

Forest Resources One-liners With GEORGIA Highlights

**Extension Forest Resources Unit
Daniel B. Warnell School of Forest Resources
and
College of Agricultural and Environmental Sciences**



Also, see our web page: <http://www.forestry.uga.edu/>

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Robert A. Isaac, Associate Dean for Extension

The purpose of this publication is to provide short notes of useful things to know about forestry. This forest resource educational information is for use in various formats, such as: presentations by educators, public officials, communication specialists, information media users, forest resource managers, environmental advocacy groups, and others.

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Publication Development Disclaimer:

This publication was developed to demonstrate positive functions and values of forest resource management that may not be recognized by many people and organizations. Forest resource areas not represented here, or that are under represented, are results of insufficient information in forms suitable for this publication. Every attempt was made to show the myriad of functions and values that come from forest-dominated ecological systems.

Information contained in this publication was derived from primary, secondary, and combined sources. As such, not all statements could be verified from its original research source. Therefore, the authors make no claim, declaration, or warranty concerning the validity, accuracy, or truthfulness of values or statements. However, the authors do believe that this set of facts, figures and concepts represents a realistic compilation of attributes of forest resource management, and as such provides a valuable contribution to awareness and understanding in the lives of American families, their communities, and this nation.



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Forest Resource Highlights with a GEORGIA Emphasis

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and
College of Agricultural and Environmental Sciences
The University of Georgia

1996

Forests and timberland

U.S.

- The U.S. has one of the world's largest and most productive forest resources. Most of its forests are managed on a sustainable basis and are concentrated along the eastern and western coasts and lake states, close to major ports.
- The U.S. has 2,263,259,000 total acres of land area. Thirty-three percent, or 736,681,000 acres, are classified as forested acres (forest lands). Federal ownership is 34 percent of total forest land.
- Overall, annual growth of U.S. forested acres exceeds harvests and losses to insects, fire, and disease by 33% each year in the commercial forests.
- Two-thirds of U.S. forestlands contain forests capable of growing 20 cubic feet of commercial wood per acre per year.
- U.S. timberland ownership is 59 percent private non-industrial, 14 percent forest industry, 10 percent national forest, and 17 percent other public.
- Altogether, federal, state, and local governments own 131 million of the 490 million acres or 27 percent of commercial timberland in the U.S.
- More than 270 million acres of federal land are set aside by various government agencies for use as wildlife refuges, parks, and wilderness areas.
- Some 36 million acres of U.S. timberlands are reserved for non-timber uses through special legislation.
- More than 10 million acres of old-growth forest can be found in Oregon, Washington, and California.
- The U.S. has 8.25 million acres of old growth forest on federal lands in Oregon and Washington alone. More than half (57%) is preserved in parks, wilderness areas, and other legislative and judicial set-asides.
- Approximately 7 million non-industrial private forestland (NIPF) owners hold 288 million acres of timberlands in the U.S.

- In the U.S. only about 600,000 NIPF owners, or 8.7% of total owners, have holdings larger than 100 acres.
- The nation's forest land area is still about two-thirds the size it was in the year 1600, in spite of the conversion of 370 million acres of forest land to other uses, principally to agriculture.
- More trees are growing in America's forests today than at any time since the early 1900's.
- In 1900, forest growth rates were a fraction of harvest. Today, overall annual forest growth exceeds harvest by 37%.
- Net annual forest growth has increased 62% since 1952, and total growth per acre has increased 71%.
- Nationally, standing timber volume per acre in U.S. forests is 30% greater today than in 1952.
- On a per acre basis, net annual tree growth in the U.S. is 52 cubic feet compared with 27 in Canada and 24 in Russia.
- Annual growth in National Forests now exceeds harvest by more than 55%.
- 47% of the nation's standing softwood sawtimber inventory is located in federally-owned National Forests.
- 70% of America's National Forest land base is in land-use categories where timber production is forbidden. 30% remains open to varying levels of harvest activity.
- Net loss of U.S. forests from roads, buildings, and urban expansion is expected to be 28 million acres over the next 50 years, by the year 2040.

South

- Seventy percent of U.S. timberland acres are located in the eastern half of the country.
- Forestry is a major resource in the 13 Southern states with two to three of every five acres devoted to forest production.
- The U.S. South, composed of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia has 211,838,000 forested acres, 40 percent of total land area.
- Alabama, Georgia, North Carolina, South Carolina, and Virginia average approximately 65 percent of total land area in forest.
- There are some 5 million owners of Southern timberland.
- In the U.S. South, private landowners own over 90% of forestland.
- Farmers own 19.5 percent of the South's timberland; other private, non-industrial landowners own 42.5 percent; forest products industries own 20 percent; corporate non-forest industry owns 8 percent; and the public owns 10 percent.

Georgia

- Georgia's total land area is 37,068,000 acres, of which 65 percent is forested; more forest acres than any other state.
- Georgia's timberland owners number around 650,000.
- Of Georgia's 23,631,000 timber acres, 752,000 acres are in national forests, 894,000 acres are other private, 4,990,000 acres are owned by forest industry, and 16,995,000 acres are owned by farmers and other private landowners.
- Hardwoods cover 53 percent of the timber land in Georgia, and pine makes up the remaining 47 percent.
- The most prevalent hardwood species in Georgia are oak, maple, and sweetgum.
- In Georgia, loblolly and slash are the primary pine species.
- The state's coastal plain and piedmont areas are home to most of Georgia's many pines and other softwood species such as cypress and cedar.
- Georgia is second in the nation with more than 4,600 certified Tree Farms that total nearly eight million acres.
- Georgia was the first state in the nation to license professional foresters. Today, the state has some 1,200 licensed professional foresters.
- An estimated 92% of Georgia's commercial forest acreage is in compliance with Best Management Practices (BMPs), which are voluntary guidelines that ensure water quality is protected during forestry operations.
- The Georgia Forestry Association has announced a goal of 100 percent voluntary compliance with BMPs by the year 2000.

Timber Supply

U.S.

- The U.S. is the world's leading producer and consumer of forest products, accounting for about one-quarter of the world's production and consumption.
- In 1994, Americans used per person, an average of 749 pounds of paper products and 18 cubic feet of lumber and structural panel products. This equates to three average pulpwood trees, plus two average sawtimber trees.
- In the U.S. in 1992, there were approximately 1 million new single-family housing construction starts. Annual housing starts are expected to remain around 1.4 million for the remainder of the 1990s and rise to about 1.7 million starts by 2010

- In 1992, the average single-family home (just over 2,000 square feet) contains 16,946 board feet of lumber (95% softwood and 5% hardwood), up to 9,668 square feet of structural panel products (74% softwood plywood and 26% OSB/waferboard), and up to 3,199 square feet of non-structural panel products (42% insulating board, 28% particleboard, 19% hardboard, and 11% hardwood plywood).
- The U.S. is the world's largest producer of softwood lumber, followed by Canada and Russia.
- The U.S. is the largest producer of hardwood lumber, softwood plywood, and composite panels.
- The supply of timber at any point in time is determined, in part, as a function of private timber inventory levels, stumpage prices, and the amount of public forestland available for harvest.
- Timber supply projections require considerations of forest growth, private timberland management, timberland area change, forest type transition, harvest flows from public timberlands, and an array of market forces.
- Timber availability for harvest is impacted by environmental constraints, demographic trends, public opinion, and landowner objectives.
- The amount of timber that is available for harvest from the total existing supply is greatly reduced by excessively sloped land, water quality problems, broken terrain, limited road access, small harvest areas, public ownership, growing metropolitan areas, endangered species, wetlands, increased costs due to adoption of best management practices for timber, state and local regulations, nontimber objectives of landowners, increased recreational use of forest lands, and conversion of land use among agricultural, forest, and urban uses.

South

- During the early 1900s onto the 1950s, timber supplies for the U.S. South were projected to fall significantly below demand. However, by the 1960s and 1970s softwood and hardwood growing inventories had increased sufficiently to prompt expansions in the solid wood and pulp and paper manufacturing sectors throughout the Southern region.
- Six-thousand new homes, using 14,000 board feet of lumber each, could be built from lumber produced only from new growth added in Southern forests during the next 24 hours.
- The growth of Southern timber inventories has leveled off due to increased removals plus environmental and urban factor constraints on available harvests in the U.S.
- The South contains about two-fifths of the timberland in the U.S. It contains 23% of the softwood growing stock in the U.S. and 44% of the hardwood growing stock.
- Southern softwood removals comprise 53% of the U.S. total. Hardwood removals are 60% of totals.
- Southern hardwood annual growth exceeds harvest by 51%. Whereas, total average softwood growth is only 88% of harvest.
- The Southern softwood annual removal to total inventory ratio is 1:18 and is 1:48 for hardwoods. This indicates an 18 year supply of standing softwood and a 48 year supply of standing hardwoods, at current harvest rates, if there were no annual new growth.

- From 1984 through 1993, Southern pulpwood production increased almost 13%, from 58.7 to 66.3 million cords.
- In 1991, the most recent year for which complete information is available, the South Central region of the U.S. ranked first in roundwood production. States from Alabama to Kentucky to Oklahoma supplied 27% of roundwood production. The Southeast produced 22% of the total.
- In the Southeast region of the U.S. with 84.9 million acres of forest, 15% is in pine plantations, 25% is in natural pines, 11% is in mixed pine/hardwoods, 32% is in upland hardwoods, and 16% is in bottomland hardwoods.

Georgia

- Total timberland area in Georgia is projected to decline from 23.5 to 21.8 million acres by the year 2030.
- Pine plantation acres in Georgia are projected to increase from 4.72 million acres to 7.17 acres by the year 2030.
- Naturally regenerated pine acres in Georgia are projected to decrease from 6.97 to 3.14 million acres by the year 2030.
- Wood volumes from planted pines can be 15 to 20% higher than for naturally regenerated stands, while total revenues can be more than 30% higher, because of higher-value wood that can be merchandized from larger stems. Such products include larger size lumber and better plywood veneers.
- Planted pines usually grow faster than naturally regenerated trees, because of generally wider spacing, often more managed care, and possibly improved genetic stock. However, fast growth produces a larger center core of light-weight, low-strength, warp-prone, non-uniform wood with wide growth rings, less suitable for high-value products.
- Practicing “sustainable forestry” involves managing forest resources for long-term productivity, which certainly includes reforestation. Artificial regeneration (plantations of trees) is probably the most cost-effective means of rapidly reproducing a forested environment when trees are harvested, helping sustain a variety of forest resources.
- Mixed pine/hardwood acreage in Georgia is expected to decrease slightly from 2.74 to 2.42 million acres by the year 2030. Typically, these stands are 50% or more oak and 25% to 50% pine.
- Upland hardwood acreage in Georgia is expected to decrease slightly from 3.58 to 3.44 million acres by the year 2030.
- In Georgia in 1992, all forest products harvested totaled 1,229,921,000 cubic feet; 506,385,000 cubic feet of sawlogs were harvested; 72,605,000 cubic feet of veneer logs; 44,948,000 cubic feet of composite board; 547,855,000 cubic feet of pulpwood; and, 58,128,000 cubic feet of poles, pilings, posts, and other miscellaneous products.
- Pulpwood production in Georgia for 1993 was 9,935,900 cords.

- Projections for softwood timber removals in Georgia show a slight decrease from 1,132,000,000 cubic feet in 1984 to 1,125,000,000 cubic feet in 2030.
- Annual growth in Georgia softwood was estimated at 1,160,000,000 cubic feet in 1984, but is expected to dip to 1,116,000,000 cubic feet per year by the year 2000, then climb to 1,210,000,000 cubic feet of annual growth by 2030.
- Georgia projections indicate that annual softwood timber harvests will exceed annual growth in the 1990s, but a surplus will be realized by the year 2000. Pine plantation growth will almost triple from 307,000,000 cubic feet per year in 1984 to 860,000,000 cubic feet per year in 2030, a 46-year span.
- Georgia softwood timber inventories experienced a large increase from 1952 to 1984 - from 10,309,000,000 cubic feet in 1952 to 15,743,000,000 cubic feet in 1984, a growing stock increase of 53%. The Georgia softwood timber inventory is projected at 14,309,000,000 cubic feet in 2030.
- Georgia annual hardwood timber harvest remained flat from 1952 to 1976, at about 265,000,000 cubic feet per year. Georgia annual hardwood timber harvest are projected to increase to 505,000,000 cubic feet by 2020, then decline to 491,000,000 cubic feet by 2030.
- In Georgia, net annual growing stock of hardwoods increased from 329,000,000 cubic feet in 1952 to 577,000,000 cubic feet in 1984, or by 75%. This net annual hardwood growth in Georgia is projected to decline to 436,000,000 cubic feet by 2010, then increase slightly to 443,000,000 by 2030.
- Hardwood inventories (growing stock) in Georgia rose from 8,191,000,000 cubic feet in 1952 to 14,288,000,000 cubic feet in 1984, a 74% increase. By the year 2000, growth and removals are projected to come into balance. Inventory in 2010 is projected to be 15,627,000,000 cubic feet of hardwoods, decreasing to 14,245,000,000 cubic feet by 2030.

Timber Demand

U.S.

- The Food and Agricultural Organization of the United Nations forecasts that world demand for wood will nearly double by the middle of the next century.
- The USDA-Forest Service projects that demand for U.S. forest products will reach 25 billion cubic feet annually by the middle of the next century, up from nearly 18 billion in 1991.
- The demand for forest products is largely determined by growth in U.S. population, income, and aggregated economic activity as indicated by Gross National Product (GNP) and total personal income.
- In broad terms, future projections for timber demand show rising trends in the consumption of forest products with a much more cyclical outlook for timber growth and inventories.
- Over the period 1990 to 2040, softwood harvests from U.S. forests should rise by 35 percent. Hardwood harvests should rise by more than 51 percent. This level of consumption requires annual sawtimber stumpage real price growth in the order of 1-2 percent above general inflation.

- With reduced softwood stumpage supply during the 1990 to 2010 period, demand will adjust downward following higher prices. Until 2010 there is expected to be rising consumption, less rapid growth in timber inventories, and increasing real prices for stumpage and products. After 2010 there are expected declining growth in rates of consumption and increasing inventories in an amount to stabilize prices until the end of the projection period in 2040.
- By 2040, U.S. timberland will comprise two distinct components: 1) private inventories with relatively stable total volume, rapid growth, harvested close to minimum merchantable ages, and employing increasingly intensive silvicultural methods to grow softwoods; and 2) public lands with rising inventories of older stands using much less intensive silviculture. In addition, more intensive forest management and more tree planting do not limit short-term price increases or harvest shortfalls, although their long-term impacts can be substantial.

Myths and Facts about U.S. Forests

MYTH: The early U.S. forest was a carpet of trees that extended from coast to coast.

FACT: The pre-Columbian forest of 1600 covered less than half of the present day United States.

MYTH: We only have 5% of the original ancient forests left that once covered the Pacific Northwest in the pre-European settlement era.

FACT: This figure wrongly assumes that the coastal Northwest was covered with old trees before the arrival of settlers from the East. According to U.S. government studies, no more than a third of the region's forest was covered with old-growth trees at any time. Natural wildfires, and fires set by native Americans, routinely cleared vast swaths of old forests.

MYTH: Congress authorized salvage logging on federal lands of dead and dying timber that ignores environmental safeguards.

FACT: Salvage logging cannot proceed without an approved Environment Assessment as required under the National Environmental Policy Act and a Biological Evaluation as required under the Endangered Species Act. Moreover, a salvage sale can be stopped at any time -- by a district ranger up to the Secretary -- until the point that the sale is advertised.

MYTH: We're running out of trees.

FACT: We have more trees today than we had in 1970, on the first Earth Day -- even more than we had 70 years ago. In the middle of the last century, for example, Vermont, Massachusetts and Connecticut were about 35% forested; today they are 59%.

MYTH: We're cutting more than we're growing for future generations.

FACT: Forest growth has exceeded harvests since the 1940s.

MYTH: We're running out of old growth trees in our ancient forests.

FACT: In the U.S. today there are 13.2 million acres of old growth, i.e. large trees 200 years of age or older. The vast majority of these trees -- comprising an area the size of New Jersey and Massachusetts combined -- will remain in their natural condition and will never be harvested due to legal and regulatory prohibitions on logging, road building and even fire fighting.

MYTH: We're running out of wilderness.

FACT: The U.S. has permanently protected 104 million acres of land, much of it forested, in the Wilderness Preservation System. It's part of a larger total of 270 million acres that is off limits to all commercial activity, including logging, mining and grazing.

MYTH: Clear cutting, the practice of harvesting most trees in a given area, destroys the forest.

FACT: Clear cutting is a sound practice that benefits future forests. By mimicking natural wildfires, clear cutting is widely recognized by forest scientists and even by conservation groups such as the Environmental Defense Fund, American Forests, the Society of American Foresters as an ecologically sound technique for reforesting many softwood species. That's because, for their survival, conifer seedlings typically require direct sunlight and cannot survive in shade.

MYTH: A natural forest supports more ecological diversity than a managed forest.

FACT: Managed forests, even those with some clear-cutting, often produce more biodiversity than completely natural forests, according to U.S. Forest Service studies in the Lake States and New England. Even tree farm plantations contain a rich mosaic of plant and animal life.

MYTH: Forest management harms fragile wetlands.

FACT: In fact, good forest management is the environmentally preferred land use for wetlands, as confirmed by the National Wetlands Policy Forum sponsored by the U.S. Environmental Protection Agency.

MYTH: Forest management harms all wildlife.

FACT: Forest management can help wildlife. Forest management creates openings that stimulate the growth of food sources --which is the prime reason why forest species such as elk, deer, turkey and antelope are far more plentiful today than earlier in the century. Sustainable Forestry guidelines promulgated by the American Forest & Paper Association require the promotion of habitat diversity and the conservation of plant and animal populations on members' forest land.

MYTH: More paper recycling will prevent the use of "virgin" wood from harvested trees.

FACT: Even if we could recycle 100% of our used paper, we would still need "virgin" fiber to replace worn-out recycled fiber and meet the increasing demand for paper products. Recycling extends the use of virgin fiber, but it will not replace it. Even so, today well over half of all fiber used in paper products comes from recycled paper and from wood waste from sawmills. Recycled wood is another promising source of fiber.

Forest Tree Planting

U.S.

- Each year Americans plant at least 1.6 billion trees -- or about 6 trees for each one we use. Of this total, forest products companies plant about half, or three-quarters of a billion trees, annually. These figures actually understate the nation's true reforestation rate as they don't include millions of hardwood trees that are not planted because they regrow naturally.
- An average of almost 5,000,000 new trees are planted each day in the U.S.
- Partly as a result of a strong reforestation record, the growth of U.S. forests exceeds the amount harvested by 33% -- confirming that trees are a renewable resource and that we are renewing them.

- There is an important but often overlooked distinction between deforestation and timber harvesting. Developing countries sometimes clear land of trees (deforest) for agriculture, grazing and other uses. But in the U.S., woodlands are typically managed and reforested after harvest so as to grow future forests. We call this sustainable forestry. In fact, the U.S. today has virtually the same number of forested acres it had in 1920 -- despite the enormous increase in population and per capita wood use since then. We are not deforesting the United States. We are voluntarily replacing what we use, and without government regulation.
- Forest products companies own only 14% of all the timberland in the U.S., compared with private individuals who own 59%, and public agencies which own 27%. Yet forest products companies each year plant 43% of all the trees planted in the United States on little more than 1 million acres of industry timberland.
- Each year, some 1.6 billion seedlings are planted in the U.S.--more than 5 new trees a year for each American.
- The forest industry plants more than 43% of the 1.6 billion seedlings are planted annually in the U.S.; 40% are planted by non-industrial private landowners; and 16% by government.
- In 1994 nearly 2.5 million acres were planted with trees in the United States on rural lands of all ownerships. This compares with 2.5 million acres planted in 1992 and 2.4 million acres planted in 1993.
- Of the 2.5 million acres planted to trees in 1994, National Forests accounted for 10% of the total acreage; 43% of the total was planted on forestry industry lands; 42% of non-industrial private lands; and all other ownerships contributed 5% of the total acreage planted.
- In 1994, 1.5 billion nursery tree seedlings were produced in the U.S. The forest industry nurseries produced 49% of these tree seedlings; State and local governments 29%; other industry 15%; and Federal agencies 7%.
- Under the 1956 to 1960 Soil Conservation Reserve Program (Soil Bank), 2.2 million acres of new pine plantations (afforestation) were planted on former cropland nation-wide.
- Under the 1986 to 1992 Conservation Reserve Program (CRP), 2.5 million acres of new pine plantations (afforestation) were planted on former cropland nation-wide.
- In 1995 in the U.S., trees were planted on 2,421,861 acres, timber stand improvement was completed on 3,162,575 acres, and nursery production totaled 1,651,123,000 trees.
- In 1995 in the U.S., of the 2.4 million acres of trees planted, 11.7% was on federal land, 3.7% was on non-federal public land, 42.8% was on forest industry lands, 2.3% was on other industry lands, and 39.5% was on non-industrial private lands.

South

- Each year the South's landowners (industrial and non-industrial) plant approximately 1.2 billion new trees, an average of 3,288,000 trees per day.
- Under the 1956 to 1960 Soil Conservation Reserve Program (Soil Bank) 1.9 million acres of new pine plantations (afforestation) were planted on former cropland in the U.S. South.

- Under the 1986 to 1992 Conservation Reserve Program (CRP) 1.3 million acres of new pine plantations (afforestation) were planted on former cropland in the U.S. Southeast.
- In 1995 in the U.S. South, trees were planted on 1,689,981 acres, or 69.8% of all tree planting in the U.S.

Georgia

- Georgia set a world record for tree planting in 1988 . . . 603,000 regenerated acres.
- Georgia ranked number one in acres of trees planted in the U.S. in 1993 with 284,482 acres planted to trees.
- In 1994 Georgia led the nation in tree planting, with nearly 330,000 acres, 13% of the nation's total.
- In 1995, Georgia planted 287,247 acres of trees, the most of any state in the U.S.; 54% non-industrial private; 45% forest industry.
- Since 1981, Georgians have replanted nearly 5 million acres in trees to ensure that future forests will continue to support our economy and environment in this sustainable use.
- Since 1981, over 650,000 acres of forests in Georgia have been naturally regenerated.
- Reforestation, using improved loblolly and slash pine nursery stock, can improve per acre timber yields by 10 percent or more.
- Georgia has replanted more than 3 billion trees over the past decade.
- Under the 1956 to 1960 Soil Conservation Reserve Program (Soil Bank) 693,499 acres of new pine plantations (afforestation) were planted on former cropland in Georgia.
- Under the 1986 to 1992 Conservation Reserve Program (CRP) 645,931 acres of new pine plantations (afforestation) were planted on former cropland in Georgia.
- According to a 1988 USDA report, after the CRP enrollment, there are still 1.1 million marginal cropland and pasture acres in Georgia that if planted to forest crops would earn higher producer incomes than the current crops and pasture uses.

Forest & Paper Industry

U.S.

- The U.S. forest and paper industry is the world's largest by far, and among the most competitive of basic industries in the U.S.
- The forest industry competes aggressively in a global market, generating a large portion of our net growth from foreign trade. Industry's unit labor costs are lower than Sweden's, Finland's and Canada's -- our major competitors.
- The U.S. forest and paper industry represents 8% of total U.S. manufacturing output, generating annual sales of about \$240 billion.

- The forest and paper industry employs 1.6 million Americans, or 1.2% of the U.S. workforce, with an annual payroll of \$46 billion, ranking among the top 10 manufacturing employers in 46 states.
- The paper industry is the most capital intensive in the nation, spending \$130,000 per employee in plant and equipment - over twice the average of other U.S. manufacturing industries. A new greenfield pulp/paper mill can easily cost upwards of \$1 billion to plan, permit, site and construct.
- The environmental operating costs of producing a ton of pulp, paper and paperboard rose from just \$4 in 1970 to \$22 in 1992 and is still climbing. Even adjusting for inflation, industry is spending about twice as much per unit of production today as twenty years ago.
- The forest industry ranges from state-of-the art paper mills to small family-owned sawmills, small family logging operations, and some 7 million individual woodlot owners.
- For every job created in the U.S. that is directly forest-related, another two jobs are created that are indirectly related. Such jobs are in transportation, distribution, and sales of forest products, and add another 3.8 million jobs to the U.S. economy.
- In the U.S. in 1992, the total value of major agricultural crops and timber harvested was \$111 billion.
- In the U.S. in 1992, timber harvested totaled almost \$24 billion, or over 21% of the total value of agricultural crops and timber.
- In 1992, timber products composed the largest portion of total agricultural crop value in the U.S. Valued at \$23.8 billion, roundwood forest products topped corn (\$19.7 billion) and soybeans (\$16.7 billion) as the leading agricultural commodity.
- Nationally, timber is the single highest-valued crop produced in the U.S., exceeding even corn and wheat.
- Residential construction stimulates the economy directly by generating jobs, wages and tax revenues and indirectly as the demand for goods and services created by the construction of new homes "ripples" through the economy.
- Impact of Single-Family Home Construction: The construction of 1,000 single-family homes generates 2,448 full-time jobs in construction and construction-related industries; \$75.5 million in wages; and \$37 million in combined federal, state and local revenues and fees.
- Impact of Multifamily Home Construction: The construction of 1,000 multifamily housing units generates 1,030 full-time jobs in construction and construction-related industries; \$32 million in wages; and \$15.8 million in combined federal, state and local tax revenues and fees.
- Essential oils from forest trees are at the core of the \$10 billion U.S. food flavoring and cosmetic industry.
- Essential oils from forest trees are used in a host of everyday products such as chewing gum, cosmetics, confections, soft drinks, dentifrice products, soaps, fragrances, detergents, disinfectants, medicines, shoe polish, insect repellents, and many others.

- Market sales for briquette charcoal totaled \$434 million in 1987.
- There are some 700 commercial applications for activated charcoal. One ounce has a surface area equivalent to 6 football fields.

South

- The impact of forestry and forest products industries on the Southern economy in 1994 was in excess of \$90 billion.
- In each of the 13 Southern states, composed of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, the forest industry ranks in the top 10 among manufacturing industries in employment and payroll income.
- The South's forest products manufacturing firms directly employ more than 660,000 people, generating an annual payroll in excess of \$14.5 billion.
- In 1993 there were 102 pulpmills operating in the U.S. South.
- In the U.S. Southeast, composed of Alabama, Georgia, North Carolina, South Carolina, and Virginia, the forest industry in 1992 included more than 1,144 primary and 7,056 secondary manufacturers of wood products, provided jobs to nearly 350,000 employees, and had an annual payroll in excess of \$6.7 billion.
- In the U.S. Southeast, from 1969 to 1992, the number of primary wood product manufacturers has dropped by more than half, while receipts have increased more than 68%.
- In the U.S. Southeast, from 1989 to 1992, the total number of sawmills declined from 975 to 910, while total volume of sawlogs received at sawmills increased 6% to 1.5 billion cubic feet, or 41% of total wood received.
- In the U.S. Southeast from 1989 to 1992, the volume of softwood sawlogs received increased 12% to 1.2 billion cubic feet, while volume of hardwood sawlogs decreased 11% to 311 million cubic feet.
- In the U.S. Southeast, yellow pine accounted for 96% of sawlog volumes in 1992.
- In the U.S. Southeast, the number of pulpmills remained constant, at 48, from 1989 to 1992, while the number of veneer mills dropped from 80 to 71, composite mills remained constant at 11, and the number of other forest product industrial mills rose from 96 to 104.
- In the U.S. Southeast, of forest industry wood residues (coarse wood 40%, bark 31%, sawdust 22%, and shavings 7%) totaling 1.3 billion cubic feet in 1992, 48% was used for industrial fuel, 32% for fiber products, 6% for particleboard/panels, 2% for sawn products, 11% for miscellaneous products, and only 1% of wood residues was not used.

Georgia

- In the manufacturing sector of the Georgia economy, forest industry ranks number one in employment, output, and value added.
- In relation to all manufacturing in Georgia, forest industries in 1990 employed 23% of the workforce. This is one of almost every four manufacturing workers, the number one employer in manufacturing.

- Of 305,256 manufacturing workers in Georgia, forest industry (wood and paper processing) employs 69,292 workers directly.
- With a type 2 employment multiplier of 2.5443 in Georgia, the wood and paper processing sector directly and indirectly employs 176,300 workers in a total Georgia economy employing 3.7 million workers.
- In Georgia, one in every five forest products manufacturing jobs is located in the Metropolitan Atlanta Area.
- In Georgia, forestry related employment is almost 2 percent of total Georgia employment. In the U.S. forestry related employment is 1.2 percent of total U.S. employment.
- In Georgia, forestry related earnings are 2.4 percent of total state earnings. In the U.S. forestry related earnings are 1.4 percent of total U.S. earnings.
- In relation to all manufacturing in Georgia, forest industries in 1990 produced 24% of output. This is \$1 of almost each \$4 of output added to the Georgia economy by manufacturing. Wood and paper processing is the number one output producing manufacturing sector in the Georgia economy.
- Of total Georgia manufacturing output of \$45 billion, forest industry (wood and paper processing sector) produced \$11 billion directly in 1992, or 24%.
- With a type 2 output multiplier of 1.7092 in Georgia, the wood and paper processing sector directly and indirectly produced almost \$19 billion in output in a total Georgia economy with \$243 billion in output in 1990.
- In relation to all manufacturing in Georgia, forest industries in 1990 earned a value-added performance of 22% of the group's total. This is \$1 of each \$4.50 of value added to the Georgia economy by manufacturing. Wood and paper processing is the number one earning value added manufacturing sector in the Georgia economy.
- Of \$16 billion manufacturing value added in Georgia, forest industry (wood and paper processing) earned \$3.5 billion in value added directly.
- With a type 2 value-added multiplier of 2.2335 in Georgia, the wood and paper processing sector directly and indirectly earns \$8 billion in value added in a total Georgia economy with \$136 billion in value added.
- In Georgia in 1994, the total value of major agricultural crops and timber harvested was \$2.9 billion.
- In Georgia in 1994, timber harvested totaled almost 30% of the total value of agricultural crops and timber.
- Timber is the highest valued crop in Georgia, followed by peanuts, cotton, and vegetables.
- In Georgia, there are over 1,600 wood using industries.
- For every dollar Georgia forest landowners receive, \$15 is generated in the state's economy.

- In Georgia, in 1994, \$13,854,467 was collected in county ad valorem taxes from timber at harvest or at sale for harvest.
- Georgia's 13 pulp/paper mills produce more pulp and/or paper than any other state, and they are served by as many as 190 pulpwood yards.
- In 1993, Georgia had four particleboard plants, four oriented strandboard (OSB) plants, and 16 facilities producing veneer and/or plywood. Two mills produce laminated veneer lumber (LVL), one makes laminated beams (GLULAM) and one produces parallel strand lumber (ParallamTM).
- So far as solid/sawn lumber is concerned, Georgia has 164 sawmills listed, although a good many are very small operations with fewer than 10 employees.
- In Georgia, approximately half the Southern pine lumber produced in the state is treated with preservatives, and there are 48 companies listed that apply preservatives to wood.
- Georgia has 12 companies listed as producing untreated posts and/or poles, which are also treated with preservatives, and nine manufacturers produce log homes.
- Georgia manages its "waste" wood wisely. So far as products formerly considered "waste" is concerned, 18 mills produce bark products, six make shavings for animal bedding or litter, three still produce pine "gum" products and 24 list firewood as a product.
- In Georgia, other manufacturers provide specialized support services that add value to primary products, such as 22 lumber resawers/remanufacturers, eight custom kiln dryers and 26 planer mills.
- In Georgia, many companies process wood into more nearly finished products. Some of which include nine log home manufacturers, 92 box and pallet producers, 24 that produce wood flooring, seven making wood fencing, and 53 fabricating wooden roof and floor trusses.
- The largest category of wood using industries in Georgia consists of the cabinet and millwork manufacturers. There are 654 of them listed in the survey, along with another 106 listed as manufacturing furniture and furniture parts.
- There are wood-using manufacturing plants in Georgia whose products may be considered unique or unusual. For instance, seven businesses are indicated as manufacturing boats or boat accessories, three make brooms, one makes car bodies, five create truck beds/bodies, one produces buggies and one builds caskets. Another business manufactures excelsior products, another one builds hand trucks, one other makes saddle parts, yet another fabricates handles of various sorts, 29 make wooden signs, five make playground equipment, one puts together overhead doors and two others make artificial limbs. Finally, nine plants are involved in the manufacture of mobile homes or parts of them, and 42 are listed as making modular-prefab homes or campers.

Paper Manufacturing

U.S.

- Each year, paper is used to publish more than two million books, 350 million magazines, and 245 billion newspapers in the United States.
- Americans use more than 90 million short tons of paper and paperboard each year.
- The U.S. paper industry has reduced its air pollution emissions by removing 97% of particulate matter generated during manufacturing. Sulphur compounds emissions -- the chief cause of nuisance odor in mill communities -- have been reduced by 90% since 1968.
- It takes far less water to make paper today than it once did - 70% less than that used in 1959.
- Under EPA's voluntary pollution prevention program called "33/50" forest industry met the goal of 50% reduction in the use of 17 chemicals by 1993 -- two years ahead of EPA's timetable.
- From 1988 - 1993, forest industry spent about \$1 billion each year on environmental improvements -- almost 20% of its total capital available for investment.
- Since 1988, forest industry has reduced dioxin from pulp bleaching by 94%.
- Forest industry's environmental research expenditures totaled almost \$290 billion in the decade 1984 - 1994.
- Today, forest industry self-generates 57% of its total energy needs, up from 36% in 1972. Over the past two decades the amount of fossil fuel required to produce a ton of paper has been reduced by 38%.
- Since 1979, forest industry's dependence on landfills and lagoons for disposal of manufacturing wastes has decreased by 16%, thanks to technology changes that allows the burning of waste and provides additional energy.

Georgia

- Thirteen pulp/paper mills in Georgia process solid wood and/or wood chips into pulp or into pulp and paper.
- Twelve other Georgia mills produce paper and/or paper products from recycled paper and/or preprocessed pulp.
- To make one ton of bleached kraft pulp requires approximately $1\frac{3}{4}$ cords of pine pulpwood.
- Most Georgia pulpmills are using hardwood as well as softwood pulpwood as their raw material. Some mills use as little as 10% hardwood, and others as much as 50% hardwood.
- In 1995, Georgia solid-wood processing pulp/paper mills had the capacity to produce over 20,000 tons of pulp per day. That equates to approximately 35,000 cords, or about 192 million pounds of pulpwood per day, or $8\frac{3}{4}$ million cord equivalents pulpwood per year.

- Georgia timberlands produced approximately 7 million cords of softwood and hardwood roundwood pulpwood in 1994. In addition, approximately 2 ³/₄ million cord equivalents of wood residues for pulp manufacture were also produced in 1994.

Paper Recycling

- Americans recover for reuse a third of all the paper recovered in the world. This volume, exceeding 40 million tons, enables U.S. papermakers to recycle enough paper each year to fill a 15-mile-long train of boxcars, an average of 297 pounds per person.
- In 1993, more paper was recovered for recycling than was sent to landfills.
- In 1994, more paper was recovered in the United States for recycling than went to landfills, saving more than 90 million cubic yards of landfill space. Americans now recover 40% of all paper used in the United States, and the paper industry has set a goal to recover - for recycling and reuse - half of all paper Americans use by the year 2000.
- The U.S. paper industry is a leader in America's recycling effort. The U.S. recovery rate for 1995 was 44%, up from 40% in 1994.
- By 2000, twice as much paper will be recovered as landfilled in the U.S. By 2000, recovered paper will supply 40% of all fiber used to make paper and paperboard products -- up from 25% in 1988.
- Over the past two decades, the paper industry has reduced its energy consumption and use of fossil fuel by 60%
- More than half of all newspapers are now recycled to make new paper products.
- As recently as 1985, only five mills in North America produced newsprint with recovered content; today there are 35. Approximately 70% of all corrugated paper material is recovered for recycling.
- Paper recycling efforts extend beyond fiber to chemical wastes recovered in the manufacturing process. Today, pulp and paper mills recover about 98% of all chemicals used to produce pulp from wood chips. These wastes are burned for fuel or used in surprising new ways, e.g. as fertilizers for agriculture or as components in chemical products such as ethanol.
- Trees are a renewable resource, and forest products are recyclable and biodegradable. In 1993, 13.6 million tons of wood were recovered for recycling and reuse in products ranging from particleboard to paper to garden mulch.
- Every ton of paper recovered for recycling saves 3.3 cubic yards of landfill space.

Demand for Pulpwood, Paper, Paperboard and Structural Panels

U.S.

- Over the next five decades, the consumption of paper and paperboard will grow more rapidly than any category of forest products, about 1.2 percent per year.

- Consumption of roundwood in the manufacture of paper and paperboard will rise about 0.7 percent per year.
- Pulpwood and paper real prices are projected to be relatively flat over the next five decades with increases slightly above general inflation.
- By 2040, pulpwood demand for softwoods is expected to rise to twice that for hardwood pulpwood.
- Uncertainties in the projections of roundwood use for pulpwood, paper, paperboard and structural panels are the result of such things as rates of wastepaper recycling and use.
- In the longer-term, growing utilization of recycled wastepaper in the production of paper and paperboard is expected. This will reduce growth in demand for softwood pulpwood, particularly in the South, allowing expanded harvest for solidwood products as pulpwood stands increase to sawtimber size.
- Structural panel prices will be stable in the longer-term because of competition between plywood and oriented strandboard and waferboard, and nearly constant fiber costs for board products. Oriented strandboard and waferboard absorb essentially all of the growth for this class of product.

Demand for Sawtimber, Solidwood Products

U.S.

- Real prices of softwood lumber and softwood sawtimber are expected to rise steadily from current levels until 2010 to 2015, then stabilize or fall in subsequent periods.
- There is expected to be a reduction in harvests of timber from public lands in all U.S. regions, but particularly in the West.
- There is a limited ability of private timber owners in the West to sustain increased harvest due to limited merchantable growing inventories.
- Lumber demand in 1995 again reached earlier high levels of 1987 and is expected to remain at this level until 2040.
- Maturation of young-growth forests on both industrial and non-industrial lands in the South is expected to lead to increases in softwood timber cuts, until 2040.
- Price increases in solidwood products and sawtimber until 2010 appear to be nearly inevitable, unless there is some major reduction in timber demand, as might occur with increasing substitution of competing products for solidwood products, or with higher levels of recycling.
- The South will be the major source of any expansion in softwood timber supply for the next 50 years. If high planting rates in the South continue as expected, real product and timber prices will stabilize, and in some cases decline, after 2020.
- Rising real prices for hardwood lumber are caused by declining inventory trends which, in turn, result from land conversion to softwoods, limited intensity of hardwood silviculture, and large increases in demands for pulpwood until 2040.

Forestry Imports and Exports

- In 1994, American forest products companies exported goods worth more than \$18 billion including over \$11 billion worth of paper products and over \$7 billion worth of wood products.
- More wood products are exported from the U.S. to Canada than to any other country.
- The U.S. is a major importer of paper and wood products. In 1994 imports totaled \$21 billion with paper products over \$11 billion and wood products over \$9 billion.
- Increased lumber imports are expected from Canada in the long-term. By 2040, the U.S. will remain a net forest products importer, but the gap between imports and exports, on a volume basis will decline.
- Through the 1990s, the world demand for wood fiber imports is expected to grow in the U.S. Atlantic and Pacific regions because of pulp and paper expansions in areas with projected declining supplies and rising costs of wood.
- Further into the future (beyond the year 2000), international wood trade is expected to level off and eventually decline, due to increasing pulping capacity in wood producing regions of the world and because of more joint ownership of this capacity by producers which formerly imported raw wood.
- World trade in wood fiber has grown more than 300 percent since 1960, which represents a compounded annual growth rate of about five percent. In 1990, international wood fiber trade totaled 53 million cubic meters.

Georgia

- Eleven percent of Georgia's forest products are sold to foreign markets.
- In 1995 all Georgia exports totaled \$12,400,489,703. Of this amount: paper and allied products = \$1,878,469,187; lumber and wood products = \$75,842,189; furniture and fixtures = \$35,167,842; and roundwood products = \$2,368,948.
- In 1995 Georgia forestry-related exports were 16.1% of total exports from the state.
- In 1995, of Georgia's total \$75,842,189 in lumber and wood products exports, the most, \$15,709,000, went to Japan. The second largest in lumber and wood products exports, \$12,730,000, went to Canada, and a distant third, \$5,845,000, went to China (Taiwan).
- The Georgia Ports Authority handled 9,519,942 tons of cargo in 1995. Of this amount, forest products play a major role with: 801,359 tons of woodpulp; 305,715 tons of linerboard; 33,196 tons of plywood; and, 16,666 tons of poles.
- In 1995 forestry-related tonnage of cargo handled by the Georgia Ports Authority was 12.1% of the Ports' total tonnage handled.

General Agreement on Tariffs and Trade (GATT)

- The General Agreement on Tariffs and Trade (GATT) is a multilateral agreement governing international trade that is global in scope. The fundamental goal is to foster economic growth. The agreement will cut tariffs worldwide by one-third over a 10-year period.
- The World Trade Organization (WTO) was created to administer the agreement and oversee dispute resolution arising from the General Agreement on Tariffs and Trade.
- U.S. tariffs are low on most forest products and global reductions on tariffs should generally benefit the U.S. forest products industry.

North American Free Trade Agreement (NAFTA)

- The North American Free Trade Agreement (NAFTA) essentially improves and expands the U.S.-Canada Free Trade Agreement (CAFTA) of 1988.
- As the new member of the North American Free Trade Agreement, Mexico agrees to implement the trade and investment liberalization accords agreed on in 1988 by the U.S. and Canada.
- NAFTA's central objective is to eliminate import duties on all goods that originate in North America. Duties on many goods were eliminated on NAFTA implementation in 1994. Duties on other goods will be phased out over 5-, 10-, and 15-year periods.
- With NAFTA, Mexico is expected to enjoy the biggest relative economic boost, a 2 to 5 percent increase in gross domestic product (GDP). The U.S. will gain approximately 0.1 percent of GDP. Canada is not expected to realize gains beyond the U.S.-Canada Free Trade Agreement (CAFTA). Canada is the U.S.'s major source of wood and paper imports and is a major export market for the U.S. U.S. forest products trade with Mexico is minor. NAFTA is likely to generate little change in U.S.-Canada forest products trade. However, it should generate significant increases in U.S. wood and paper exports to Mexico, as the Mexican economy improves.

Wood's Advantage

- Steel requires three times as much energy as its wood counterpart to extract, manufacture, transport, and construct.
- The energy efficiency of forests extends to forest products. For example, aluminum framing requires 20 times as much energy to produce as wooden wall studs, steel studs require almost nine times more. In general, products made from steel, glass, plastic, cement, or brick require approximately 24, 14, 6, and 4.5 times more energy, respectively, than does wood to make a final product.
- Carbon dioxide emissions, which contribute to global warming, are three times higher for steel than for a comparable quantity of wood.

- While wood accounts for 46 percent of industrial raw materials (by weight) worldwide, it uses only 4 percent of the energy required to process raw materials into useful products.
- Air pollution emissions--such as sulphur dioxide, nitrous oxides, methane, particulate and volatile organic compounds--are significantly higher for steel than for wood.
- The steel wall requires 25 times more water than the wood wall, primarily at the manufacturing stage, and steel manufacturing also has a greater impact on the quality of the waste water during manufacture.
- In-use building materials have an impact on the environment, mainly because the choice of building materials will significantly affect the energy requirements for heating and cooling. Wood framing in a wall is a relatively good thermal insulator compared to steel framing, which is a good conductor of heat and acts as a thermal bridge. A steel-framed 2 by 4 wall with R-12 fiberglass bats has an overall R-value of only 6 to 6.85, while a wood 2 by 4 wall has an overall R-value of about 10.9.
- Wood is the only building material derived from a renewable resource. It is considered an agricultural crop that is harvested and replanted in a continually regenerating cycle while nonrenewable resources such as iron ore are mined on a permanently depleting basis.
- A 1976 study by the National Research Council committee on Renewable Resources concluded that producing 1 Ton of steel requires 50.3 million BTU oil equivalent, compared to 2.9 million BTU oil equivalent for 1 Ton of softwood lumber.
- A 1991 U.S. EPA listing of toxic substances released and transferred in the manufacturing process, indicated primary metals at 757 million pounds, fabricated metals at 103 million pounds, plastics at 195 million pounds, petroleum at 103 million pounds and wood at 38 million pounds.
- Trees are a renewable resource. Forest products are also recyclable and biodegradable.
- Most wood substitute materials come from non-renewable resources--petrochemicals used in plastics and ores used for aluminum, iron, etc.
- We sometimes forget that wood is naturally reusable, recyclable and biodegradable. It is the best insulator of all structural building materials, thus conserving finite fossil fuels and coal by requiring less energy to heat and cool a home built with wood.
- One mature tree absorbs approximately 13 pounds of carbon dioxide per year.
- For every ton of wood a forest grows, it removes 1.47 tons of carbon dioxide and produces 1.07 tons of oxygen.
- Three well-placed mature trees around a house can cut air-conditioning costs by 10 to 50%.
- Trees and other plant landscaping can increase property values by 5 to 10%.
- The average American each year uses the equivalent of one tree, 100 feet tall, 16 inches in diameter to fulfill wood and paper needs.
- On average, it takes 60 years to grow a 100 foot tall tree.

- In 60 years a tree moves about 5 million pounds, or 660,000 gallons, of water from the soil into the air.
- The average 1,800 sq. ft. house requires about 39.5 trees to build.
- Ounce for ounce, wood is the strongest structural material commonly used in building.
- Under typical conditions, a 20 foot long piece of lumber will change in length only .09 inches during a year from heat or humidity.
- A hardwood floor over a wood subfloor (approx. 1 ½ inches thick) provides thermal insulation equal to 22 inches of concrete floor.
- Basswood, a very light weight native wood, weighs about 26 lbs. per cu. ft. when moderately dry, whereas live oak, at the same moisture content weighs about 62 lbs. per cu. ft. and will barely float.
- All wood contains some water in common use, since dry wood can even absorb moisture from air surrounding it. Wood in a living tree contains much more water than wood in use. Typically, there is nearly as much water by weight in a tree as there is wood material. A giant redwood contains enough water to fill a backyard swimming pool.
- There is no such thing as “dry rot”. Wood will not decay if kept dry. However, there are some decay fungi that can transport water great distances through root-like structures and destroy wood even when it is not near a source of water.
- "Plastics" can be made from wood fibers which are dissolved and then formed into molded articles, thin sheets or fibers such as rayon.
- Sugar, grain alcohol, wood alcohol, and burnable gas can be made from wood.
- Many paint products are made from chemicals produced by pine trees.
- No wood is naturally immune indefinitely to decay, regardless of exposure conditions. Sapwood of nearly all trees has very little resistance to decay when exposed to suitable conditions, although some heartwood of certain species will resist attack by decay fungi for long periods.
- Large wooden beams are more resistant to collapse during a fire than uninsulated steel beams of similar strength. A layer of char forms on wooden beams which insulates the inside, greatly slowing strength reduction. Steel beams conduct heat rapidly throughout, losing much strength quickly.
- All woods have approximately the same fuel value, in Btu per lb. Woods like hickory and oak have more fuel value per stick, because they are heavier (contain more woody material per cu. ft.).
- Tree "sap" is the water (and a few nutrients it brings in from the soil) that is conducted up from roots to leaves.
- Trees grown under similar conditions of temperature, humidity and soil moisture availability, all have the same basic characteristics. “Northern hardwoods” are not different from “Southern hardwoods” because of geographic location, but because of conditions of growth.

- A tree grows taller by expanding upward at its tip; not by "pulling up out of the ground". That means, a branch produced at 10 feet above the ground will remain at 10 feet throughout the life of a tree.
- The age of a piece of wood cannot be determined just by looking at it. The number of years that it took to produce the piece can be approximated by counting growth rings showing on the end, but the total age of the tree from which it came and the time since cutting cannot be determined this way.
- Insects that attack wood can attack nearly any kind of sapwood, but certain insects "fit" certain woods better. For instance, one species of beetle (*Lyctus* powder post beetles) attack hardwoods with large cells (ring-porous hardwoods) like oak and ash almost exclusively.
- Southern pine lumber produced today is not necessarily inferior to lumber cut 50-100 years ago. Because of demand for lumber and consequent high production, average log size has decreased at Southern pine mills. Also, average growth rate (ring width) of plantation-grown pine trees is often greater than trees naturally regenerated long ago. Faster growth means less uniformity but does not necessarily make lower-quality construction lumber. Strength and other properties of modern lumber is usually equal to that of older lumber of similar size. In fact, better control of lumber grading probably means consumers have a greater chance of getting lumber appropriate for a particular use than ever before.
- Low temperature does not reduce the strength of wood. Although very wet lumber may crack open as the water in it freezes, low temperature alone does not weaken wood.
- To the industry, "old growth" timber means the latest growth of timber before we started to utilize the trees extensively for man's benefit; not trees left from prehistoric times. There are no living "prehistoric" trees, although a very few living trees are some 3,500 to 5,000 years old
- Most "old growth" trees on the U.S. West coast (redwoods) are 500 to 800 years old, while "old growth" trees in the state of Georgia would more likely be 400 year-old live oaks or longleaf pines in coastal areas.
- Since "tree farmers" do not plow, plant, fertilize, cultivate and harvest timber on a frequent, regular basis, but instead manage timbered environments for the production of many renewable natural resources, they should be called "timber conservationists".
- **One cord of wood** can produce:

942 one-pound books; or,	61,370 No. 10 (standard size) envelopes; or,
460,000 personal checks; or,	89,870 sheets of letter head bond paper; or,
1,200 copies of National Geographic; or,	12 eight-seater dining room tables; or,
4000 one-gallon paper milk cartons	
- **Twenty cords** \cong 10,000 board feet is sufficient for building an 1,800 square foot house.
- **Solid wood** is used to produce: lumber, flooring, wall paneling, posts, poles, piling to support buildings and bridges, barrels, tubs, shakes/shingles, charcoal, excelsior, pallets, fuelwood, railroad ties, poles, mine timbers, furniture, molding, picture frames, measuring rulers, lumber-drying spacers (stickers), scaffold boards, roof and floor trusses, window and door frames, spring supports for some vibrating conveyors, center spars for some helicopter rotors, rowboats, canoes, sailboats, motorboats, saddle parts, mobile homes/campers, some automobile bodies (e.g. the English-made Morgan Plus 4), horse-pulled

wagons and buggies, coffins, animal cages, packing cases, wire reels, axles for various rolled products, walking canes, crutches, hiking staffs, tool handles

- **Composite wood products** include: veneer, plywood, decorative paneling, insulation board, hardboard (Masonite), medium-density fiberboard (MDF), particle board, oriented strand board (OSB), laminated veneer lumber (LVL), parallel strand lumber (PSL and Parallam), veneer or plywood/particle board lumber and panels (COM-PLY), acoustic panels, fire-retardant excelsior-cement board panels, plywood/expanded-foam construction panels, plywood/expanded-paper-core doors, wood I-beams, laminated beams, scaffold boards
- **Dimensionally stabilized wood products** are used where stability is necessary but other wood properties are desirable: Impreg (for fabrication of metal dies), Compreg (for tooling jigs, bobbins, for textile looms, cutlery handles, novelties)
- **Paper products** from wood fibers include containers and sheet goods such as: corrugated containers (cardboard boxes), milk cartons, food container boxes, newsprint, writing paper, magazines, books, paper bags, punch cards, electrical insulation, file folders, sheathing papers for construction, roofing felts, felts for asphalt tile, toilet paper, paper towels, napkins, disposable clothes, catalogs, wallpaper, computer paper, adding machine/cash register paper, shipping tubes, drums and cans, egg crates, cigarette papers, bandages, thermal insulation, photographic slide holders
- **Other wood-pulp and cellulose products** are made into plastics and used in many different capacities such as: rayon textile, furfural (a component of nylon), toys, lamp shades, vacuum cleaner parts, combs, housewares, telephones, portable radio cases, pipe and tubing, tool handles, electrical insulation components, car hardware, glasses frames, fabric coatings
- **Other cellulose products** from trees include: photographic film, smokeless gunpowder, formic acid, levulinic acid, sorbitol, propylene and ethylene glycols, glycerine, proteins, vitamins
- **Tree-produced chemicals** are used for many varied products too such as: paint solvents, odorants, bactericides, pine oils, insecticides, adhesives, flavorings (such as lemon, lime, peppermint, spearmint, nutmeg, lilac, violet, lily of the valley, rose), fabric treatments, inks, soaps, detergents, hard-floor coverings, paper sizing (slick-paper coatings), chewing gum, rosin bags, violin-bow rosin, drilling-mud thinners, leather-tanning agents, water-treatment chemicals, ethyl alcohol for disinfectant/sterilization and beverages, gasohol, synthetic rubber, Torula yeast, vanillin (vanilla flavoring) dimethyl-sulfide and dimethyl sulfoxide (industrial and pharmaceutical solvents), acetic acid, activated charcoal (for especially effective filtering), molasses for animal feeds, artificial sweeteners, resin for mounting optical lenses and microscopic slides, flypaper, ointments and salves, porous plaster, maple syrup, dyes, taxol (anti-cancer drug)
- Tree-produced **nuts and fruits** are healthy foods, such as: pecans, walnuts, butternuts, beechnuts, pinyon pine nuts, chestnuts, apples, oranges, limes, lemons, grapefruit, peaches, plums, apricots, pears, figs, persimmons, cherries
- **Decorative tree parts** for special occasions include: pine cones, spruce cones, hemlock cones, Douglas fir cones, Deodara cedar cone parts (wood roses), tree boughs
- **Wood substrate for various miscellaneous products** such as: Shitake mushrooms, decorative mistletoe

- **Miscellaneous wood-based products** such as: animal bedding, mulch, decorative jewelry, jewelry boxes, novelty souvenirs, letter openers, writing pens, pencils, toys, models (planes, boats, cars, etc.)

Wood for Energy:

- The use of wood for energy is projected to reach between 2.8 and 3 quadrillion BTU's by the year 2000.
- In the U.S., the forest products industries themselves are the major users of wood for fuel, accounting for 69 percent of wood fuel consumed in 1992. Residential use, utilities, and other industries consume the remaining 31 percent.
- Production of liquid fuels from woody biomass is not economical at this time, but research is being conducted to lower costs.
- USDA Forest Service projects estimated wood-energy use to increase from a base of 2.67 quads (quadrillion BTU's) in 1986 to about 3 quads in 2000, 3.35 quads in 2020, 3.5 in 2030, and 3.7 quads in 2040.
- In 1993, wood and wood waste used as fuel accounted for 97 percent of nonelectric renewable energy consumption, excluding ethanol. Nonelectric uses include steam production for industry and heat for residential dwellings.
- Wood for non-electrical fuel uses is expected to increase from 2.09 quads (quadrillion BTU's) in 1993 to 2.61 quads in 2010, an annual growth rate of 1.3 percent in about 17 years.
- For electrical power generation, the Department of Energy (DOE) projects wood use at approximately 0.5 quad (quadrillion BTU's) in 2000 and about 3 quads in 2030, assuming that wood comprises more than half the energy derived from forest and agricultural residues and municipal solid waste.
- Lumber mills and other primary processing industries use mill residues--such as log trimmings, sawdust, and bark--for 18% of industrial wood energy use.
- Regional differences in wood energy use are due to the location of wood resources and wood-consuming industries. The South has the largest share of consumption, followed by the West, the Northeast, and the Midwest.
- Methanol or wood alcohol is the first and most common liquid fuel that can be produced from wood. A number of other possible fuels or fuel additives can be produced from wood, including diesel fuel, methyl tertiary butyl ether, ethyl tertiary butyl ether, isopropyl alcohol, sec-butyl alcohol, tertiary butyl alcohol, and tert-amylmethyl ether.
- With practices similar to modern agriculture, plantations of high-yield, fast-growing trees could produce up to 10 tons of biomass per acre per year. The establishment of such plantations on a large scale could provide a steady source of renewable fuel for cogeneration power plants to produce electricity and steam or as a raw material for chemical or alcohol production.

Trees and people

- Trees supply oxygen in the air we need to breathe and keep our air supply fresh by absorbing carbon dioxide.
- Trees lower air temperatures by evaporating water from their leaves.
- Trees cut down on noise pollution by acting as sound barriers. A 1970 study found a 6 to 8 decibel reduction in noise per 100 feet of forest cover.
- Trees provide shade and shelter, reducing yearly heating and cooling costs in the U.S. by \$2.1 billion.
- Tree roots stabilize the soil and prevent soil erosion.
- Ornamental trees may need pruning, fertilizing, and watering in order to thrive.
- A tree doesn't reach its most productive stage of carbon storage until about ten years of age, and many urban trees don't survive that long. The average tree in metropolitan areas survives only about 8 years!
- An acre of trees is expected to grow 4,000 pounds of wood per year, consuming 5,800 pounds of carbon dioxide and releasing 4,280 pounds of oxygen. Old, slow growing forests can consume more oxygen than they produce but young, vigorous forests tend to be the most efficient at absorbing carbon dioxide and producing oxygen.
- One million acres of forest are lost to city growth in the U.S. each year.
- Of every four city trees that die or are removed, only one is replaced.
- In one year, a single average sized tree can absorb as much carbon from the atmosphere as is produced by a car driven 26,000 miles.
- To store the carbon a person is responsible for producing in a lifetime, 45 seedling trees should be planted.
- When a tree dies, it releases its stored carbon back into the air. The death and rotting of one 70-year-old tree would return over 3 tons of carbon to the atmosphere.
- U.S. forests remove about 9% of the nation's total carbon dioxide emissions.
- Since 1990, the forest industry spends approximately \$1 billion a year - about one of every five dollars earned - on environmental improvements and has committed itself to a major long-term research initiative with the U.S. Department of Energy to ensure continued productivity and environmental improvements into the next century.

- Approximately 800 million tons of carbon are currently stored in U.S. urban forests, with an annual increase of 6.5 million tons. With the next-best alternative control cost of \$25 per ton, the carbon-storing capacity of U.S. urban forests exceeds \$22 billion.
- Trees reduce smog by absorbing smog-forming pollutants, such as ozone (O₃), and lowering ambient temperatures.
- A 1984 study of shade tree benefits showed lowered building temperatures in tree shade meant a comparative decrease in summer building energy use of up to 22% per square foot of air conditioned floor space.
- A 1988 tree shade study of homes in Tucson and Miami showed that reductions in annual cooling energy use from dense tree shade were directly estimated to save \$249 and \$235 per home, respectively, with west wall shade providing the greatest savings.
- A 1985 shade tree study found that street trees located on the south side of conventional homes could annually save \$60 in Palm Springs in cooling costs and \$16 in Sacramento, compared to homes with no trees.
- A 1989 study showed tree shading of air conditioner units can increase air conditioner efficiency up to 10%.
- A 1985 study in Pennsylvania found conifer windbreaks reduced winter wind speed by 50% and saved 6.6% of heating energy for mobile homes.
- Hardwood tree canopies intercept and evaporate 7% of winter precipitation and conifers about 18 to 25%. Together, hardwood and conifer canopies intercept 15 to 20% of growing season rainfall.
- Soil erosion of forested lands averages about 50 tons per square mile per year. Areas under development can reach soil erosion losses of 25,000 to 50,000 tons per square mile per year, or 500 to 1,000 years worth of “normal” forest land erosion per year.
- A 1980 study of home value in a Connecticut town showed that 6% of total property value, or \$2,686 per home, was due to tree cover.
- A 1987 study of home value in Athens, Georgia found the average house sold for 3.5 to 4.5% more for having 5 trees in the front yard, with pines adding about \$275 each, hardwoods \$333 each, and large trees \$336 each.

Aquaculture

- The 1995 farm value of Georgia’s aquaculture industry was over \$26 million.
- There are over 6,000 acres of catfish ponds in Georgia with a production farm value of \$14 million.
- Other aquaculture species produced in Georgia include: ornamental fish, bait fish, alligators, crawfish, rainbow trout, hybrid striped bass, grass carp, largemouth bass, and various species of bream.

- Georgians consume about 258.5 million pounds of seafood annually.
- Over one-half the recreational fishing in Georgia occurs on privately owned ponds and lakes.
- There are approximately 100,000 privately owned ponds and lakes in Georgia. This represents about 260,000 acres of impounded water.
- In 1991, there were 1.1 million state residents and nonresidents, 16 years and older, who went sportfishing in Georgia. Of this total, 906,000 were state residents and 200,000 came from out-of-state. Resident anglers spent \$535 million in 1991 for fishing.
- Fishing on U.S. National Forest lands generated \$1.8 billion in retail sales, \$5.1 billion in total multiplier effects, \$1.3 billion in salaries and wages, and 64,865 jobs annually in 1994.
- Fishing on U.S. National Forest lands provided \$82.2 million in state sales tax revenues, \$17.3 million in state income tax revenues, and \$160.3 million in federal income tax revenues in 1994.
- Over the next 50 years, until 2040, cold water fishing is expected to increase 100%, while warm water fishing is expected to increase 50%, from 1989 levels.

Wildlife and recreation

- Over the next 50 years, until 2040, migratory water fowl hunting in the U.S. is expected to increase 50%, while non-consumptive wildlife use is expected to increase over 100%, from 1989 levels. Maintenance of the status quo, or small decreases, are predicted for big and small game hunting over the same period.
- Trees provide food and shelter for wildlife.
- Nearly 34 million people 16 years old and older annually participate in wildlife-associated recreation in the 13 Southern states.
- Since 1955, in the South, the number of licensed anglers and hunters has more than doubled to more than 23 million.
- Forest products companies employ more than 90 wildlife scientists and have spent over \$100 million in the past decade to improve forest habitat for wildlife. Wildlife conservation programs have been initiated on commercial timberlands in every region of the country.
- American's forest products companies have donated more than 1 million acres of land - valued at over \$400 million - for conservation, recreation, or social causes.
- Over the past decade, forest products companies have spent more than \$100 million on wildlife and environmental research.
- As a result of careful forest management, the white-tail deer population has grown from 4.5 million to over 16 million in the past 30 years; wild turkeys have gone from near extinction to more than 4 million today.

- In the 1970's, scientists knew of only 200 pairs of Northern Spotted Owls. There are now more than 3,510 owl pairs.
- The Nature Conservancy now owns or controls some 760 square miles of forested mountains, bogs, riverbanks and old growth stands in 28 states.
- Big game hunting on National Forest lands generated \$438 million in retail sales, \$1.2 billion in total multiplier effects, \$315 million in salaries and wages, and 13,323 jobs annually for the U.S. economy in 1994.
- Big game hunting in the U.S. provided tax revenues by generating \$13.8 million in state sales tax and \$3.5 million in state income tax revenues, and \$37 million in federal income tax revenues in 1994.
- Small game hunting generated \$119 million in retail sales, \$336.7 million in total multiplier effects, \$85.6 million in salaries and wages, and 3,618 jobs annually for the U.S. economy in 1994.
- Small game hunting provided tax revenues by generating \$3.8 million in state sales tax and \$0.9 million in state income tax revenues, and \$10 million in federal income tax revenues in 1994.
- Hunting for migratory birds generated \$66.7 million in retail sales, \$188.8 million in total multiplier effects, \$48 million in salaries and wages, and 2,030 jobs annually for the U.S. economy in 1994.
- Hunting for migratory birds provided tax revenues by generating \$2.1 million in state sales tax and \$0.5 million in state income tax revenues, and \$5.6 million in federal income tax revenues in 1994.
- Wildlife-related activities on National Forest lands generate \$1.8 billion in retail sales, \$5.1 billion in total multiplier effects, \$1.3 billion in salaries and wages, 55,237 jobs, \$57.2 million in state sales tax revenues, \$14.3 million in state income tax revenues, and \$155.5 million in federal income tax revenues in 1994.

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