

The First Southern Forest Survey

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The passage of the McSweeney-McNary Act of 1928 authorized a nationwide inventory of the Nation's forests. In part, such data were required to develop new markets, and the need for such development in the impoverished South was great. The virgin forests of the South had been aggressively harvested and the land lay barren due in part to the tax policies in most Southern States, which taxed cutover land at higher values than other real estate (Fickle 2001). Second-growth forests on some of these cutover lands were the pride of early foresters, but their nature, usefulness, and location were largely unknown.

In the late 1920s, timberland owners and managers began to understand that the second-growth pine (*Pinus* spp.) forests developing across the South could be profitable. A number of pioneers began to promote reforestation of cutover forests. Much of the initial effort was due to individuals such as Henry Hardtner at Urania Lumber Company, Col. W.H. Sullivan at Great Southern Lumber Company, and Austin Cary of the U.S. Department of Agriculture Forest Service (Carter and others 2015). However, products that could be made profitably from young pine trees were needed. Dr. Charles H. Herty, a noted chemist in Georgia, demonstrated that newsprint could be made from young southern pines. Herty began a promotional effort to convince southern landowners that there was value in these young stands (Reed 2010). The next step was to determine if there was sufficient raw material to support paper mill construction; hence, the first survey of the South's forests.

The Southern Forest Survey was undertaken to answer the questions of those interested in investing in forestry (Eldredge 1934, 1935). Responsibility for the survey of the southern forests in the Coastal Plain and Lower Mississippi River Valley was assigned to the Forest Service's Southern Forest Experiment Station (SOFES), headquartered in New Orleans. The challenge was huge—the SOFES was to conduct an inventory of forest resources on more than 200 million acres stretching from the Atlantic coast of South Carolina to the prairies of Texas.

Planning for the survey began in 1931 (Lentz 1931), as the survey was more than just a "super-sized" timber cruise. The fivefold objective of the survey was to:

- Inventory the present supply of timber and other forest products
- Learn the rate at which this supply was being increased through growth
- Determine the rate at which this supply was being diminished through industrial and local use, windfall, fire, and disease
- Determine the present requirements and probable future trends for timber and other forest products

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- Correlate these findings with existing and anticipated economic conditions so policies could be formulated for the effective use of land suitable for forest production (Eldredge 1934)

Station Director E.L. Demmon assembled a well-qualified staff to develop methods for conducting the survey and for recording and analyzing the data. He needed, however, an exceptional individual to lead and manage the enormous field operation. He soon realized that the most qualified person with the needed background and southern experience was Inman F. “Cap” Eldredge (Barnett 2016). Demmon assigned the task to Eldredge, who was fully capable of leading the monumental effort to determine the status of the South’s forests.



Cap Eldredge was effective in advocating the value of the Forest Survey.

CAP ELDREDGE AND THE FIELD WORK

Eldredge had studied engineering at Clemson University but had entered the forestry program at Biltmore Forest School in 1903. After he was hired by the Forest Service in 1906, he worked in the West for a few years. In 1909, he was temporarily assigned to one of the newly created national forests in Florida. In the absence of the named forest supervisor, Eldredge served in that capacity for 8 years, instituting policies for administering about half a million acres of timberland (Maunder 1977). After the outbreak of World War I, Eldredge was commissioned and served in the U.S. Army as a captain in the 10th Engineers (Forestry), a pioneer forestry unit, in southern France. There, he got his nickname “Cap”, which was used the rest of his life (Anon. 1963). After the war, Eldredge returned to the Forest Service, this time at the Washington Office. However, his assignments required frequent travel.

With a young family, Eldredge wanted less travel. In early 1926, he assumed the responsibility of managing Superior Pine Products Company’s 208,000-acre Suwannee Forest in the longleaf pine (*P. palustris*) region near Fargo in southeastern Georgia. The town of Fargo was abandoned by the previous owner and was purchased by Eldredge’s company. Most of the employees worked in naval stores or turpentine chipping camps and were a tough lot (Maunder 1977). Fargo had no law enforcement and was known as “Bad Man’s Fargo.” Not surprisingly, it became a sump into which all the hard characters of Florida and Georgia ended up when pursued by the law.

Under Eldredge’s guidance, Fargo was tamed, and the Suwannee Forest became a proving ground for many forest practices including planting, thinning, and prescribed burning. Eldredge left the Suwannee Forest position in 1932 when he was selected to become the Station’s regional survey director.

A technical forester who had earned a national reputation, Eldredge had a remarkable ability for understanding and knowing how to work with people on all levels. For example, Maunder (1977) quoted Eldredge as saying, “...turpentine operators...were the greatest, ablest and most energetic set of wood-burners that the Lord has ever smiled upon.” A native of South Carolina, Eldredge was one of few southerners who at the time had gone into forestry (most foresters in the South at the time were northerners). So, he better knew the South’s customs and way of life (Wakeley and Barnett 2016).

Conducting the Southern Forest Survey was a massive undertaking for the time. Led by Field Manager Mark Lehrbas, the field work was done by 25 three-man crews, each of which consisted of an expert timber cruiser and two assistants. Because of the Great Depression, many of the best timbermen in the South were available to work in these crews. The crews inventoried areas to be covered by the survey without regard to land occupancy or ownership. Quarter-acre sample plots were laid out at intervals of 660 feet on parallel compass lines 10 miles apart. On each sample plot, the trees were counted and measured, and classified by diameter classes and species. Growth rates of individual tree species, cull percentages, merchantable lengths, and other special data were obtained on randomly selected sample trees located on the sample plots. Forest growth and forest utilization specialists were assigned to conduct growth and utilization studies in each of the survey units (Eldredge 1934). Crews worked ably and vigorously under difficult conditions. For example, it was reported that swamps near Grand Lake and Morgan City, LA, were largely inventoried on the cruisers' hands and knees (Maunder 1977).

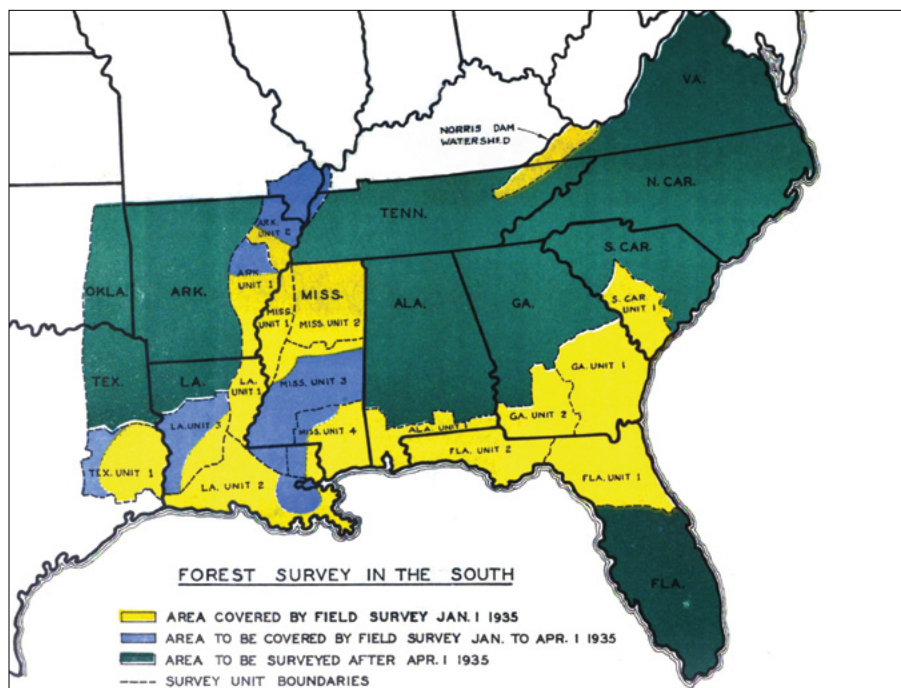
The survey work was carried out in geographic units of 4 to 10 million acres. Unit boundaries were established within a given State where the timber stand conditions, as well as factors governing social, economic, and industrial activities, were as uniform as possible throughout the unit. In southern Alabama, for example, a 4.5-million-acre survey unit was established to include most of the commercial range of the longleaf-slash pine timber type within the State. This unit also included most of the naval stores operations in Alabama.

The Southern Forest Survey began just as an interest in forestry was developing, and forest industries became its best supporters. While the survey was underway, Eldredge would meet with user groups to determine what kind of information they needed from the survey. For example, the pulp and paper folks wanted volume in cords as well as board feet. They also wanted data by species, sizes, geographic location, and stands per acre (Eldredge 1935).



Above: Mark Lehrbas, Field Manager for the measurement of field survey plots.

Left: 1935 map of the Forest Survey measurements units assigned to the Southern Forest Experiment Station.



Funding for this massive undertaking was primarily supplied via several of President Franklin Delano Roosevelt's "New Deal" programs. Amazingly, the field effort was completed in 4 years, although analysis and publication of the data took much longer. Eldredge's goal was to get some of the information out as quickly as possible. To do this, 40 people in New Orleans tabulated the data using the latest computing equipment available (Barnett 2018).

PHILIP R. 'PHIL' WHEELER AND THE DATA COMPILATION



Phil Wheeler (right) with Dr. R.S. Campbell, an early range scientist in the Southern Forest Experiment Station.

While Eldredge, as Regional Survey Director, oversaw the conduct of the Southern Forest Survey, he did not have the training or expertise to develop plans for the survey's fieldwork or for analysis of the data collected. Philip R. Wheeler, Computing Chief, led the analysis of the data, and Robert K. Winters, the Survey's Executive Officer, was primarily responsible for the publication of the data in progress reports known as Forest Survey Releases (Eldredge 1935).

Wheeler, a native of Grand Rapids and 1930 graduate of the University of Michigan, arrived at the Station in 1931 and joined the group planning the survey. Wheeler used guidance from Station Statistician Roy A. Chapman to develop practical field techniques and effective data analyses. This resulted in quality survey products that forestry investors needed to make decisions.

Wheeler was energetic, tenacious, and thorough in approach to the projects that came his way. Tall, thin, and brisk of speech, he gained wide respect for his leadership. He led a staff of 19 statistical experts and skilled computer specialists in summarizing and analyzing the tremendous mass of field data gathered in each survey unit by the field crews. For this computation work, electric sorting and tabulating machines were required. In the analysis of the data, it was estimated that more than half a million tabulating cards were used. The punched cards were retained to permit the reanalysis of survey data for special reports other than those originally planned (Eldredge 1934).

Wheeler later pioneered the use of computers in analysis of the data from the survey and led development of forest survey technology following World War II. In effectively providing data through his analysis and distribution of forest survey results, Wheeler helped foster the development of forest industry in the South.

PUBLICATION OF THE FIRST SOUTHERN FOREST SURVEY RESULTS

The amount of data was so massive that it was 1946 before all the results of the first Southern Forest Survey were analyzed and published. A steady stream of information came from the data analyses, and the Station published 55 Forest Survey Releases during the period from 1934 to 1946 (SFES 1946). When an analysis of survey data was completed for any unit, a preliminary report provided the following essential information (Eldredge 1934):

- Area classified as cultivated agricultural land, idle and abandoned agricultural land, pasture, railroads and other rights-of-way, towns, villages, waterways, marsh, and prairies
- Area by forest conditions and forest types, such as stands of old-growth longleaf pine, second-growth slash pine (*P. elliottii*), clear-cut loblolly pine (*P. taeda*), etc.

- Stand and stock tables showing, for the average acre, the number of trees and volume of trees in the various diameter classes
- Volume of new sawtimber by species, number of poles divided into three or more broad groups based on the American Standard Association pole classification system, number of pilings by length classes, volume of pulpwood and fuelwood, and an estimate of the present and potential supply of longleaf pine stumps for wood naval stores production
- In the naval stores region, the number of crops of turpentine cups in operation at the present, and the number of additional cups that could be hung on trees of operating size, and the future supply of timber available for turpentine
- Forest growth data
- An estimate of the rate at which existing timber supplies were being diminished through industrial use and natural losses

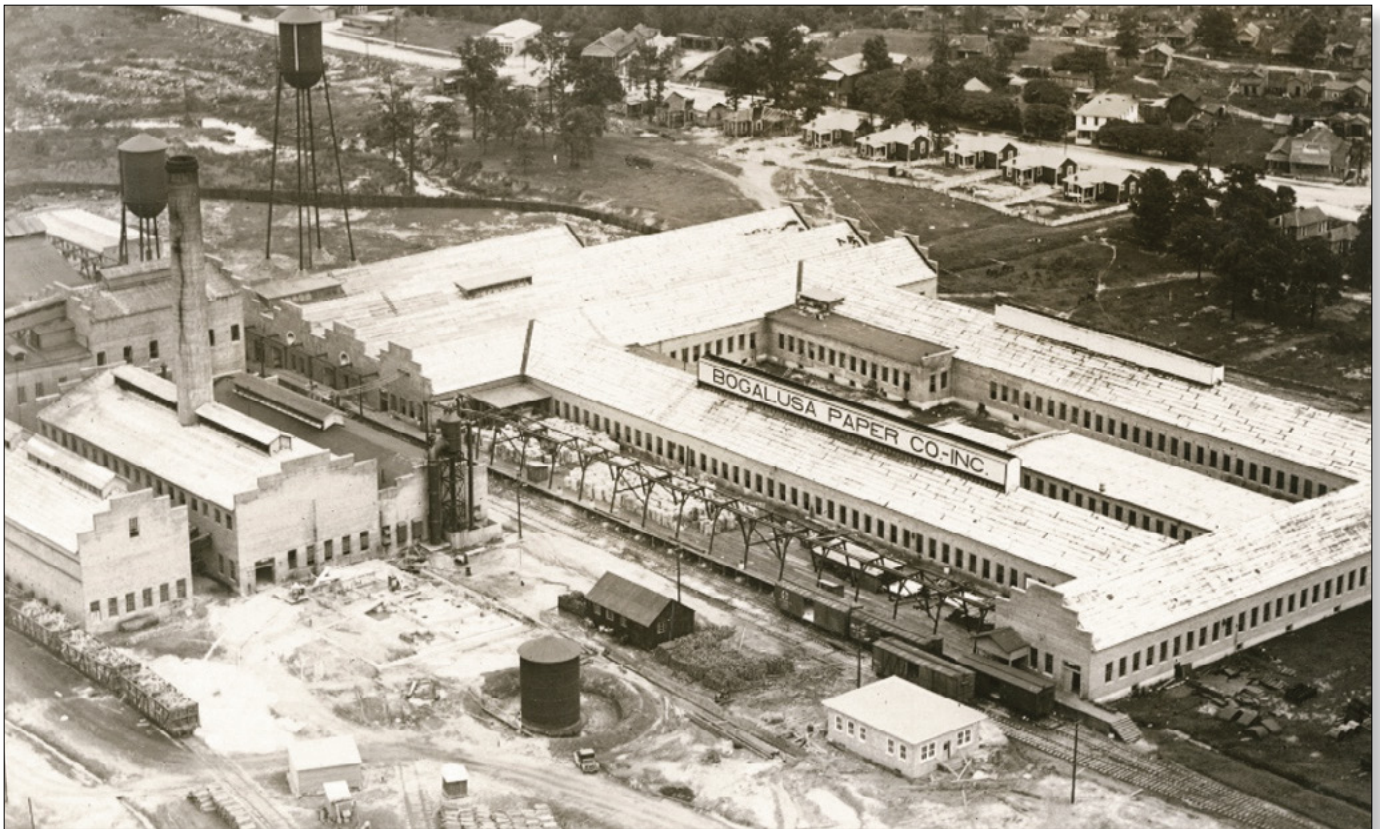
In addition, Eldredge spoke at professional forestry meetings and wrote articles for journals on the status of the survey (Eldredge 1934, 1935, 1942). He became a promoter of the potential of forestry in the South and encouraged industrial development (Eldredge 1937, 1939a, 1939b). Others involved in analysis of the survey data published articles touting the potential of the new forests to provide raw material for forest industries (e.g., Demmon 1943, Lentz 1931, Mesavage 1944, Winters 1937).

INDUSTRIAL IMPLICATIONS OF THE FIRST SOUTHERN FOREST SURVEY

The Southern Forest Survey probably had more to do with the rapid expansion of southern forestry than any other project (Eldredge 1952). After all, until the survey results were published in the 1930s and 1940s, it was not fully realized that a new forest of pine, hardwoods, and cypress (*Taxodium* spp.) was emerging from many of the cutover lands and abandoned farms of the South. Lumbermen, who were transitioning from old-growth timber to smaller and often lower quality logs from second growth, were encouraged. As they found ready markets for their timber products, lumbermen also realized that the new crop of trees was growing fast enough and of suitable quality. Besides introducing an optimistic note for a worried industry, this effort provided much-needed boosts for fire protection, longer forest land tenure, and forestry and foresters (Eldredge 1952).

The results of the survey had another and perhaps more significant result. As Eldredge later noted "...the amount of timber we had, how fast it was growing, how universally it was distributed, and what state of development it had reached... and that's what brought the pulp and paper industry south within the next few years" (Maunder 1977). The South's fledgling pulp and paper industry saw new opportunities for mills across the region as the first Southern Forest Survey identified locations where forest conditions would support their development. In the next 15 years, the number of plants increased fivefold and requests of areas that would support mills continued to develop (Eldredge 1935).

When the pulp and paper industry built its southern operations, a major aspect of the process was land acquisition to assure adequate pulpwood supplies.



One of the South's first paper mills using wood from young pine stands was developed by the Great Southern Lumber Company at Bogalusa, LA. (Photo courtesy of the Louisiana State University Archives)

Timberlands were purchased from lumber companies, land companies, and other private owners. Substantial areas were leased to supplement supplies produced on company land and acquired on the open market.

Yet for all these positive aspects of an expanding pulp and paper industry, concerns remained that this growing segment would follow the footsteps of the lumber industry, cutting over the lands and then moving on. F.A. Silcox, fifth Chief of the Forest Service, warned that building “new pulp and paper plants upon the thousands of lumber and other forest industries already established there means that, without some form of intelligent forest management, certain southern forest areas may be left in an unproductive condition for generations” (Fickle 2001). Silcox argued that indiscriminate cutting for pulp and paper would not leave enough sawtimber for the lumber industry.

To overcome many of these worries, the pulp and paper industry formed the Southern Pulpwood Conservation Association in 1939. The association sought to develop specific rules regarding pulpwood cutting and forest management and to undertake public education to promote forest conservation. The association also established pilot forests to demonstrate good forestry practices and assisted individual landowners in obtaining technical assistance from conservation foresters on matters such as timber harvesting and reforestation (Fickle 2001).

Most pulp and paper companies also hired conservation foresters who worked with private landowners to promote better harvesting practices and forestry activities such as fire prevention, tree planting, and thinning. Longtime consulting forester Zebulon White noted that the Southern Pulpwood Conservation Association “was one of the first ones that insisted that pulp

companies with their land holdings practice acceptable forestry. The big seed tree programs—all of that started when they got together” (Fickle 2001). Walter Damtoft (quoted in Maunder 1977) stated that “the pulp and paper industry has been a great boon to the South. The consciousness of the real value of timber came with the pulp and paper industry.” In the early 1950s, Lyle F. Watts, Chief of the Forest Service, said,

it was a great day for forestry in the South when paper from southern pine was made practical. That development brought the demand for small-sized trees that made intensive forestry possible, the dream of practicing foresters ...

THE FIRST SOUTHERN FOREST SURVEY’S LEGACY FOR THE SOUTHERN FOREST EXPERIMENT STATION

Forest Survey Releases were eagerly sought, and the Southern Forest Survey’s growing reputation greatly enhanced that of the Station. Because of this, it could be argued that the Southern Forest Survey probably had more to do with the expansion of southern forest industry than any other project of the Station and greatly contributed to the development of sustainable forestry in the South (Barnett and Carter 2017). The success of the first Southern Forest Survey established the credibility of the Station in providing data to support the needs of forest industry and resulted in the need for additional periodic forest surveys, now known as the Forest Inventory and Analysis program. The Station’s expertise in forest mensuration, developed in part for the Southern Forest Survey, set a precedent that continued for decades (Barnett and others 2023).

The first Southern Forest Survey also benefited those who worked on it. For their years of dedicated and fruitful service, Eldredge and Wheeler received many professional accolades. Eldredge was elected as a Fellow in the Society of American Foresters in 1942. In 1956, he received the Gifford Pinchot medal for distinguished service to forestry. During World War II, Wheeler served in important U.S. Coast Guard commands such as a Captain of the Port of New Orleans and overseas duty in the Pacific. In 1947, Wheeler was appointed Chief, Division of Forest Management Research, and in 1952 was promoted to Chief of the Division of Forest Economics for the Station (Anon. 1970). Later, Wheeler received the U.S. Department of Agriculture’s Superior Service Award and was awarded the Schlich Medal and fellow status by the Society of American Foresters (Anon. 1970).

Both men also continued serving the forestry community after their retirements. Eldredge worked as a consultant advising industry on optimum locations for establishing wood processing facilities and became a proponent for the rapidly developing pulp and paper industry in the South (Eldredge 1952). Upon his 1962 retirement from the Forest Service, Wheeler worked for the Southern Pine Association as analyst for the Southern Forest Resource Committee. In this role, he led development of the famous document entitled *The South’s Third Forest* (Wheeler 1970), which laid out what has been described as the most ambitious program for timber resource development in history (Barnett 2016). This report called for doubling timber growth in the South prior to the year 2000 to meet anticipated needs for forest products, recreation, and other essentials, resulting in incentives and assistance for small landowners who held 70 percent of the region’s forest land (Wheeler 1970).

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