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STATUS OF THE LONGLEAF PINE FORESTS OF THE WEST GULF COASTAL PLAIN

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Abstract.-Data from the USDA Forest Service, forest inventory and analyses permanent field plot were used to track changes in longleaf pine (*Pinus palustris* Mill.) communities in Texas and Louisiana between 1985 and 1995. The decline of longleaf forest has continued in Louisiana. Texas had much less longleaf type in 1985, but unlike Louisiana there has been a small increase in the area occupied by longleaf over the last 10 years. This was due to an increase of longleaf forest on public and forest industry owned lands. The greatest losses in the region over the last decade were from private lands.

Longleaf pine communities once covered extensive areas of the West Gulf Coastal Plain. Texas and Louisiana were thought to have had the densest stands over the most extensive areas. Longleaf stands often failed to replace themselves following cutting and acreage declined rapidly. By 1935 much of the virgin longleaf was gone and losses continued through the following decades.

Intensive exploitation of longleaf forests, with little regard for regeneration, began in Virginia and North Carolina during colonial times. Mohr (1888) very early concluded that the prospect of maintaining the longleaf forest seemed hopeless. Longleaf stands often failed to replace themselves following cutting as the more competitive loblolly pine (*Pinus taeda* L.) and hardwoods captured the sites. Feral hogs contributed to the decline by feeding heavily on longleaf pine seed and seedlings (Schwarz 1907).

Longleaf pine forests originally covered extensive areas of the Gulf Coastal Plain from Texas to Alabama (Wahlenberg 1946). In the West Gulf Coastal Plain the longleaf type occurred in 19 parishes in Louisiana and 15 counties in adjacent southeast Texas (Little 1971). Mohr (1896) reported longleaf acreage of 1,625,000 north of the Red River and 2,668,000 south of the river in Louisiana and 2,890,000 in east Texas. The West Gulf Coastal Plain region was the last of the longleaf areas to be intensively logged (Landers et al. 1995). From an estimated pre-logged acreage of 7,183,000 it was reduced to 1,642,400 (Eldredge 1937; 1938; Cruikshank & Eldredge 1939) by 1935.

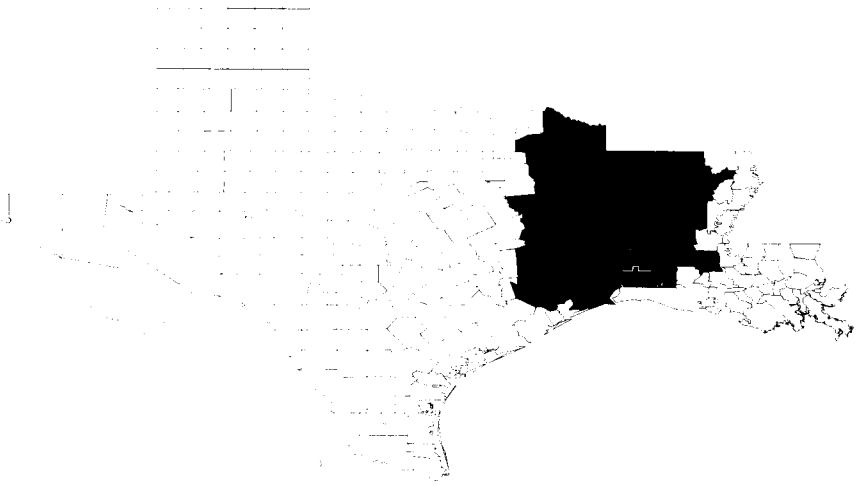

Figure 1. Counties of the West Gulf Coastal Plain surveyed for longleaf pine type.

The decline of longleaf continued through ensuing decades of the 1900's (Croker 1987). Harvested stands were often regenerated to other pines because of poor success from artificial regeneration and the perceived slower growth rates of longleaf pine. As second growth longleaf forests were harvested they were often converted to slash (*Pinus elliottii* Engelm.) or loblolly pine. This decline of the longleaf dominated forests across the South has been documented periodically for the last 50 years (Wahlenberg 1946; Sirmon & Dennington 1989; Kelly & Bechtold 1990). In Louisiana there was a 76% decline in longleaf type between 1955 and 1985 and in Texas a 82% loss for this period. This paper reports the changes in longleaf forest type for the West Gulf Coastal Plain since 1985.

METHODS

This report is based on information gathered by the Forest Inventory and Analysis (FIA) units of the Southern Research Station, USDA Forest Service. It covers the area designated as the Northwest and Southwest survey units in Louisiana and the Northeast and Southeast units in Texas (Figure 1). The Forest Service conducted the first broad-scale, objective inventories in the 1930's. Although minor changes have been made in data collection procedures the same plots have been used to track changes in forest inventory since 1955. Data in this report for

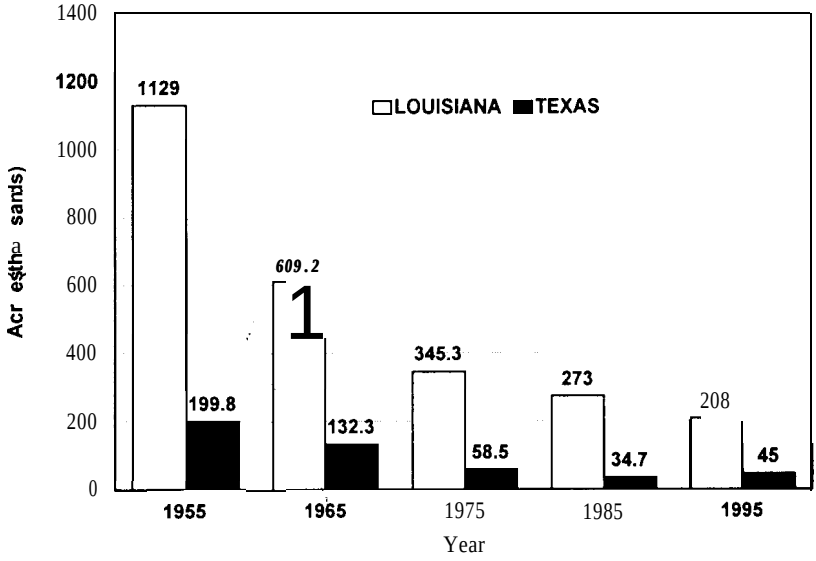

Figure 2. Loss of longleaf pine type in West Gulf Coastal Plain.

1955 to 1985 are adapted from Kelly & Bechtold (1990). Data for 1995 are from surveys that were completed for Louisiana in 1991 (Rosson 1995) and for Texas in 1992 (Miller & Hartsell 1992).

Personnel conducted these inventories on permanent sample plots systematically distributed across timberland to obtain a proportionate sample of all major forest types, sites, and ownership classes in the region. Each sample plot represented a specific number of equivalent acres of timberland from the entire population. This number, termed the expansion factor, had an average value of 3,500 acres for sample plots located in longleaf pine forest type in the West Gulf Coastal Plain. Acreage totals in this report were obtained by summing the expansion factors for all plots where longleaf pine comprised more than 50% of the tree cover. Thus, plots with some longleaf pine, but dominated by hardwoods or other pines, based on total basal area, are not included in this paper.

Data for the 1985 and 1995 survey cycles was collected using the following system. At each sample location, a multi-point cluster plot was used to collect data on a representative sample of trees. Trees 5.0 inches in diameter and larger were selected using a basal-area factor of 37.5 square feet per acre. Trees smaller than 5.0 inches were tallied on small, fixed plots that shared common point centers with each variable

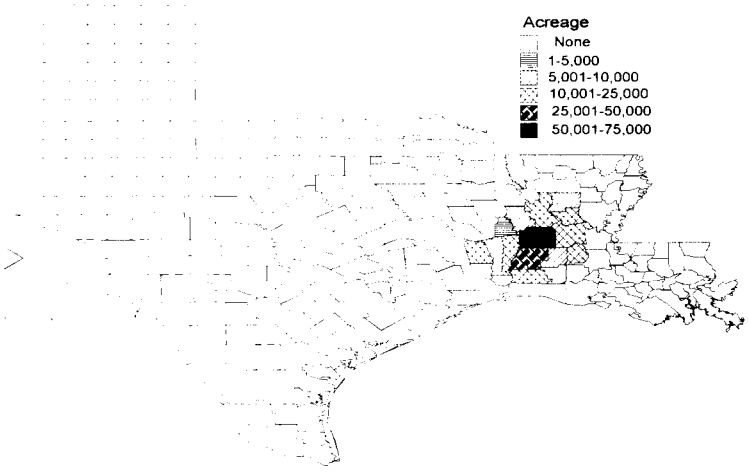

Figure 3. Distribution of longleaf pine in West Gulf Coastal Plain in 1995.

radius point center. Plot-level classifications used in the study were either computed or assigned in the field. Stocking-related items, such as forest type and stand size were assigned in the field and verified during data editing and compiling for consistency with actual tree data collected. Variables such as site type and stand origin were assigned based on observations during the data collection phase.

The numbers used in this paper are based on sample plots and not a complete inventory. As with any sampling, the probable error of the estimated mean increases as sample size decreases. Figures for individual counties have the largest sampling errors and are the least reliable. Estimates of sampling error are given in the cited FIA references. Also some counties shown as having no longleaf pine type left could have small amounts of longleaf pine remaining, but they have fallen below the threshold of detection of the sampling level.

RESULTS

The decline of longleaf forest in the West Gulf Coastal Plain has continued in Louisiana, which lost an additional 65,000 acres over the last 10 years (Figure 2). In the most recent survey only 10 of the parishes still contained detectable amounts of longleaf forest type (Figure 3). The greatest remaining concentration of longleaf type is in Vernon and Beauregard parishes. Texas had very little longleaf type left by 1985, but unlike Louisiana there has been an increase in the area

Table 1. Recent changes in longleaf pine acreage in the West Gulf Coastal Plain by ownership and state.

Ownership	Louisiana		Texas	
	1985	1995	1985	1995
		-Acres-		
Public	71,700	73,600	6,100	11,100
Private	103,100	65,600	17,200	11,100
Forest Industry	98,200	68,800	11,400	22,800
Total	273,000	208,000	34,700	45,000

occupied by longleaf over the last decade. However, of the 15 Texas counties in the original range according to Little (197 1), only four still have detectable amounts of longleaf forest. Most of the longleaf forest in the West Gulf Coastal Plain is still from natural regeneration, 75 % in Louisiana and 73% in Texas.' The number of acres of planted stands is increasing, however.

Longleaf forests have remained stable on public lands in the West Gulf Coastal Plain of Louisiana while increasing in Texas over the last decade (Table 1). Forest industry has less longleaf forest in Louisiana now compared to 1985, but in Texas they have increased the amount of longleaf. As is true across the range, there has been a continued loss of longleaf from privately owned lands during the last 10 years in both Louisiana and Texas. The loss on private lands is less of a problem in Texas because private owners only control 25% of the remaining longleaf forest. Forest industry controls 50% of the remaining longleaf area and the other 25% of the longleaf forest is in public ownership. In Louisiana however, the longleaf-containing area is equally divided between forest industry, private and public ownership with each controlling about one third. Most of the current longleaf is larger, sawtimber sized trees in both Louisiana (81%) and Texas (64%) (Table 2). Longleaf reproduction in the seedling and sapling size classes occupies only 13 % of the longleaf areas.

DISCUSSION

Of the 74 million acres of pre-colonial longleaf forest (Frost 1993) 4% were in Texas and 6% in Louisiana west of the Mississippi River. Thus the West Gulf Coastal Plain region once contained 10% of all the longleaf habitat. In 1995 Louisiana had 7% of all remaining longleaf type and 4.8% of its original longleaf acreage, but Texas had only 1.5 % of its original amount. Therefore, other than Virginia, which has lost

Table 2. Current (1995) distribution of longleaf pine in West Gulf Coastal Plain by tree size and state.

Size Class	Diameter Class (in.)	Louisiana	-Acres-	Texas
Seedlings & Saplings	< 5	27,000		5,300
Poles	5-9	12,400		11,100
Sawtimber	> 9	168,600		28,600
Total		208,000		45,ooo

virtually all of its longleaf forest (Outcalt & Sheffield 1996) Texas is the state with the greatest longleaf habitat loss. Although, there has been a small recent increase in acreage, longleaf type was still only detected in one fourth of the counties it originally occupied in Texas. This is especially critical because the vegetation of the longleaf community of Southeast Texas is different from other regions (Marks & Harcombe 1981; Harcombe et al. 1993). Thus, a distinct type of longleaf habitat has been drastically reduced in amount and distribution.

There has been an encouraging increase in longleaf forest in Texas over the last decade. About half of this increase can be accounted for by new plantings, as indicated by the existence of 5,300 acres in the seedling/saplings size class. This increase resulted from a variety of reasons including the recognition that longleaf pine can be successfully regenerated by natural or artificial methods (Croker & Boyer 1975; Dermington & Farrar 1983; Barnett et al. 1990). Research has also shown that longleaf can produce yields comparable to other southern pines and will out-perform them on xeric sites (Schmidtling 1987; Outcalt 1993). Longleaf also has the advantage of producing high-quality timber useful for high valued products (Landers et al. 1995). In addition longleaf pine is highly resistant to fire and has fewer disease and insect problems than other southern pines. Recently there has also been a much wider appreciation for the habitat these longleaf forests provide (Means & Grow 1985; Noss 1989) and the diversity they contain (Hardin & White 1989; Walker 1993).

The noted increase in longleaf in Texas since 1985 has occurred on publicly owned and forest Industry controlled lands. A predominance of larger trees as shown in Table 2 seems to be inconsistent with this recent increase in longleaf type. However, regeneration of areas to longleaf pine is only partially responsible for the increases in longleaf type in Texas. The remaining 5,000 acres, that can not be accounted

for by plantations, likely resulted from management practices such as selective harvesting or timber stand improvement cuts that favored longleaf and removed hardwoods. Prescribed burning can also favor longleaf pine over other species. Collectively these management practices are resulting in longleaf pine dominating a few more acres.

Loss of longleaf habitat from private lands is a continuing process across the entire natural range. A majority of the remaining longleaf in the West Gulf Coastal Plain is aging second growth of the sawtimber size class. Because of the increasing value of this material there is increasing economic incentive for private individuals to harvest such stands. Availability of pertinent information would allow landowners to make informed choices and could be used to encourage the regeneration back to longleaf following harvest of these stands. The concerns and motivations of these private owners must be addressed if one hopes to maintain the longleaf forest they presently own in the West Gulf Coastal Plain.

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