

VEGETATIONAL COMPOSITION OF THE UPPER BARATARIA BASIN SWAMP, LOUISIANA

Vast virgin stands of baldcypress (*Taxodium distichum*) once existed in Louisiana, but extensive logging from 1890 to 1925 eliminated all large stands of virgin baldcypress timber. Some virgin baldcypress trees can still be found throughout the state, but, in general, forested wetlands in Louisiana today are covered with second-growth timber. Water tupelo (*Nyssa aquatica*), underutilized as a timber resource, is actually a much more common member of the forest community than baldcypress.

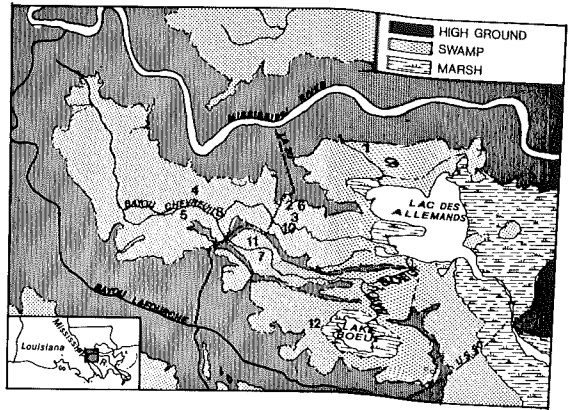
The upper Barataria basin contains 697 km² of swamp forest and contains evidence of old logging canals and logging operations still visible on aerial photographs of the area. Conner and Day (1976) and Conner *et al.* (1981) have conducted vegetational studies in this swamp but their studies were confined to three sites in the central portion of the basin and swamp. In this report we describe and quantify the tree species composition over a much larger area of the Barataria swamp.

METHODS

The point-center quarter method (Cottam and Curtis 1956, Ashby 1972) was used to determine tree species composition of individuals > 2.5 cm diameter at breast height (dbh) at 12 sites within the swamp forest (Fig. 1). The sites were chosen by looking at available maps and aerial imagery. Accessibility was a factor in choosing all sites, since most areas had to be reached by boat. All transects were begun 50-100 m away from the channel to avoid bias caused by the effect of spoil banks or natural

levees.

At each site a series of points 20 m apart were sampled along a transect. A minimum of 20 points was selected (Cottam and Curtis 1976) and, in all but two cases, more than 30 points were evaluated. In all, 616 points were sampled. Density, frequency of occurrence, and basal area were calculated for all tree species on each transect.



1. Map of the Barataria swamp forest showing location of the twelve transects.

RESULTS AND DISCUSSION

The total number of tree species at each study site varied from five on the wettest transects (4 and 12) to seven on drier transects (1 and 2). For a complete listing of species in the area, the reader is urged to consult Conner and Day (1976). Four species are clearly dominant in this swamp forest: baldcypress, water tupelo, ash (*Fraxinus* spp.), and Drummond red maple (*Acer rubrum* var. *drummondii*). The density, basal area (BA), and frequency of these species is presented by transect in Table 1. The other species are given as a sum of all, since individually each represents such a small BA.

Baldcypress and water tupelo are the most common associates found in this swamp forest. The individual BA of

Table 1. Density, basal area (m²/ha), and frequency of occurrence for the dominant species found on 12 transects in the Barataria swamp forest.

SPECIES	TRANSECT NUMBER											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Taxodium distichum</i>												
1. trees/ha	10	10	73	42	74	188	51	52	48	524	115	795
2. BA	0.4	0.1	5.1	3.1	3.6	11.1	1.9	4.1	4.1	22.0	4.2	33.8
3. frequency*	0.8	1.2	7.0	2.5	4.2	12.0	5.0	4.9	5.0	40.2	8.7	57.0
<i>Nyssa aquatica</i>												
1. trees/ha	--	17	83	126	164	114	334	381	377	382	593	391
2. BA	--	0.6	5.0	9.0	10.7	5.6	11.5	15.4	19.9	14.0	36.6	26.8
3. frequency*	--	2.1	8.0	7.5	9.4	7.2	32.5	35.8	39.2	29.3	45.0	28.0
<i>Fraxinus</i> spp.												
1. trees/ha	117	220	173	211	57	436	64	9	144	93	33	--
2. BA	1.3	5.1	3.8	7.8	0.4	8.9	1.4	<.1	3.9	0.6	0.6	--
3. frequency*	10.0	26.6	16.6	12.5	3.2	27.9	6.2	0.8	15.0	7.1	2.5	--
<i>Acer rubrum</i> var. drummondii												
1. trees/ha	583	227	246	548	647	502	527	407	337	254	560	181
2. BA	7.0	3.1	2.6	7.4	4.8	4.7	7.9	10.0	4.3	0.9	1.2	1.3
3. frequency*	50.0	27.4	23.6	32.4	37.2	32.1	51.2	38.2	35.0	19.4	42.5	13.0
Other species												
1. trees/ha	456	353	466	760	795	324	53	216	56	50	17	28
2. BA	7.2	5.2	6.6	5.1	12.6	4.8	0.2	2.1	0.5	0.8	<.1	<.1
3. frequency*	39.1	42.7	44.8	45.1	45.8	20.7	5.2	20.3	5.8	3.8	1.3	2.0
TOTAL												
1. trees/ha	1166	827	1041	1687	1737	1564	1029	1065	962	1303	1318	1395
2. BA	15.9	14.1	23.1	32.4	32.1	35.1	22.9	31.6	32.6	38.3	42.6	61.9

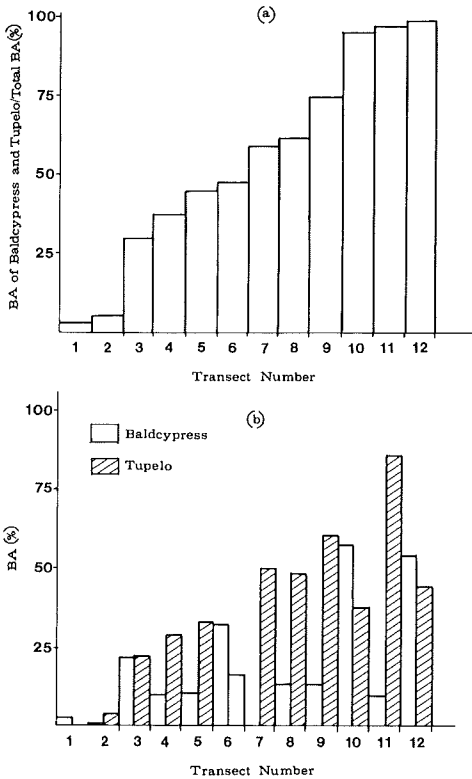
*percent of total trees on transect

these species, as well as their combined BA, expressed as a percent of the total BA, are plotted by transects (Fig. 2). Three groupings are evident in the figure. Transects 10, 11, and 12 represent the wettest areas, or deep swamps, in the Barataria basin. These areas are almost totally populated with baldcypress and water tupelo (over 90% of the total BA). Water tupelo accounts for $57 \pm 15\%$ of the total BA while baldcypress accounts for $40 \pm 5\%$. Drummond red maple is also common in these areas (there was an average density of 332 trees/ha), but these trees are of such small size that they do not represent much BA. Some ash, buttonbush (*Cephalanthus occidentalis*), snowbell (*Styrax americana*), and willow (*Salix nigra*) are present but not in large numbers.

Transects 1 and 2 were the driest

sites surveyed. Baldcypress and tupelogum were uncommon on these transects representing less than 5% of the total BA, whereas ash, Drummond red maple, sweetgum (*Liquidambar styraciflua*) and oaks (*Quercus nigra* and *Q. nuttallii*) were common. Transect 1 was next to an old crevasse of the Mississippi River, and transect 2 covered a natural levee area along Bayou Chevreuil.

Transects 4-9 represent that zone of transition that lies between the deep swamps and the higher levee areas. On these transects, baldcypress and water tupelo are common (40-60% of the total BA), but bottomland tree species, especially American elm (*Ulmus americana*), ash, and red maple, are also important. Water tupelo made up $40 \pm 16\%$ of the total BA and baldcypress



2. (a) Percent of the total basal area (BA) on each transect represented by baldcypress and water tupelo, and (b) percent of baldcypress and water tupelo BA on each transect.

14 ± 6%.

Transect 3 represents an unusual case. This area has been impounded and contains water the year-round. We expected to find mostly baldcypress and water tupelo under this constantly flooded condition. However, the transect

crossed several natural spoilbanks from relict streams and on these banks, we encountered several species normally found in drier areas. With the permanent water cover, many of the species will eventually die out and baldcypress and water tupelo, which are more tolerant to flooding, will become the dominant species. Eventually, however, even these species will die of natural causes and, without dry periods for seedling establishment, the area will be dominated by shrubs and aquatic herbs.

Water tupelo was common throughout the Barataria basin. It occurred on all but one transect and, on all but four transects, was more dominant than baldcypress, accounting for 37 ± 7% of the total BA as compared with 19 ± 5% for baldcypress (Fig. 2). This species seems to be common on heavily cutover areas (Sternitzke and Putnam 1956, Putnam *et al.* 1960). Johnson (1978) suggests that this occurs because tupelogram (*N. aquatica* and *N. sylvatica* var. *biflora*) sprouts more easily than baldcypress from stumps. Kennedy (1969) reported that extensive stands of second-growth tupelogram exist in Louisiana. This certainly seems to be the case in many areas of southeast Louisiana. In reviewing the literature of Louisiana swamp forests, we noted that tupelogram clearly dominated in a

Table 2. Basal area (m²/ha) and density (trees/ha) of baldcypress and tupelo in southeastern Louisiana swamp areas.

Area	<i>Nyssa</i> sp.		<i>Taxodium distichum</i>		Reference
	BA	Density	BA	Density	
Barataria Basin					
1. Dry	0.3	14	0.2	10	This study
2. Moist	11.0	249	4.7	76	This study
3. Wet	25.8	455	20.0	478	This study
Pontchartrain Basin					
1. St. Charles Parish					
a.	--	--	44.2	772	Conner <i>et al.</i> 1980
b.	3.4	167	24.3	61	Montz 1970
2. Blind River	49.5	1037	4.6	46	Conner <i>et al.</i> 1980
3. Pearl River	36.5	1440	5.1	330	Hall and Penfound 1938
4. Pearl River	45.5	836	6.5	157	White 1983

majority of the studies (Table 2). Pure baldcypress stands were reported in only two studies, and both of these areas were in St. Charles Parish along the south shore of Lake Pontchartrain.

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