

SOUTHERN PULPWOOD PRODUCTION
AND THE
TIMBER SUPPLY

by

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PREFACE

Through the McSweeney-McNary Act of 1928, Congress authorized the Secretary of Agriculture to conduct a comprehensive survey of the forest resources of the United States. The Forest Survey was organized by the Forest Service to carry out the provisions of the Act, and each of the eleven Regional Forest Experiment Stations is responsible for the work in its territory. In the Middle Atlantic States the Forest Survey is an activity of the Southeastern Forest Experiment Station, Asheville, North Carolina.

The work of the Survey is divided into five major phases:

1. Inventory. Determination of the extent, location, and condition of forest lands, and the quantity, species, and quality of timber on these lands.
2. Growth. Determination of the current rate of timber growth.
3. Drain. Determination of the amount of industrial and domestic wood used, and the total loss resulting from fire, insects, disease, suppression, and other causes.
4. Requirements. Determination of the current and probable future requirements for forest products by all classes of consumers.
5. Policies and plans. Analysis of the relation of these findings to one another and to other economic factors as a basis for public and private policies and plans of forest land use and management.

This progress report examines the timber resources of the South from the viewpoint of the rapidly expanding pulp and paper industry, calls attention to the steady decline in volume of southern pines, which are at present the principal pulping species, and suggests measures for bringing wood supplies and requirements into balance.

SOUTHERN PULPWOOD PRODUCTION AND THE TIMBER SUPPLY^{1/}

by

James W. Cruikshank^{2/}

The southern pulp and paper industry is again on the march. Practically as soon as the war was over several plants started expansion programs, and construction was started on a number of new mills. Investigations and surveys now under way also indicate that additional new pulp and paper mills can be expected to locate in the South in the near future. This is not news to you members of the industry, but it does point up the need for a review of the South's timber supply in order to see if annual yields of wood are large enough to meet present requirements and at the same time allow for some new plant capacity. Also, since the timber lands of the South are growing much less wood than they are capable of producing, it should be worthwhile to consider briefly some of the causes of low production and the yields that might be attainable under good forest practices.

PULPWOOD PRODUCTION

Before discussing the timber supply situation, I would like to briefly review the status of the pulp industry in the South, with particular emphasis upon its present and immediate future needs for pulpwood. In 1946 there were 50 wood-pulp mills in the South with a total daily capacity of about 16,200 tons of pulp, about one-half the total U. S. pulpmill capacity. Slightly over 80 percent of this capacity was utilized for the production of kraft pulp, about 10 percent for ground wood, and the remaining 10 percent for semi-chemical, soda, and sulphite fiber. Since 1946 at least ten companies have undertaken expansion programs designed to increase production at over one-fourth of the pulpmills.

^{1/} Presented at the meeting of the Southern Pulpwood Conservation Association, Atlanta, Ga., Jan. 28, 1948.

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It is difficult to appraise accurately the net effect of these expansions in terms of increased capacity, but it is probably safe to say they approximate four or five large new mills. In the same period, construction has started, or is definitely planned, on seven new mills (fig. 1), one of which will produce newsprint, two building board, and the rest kraft products.

DISTRIBUTION AND TYPES OF PULP MILLS IN THE SOUTH, AND NEW MILLS UNDER CONSTRUCTION, 1947

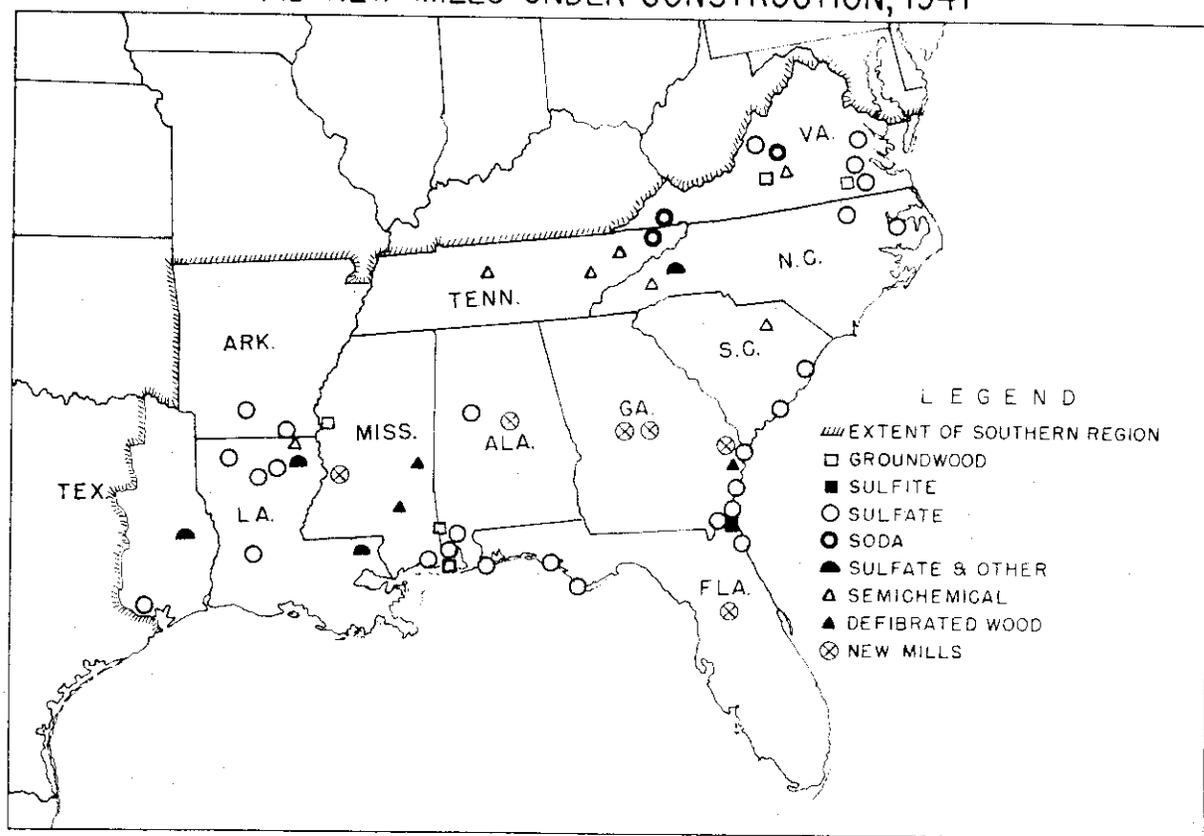


Figure 1

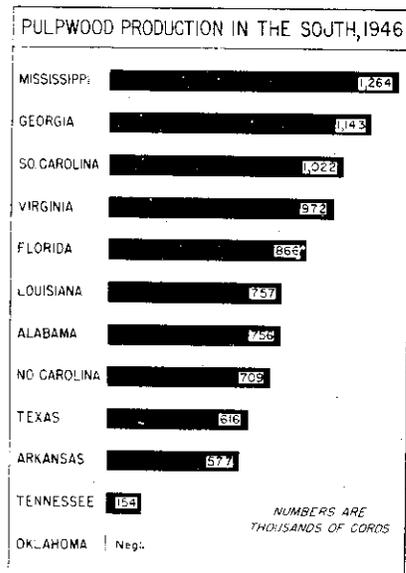


Figure 2

ally increase as expansion programs are completed and new mills come into production. The additional amount of wood needed cannot be estimated precisely, but on the basis of increased capacity so far announced it appears that expansions in present mills will require about 1.3 million cords and new mills will need about 1.2 million cords, in both cases chiefly pine timber. Thus, by 1950 total pulpwood production in the South can be expected to exceed 11 million cords annually. This is nearly a 30-percent increase above 1946 and new mills, as yet unannounced, may cause further increases.

The impact of this increased production will be greatest on the forests of the Southeast, as six of the seven new plants now under construction will draw wood from South Carolina, Georgia, Florida, or Alabama. Also, about 40 percent of the wood requirements for the increased capacity now being added to existing plants will come from this same general area. Without question this will greatly intensify competition for pulpwood along the coast of South Carolina and Georgia, and in northeast Florida where the annual cut of pulpwood alone now approximates one-tenth cord per acre of commercial forest.

It appears, therefore, that the demand for pulpwood can be expected to increase markedly during the next few years and this demand will be largely concentrated in the Southeast. Also, there is a strong possibility that additional pulpmills may be established in this and other parts of the south that will further increase the consumption of pulpwood. Inasmuch as these new requirements will generally be superimposed upon the timber needs of the lumber and other wood-using industries, the question of the adequacy of the South's timber supply assumes real importance.

Even before this general postwar expansion, pulpwood production in the South had been gradually increasing. In 1940 total production amounted to 6.3 million cords, but in spite of occasional setbacks in certain war years it rose to 8.8 million cords by 1946, an increase of 40 percent. The proportionate increase was greatest in Texas where production was increased from 262,000 cords in 1940 to 616,000 in 1946, but Mississippi, Alabama, Georgia, and South Carolina also experienced rapid gains. Almost one-half of the pulpwood produced was cut in these latter four states with three of them yielding over one million cords each. (fig. 2).

Estimates of 1947 pulpwood production are not available, but reports for the first nine months indicate that production should closely approach that of 1946. In 1948 and 1949 requirements for pulpwood will gradu-

THE TIMBER SUPPLY

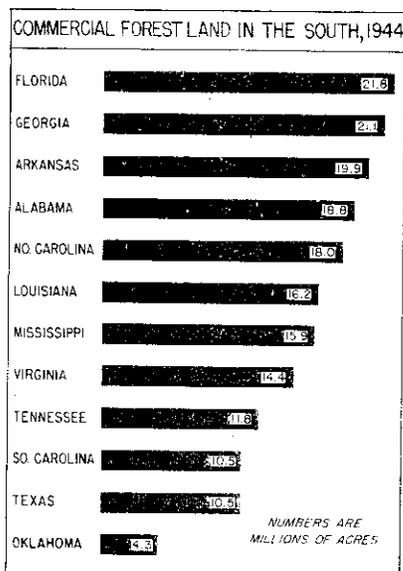


Figure 3

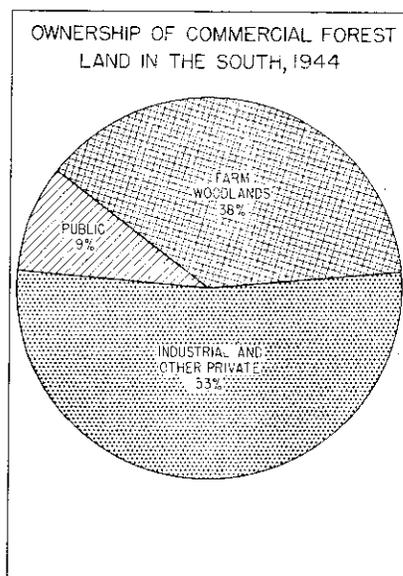


Figure 4

The timber supply upon which your industry depends is distributed rather thinly over 183 million acres, which is 56 percent of the land area in the South. No state, with the exception of Texas and Oklahoma, has less than 40 percent of its area in commercial forest, and Florida has over 60 percent. Every state except Oklahoma has over 10 million acres of commercial forest land, and Florida and Georgia each has over 20 million (fig. 3).

Among the major forest regions of the nation only two, the Central States and New England, exceed the South in the proportion of commercial forest land held in private ownership. Some 69 million acres are on farms, nearly 8 million are owned by the pulp and paper industry, and about 90 million are in other classes of industrial and private ownership. Only 9 percent is in public ownership (fig. 4), and 10 of these sixteen million acres are in National Forests. Privately-owned timber lands are, therefore, your major source of wood, but the point to remember is that nearly three-fourths of the private forest land is held by 1.6 million small owners in tracts averaging only 70 to 75 acres in size. Since there is relatively little intensive forest management on these small properties, timber yields over much of the South are unnecessarily low.

So far, we have said little about the characteristics of the timber resources of the South, so let us consider briefly the kinds of timber and their general location. Bordering the Atlantic and Gulf coasts from South Carolina to east Texas is the longleaf-slash pine forest of

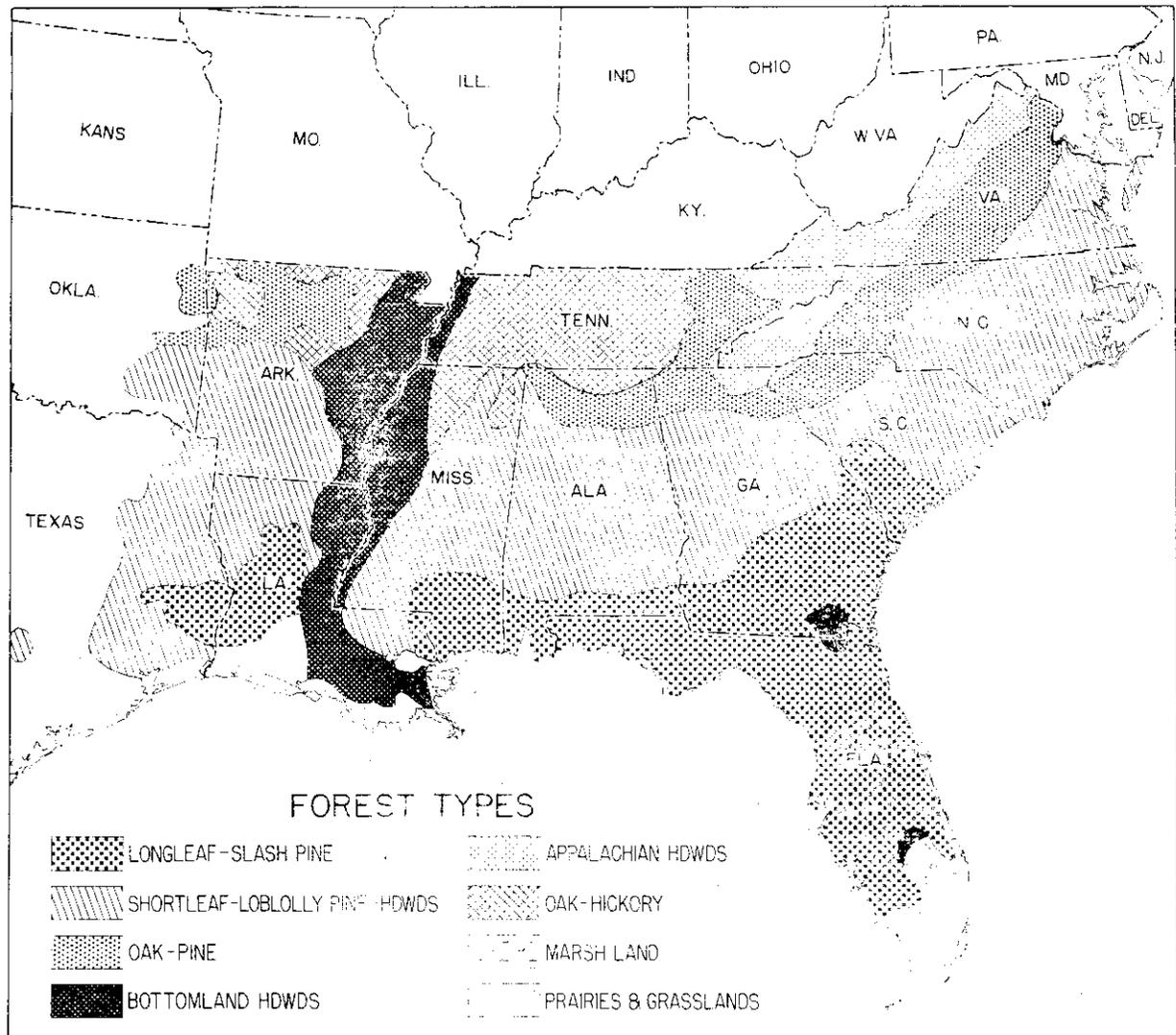


Figure 5

the flat coastal plain (fig. 5). It occupies nearly 35 million acres, two-thirds of which are in Florida and South Georgia. Loblolly pine is the leading species on the coastal plain of the Carolinas and Virginia, with shortleaf pine the dominant tree farther inland on the Piedmont. Virginia pine mingles with hardwoods in the eastern foothills of the Appalachians and forms a belt across Virginia and the Carolinas which extends on into North Georgia and Alabama. The rolling hills of Georgia, Alabama, Mississippi, Louisiana, and Texas are clothed with a mixed loblolly-shortleaf-hardwood forest. Loblolly pine in mixture with hardwoods is prevalent in southwest Arkansas, but in the mountainous part of the state it is replaced by shortleaf. Tennessee is

chiefly a hardwood state, although a narrow belt of pine extends along the western edge of the Appalachians into Kentucky. All together there are nearly 70 million acres of this loblolly-shortleaf-hardwood forest. Less important from a pulpwood standpoint are the Appalachian hardwoods, the scattered stands of upland hardwoods intermixed with pine, the bottomland hardwoods along the major rivers, and the Delta hardwoods of the Mississippi flood plain.

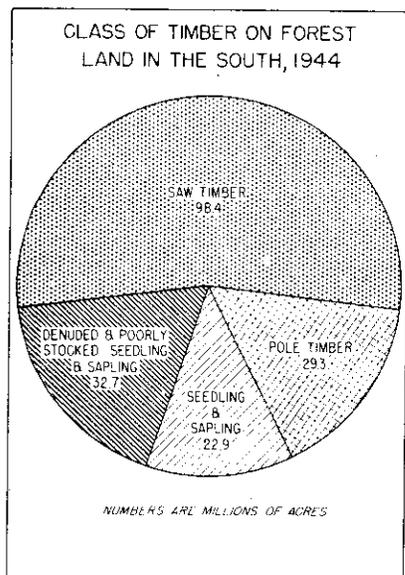


Figure 6

industries. The need is particularly acute in Florida, where 43 percent of the forest land is in this condition.

For the South as a whole, the average stand per acre of all sound trees 5.0 inches d.b.h. and larger is about 4.5 standard cords of pine and 6.0 cords of hardwood. Florida, with its large area of poorly-stocked timberlands, has only 2.7 cords of pine per average acre, while east Texas leads with slightly over 8.

The present condition of the timber stands reflects a history of inadequate fire protection and poor or destructive cutting practices balanced in part by the South's natural advantages in climate and soil, which stimulates the reproduction and growth of trees. Second-growth saw timber and pole timber have restocked 128 million acres (70 percent) of the forest land, but probably not over one-fourth of these stands are fully stocked. Seedling and sapling stands with more than 40 percent stocking occupy 23 million acres (fig. 6), but there are an additional 33 million acres that are either denuded or bear less than a 40-percent stocking of young trees. Thus, at the present time about 18 percent of the South's forest land is growing scarcely any timber. Putting this land back into timber production will go a long way toward providing the wood needed by expanding

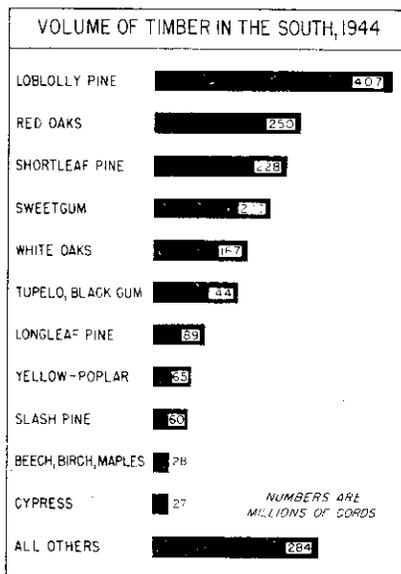


Figure 7

The total stand of all species amounts to 1.9 billion cords. Softwoods, chiefly the southern yellow pines, total 833 million cords, nearly one-half loblolly pine (fig. 7). The 1.1 billion cords of hardwoods run heavily to the smaller-sized trees, as hardwood saw timber totals only 144 billion board feet compared to 194 billion board feet of pine. A large part of the hardwood volume is in the various species of oak which are not generally favored as pulp- ing woods. However, almost one-third is sweetgum, blackgum, and tupelo -- species which are used to a small extent in many southern pulp mills and which have a total volume greater than the combined volume of shortleaf and longleaf pine.

To the uninitiated, a wood resource of nearly two billion cords might seem ample to support all present industries and those foreseeable in the near future.

I am sure you all realize, however, that industry, to be permanent, must depend upon the annual growth of wood, and at the present time this is only 50 million cords of softwoods and 44 million cords of hardwoods. Thus, in the South as a whole, the forests are growing about one-half cord per average acre per year, but only one-quarter of a cord of the desired softwoods. For comparison, you will recall I mentioned earlier that in parts of the Southeast the annual cut of pine pulpwood alone is one-tenth cord per acre per year.

This leads us to a consideration of timber drain, i.e., the amount of timber that is lost each year through such destructive agencies as fire, insects, disease, and windstorms, and the amount that is cut for conversion into useful products. The first of these, the wood lost through mortality, amounts to 13 million cords annually and could be largely eliminated under intensive forestry practices. Efforts to eliminate a large proportion of this loss justify considerable outlay, as the volume now lost each year is nearly 50 percent more than the 1946 cut of pulpwood.

The amount of timber cut for the various forest products has kept pace with the growth of our second-growth forests and in some areas has exceeded it. It is true that a considerable number of large sawmills have closed down in recent years, but their place has usually been taken by numerous portable mills. In 1946, for example, we found 30 percent more sawmills in four states of the Southeast than in 1942, and North Carolina alone contained over five thousand sawmills. There are indications that the cut of fuelwood is decreasing as home-owners and tobacco growers convert to coal and gas and as greater use is made of sawmill waste.

Meanwhile pulpwood production climbs and other products are being produced in increasing quantities. This is as it should be, for the timber resource of the South is one of its greatest raw materials, but care must be taken not to kill the goose that lays the golden egg. In 1944, the last year for which complete records are available, the total amount of wood cut from southern forests amounted to 46 million cords of softwoods and 36 million cords of hardwoods. Thus, the total drain upon the forests was 95 million cords, or about one million more than the growth. It was distributed by causes as shown in figure 8.

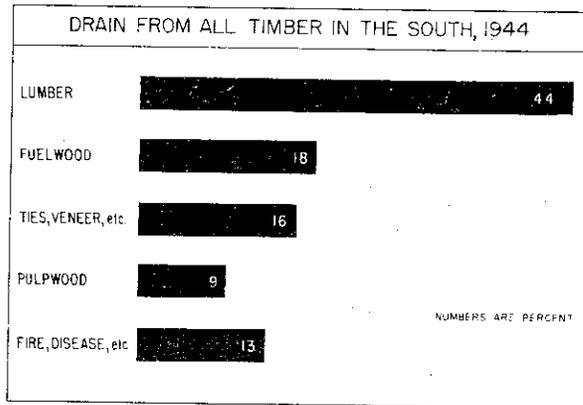


Figure 8

Although growth and drain of the total growing stock were in approximate balance in 1944, the situation is not entirely favorable for your industry. Both softwood and hardwood saw timber decreased over two billion board feet in 1944 (fig. 9), and with declining supplies of suitable saw timber the small portable mills intensify their competition for six- and eight-inch trees. Also, drain on the entire softwood growing stock was 2.6 million cords (fig. 10) greater than growth, while hardwood drain was 1.8 million cords less than growth. Since these differences represent the trend for at least the past decade, the effect is to build up the quantity of small hardwoods and reduce the volume of softwoods -- the species upon which you pretty largely depend.

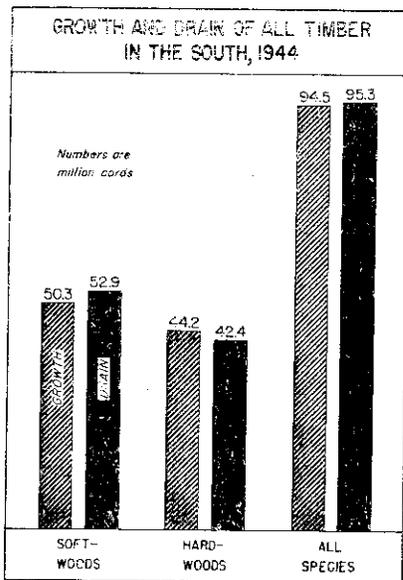


Figure 10

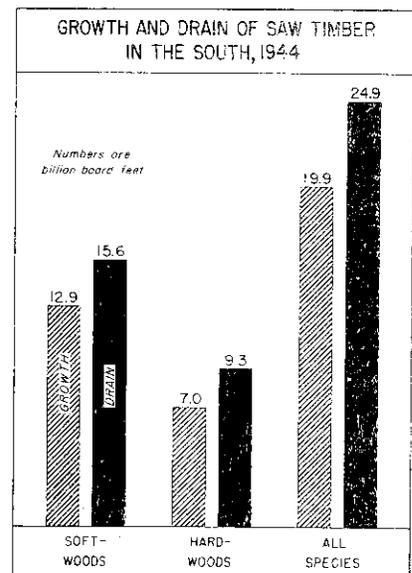


Figure 9

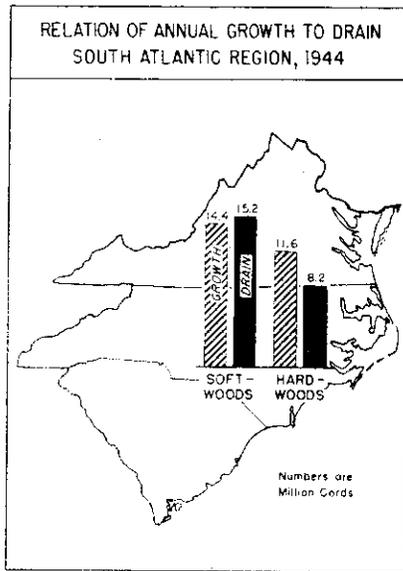


Figure 11

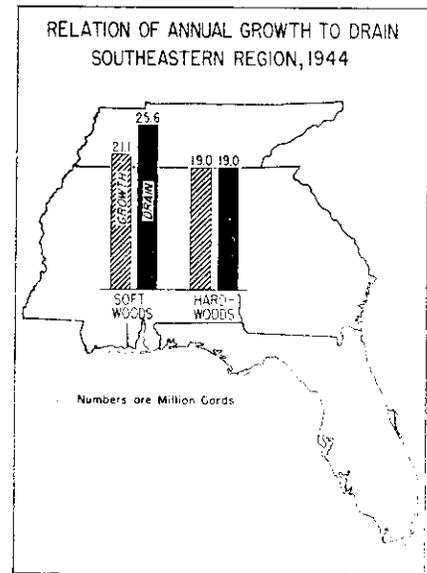


Figure 12

There are differences, of course, within the various regions of the South. The South Atlantic region (fig. 11), composed of the Carolinas and Virginia, follows the South-wide trend with softwood drain slightly exceeding growth and hardwood drain 3.5 million cords less than growth. In the Southeastern region (fig. 12), softwood drain was 4.5 million cords more than growth, but the hardwoods were in balance. The general trend is reversed in the west Gulf region (fig. 13), where softwood growth exceeded drain by 2.7 million cords in 1944 and hardwood drain exceeded growth.

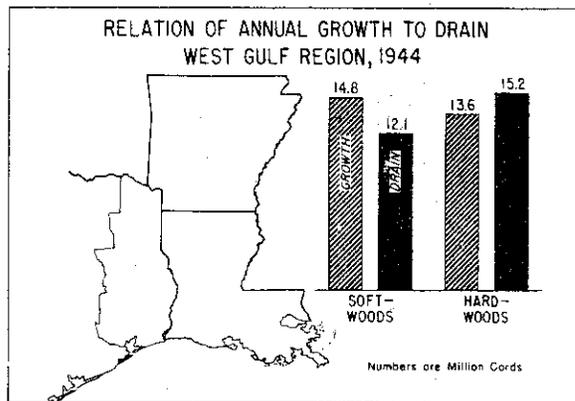


Figure 13

So far, this discussion of growth and drain has been based largely upon the changes in one year. What has happened over a longer period? The original Forest Survey provided us with estimates of timber volumes in all of our states except Tennessee. The date of these state surveys varies from 1932 in Mississippi to 1940 in Virginia. In 1945 the Forest Service, in cooperation with the American Forestry Association and State Forestry agencies, completed another extensive check of the timber resources of the South. This survey admittedly does not compare in accuracy with the original Forest Survey, but it does furnish an indication of trends that are enlightening. For instance, the total pine-growing stock has decreased

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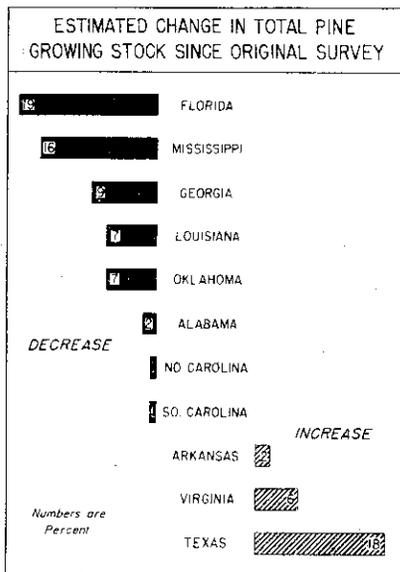


Figure 14

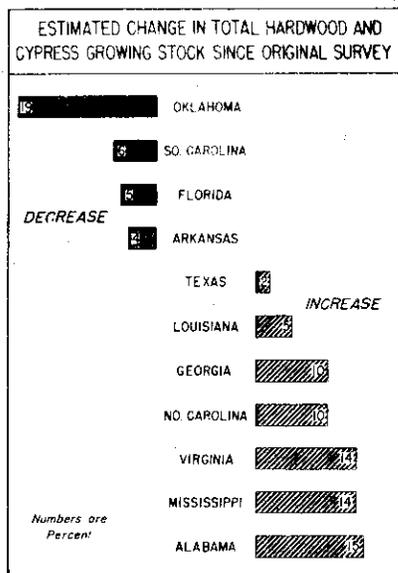


Figure 15

in all but three states, with Florida experiencing the largest reduction (fig. 14). Mississippi also has suffered a noticeable decline in pine timber. East Texas bears out predictions made at the time of the original survey and now has nearly twenty percent more pine, despite the addition of two large pulp mills in the meantime.

In the case of the hardwoods and cypress, the situation is practically reversed. Only four states have experienced a reduction in volume, with the major loss occurring in Oklahoma (fig. 15). Increases in the other states range up to 15 percent in Alabama.

Regional and state analyses fail to point up local situations that are really the major interest of all of you. I will not touch upon these except to give you the preliminary results of the resurvey the Forest Survey has just completed in a group of nine coastal counties in South Carolina, extending from Savannah to Georgetown. This area was surveyed originally about twelve years ago, and during that period the volume in pine trees 5.0 inches d.b.h. and larger has decreased about 10 percent, while that in hardwoods and cypress has increased about 15 percent. Saw timber of all species has decreased. This exemplifies the timber situation in the South today; a fairly consistent decline in the volume of trees of saw-timber size and in pine trees of all merchantable sizes; a marked rise in the volume of small hardwoods.

FUTURE POSSIBILITIES

In view of the present situation is it reasonable to assume that the South can support additional forest industrial capacity? I believe it is, providing we recognize the problems to be overcome and take aggressive action to solve them.

The most difficult period confronting us is in the immediate years ahead, as total drain now exceeds growth and wood requirements are increasing. In the face of this we need to increase the growth, and this can be done only through the slow process of building up our timber stands. Thus, we are caught between two horns of a dilemma; on the one hand cut more timber to supply industry, on the other leave more to grow.

There is no entirely satisfactory solution to this, but there should be no argument that we need to begin immediately a much more widespread application of better forestry practices, including protection, thinnings, selective cutting, and planting. Results, in the form of larger yields of timber, will be relatively slow, so there is need for other measures that will help to tide us over the next few decades.

These might include reducing the volume lost through mortality by more intensive protection and cutting practices that would salvage trees killed as a result of fire, wind, insects, disease, or suppression. Intensive efforts along this line might result in saving ten percent, or 1.3 million cords, of the wood now lost each year. Secondly, there are

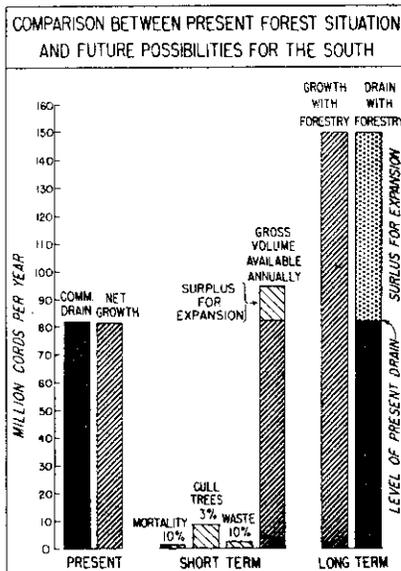


Figure 16

at least 300 million cords of sound wood in cull trees. If only 3 percent of this were cut each year, it would amount to 9 million cords. Part of the pine and gum could be used for pulpwood, but if necessary all of it could be cut into fuelwood, thus reducing the 30-million-cord annual fuelwood drain on sound trees. A third source of wood lies in reducing and making more effective use of logging and manufacturing waste that amounts to the equivalent of 26 million cords annually. Obviously, it is impossible to utilize all of this, but if only 10 percent were saved, we would have 2.6 million cords more wood. The net effect of these savings would be to eliminate the present drain deficit and increase our wood supply by 12 million cords annually (fig. 16).

If these measures were put into effect, they would reduce the pressure upon the existing sound-tree growing stock and allow the South time to increase the timber growth substantially by a widespread application of good forestry practices. Most of you are familiar with the job to be done. It includes bringing on-the-ground assistance to the 1.6 million small forest owners, establishment of adequate fire protection (at present one-half of the forest land receives either poor protection or none), reducing the eight-million-cord annual loss due to insects and disease, planting some part of the 33 million acres now poorly stocked or denuded, and general adoption of conservative cutting practices on that 60 percent of all land which is now subject to poor or destructive cutting. It is estimated that within 50 years measures such as these would increase the annual yield to 150 million cords, providing a surplus for expansion of nearly 70 million cords. Surely such a goal is worth striving for.

FOREST SURVEY REPORTS PUBLISHED BY SOUTHEASTERN FOREST EXPERIMENT STATION

Forest Survey Releases

- No. 1 - Forest Resources of the Northern Coastal Plain of South Carolina. 1939
- No. 2 - Forest Resources of the Piedmont Region of South Carolina. 1939
- No. 3 - Forest Resources of the Southern Coastal Plain of South Carolina. 1939
- No. 4 - Forest Resources of the Southern Coastal Plain of North Carolina. 1940
- No. 5 - Forest Resources of the Northern Coastal Plain of North Carolina. 1940
- No. 6 - Forest Resources of the Piedmont Region of North Carolina. 1940
- No. 7 - Forest Resources of the Mountain Region of North Carolina. 1941
- No. 8 - The Distribution of Commercial Forest Trees in North Carolina. 1941
- No. 9 - The Distribution of Commercial Forest Trees in South Carolina. 1941
- No. 10 - The Distribution of Commercial Forest Trees in Virginia. 1942
- No. 11 - Virginia's Forests. 1942
- No. 12 - The Forest Situation in the Coastal Plain of Virginia. 1943
- No. 13 - The Forest Situation in Piedmont Virginia. 1943
- No. 14 - Preliminary Estimate of 1942 Lumber Production in the Carolinas, Virginia, West Virginia, Kentucky, and Tennessee. 1943
- No. 15 - The Forest Situation in the Mountain Region of Virginia. 1943
- No. 16 - Wartime Lumber Production in the Appalachian Hardwood Region, January 1942-June 1944. 1944
- No. 17 - Wood Waste Available for Conversion to Ethyl Alcohol in the Columbia Area of South Carolina. 1944
- No. 18 - North Carolina Forest Growth and Drain, 1937-1943. 1945
- No. 19 - Approximate Forest Area and Timber Volume by County in the Carolinas and Virginia. 1945
- No. 20 - South Carolina Forest Growth and Drain, 1936-1943. 1945
- No. 21 - 1945 Pulpwood Production by County in the Carolinas and Virginia. 1946
- No. 22 - Southern Forests as a Source of Pulpwood. 1947
- No. 23 - 1946 Pulpwood Production by County in the Southeast. 1947

USDA Miscellaneous Publications

- No. 533 - North Carolina Forest Resources and Industries. 1944
- No. 552 - South Carolina Forest Resources and Industries. 1944