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Department of
Agriculture



Forest Service
Northeastern Area
State and Private
Forestry

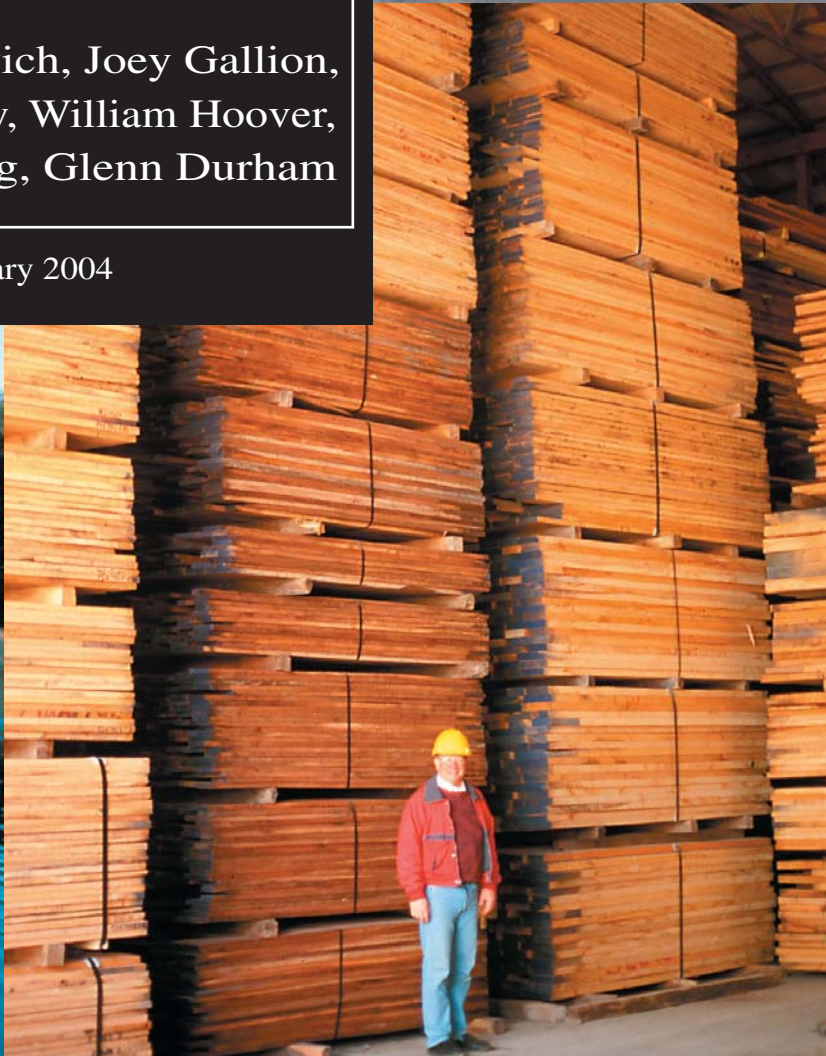
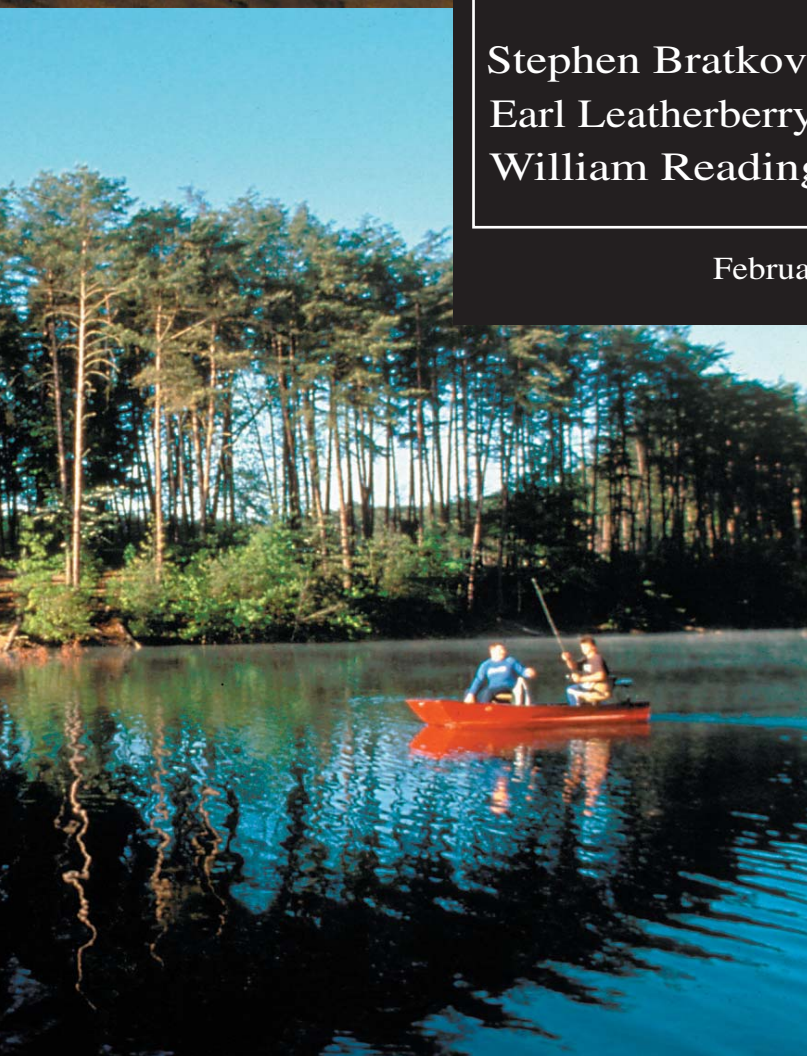
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FORESTS OF INDIANA: THEIR ECONOMIC IMPORTANCE

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State Forester's Welcome

Greetings!

On behalf of the Indiana Department of Natural Resources and the USDA Forest Service, I am pleased to provide you with an overview of the economic importance of our State's great forest resources.

Indiana's forests are among the most diverse and productive in the country. In addition to providing oxygen to breathe, clean water to drink, and brilliant fall colors to enjoy, forests provide numerous direct and measurable economic benefits to Hoosiers, other Americans, and the world.

Almost 200 years ago, forests covered 85 percent of the state. By the early 1900's, most forestland had been cleared to make room for farms, industry, infrastructure, and the growing number of Hoosiers. In 1922 State Forester Charles Deam predicted that Indiana would be treeless in 15 years. I'm pleased to report that as we enter the 21st century, forests have rebounded and now comprise almost 20 percent of the State (4.5 million acres).

The information in this booklet was compiled from numerous Federal, State, and local sources. Chief among these were the USDA Forest Service's North Central Research Station, the U.S. Department of Commerce, the Indiana Department of Commerce, the Indiana Department of Natural Resource's Division of Forestry, and Purdue University.

How we care for, manage, and sustain our forests will determine the future of this important resource. I invite you to take a few minutes and become acquainted with the economic importance of Indiana's forest resource. I hope you enjoy reading the information and, as a result, become more knowledgeable about our State.

Burnell C. Fischer
Indiana State Forester

Highlights

- The contribution of forests to the Indiana economy is over **\$9 billion** annually.
 - Forest-based manufacturing provides over **\$8 billion in value of shipments**. This is about 6 percent of the Statewide value for manufacturing.
 - Forest-based recreation and tourism expenditures contribute **\$1 billion**.
 - Sale of trees generates estimated revenue of **\$175 million**.
 - The sale of associated forest products, such as Christmas trees, maple syrup, and firewood, contributes nearly **\$25 million**.
- Forest-based manufacturing provides employment for over **54,000** people and generates payrolls of over **\$1.4 billion annually**.
- **4.3 million acres** in Indiana are categorized as timberland.
- Each **1,000 acres** of timberland in Indiana directly supports **12** forest-based manufacturing jobs.
- For **every acre** of Indiana timberland, over **\$340** of direct forest-based manufacturing payroll is generated annually.

Forests of Indiana: Their Economic Importance

Mental images of Indiana often range from corn, soybeans, and hogs, to high school basketball. The average Hoosier has little knowledge, however, of the scope, productivity, and economic impact of Indiana's forestland. The State's best-kept secret is that its beautiful forests that draw many visitors are also economically vital to the State's economy. A surprise to many is that Indiana is ranked first nationally in the manufacture of wood office furniture, and forest-based businesses are the fourth largest manufacturing sector by employment in the State.



Forests play a key role in the economy of Indiana. They provide employment, offer tourism and recreation opportunities, and support a diverse forest products industry. From hardwood lumber to maple syrup and from wildlife viewing to wood office furniture, Indiana's forests are vital in providing the nation and the world with useful goods and services. This publication highlights Indiana's forest resources from an economic perspective. See *Forests of Indiana: A 1998 Overview* for additional information on the history, diversity, and productivity of the State's forests (13).

Units commonly used to measure volume of tree growth, harvest, and use:

One **cubic foot** of wood is equal to a solid cube that measures 1 foot high, 1 foot wide, and 1 foot deep.

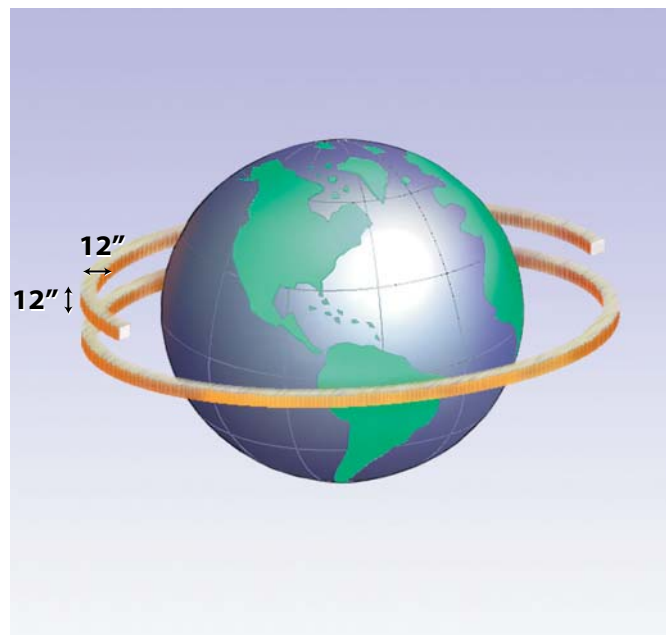
One **board foot** relates to lumber that is 1 foot long, 1 foot wide, and 1 inch thick (or its equivalent).

One standard **cord** is 128 cubic feet of stacked wood, typically pieces 4 feet long stacked 4 feet high and 8 feet wide. The "stack" is called a **face cord** or **rick** when the pieces are less than 4 feet long.

Indiana's Forest Resources

Forestland accounts for about 20 percent—4.5 million acres—of the 23 million acres of land in Indiana (9). Almost 7 of every 10 acres of forestland is south of an imaginary line drawn east to west through Indianapolis. In the southern part of the State, forests exist in large consolidated blocks of land. North of Indianapolis, forests generally occur in scattered woodlots, and along rivers and streams.

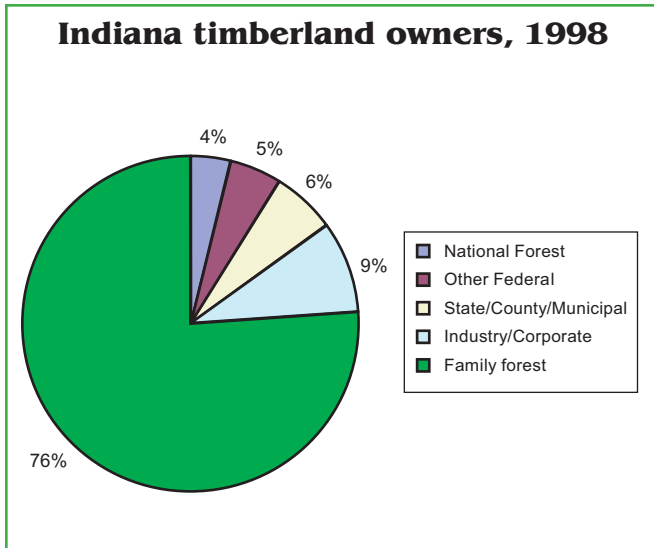
Of Indiana's 4.5 million acres of forestland, 4.3 million acres are defined as timberland—land capable of growing more than 20 cubic feet per acre of industrial wood each year and not withdrawn from timber harvest by statute, regulation, or development. Annually, net growth of Indiana's timberland averages 52 cubic feet per acre.



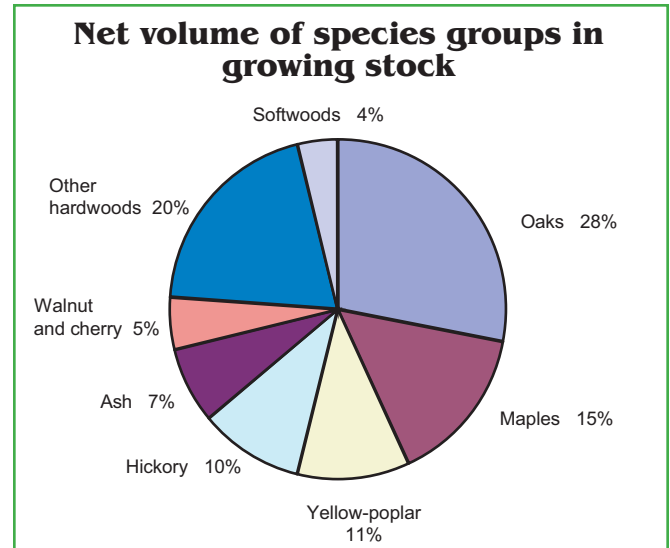
Annual growth of Indiana's timberland is equivalent to a band of wood 12 inches high and 12 inches wide encircling the earth over 1½ times at the equator!

Private landowners own the majority—85 percent—of timberland in Indiana. Over three-fourths of timberland owners are individuals or “family forest owners” with an average forest tract of less than 25 acres (13).

Hardwoods make up 96 percent of the 85 different tree species that grow naturally in Indiana’s forests. Some of the most common timberland tree species, by volume, are oaks, maples, yellow-poplar, hickory, and ash.



Most of the timberland in Indiana is privately owned (9).



Growing stock in Indiana’s forests is predominantly hardwoods (9).



Of the nearly 1,100 certified tree farms in Indiana, 99 percent are family owned.

Photograph: Indiana DNR

How Do Forests Contribute to Indiana's Economy?

In addition to providing oxygen to breathe, clean water to drink, and brilliant fall colors to enjoy, Indiana's forests provide numerous direct and measurable economic benefits.

Timber Harvesting

Timber harvesting produces a stream of income that is shared by those involved in owning, managing, marketing, cutting, hauling, and delivering wood to processing mills. In 2000, loggers harvested 97 million cubic feet of wood—"growing-stock volume"—from Indiana's forests (8). This included sawtimber removals of 367 million board feet, Doyle rule. On average Indiana forests annually grow more than 2 times the amount of wood harvested plus natural death of trees.



Timber harvesting in Indiana centers on independent logging firms with most employing less than 20 people (11). Payroll, value added, and value of shipments

attributed to logging are important economic contributors to many rural communities.

Logging industry in 2000

Firms	530
Employees	2,000
Payroll	\$40 million
Value added	\$100 million
Value of shipments	\$200 million

Forest inventory terms:

Growing stock refers to tree species suitable for industrial wood products that are healthy, sound and reasonably straight, and are greater than 5 inches in diameter at 4½ feet above the ground.

Sawtimber trees are the larger growing-stock trees (9 inches in diameter for softwoods and 11 inches in diameter for hardwoods).

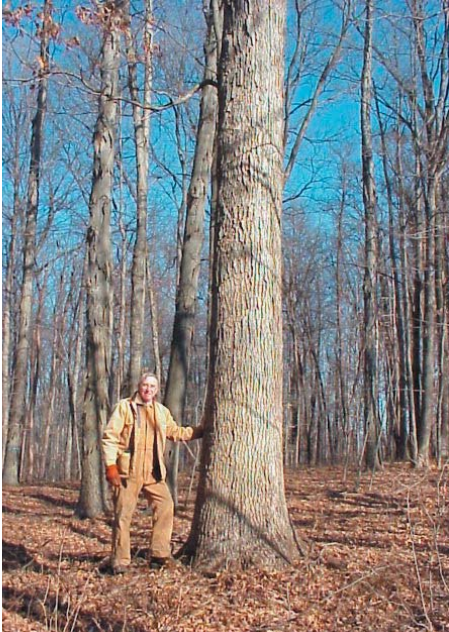
The **Doyle rule** is the formula used in Indiana to estimate board feet volume of trees and logs. References to board feet volumes in this publication are given as Doyle rule.

The **International ¼-inch rule**, a national standard, can be computed by multiplying the Doyle value by 1.38 for sawlogs, and 1.14 for veneer logs.

Value added is derived from the value of shipments minus the cost of the "things"—materials, supplies, fuel, power, containers, contract work—used to make the product. For example, a furniture plant that spends \$400,000 on materials (lumber), supplies (nails and other fasteners), electrical power, and shipping containers, and sells the final products for a total of \$1 million would have a net value added of \$600,000 (\$1,000,000 minus \$400,000).

Value of shipments is the net selling value of products shipped from a manufacturing plant to its next destination. For example, a furniture plant that manufactures and ships 500 wood office desks, at \$2000 per desk to a retail outlet, would be credited with \$1 million in value of shipments (500 times \$2,000).

Landowners receive an estimated \$175 million each year from timber sales. Based on 2002 sale data from consulting foresters (10) and a Purdue University study (3), “average” hardwood stands returned \$330 per thousand board feet to the landowner, and “high quality” stands



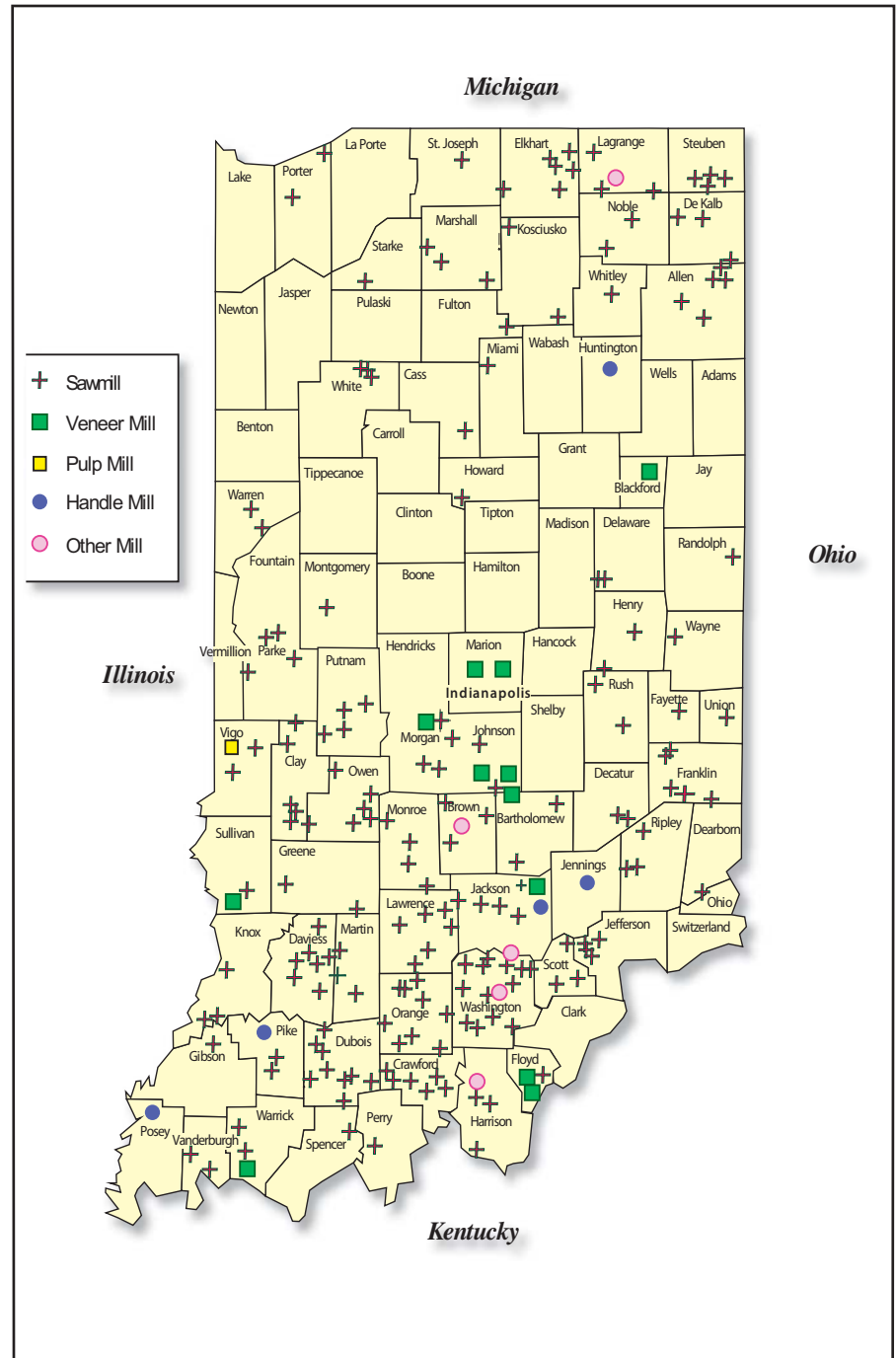
“Stumpage” is the money earned by forest landowners for the sale of standing timber.

Photograph: William Hoover

sold for \$490 per thousand board feet. The typical acre of timberland in the State contains approximately 4,000 board feet of sawtimber (9).

Lumber, Veneer and other Primary Products

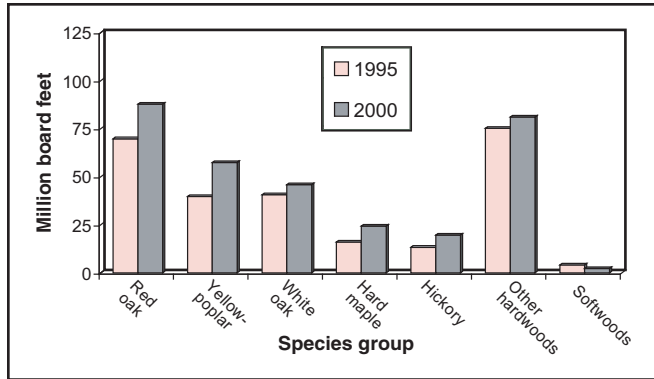
“Primary” mills take logs and other round sections cut from trees—called roundwood—and convert them into products such as lumber, veneer, or pulp. In 2000, there were 206 primary wood-processing mills in Indiana—184 sawmills, 12 veneer mills, 4 handle plants, 1 pulp mill, and 5 mills producing other wood products (8).



Primary wood-using mills in Indiana are concentrated in the southern part of the State near large blocks of forestland (8).

Primary wood-processing mills depend on the State’s forests. Of the nearly 90 million cubic feet of logs and other roundwood processed in the State, 85 percent was cut from Indiana’s forests. Neighboring states supplied most of the imported logs.

Indiana's primary forest products industry has always been strongly oriented to hardwood sawlogs. The volume of logs milled in 2000 increased 20 percent over the 1995 volume, from 289 to 348 million board feet (8).



The heavy use of hardwoods by Indiana's primary forest products industry increased between 1995 and 2000 (8).

Following sawlogs, pulpwood harvests of 45,000 cords made up the second largest use of Indiana's logs in 2000. The 12 veneer mills in Indiana processed 28 million board feet of veneer logs in 2000, a drop of 10 percent from 1990. In-State wood processing mills purchased 93 percent of the logs and other roundwood harvested from Indiana's forests in 2000.



For over 100 years Indiana has been a major producer of hardwood lumber.

Photograph: Evergreen Foundation

Sales and receipts from primary wood-processing mills account for less than 1 percent of the State's manufacturing economy (15). Although only a small part of the manufacturing economy Statewide, primary mills are important locally for employment and creating economic activity through purchases of raw materials, capital expenditures, value added through manufacturing, and value of shipments (Table 1).

Primary mills in Indiana, 1997 (15)

Industry	Employees		Value added (\$1,000)	Cost of materials (\$1,000)	Value of shipment (\$1,000)	Total capital expenditures (\$1,000)
	Number	Payroll (\$1,000)				
Sawmills, wood preservation	1,987	43,740	111,782	202,482	312,022	11,576
Veneer, plywood, engineered wood products	3,703	90,445	180,527	263,177	440,256	13,829
Pulp, paper, particleboard mills	1,163	45,980	113,110	181,403	293,857	19,945
Total	6,853	180,165	405,419	647,062	1,046,135	45,350

Furniture, Cabinets, and Other Secondary Products

Secondary wood manufacturers dry, plane, cut, and assemble processed wood (lumber, veneer, and other primary products) into parts or finished products. Examples of secondary products include office furniture, kitchen cabinets, architectural millwork, pallets, and paper products.

In 1997, there were over 900 secondary mills with an average of about 50 employees per mill; however, less than one-half of the firms employed 20 workers or more (15) (Table 2). Total employment in secondary mills was estimated at over 45,000 with an annual payroll approaching \$1.3 billion.

As noted in Table 2, the economic impact of value added by secondary manufacturing and value of shipments is sizable. In total, secondary manufacturing accounted for over 85 percent of value added by the forest industry in Indiana.



Nearly 80 percent of secondary mill employment is in the northern half of the State.

Photograph: Wood and Wood Products

Secondary mills in Indiana, 1997 (15)

Industry	All Establishments		All Employees		Production Workers		Value added (\$1,000)	Value of shipments (\$1,000)
	Total	20 or more	Number	Payroll (\$1,000)	Number	Wages (\$1,000)		
Millwork and custom architectural woodwork	153	76	5,952	151,599	4,873	107,614	319,316	838,047
Wood container and pallet	136	31	1,968	35,034	1,587	25,736	76,231	162,054
Converted paper product	157	117	12,148	385,656	9,005	245,237	1,093,730	2,471,500
Wood kitchen cabinet and counter top	190	49	5,674	141,234	4,766	107,045	394,538	698,860
Wood household furniture	115	41	5,937	145,609	5,158	107,987	319,189	596,218
Wood office furniture	32	22	5,113	132,970	4,342	102,593	307,522	551,833
All other wood product	143	54	8,735	263,205	7,162	193,817	580,604	1,470,154
Total	926	390	45,527	1,255,307	36,893	890,029	3,091,130	6,788,666

Wood Energy

Indiana's forests provide wood for heating homes and businesses, and to people who burn wood for recreation and pleasure (6). In 1996, over 400,000 households burned over ½ million cords of firewood (more than 1½ million ricks or face cords). Homeowners cut about two-thirds of the wood they burned; the rest came from other sources.

The nearly 130 commercial firewood producers in the State sold about \$12 million worth of firewood to homeowners in 1996. Approximately 70 percent of the firewood produced was salvaged from dead trees and harvest residues. Only 12 percent came from standing live trees growing on forestland. The remainder came from sources such as: cities and small towns, windbreaks, fencerows, and rural yards.



Almost half of the firewood burned by homeowners is used as a primary source of heat in the home.

Photograph: Dennis Haugen

Nontimber Forest Products

In addition to products that are made from wood, a wide variety of nontimber products come from Indiana's forests, such as maple syrup, Christmas trees, mushrooms, herbs, medicinal plants, and floral supplies.

Maple syrup: In 2002 the Indiana Department of Natural Resources surveyed syrup producers who reported the following quantities:

Maple Syrup Production

Syrup producers	200 families
Sap collected	219,000 gallons
Syrup produced	5,200 gallons
Syrup price (average)	\$32 per gallon

Including survey nonrespondents, income from all syrup producers was estimated at a minimum of \$200,000.



About 200 families in Indiana tap maple trees for sap to produce maple syrup.

Photograph: Yoder's Sugar Bush

Christmas trees: Every year, Christmas tree growers sell approximately 500,000 trees with a retail value of \$12.5 million. Scotch and white pines are the predominant Christmas trees grown in the State.



Christmas tree farms are located throughout Indiana.

Photograph: Stephen Bratkovich

Other nontimber products: Although harvest numbers are not known, nontimber products such as mushrooms, herbs and medicinal plants, grapevine wreaths, and floral greenery are important economically as cottage industries at a local level. Also, many nontimber products are harvested and used for recreational purposes rather than to generate income.

Forest-Related Recreation and Tourism

Forest-related recreation and tourism make significant contributions to Indiana's economy. It is difficult to estimate with precision, however, the contributions made by these enterprises. Data from the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation and the Indiana Tourism Division provide insight into the importance of forest-related recreation and tourism to Indiana's economy.

Hunting: In 2001, about 300,000 people hunted in Indiana, spending over \$265 million on equipment and trip-related expenses (17). The average hunter spent nearly \$900.



Leasing land for hunting rights is growing in popularity in Indiana, with fees of \$15 collected per acre per year (7).

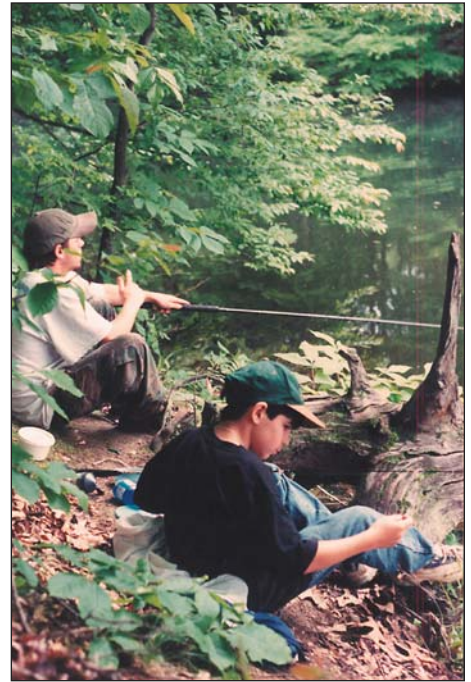
Photograph: Indiana Department of Natural Resources

Fishing: In 2001, over three-quarters of a million people fished Indiana waters, many of which were associated with a forest (17). Anglers spent over \$500 million on fishing expenses including food and lodging, transportation, equipment purchases and rentals, boat fuel, membership dues, and licenses.

Wildlife watching: Almost 1.9 million individuals engaged in non-consumptive wildlife related recreation in Indiana in 2001 (17). Activities such as observing, photographing, and feeding fish and wildlife provided enjoyment for all ages. These "wildlife watchers" spent over \$700 million enjoying their "sport," or almost \$400 per person.

Public forests offer excellent fishing opportunities.

*Photograph:
Hoosier
National Forest*



Tourism: In 2001 over 57 million visitors to Indiana spent over \$6 billion (5). According to the Indiana Tourism Council, "enjoying scenic beauty" is the number one activity visitors participated in during their stay. Nearly one-half of visitors enjoyed activities at lakes, rivers, and other natural features, and 35 percent participated in activities at State and National Parks.

Based on the hunting, fishing, wildlife watching, and tourism data, a conservative estimate of the annual economic impact of forest-related recreation and tourism is \$1 billion.



The Hoosier National Forest provides recreational opportunities for people of all ages.

Photograph: Hoosier National Forest

How Does Indiana's Forest Economy Compare With Other States and Other Industries?

The forest economy in Indiana compares favorably with other states and manufacturing industries when viewed in terms of timberland productivity, forest-based employment, manufacture of secondary products, and exports.

Timberland Productivity

Indiana's timberland is quite productive, especially when compared with other North Central States (12). Michigan—a heavily forested state—has nearly four times the total growing stock volume of Indiana. On a per acre basis, however, Indiana's growing stock volume is 11 percent greater than Michigan's, and board foot volumes are

300 percent greater! In fact, a comparison with all North Central States—Michigan, Wisconsin, Minnesota, Illinois, Missouri and Iowa—shows Indiana nearly double in board feet volume per acre (4,380 board feet versus regional average of 2,328 board feet).

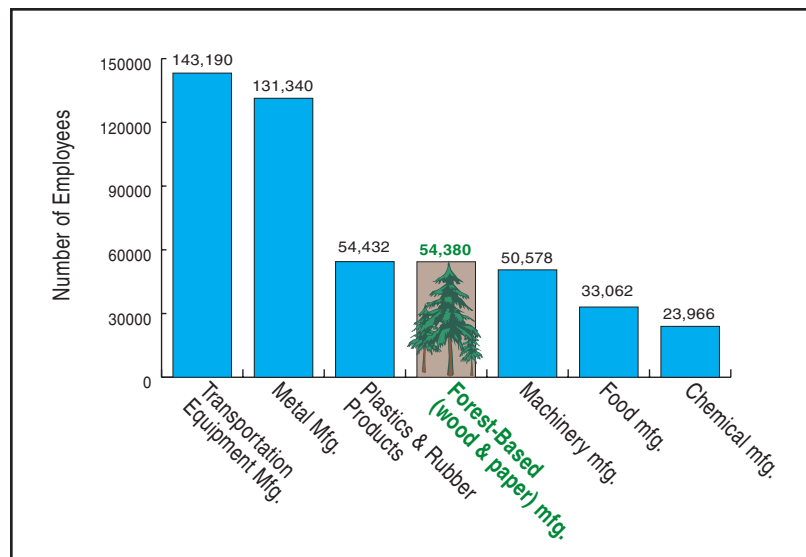
Annually, the average net growth of Indiana's timberland is over 10 percent more than the national average. And Indiana timberlands are yearly increasing their growing stock volumes, on a percentage basis, more than national growth rates! In fact, the sawtimber portion of Indiana's growing stock volume is increasing at 157 board feet per acre per year. This

translates to an economic gain of over \$51 per acre per year based on the "average stand" stumpage price of \$0.33 per board foot.

Employment

Employment in forest-based manufacturing (primary and secondary) accounts for over 8 percent of all manufacturing employment in Indiana (15). Forest-based manufacturing ranks fourth in employment behind transportation equipment, metal, and

plastics and rubber products manufacturing and above machinery, food, and chemical manufacturing employment. Although Indiana ranks 35th of the 50 States in timberland area (12), the Hoosier State places 16th nationally in forest-based



Forest-based manufacturing employs over 54,000 people in Indiana (15).

manufacturing employment, with over 54,000 employees. The State's timberland supports the equivalent of 12 forest-based manufacturing jobs for each 1,000 acres, with over \$340 of annual payroll generated for each acre. The total forest-based manufacturing payroll for the State is over \$1.4 billion (15).

Between 1988 and 1998, forest-based employment decreased in many western States while it increased in Indiana. In 1998, Indiana employed more forest-based manufacturing workers than Idaho, Montana, Colorado, and Alaska combined (1)!

Secondary Products

Value of shipments for forest-based manufacturing ranks sixth in the State—about 6 percent of the Statewide value—totaling over \$8 billion in 1997 (14). About 85 percent of the value of shipments is attributed to the manufacture of secondary products.

On the national scene, Indiana is a major

<u>Product</u>	<u>National Rank</u>
Wood office furniture	First
Mobile homes	Second
Wood kitchen cabinets, counter tops	Third
Upholstered household furniture	Fifth
Prefabricated wood buildings	Fifth

player in the production of secondary wood products. Five industry sectors (product lines) rank in the top five nationally in value of shipments (16):

Exports

In addition to domestic markets, Indiana forest-based products are in demand worldwide. Furniture and cabinets, lumber and millwork, flooring, veneer facing for furniture, doors and door parts, prefabricated wood buildings, pallets, and cardboard boxes are a few examples of products manufactured locally and shipped to other states and countries (2).

In 2002 Indiana exported forest-based products valued at nearly \$354 million (4). Included were wood products valued at over \$137 million (13th in the State), paper products at \$80 million (18th), plus an additional \$135 million of furniture and bedding products (14th).



Hoosier-made wood kitchen cabinets are enjoyed by people within and outside Indiana.

Photograph: Ed Cesa

Conclusions

The sustainability of Indiana's forests is vital to the State's economy. In some counties, the "forest" is the main catalyst and source of local economic activity (2). Of every \$15 earned by manufacturing employees in Indiana, \$1 is forest-based (15). Numerous nontimber forest product businesses flourish throughout the State, providing an economic boost to local economies. And a sizable forest-dependent recreation and tourism industry has a positive economic impact for both Hoosiers and visitors. To support and expand Indiana's forest-based economy, wise decisions must be made regarding the forests' long-term care and management.

The "economics" of Indiana's forests go well beyond the statistics in this publication. There are many additional economic benefits difficult or impossible to quantify. For example,

consider the oxygen released by the State's forests, the clean water produced from forested watersheds, and the "cooling savings" from large canopy trees in urban neighborhoods. These examples are real and provide economic benefits but were not addressed in this publication.

As we look to the future, U.S. and world demand for wood and paper products will continue to increase. Coupled with increasing demands on forests to provide recreation and leisure opportunities, the forests of Indiana play a vital role in providing the goods and services needed by society.

Yes, Indiana is far more than corn, soybeans, hogs, and high school basketball. Indiana is also forests, and the vibrant economic activity associated with them.



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