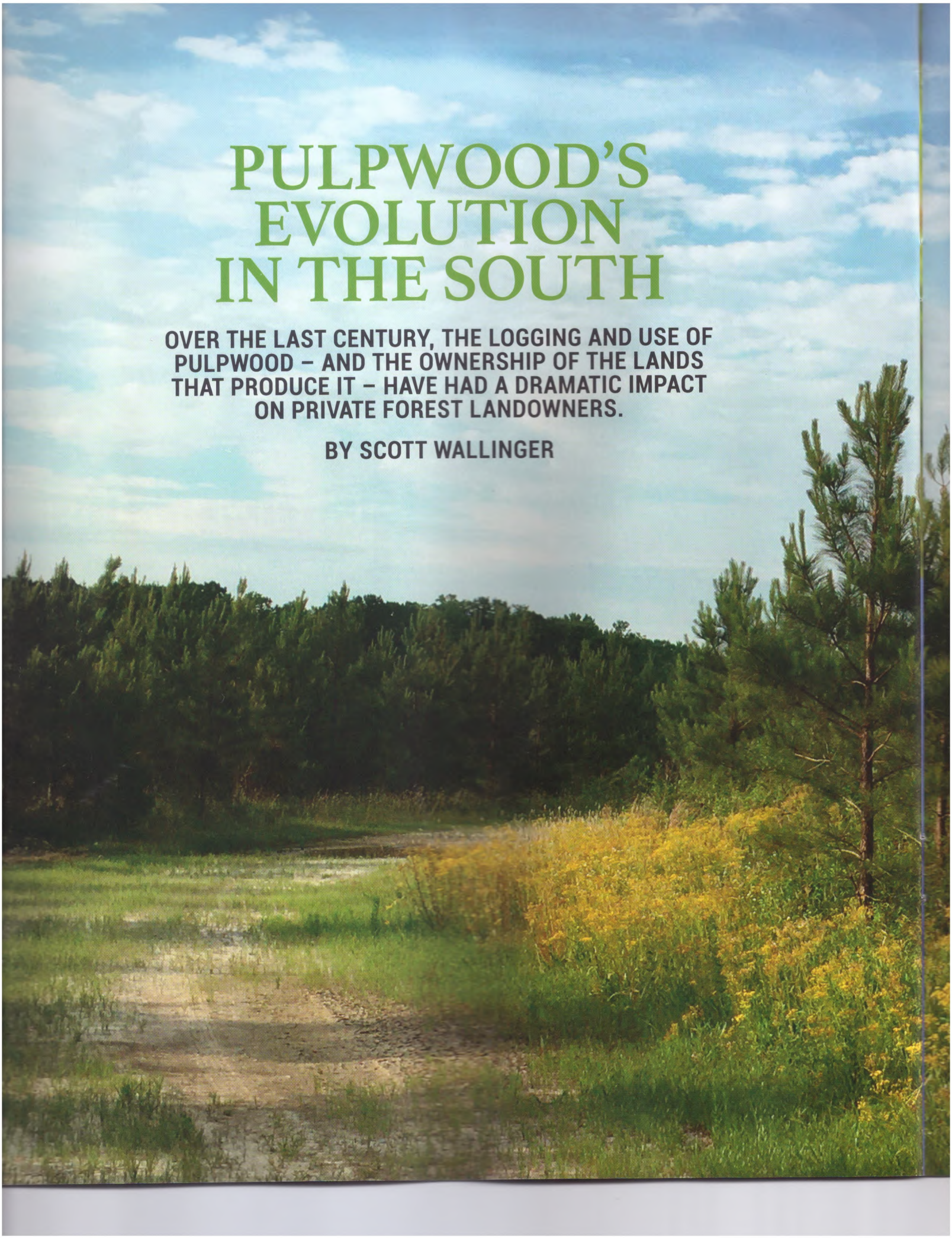


PULPWOOD'S EVOLUTION IN THE SOUTH

OVER THE LAST CENTURY, THE LOGGING AND USE OF PULPWOOD – AND THE OWNERSHIP OF THE LANDS THAT PRODUCE IT – HAVE HAD A DRAMATIC IMPACT ON PRIVATE FOREST LANDOWNERS.

BY SCOTT WALLINGER

Pulpwood is ubiquitous across the rural South -- along the coast, in the Piedmont, and into the edges of the mountains. Pulpwood went hand in hand with the paper industry and followed its development during the last century.

Early paper was made from rags or reused paper pulp. A few local mills made paper for local consumption, but those operations weren't large. For example, Benjamin Waring made paper in Charleston in the early 1800s and similar local mills were in other states.

The sulfite process for making kraft wood pulp emerged in Germany in 1879 ("kraft" is the German word for "strong"). A paper mill in Roanoke Rapids, North Carolina was built in 1909 and one was built in Pensacola, Florida in 1910. They were among the earliest Southern mills to use that process.

Champion Papers started a new paper mill in Canton, North Carolina. But it was the creation of the sulfate pulping process in 1931 by Charles H. Herty in Savannah, Georgia that launched the great southern Kraft paper industry to become an economic driver for the South. The acidic sulfite process hydrolyzed and weakened pinewood fibers but the sulfate process retained its natural strength for containers and bag stock that replaced wood crates.

The kraft sulfate process launched a wave of pulp and paper mills across the South. The Chesapeake Corporation of Virginia that operated a small mill at West Point, Virginia since 1914 became one of the earliest sulfate process kraft paper mills.

Champion began making bleached kraft paper from southern pine in Canton in 1935. Camp Manufacturing in Franklin, Virginia began producing kraft paper in 1936. Union Bag had four paper machines and a bag plant at a mill near Savannah in 1937. That same year West Virginia Pulp and Paper Company began operating a Charleston, South Carolina mill and International Paper Company began operating a new mill at Georgetown, South Carolina. Champion built a newsprint mill in Pasadena, Texas and the Southland newsprint mill in Lufkin, Texas began operation.

That pattern followed across the South, mainly in the coastal and piedmont regions, in all the states between Virginia and Texas. A 1946 USFS Forest Survey

This tract in Windsor, Virginia, is not far from where Champion began making bleached kraft paper from southern pine in 1935.

report showed the explosion of paper mill capacity in the South following the introduction of the sulfate process: In 1910 sulfate pulp capacity in the South was less than 1,000 tons per day. It crept slowly to 5,000 tons per day by 1935 and then soared to almost 20,000 tons per day by 1948

But the topic here isn't the paper industry. It's pulpwood and the flow of wood that supplied Southern paper mills with fiber.

Virgin pine forests supplied sawlogs in the early "cut and get out" era when huge logs were sawed into lumber in band mills. A second forest emerged afterward that became the source of wood for lumber and the nascent paper industry. Trees then were basically "sawtimber" (12 or more inches in diameter at breast height - DBH) and "pulpwood" (trees smaller than that, often from thinning the new and overstocked pine stands on former forests and abandoned cotton fields). The paper and lumber industry grew to a point wherein the late 1960s the Forest Farmers Association (now Forest Landowners Association) focused on steps to create "The South's Third Forest" to continue to supply the mills.

Cutting pulpwood from the beginning was labor-intensive with difficult and dangerous working conditions in the woods. It progressed from early manual harvesting methods through the arrival of gasoline and diesel engines to hydraulic systems that transformed harvesting machinery and eventually led to a merging of pulpwood and sawlog harvesting.

The earliest wood procurement systems in the South were usually based on a dealer system. Paper mills began rudimentary forestry operations on land they acquired as they built the initial paper mills, but for the most part, those tracts were stocked with immature trees. Most of the wood came from privately owned woodlands.

Mills built by northern companies had no roots in the South or its culture. Most early foresters in the South graduated from northern universities. Local wood dealers -- businessmen with an intimate knowledge of local landowners and workers -- provided the interface. They bought the standing timber and arranged its harvest and delivery to the mills by local wood producers.

Wood dealers bought the timber, the producers cut and delivered it, the mill paid the dealer, the dealer paid the producers and landowners. Wood procurement foresters were the interface between the mills and the dealers.

In the earliest days of the industry, the crosscut saw and ax were tools of the trade, as were wagons pulled by mules to bring the wood from the forest. The chainsaw was the first step to reduce labor and increase productivity. The first power saws required two men, just like manual crosscut saws. An early one-man chainsaw with a bow blade let one man walk up to a tree or log and push the blade through. Chainsaws with a bar blade evolved from early Homelite and McCullough saws to today's saws made by Jonsered, Husqvarna, and Stihl.

Many pine stands developed on land that had been abandoned from farming. On those sites, especially in the Piedmont, a truck could be driven through the woods. The standard vehicle to transport pulpwood was the "bobtail" truck -- often a former

Pepsi or Coca Cola delivery truck with a wood rack on its rear seeing a second life in the woods.

The unit of measurement for pulpwood was the cord defined as the equivalent of a stack of wood 4 feet wide by 4 feet tall by 8 feet long containing 128 cubic feet.

Pulpwood was "short wood" -- trees cut into five-foot lengths. The bolts of wood had to be of a size and weight one or two strong men could handle them all day long. Sometimes, a used farm tractor pulled a cart through the woods and the wood would be loaded onto the cart. At the road side, it would be reloaded onto the truck.

Rail cars hauled the wood from woodyards to the paper mill. Two stacks of five-foot wood across a car were just over 10 feet, within the width that allowed two trains to pass each other safely. So, the "cord equivalent" with five-foot logs became the industry standard.

By the 1960s, woodyards had rubber-tired machines to lift the wood off the trucks and stack it in the rail cars -- a step toward mechanization. The men who cut and loaded pulpwood were mostly from the bottom of the economic and social spectrum. Many had done manual farm work for local farmers or on their patches of land. For many pulpwood workers, the job just provided a roof over their heads, a basic diet, and enough left over to buy liquor for the weekend.

Some larger pulpwood operators relied on cable loaders operated by winches to load heavier pulpwood bolts onto trucks. In 1956, Leo Heikkinen in Wisconsin introduced the first Prentice hydraulic knuckleboom loader. At the stump, an operator could easily pick up pulpwood and place it onto a hauling machine or truck faster, safer, and with much greater productivity. Beginning in 1963, Barko loaders reinforced the transition to hydraulic loaders.

The Franklin Logger in 1962 a rubber-tired skidder made by Roger Drake in Franklin, Virginia, started a new era in harvesting. The Franklin skidder, along with skidders from a quickly appearing array of other manufacturers, with hydraulic steering and winches and tires designed for logging, paved the way for evolution in pulpwood harvesting in the South: Timberjack, John Deere, and Caterpillar. Log skidders set the stage for tree-length logging.

Concurrent development of the pulpwood pallet made of metal piping led to a system capable of loading more pulpwood onto a large truck for transport from the forest to the mill. The pallets were loaded with pulpwood on the ground and then winched onto the rear bed of a truck that could carry two to five pallets. The more efficient hauling demanded a higher level of production in the woods to balance the capacity of larger trucks.

The 1960s were the turning point in the mechanization of short wood pulpwood. It came with the arrival of new machine technologies and just in time to meet an explosion in demand for pulpwood. A 1968 paper by Zebulon W. White said there were 92 pulp mills in 12 southern states with a capacity of 70,512 tons of pulp per day, and another eight mills were under construction. Pulpwood consumption had risen to 20 million cords per year in 1956 and was forecast to be 33 million cords per year in 1966.

Mechanization was critical as rural labor dwindled across the South. As farming became mechanized and as new manufacturing plants arose, the need for farm labor eroded and rural workers moved to better opportunities. Fewer workers had to produce more wood.

Early 1960s innovations simply mounted a cable or small grapple loader on the back of a farm tractor to do pick up pulpwood on the ground and load it on a cart or truck. The Massey-Ferguson Treever was one example.

Tom Busch at International Paper Company introduced the Busch Combine in 1965, a tractor that felled trees, cut them to length, and transported a cord of pulpwood on its back.

Walter Jarck and Tom Walbridge at Catawba Timber Company in South Carolina designed an early "Go-Getter" that was manufactured by Brown Machinery Service in Mississippi in 1965. It was essentially an articulated tractor with a loader that could carry a pallet into the woods, load it with pulpwood, carry it to the roadside and slide it to the ground.

Charleston Ellis at Westvaco's Charleston mill quickly adapted the idea to a heavier hydraulic steered articulated Go-Getter with a knuckleboom loader to fill a pallet with pulpwood in the woods. Several of these were manufactured in Savannah.

Greater productivity in cutting trees required an increase in trucking capacity. The bobtail truck began to give way to trucks

Pulpwood generally refers to an economic class of smaller trees used to make wood pulp, OSB panels, and wood pellets for energy

with longer beds or to tractor-trailer rigs that could haul several pallets. The loaded pallets were pulled onto the truck with a winch behind the cab.

Not all wood was hauled to the mills by truck or railroad. Some companies took advantage of river systems to move pulpwood by barge. International Paper barged pulpwood from Georgia to its South Carolina mill. West Virginia Pulp and Paper barged chips from its eastern North Carolina land to Charleston. Rivers to mills on the Gulf coast likewise carried barges to move wood. With roundwood, this meant transferring the wood from trucks to the barges.

A small crawler tractor is used to drag a loaded pallet of pine pulpwood from the woods to roadside in the 1960s. Note lack of any safety canopy or hard hat on the driver.

Mechanization of timber harvesting impacted traditional pulpwood dealers. Local businessmen were adept at financing chainsaws and used trucks. Rubber-tired skidders, hydraulic loaders, large trucks, and tractor-trailers were beyond the financial capabilities of many dealers.

Also, after World War II the GI bill enabled many returning Southern veterans to graduate from Southern forestry schools. Many came from rural backgrounds and worked for pulp and paper companies. A decade or so later, companies had experienced foresters in mill wood procurement regions who knew the local culture, people, and pulpwood producers and loggers. The local dealer was much less needed as a cultural interface.

As mentioned earlier, initial pulpwood was sections of trees that were five feet long and delivered as "short wood" to paper mills. The mills removed bark from the wood in rotating drum debarkers that tumbled the wood before the wood was chipped for pulping.

As pulpwood harvesting evolved from short wood to tree length, mills needed to cut the wood into traditional five-foot lengths. Sometimes this was done at the mill with a slasher deck -- a wide deck with an array of circular saw blades five feet apart and moving chains to carry the trees through the saws. An alternative was the "bundle bucker," basically a huge chainsaw. A truckload of pulpwood logs drove under it and the saw cut across the entire load. The saw retracted, the truck moved forward five feet and another cut was made, and this was repeated until the entire load was reduced to five-foot wood. These saws could be used at locations on route to the mills.

As tree-length logging emerged, many companies eliminated chipping facilities at the mill and converted mill woodyards to chip unloading and storage facilities. Chip mills operated by a company or contractor replaced the traditional short wood rail woodyards. Tree length trees were unloaded at the chip mill and passed through a ring debarker into the chipper. The chips were then transported by truck or rail to the mill. In some cases, chip mills could separate sawlogs from the smaller trees to capture incremental market value.

A decade after this period of initial mechanization of pulpwood harvesting began, another innovation arrived -- the Chip-N-Saw chipping heading for sawmills. Now the lower portions of trees 8 to 10 inches DBH -- pulpwood -- could be sawed into smaller dimension lumber, and the milling process generated large volumes of wood chips suitable for making Kraft pulp. The upper end of the pulpwood spectrum of trees was now small sawtimber.

While pine thinnings continued to be a pulpwood source, pine plantations on corporate and private individual ownerships could be clear cut and replanted with newer, more genetically advanced pine seedlings. As older sawmills converted to the new sawing technology and paper mills built sawmills, many traditional pulpwood producers disappeared. They were replaced by a growing number of logging companies that each operated several skidders, had hydraulic loaders that could handle an entire tree and place them tree-length on tractor-trailer haulers.

By the turn of the 20th century, foresters began to establish plantations with much wider spacings than the traditional 8 x 8 feet of earlier years. This made thinning less necessary and no longer required the removal of an entire row of trees.

Today, logging of pulpwood and sawtimber together is done with fully mechanized machines: feller-bunchers, whole tree processors, shovel loaders to move trees from wetter sites, loaders, and tractor-trailers that deliver to pulp mills, sawmills and chip mills.

The 1990s and into the next decade brought a huge change in land ownership as pulp and paper companies divested their timberlands. Paper companies traditionally took advantage of sawtimber on their land but their primary objective was pulpwood to supply their mills.

When companies realized their mills were surrounded by a "wall of wood" on their own and other forest lands, their need to own forests diminished. That reflected enormous gains in pine productivity from research in tree genetics, stand fertilization, weedy competition control, and higher quality seedlings for reforestation. The growth rate of pine plantations had doubled to tripled.

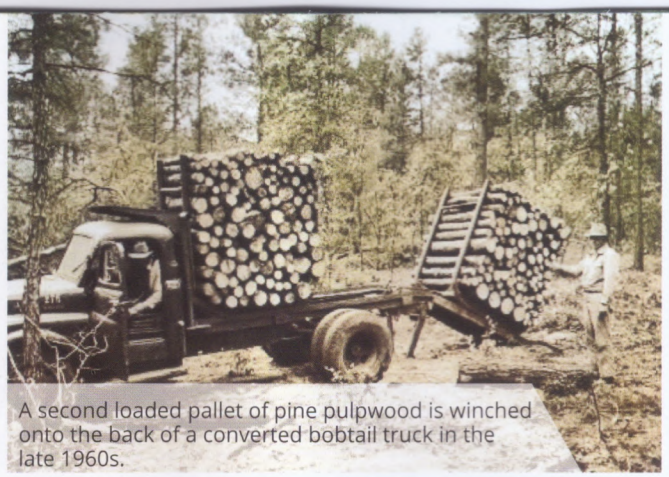
For the TIMOs and REITs -- and most individual forest owners -- the objective of pine forestry is financial. This means a focus on sawtimber. For almost three decades, Chip-N-Saw sawtimber has been worth twice the price per ton on the stump as pulpwood, so that rationale is understandable. "Pulpwood" is no longer just wood for pulp and paper mills.

Plywood was originally made from very large trees typical of the old forests in Western states. In 1964, Georgie-Pacific Company opened the first Southern pine plywood plant in Fordyce, Arkansas. Other plywood plants followed across the South, providing a market for large, high-quality pine logs to peel into sheets to form plywood. Those trees brought premium prices. By 2005, southern mills were producing two-thirds of the nation's plywood.

The 1970s and early 1980s saw the emergence of Oriented Strand Board as a major construction panel. It could be made with wood chips from pine trees of all sizes, including lower-cost "pulpwood" trees. That industry has grown enormously

to meet construction demand and replaced plywood as the major wood panel.

At the beginning of this century, demand for dried wood pellets to be burned for energy began to boom as environmental pressures, first in Europe but growing in the United States, caused industries and power generators to seek alternatives to coal and gas. This business has grown immensely and provides another market for trees. Pine makes the higher quality pellets.



A second loaded pallet of pine pulpwood is winched onto the back of a converted bobtail truck in the late 1960s.

The term "pulpwood" has undergone a transition. Initially, it defined a class of wood with a specific end use: raw material for making paper. In the South, most pulpwood was pine used in Kraft pulp for high-quality corrugated containers and grocery bags.

Today, "pulpwood" is an economic class of smaller trees used to make wood pulp, OSB panels, and wood pellets for energy. It is mostly younger trees and some older trees of poor form. "Chip-N-Saw" is a class of pine trees ideally suited for the manufacturer of Southern Pine Lumber in mills with chipping headings that chip away the outside of the lumber profile and saw the remaining core into boards, typically in the 10-13 inches DBH range. "Sawtimber" is the class of larger pine trees used to make wider lumber, specialty boards, and plywood.

The stumpage price for pine pulpwood in the Southeast began at almost zero in the 1930s - owners were glad to have a market for trees thinned from growing forests. Starting from less than $1 per ton, by 1945 it was $1.00, rising to $2 by about 1973 and then accelerating rapidly to a peak of about $10 per ton. It then dropped rapidly to about $6 per ton around the year 2000 before rebounding. In recent years, pine "pulpwood" stumpage has fluctuated narrowly around $10 per ton.

Today, there is no longer a meaningful difference between "pulpwood producing" and "logging." Except for thinning specialists, most loggers today harvest the full range of products from a timber stand. Loggers are heavily capitalized businesses with sophisticated machines for harvesting, sorting, and transporting trees to various markets. They operate more safely than in earlier decades and provide higher-quality jobs. As innovative new uses for wood emerge, demand for Southern trees of all sizes will remain to support society's needs -- and an opportunity for successful loggers to harvest and deliver wood to markets.

R. Scott Wallinger worked for Westvaco Corporation for 39 years and oversaw management of company forests in the United States and Brazil. He is co-author of Forestry in the U.S. South: A History.