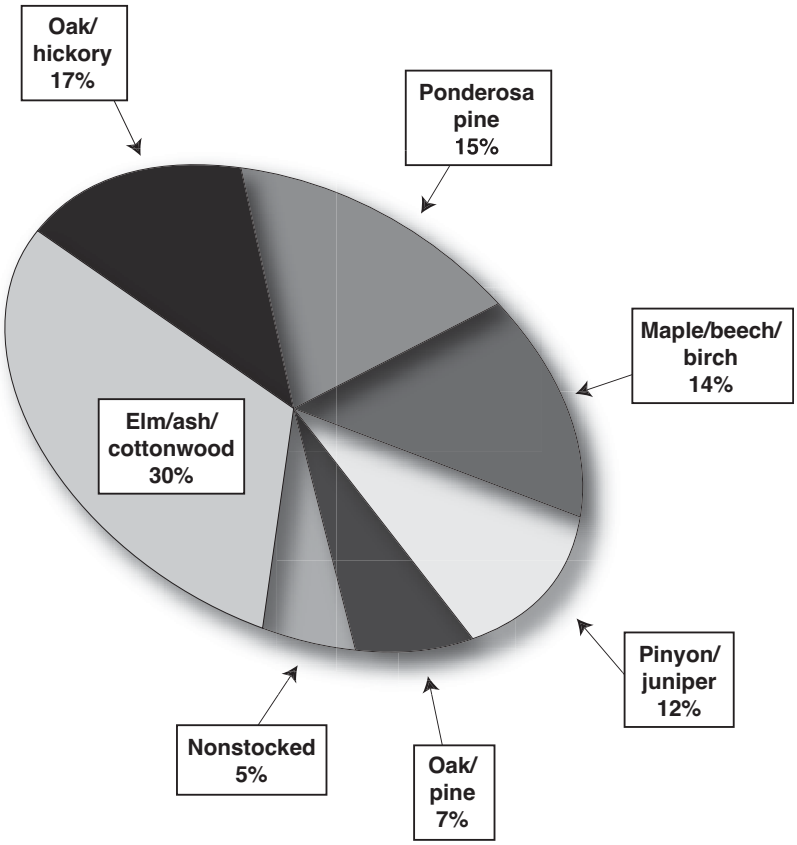

Figure 2. — *Area of timberland by forest type, Nebraska, 2001-2002.*

largely dominated by conifers, and ponderosa pine is found on 199,600 ± 41,700 acres in northwestern Nebraska, accounting for 15 percent of all timberland.

The distribution of Nebraska's timberland area by stand-size class generally agrees with that of the 1994 inventory, with the majority of timberland dominated by trees in larger size classes. Initial estimates based on the 2002 inventory indicate that sawtimber stands occupy 720,000 ± 79,000 acres, or more than half (55 percent) of all timberland (fig. 3, table 3). Sawtimber refers to a live tree that is 11.0 inches diameter at breast height (d.b.h.) for hardwoods or 9.0 inches d.b.h. for conifers and contains at least a 12-foot saw log or two non-contiguous saw logs 8 feet or longer. An additional one-quarter (27 percent) 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 less than 14 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, there is wood volume in noncommercial trees, rotten trees, and rough trees that do not qualify as growing stock. Volume from non-growing-stock trees is often used for wood fiber and fuelwood. Non-growing-stock volume is also an important

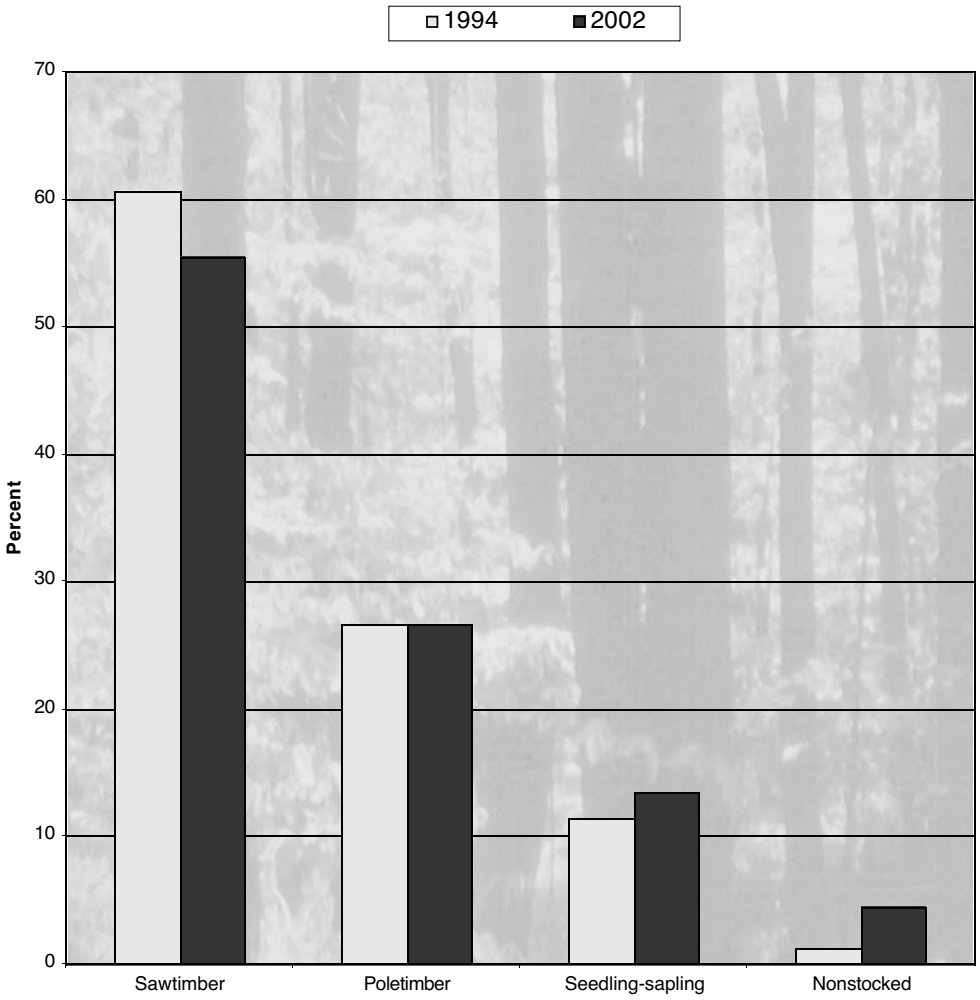

Figure 3. — *Stand-size class as a percentage of total timberland area, Nebraska, 1994 and 2002.*

ecological component of the landscape because it provides wildlife habitat and soil and water protection. With the annualized 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 is an estimated 1,931.1 thousand cubic feet of all live volume on the 1,346.5 thousand acres of forest land in Nebraska (table 4) or an average of more than 1,434 cubic feet of all live tree volume for each forest land acre. On the 1,297.4 thousand acres of timberland, there is an estimated 1,944.2 thousand cubic feet of all live tree volume (table 5) or the equivalent of 1,498 cubic feet for each timberland acre in Nebraska.

Although relatively small, the difference in all live tree volume on forest land and on timberland is a reflection of the characteristics of the land trees are growing on. 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 2002 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 represent 83 percent of the total growing-stock volume on timberland (table 6). The majority of the growing-stock volume is in the elm-ash-cottonwood species groups (52 percent), followed by the oak-hickory group (17 percent) and the maple-beech-birch group (11 percent). More than 70 percent of total volume in the softwood type groups is associated with ponderosa pine stands (table 6). Often, stands are a mix of species, sometimes with hardwoods and softwoods intermixed. For instance, 5 percent (13.1 million cubic feet) of the growing-stock volume in the softwood type groups is contained in hardwood species. In the hardwood type groups, about 3 percent (45.3 million cubic feet) of growing-stock volume is in softwood species.

For hardwood species, estimated growing-stock volume increased by more than 345 percent from 285.8 ± 31.0 million cubic feet in 1983 to 1,275.8 ± 203.1 million cubic feet in 2002 (fig. 4). During this same time period, growing-stock volume of softwood species increased from 170.3 million cubic feet to 290.3 million cubic feet, or by about 70 percent (fig. 5).

Fifty-nine percent of all growing-stock volume is in trees that are 15 inches d.b.h. and larger (table 7). Thirty-eight percent of all growing-stock volume is in trees that are 21 inches d.b.h. and larger; most of this volume is cottonwood trees. The cottonwood and aspen species group accounts for 42 percent of all growing-stock volume. However, there is some concern about cottonwood regeneration, reflected in the small amount of volume in the smaller diameter classes as shown in table 7.

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 totals 6.1 billion board feet (table 8). Most sawtimber volume is in hardwood trees—83 percent. More than half (52

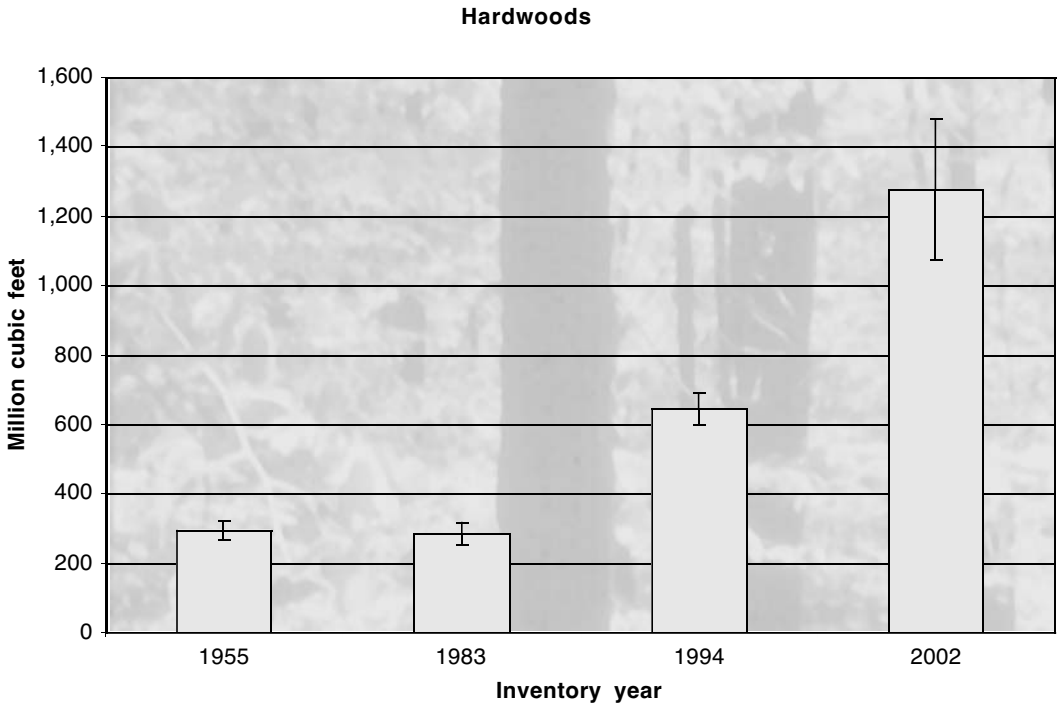

Figure 4. — Hardwood growing-stock volume, Nebraska, 1955-2002. (Note: The sampling error associated with an inventory is represented by the vertical line at the top of its bar.)

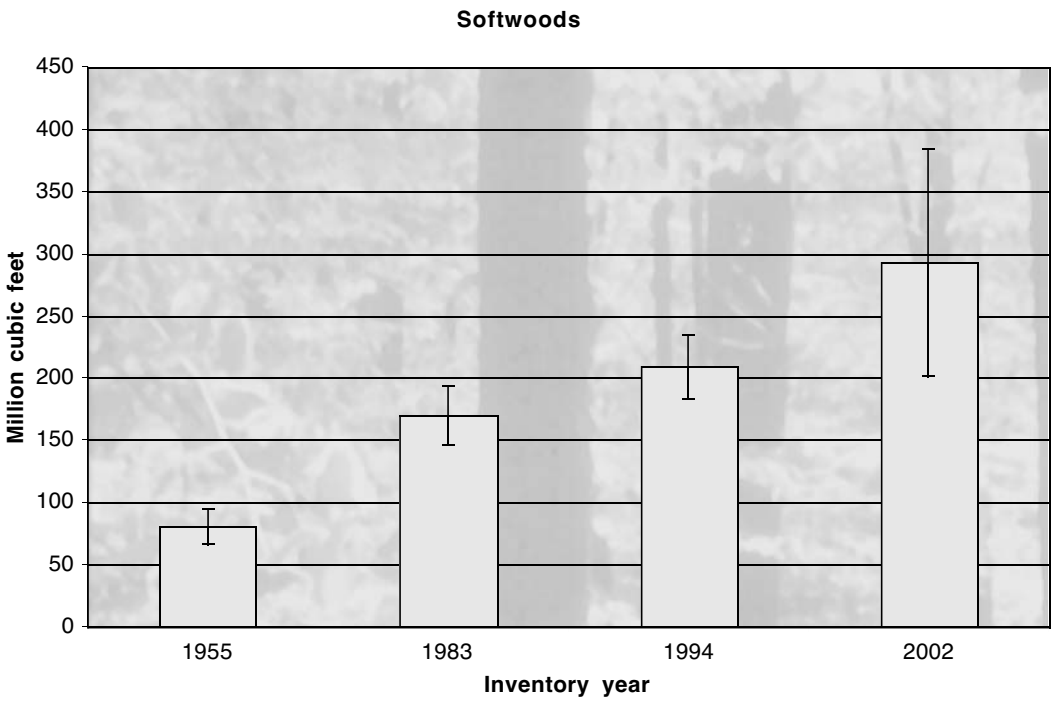

Figure 5. — Softwood growing-stock volume, Nebraska, 1955-2002. (Note: The sampling error associated with an inventory is represented by the vertical line at the top of its bar.)

percent) of sawtimber volume is in the cottonwood and aspen species group. The ponderosa and Jeffrey pine species group accounts for 13 percent of sawtimber volume.

Biomass

Live aboveground tree biomass in Nebraska's timberland area was estimated to be 43.3 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. Seventy-five percent of tree biomass is in growing-stock trees, 20 percent is in non-growing-stock trees, and the remaining 5 percent is in trees less than 5 inches d.b.h. (table 9). For both growing-stock and non-growing-stock trees, nearly three-fourths of total aboveground biomass is in the bole of trees. The remaining aboveground biomass is in stumps, tops, and limbs. About 85 percent (36.6 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 Forest Health Protection program of State and Private Forestry reports on forest health. Summarized below are some of the major concerns in 2002. A high population of engraver beetle (*Ips* spp.) was reported in jack pine stands that had been defoliated by jack pine budworm on the Halsey unit of the Nebraska National Forest. In severely defoliated areas, up to 25 percent of the trees had *Ips* attacks. In the Pine Ridge area, there was light and scattered mortality caused by *Ips*. Reports of damage on Scotch pine from European pine sawfly (*Neodiprion sertifer*) were quite common from landowners and Christmas tree growers in eastern Nebraska. Pine wilt and pinewood nematode (*Bursaphelenchus xylophilus*) are a problem throughout southeastern Nebraska. The incidence of pine wilt was high in 2002. Heavy mortality was linked to pinewood nematode, especially in Scotch pine. Other pest problems identified in 2002 included higher than normal populations of bagworm (*Oiketicus* spp.,d *Thyridopteryx* spp.) on eastern redcedar and Rocky Mountain

juniper and yellownecked caterpillar (*Datana ministra*) on oaks, basswood, elm, fragrant sumac, and maple. Dutch elm disease (*Ceratocystis ulmi*) was identified as a problem in riparian areas and cities throughout Nebraska. Oak wilt (*Ceratocystis fagacearum*) continued to present problems for bur and red oaks along the eastern edge of the State. Herbicide and pesticide damage to windbreaks and other tree plantings has also been identified as a serious problem in Nebraska.

Summary

The results from the first 2 years of the annual inventory of Nebraska completed in 2002 generally agree with the trend of increasing forest land and increasing growing-stock volume observed throughout the second half of the 20th century. However, because of the small sample in the first 2 years of the annual inventory system, there are insufficient data at present to state with statistical certainty how Nebraska's forest resources have changed since the 1994 inventory. As additional data become available under the annual inventory system, a clearer picture of the status and direction of Nebraska's forests will emerge. Until that time, the 1994 inventory remains the best source of data on Nebraska's forest resources. Additional data related to the most recent three 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 is the change from periodic inventories to annual inventories. Historically, the NCFIA inventoried each State on a cycle that averaged about 12 years. However, the need for timely and consistent data across large geographical regions, combined with national legislative mandates, resulted in NCFIA's implementation of an annual inventory system. 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 to an annual inventory, one difficulty is reporting on results in the first 4 years. With the 2002 inventory, only 40 percent of all field plots have been measured. Sampling error estimates for the 2002 inventory are 8.1 percent for forest land area, 8.2 percent for timberland area, 15.3 percent for number of growing-stock trees on timberland, 14.4 percent for volume of growing stock on timberland, and 16.6 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 samples. Thus, caution should be used when drawing conclusions based on this limited data set. As we complete ensuing measurements, we will have additional confidence in our results because of the increased number of field plots measured. As each measurement year is completed, the precision of estimates will improve.

Other significant changes between inventories include the implementation of new remote sensing technology, the implementation of a new field plot design, the development of new volume equations, and the gathering of additional 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 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 2001-2002 to assign forest type and stand-size class to each condition observed on a plot. These algorithms are being used nationwide by FIA to provide consistency among States and will be used to reassign the forest type and stand-size class of every plot 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 2002 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 2002 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 entailed measurement of the traditional FIA set of mensurational variables, and the third phase focused on a set of variables related to the health of the forest.

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

Phase 1

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

Phase 2

Phase 2 of the inventory consisted of the measurement of the annual sample of field plots in 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, non-overlapping subsamples or panels. Each year the plots in a single panel are measured, and panels are selected on a 5-year, rotating basis (McRoberts 1999). For estimation purposes, the measurement of each panel of plots may be considered an independent systematic sample of all land in a State. Field crews measure vegetation on plots forested at the time of the last inventory and on plots currently classified as forest by trained photointerpreters using aerial photos or digital orthoquads.

Phase 3

NCFIA has two categories of field plot measurements—phase 2 field plots (standard FIA plots) and phase 3 plots (forest health plots)—to optimize our ability to collect data when available for measurement. Both types of plot are uniformly distributed both geographically and temporally. Phase 3 plots are measured with the full set of FHM vegetative and health variables (Mangold 1998) collected as well as the full set of measures associated with phase 2 plots. Phase 3 plots must be measured between June 1 and August 30 to accommodate the additional measurement of non-woody understory vegetation, ground cover, soils, and other variables. We anticipate that in 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 1999-2002 annual inventory results represent field measures on 170 phase 2 forested plots and 12 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 (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 5 inches d.b.h. 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 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 is 1 acre or more.

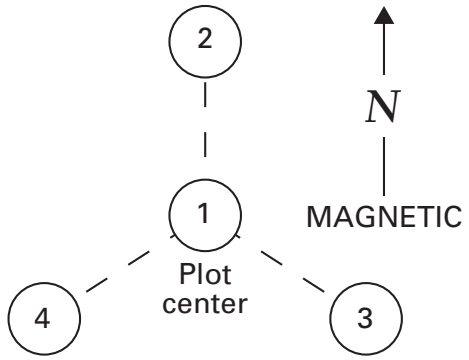

Figure 6. — *Current NCFIA field plot design.*

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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TABLE TITLES

Table 1.—*Area of forest land by forest type group and owner category, Nebraska, 2001-2002*

Table 2.—*Area of timberland by major forest type group, stand origin, and owner category, Nebraska, 2001-2002*

Table 3.—*Area of timberland by forest type group and stand-size class, Nebraska, 2001-2002*

Table 4.—*Net volume of all live trees on forest land by species group and owner category, Nebraska, 2001-2002*

Table 5.—*Net volume of all live trees and salvable dead trees on timberland by class of timber and softwood/hardwood species, Nebraska, 2001-2002*

Table 6.—*Net volume of growing stock on timberland by forest type group and softwood/hardwood species species, Nebraska, 2001-2002*

Table 7.—*Net volume of growing stock on timberland by species group and diameter class, Nebraska, 2001-2002*

Table 8.—*Net volume of sawtimber on timberland by species group and diameter class, Nebraska, 2001-2002*

Table 9.—*All live aboveground tree biomass on timberland by owner category, softwood/hardwood species category, and tree biomass component, Nebraska, 2001-2002*

TABLES

Table 1. -- Area of forest land by forest type group and owner category, Nebraska, 2001 - 2002

(In thousand acres)

Forest type group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Pinyon / juniper	150.8	30.1	120.7	- -
Ponderosa pine	225.8	58.4	167.4	- -
All softwood types	376.6	88.4	288.1	- -
Hardwood type groups				
Oak / pine	95.4	2.8	92.6	- -
Oak / hickory	237.6	17.2	220.4	- -
Elm / ash / cottonwood	400.4	63.2	337.2	- -
Maple / beech / birch	178.9	- -	178.9	- -
All hardwood types	912.2	83.1	829.1	- -
Nonstocked	57.8	3.7	54.1	- -
All forest types	1,346.5	175.3	1,171.3	- -

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 total due to rounding.

Table 2. -- Area of timberland by major forest type group, stand origin, and owner category, Nebraska, 2001 - 2002

(In thousand acres)

Major forest type group and stand origin	Owner category			
	All owners	Public	Private	Unidentified owner
Softwood type groups				
Natural	320.3	43.4	276.9	- -
Planted	30.1	30.1	- -	- -
All softwood types	350.4	73.5	276.9	- -
Hardwood type groups				
Natural	870.7	83.1	787.6	- -
Planted	18.6	- -	18.6	- -
All hardwood types	889.3	83.1	806.2	- -
Nonstocked	57.8	3.7	54.1	- -
All groups	1,297.4	160.3	1,137.1	- -

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 and stand-size class, Nebraska, 2001 - 2002

(In thousand acres)

Forest type group	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Non-stocked
Softwood type groups					
Pinyon / juniper	150.8	18.7	113.0	19.1	- -
Ponderosa pine	199.6	116.2	36.8	46.6	- -
All softwood types	350.4	134.9	149.8	65.6	- -
Hardwood type groups					
Oak / pine	95.4	39.5	29.8	26.0	- -
Oak / hickory	225.8	153.6	72.2	- -	- -
Elm / ash / cottonwood	389.2	322.0	27.0	40.3	- -
Maple / beech / birch	178.9	69.9	66.2	42.7	- -
All hardwood types	889.3	585.0	195.1	109.1	- -
Nonstocked	57.8	- -	- -	- -	57.8
All forest types	1,297.4	720.0	344.9	174.8	57.8

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 and owner category, Nebraska, 2001 - 2002

(In thousand cubic feet)

Species group	Owner category			
	All owners	Public	Private	Unidentified owner
Softwoods				
Other yellow pines	1,315	1,315	- -	- -
Other eastern softwoods	139,031	15,530	123,501	- -
Ponderosa and Jeffrey pines	185,264	46,064	139,200	- -
Western woodland softwoods	360	- -	360	- -
Total softwoods	325,970	62,909	263,061	- -
Hardwoods				
Select white oaks	251,541	13,863	237,678	- -
Select red oaks	5,818	1,109	4,709	- -
Other red oaks	1,245	- -	1,245	- -
Hickory	3,058	505	2,553	- -
Soft maple	16,390	- -	16,390	- -
Ash	107,766	16,367	91,399	- -
Cottonwood and aspen	730,054	196,960	533,094	- -
Basswood	39,782	- -	39,782	- -
Black walnut	16,768	2,678	14,091	- -
Other eastern soft hardwoods	324,115	20,524	303,591	- -
Other eastern hard hardwoods	98,315	7,672	90,643	- -
Eastern noncommercial hardwoods	10,278	569	9,709	- -
Total hardwoods	1,605,130	260,247	1,344,883	- -
All species groups	1,931,100	323,156	1,607,944	- -

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, Nebraska, 2001 - 2002

(In thousand cubic feet)

Class of timber	All species	Softwood species	Hardwood species
Live trees			
Growing-stock trees			
Sawtimber			
Saw log portion	1,145,907	188,467	957,440
Upper stem portion	115,726	25,817	89,909
Total	1,261,633	214,284	1,047,349
Poletimber	304,546	76,057	228,489
All growing-stock trees	1,566,179	290,341	1,275,838
Cull trees			
Rough trees [1]			
Sawtimber size	221,952	22,510	199,442
Poletimber size	88,395	9,302	79,093
Total	310,347	31,811	278,536
Rotten trees [1]			
Sawtimber size	25,454	- -	25,454
Poletimber size	4,043	- -	4,043
Total	29,497	- -	29,497
All live cull trees	339,844	31,811	308,033
All live trees	1,906,023	322,152	1,583,871
Salvable dead trees			
Sawtimber size	20,035	646	19,388
Poletimber size	18,134	1,453	16,681
All salvable dead trees	38,169	2,099	36,069
All classes	1,944,192	324,252	1,619,940

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 and softwood/hardwood species, Nebraska, 2001 - 2002

(In thousand cubic feet)

Forest type group	All species	Softwood species	Hardwood species
Softwood type groups			
Pinyon / juniper	72,347	66,509	5,839
Ponderosa pine	183,838	176,591	7,248
All softwood types	256,185	243,099	13,086
Hardwood type groups			
Oak / pine	55,970	29,075	26,895
Oak / hickory	266,850	13,064	253,786
Elm / ash / cottonwood	808,796	- -	808,796
Maple / beech / birch	172,904	3,185	169,719
All hardwood types	1,304,520	45,324	1,259,196
Nonstocked	5,473	1,918	3,556
All forest types	1,566,179	290,341	1,275,838

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 and diameter class, Nebraska, 2001 - 2002

(In thousand cubic feet)

Species group	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	1,060	164	- -	- -	896	- -	- -	- -	- -	- -	- -
Other eastern softwoods	112,703	28,371	27,275	19,595	17,944	16,498	- -	3,020	- -	- -	- -
Ponderosa and Jeffrey pines	176,217	6,485	13,402	21,996	33,942	33,371	30,220	14,436	18,012	4,354	- -
Western woodland softwoods	360	- -	360	- -	- -	- -	- -	- -	- -	- -	- -
Total softwoods	290,341	35,020	41,037	41,590	52,783	49,869	30,220	17,456	18,012	4,354	- -
Hardwoods											
Select white oaks	198,554	9,641	16,976	29,907	23,097	13,634	8,351	25,723	15,502	44,524	11,197
Select red oaks	5,818	- -	1,621	- -	- -	- -	- -	- -	4,197	- -	- -
Other red oaks	1,245	- -	- -	- -	1,245	- -	- -	- -	- -	- -	- -
Hickory	2,865	624	441	1,800	- -	- -	- -	- -	- -	- -	- -
Soft maple	7,359	1,045	407	1,835	1,347	2,725	- -	- -	- -	- -	- -
Ash	84,329	10,026	17,665	17,836	16,808	12,626	9,368	- -	- -	- -	- -
Cottonwood and aspen	663,652	1,392	2,592	6,119	17,748	17,399	35,402	33,581	45,785	233,599	270,035
Basswood	28,136	632	3,350	2,001	4,297	4,703	9,164	3,989	- -	- -	- -
Black walnut	13,863	568	488	591	1,216	4,500	- -	- -	- -	6,501	- -
Other eastern soft hardwoods	215,528	18,626	32,080	25,706	27,562	27,771	30,076	11,214	14,490	28,002	- -
Other eastern hard hardwoods	54,489	5,845	12,147	6,527	15,315	7,205	7,451	- -	- -	- -	- -
Total hardwoods	1,275,838	48,399	87,768	92,322	108,634	90,564	99,810	74,508	79,973	312,627	281,233
All species	1,566,179	83,419	128,805	133,912	161,417	140,433	130,030	91,964	97,985	316,981	281,233

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 and diameter class, Nebraska, 2001 - 2002

(In thousand board feet)[1]

Species group	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	4,068	- -	4,068	- -	- -	- -	- -	- -	- -
Other eastern softwoods	292,821	106,421	92,037	80,617	- -	13,747	- -	- -	- -
Ponderosa and Jeffrey pines	769,015	101,233	161,036	163,201	151,391	75,769	94,037	22,349	- -
Total softwoods	1,065,904	207,654	257,141	243,817	151,391	89,515	94,037	22,349	- -
Hardwoods									
Select white oaks	702,937	- -	109,114	64,742	40,213	125,864	76,816	227,330	58,858
Select red oaks	21,386	- -	- -	- -	- -	- -	21,386	- -	- -
Other red oaks	5,554	- -	5,554	- -	- -	- -	- -	- -	- -
Hickory	- -	- -	- -	- -	- -	- -	- -	- -	- -
Soft maple	17,397	- -	5,533	11,864	- -	- -	- -	- -	- -
Ash	167,378	- -	70,081	54,562	42,735	- -	- -	- -	- -
Cottonwood and aspen	3,201,270	- -	79,077	79,279	169,544	167,298	233,986	1,231,464	1,240,622
Basswood	116,898	- -	22,097	24,692	48,596	21,513	- -	- -	- -
Black walnut	58,783	- -	5,355	20,938	- -	- -	- -	32,490	- -
Other eastern soft hardwoods	633,954	- -	121,095	124,921	135,805	50,829	67,901	133,402	- -
Other eastern hard hardwoods	127,009	- -	63,864	30,571	32,574	- -	- -	- -	- -
Total hardwoods	5,052,566	- -	481,769	411,570	469,468	365,504	400,089	1,624,686	1,299,480
All species	6,118,470	207,654	738,911	655,387	620,859	455,020	494,126	1,647,034	1,299,480

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 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 - 2002

(In dry tons)

Owner category and softwood/hardwood category	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Non-growing-stock trees		
			Total	Boles	Stumps, tops, and limbs	Total	Boles	Stumps, tops, and limbs
Public								
Softwoods	1,337,663	212,280	1,053,322	826,818	226,505	72,060	53,973	18,088
Hardwoods	5,237,425	107,347	4,500,463	3,426,389	1,074,073	629,615	444,761	184,855
Total	6,575,088	319,627	5,553,785	4,253,207	1,300,578	701,676	498,734	202,942
Private								
Softwoods	5,375,207	543,984	4,270,288	3,303,737	966,551	560,936	412,322	148,614
Hardwoods	31,319,400	1,259,351	22,718,274	16,790,530	5,927,744	7,341,775	5,331,090	2,010,686
Total	36,694,608	1,803,335	26,988,562	20,094,267	6,894,295	7,902,711	5,743,411	2,159,300
All ownerships								
Softwoods	6,712,871	756,264	5,323,610	4,130,554	1,193,056	632,996	466,294	166,702
Hardwoods	36,556,826	1,366,698	27,218,736	20,216,919	7,001,817	7,971,391	5,775,850	2,195,541
Total	43,269,696	2,122,963	32,542,347	24,347,473	8,194,873	8,604,387	6,242,145	2,362,242

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.

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Results of the 2002 annual inventory of Nebraska show an estimated 1,346.5 thousand acres of forest land in the State. The estimated total volume of all live trees on forest land is 1.9 billion cubic feet. An estimated 1,297.4 thousand acres of forest land are classified as timberland. The estimate of growing-stock volume on timberland is 1.6 billion cubic feet. All live aboveground tree biomass on timberland is estimated at 43.3 million dry tons. Forest health concerns include a high population of engraver beetle in pine stands in north central and western Nebraska, and pine wilt and pinewood nematode in the southeastern part of the State.

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

The Forest inventory and Analysis web site is:
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