MULTIPLE-USE INVENTORIES IN LOUISIANA FORESTS

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ABSTRACT

An inventory of understory herbage and browse indicated that the forage potential of southwest Louisiana forests is not being fully utilized. The longleaf-slash pine and loblolly-shortleaf pine ecosystems produce the greatest amount of forage, but bottomland hardwoods have the best browse composition.

INTRODUCTION

The need for a definitive appraisal of the Nation's resources was recently recognized by Congress through passage of Public Law 93-378 (Forest and Rangeland Renewable Resources Planning Act of 1974). For many years, timber resources have been measured continuously by the U. S. Forest Service's Forest Survey teams, but range and wildlife resources have received only sporadic and limited inventories. Incorporating other resource maeasurements into the Forest Survey would provide an efficient means of regularly assessing the total forest values. The survey scheduled for southwest Louisiana during 1973 provided an opportunity to attempt a forage inventory.

These vegetation measurements indicate the forest potential to support wildlife and livestock. Browse characterizes deer habitat (Moore *et al.* 1960); herbage is the most important component of cattle range (Pearson 1974). Seeds and fruits from legumes, other herbage, and woody plants are important for quail and other birds (Brunswig and Johnson 1972). However, most animals may consume some of all the food sources at one time or another. These plants also afford cover to wildlife.

This paper describes inventories of wildlife habitat and range resources on the coastal plain of Louisiana.

METHODS

Forest Survey sample locations are permanently established at 3-mile grid intersections throughout the 11 parishes (counties) in southwest Louisiana (Fig. 1). At forested locations, timber resource data were recorded from 10 permanent sample points systematically distributed on a 1-acre area. Understory vegetation (herbage and browse) was measured in four circular 9.6-square-foot plots arranged in a diamond-shaped pattern 114 feet apart on the same area. The period of field inventory extended from June to October 1973.

The amount of herbage and browse foliage ground cover was estimated in 20-percent classes up to maximum plant heights of 5 feet. Twenty-four plant species or groups were classified. Forage utilization was estimated as light (less than 35 percent of the plants grazed), moderate (35-70 percent), or heavy (more than 70 percent); no attempt was made to distinguish between browsing by livestock or deer. Evidence of burning within the last 3 years and livestock presence were also recorded (Pearson and Sternitzke 1974).

RESULTS AND DISCUSSION

About two-thirds of southwest Louisiana is forested, less than one-tenth is in improved pastures, and about one-fourth is devoted to urban and industrial development, roads and highways, and other land uses (Table 1). The 4.5 million acres of forest are divided into six ecosystems (Table 2). Loblolly-shortleaf pine is the most common, occupying 35 percent of the forested area. Only 13 percent of the forest is publicly owned.

Browse

Over 2 million acres had less than 20 percent browse cover; only about half a million had more than 60 percent; overall, browse cover averaged 31 percent (Table 3). Browse cover was slightly better than average in loblolly-shortleaf pine, oak-pine, and oak-hickory ecosystems. In the longleaf-slash pine ecosystem, 68 percent of the acreage had less than 20 percent browse cover while only about 40

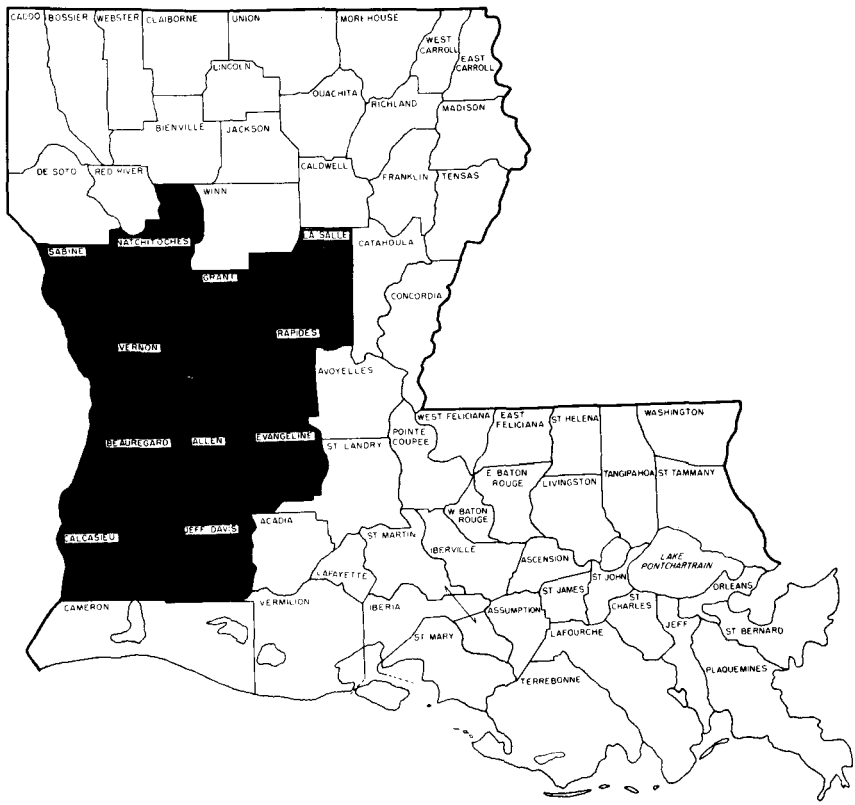

Figure 1. Eleven southwest Louisiana parishes were surveyed.

Table 1. Land uses in southwest Louisiana.

Land Use	*Acreage*	*Percent*
	(1,000)	
Forest	4538.4	65.6
Improved pasture	607.6	8.8
Other areas	1772.4	25.6
Total	6918.4	100.0

Table 2. Forest land percentages by ecosystem and ownership class.

Ecosystem	*All ownerships*	*Public*	*Forest industry*	*Other private*
Upland				
Longleaf-slash pine	16.2	2.2	6.2	7.8
Loblolly-shortleaf pine	34.7	5.2	11.4	18.1
Oak-pine	18.0	2.7	5.3	10.0
Oak-hickory	13.0	0.6	4.2	8.2
Bottomland				
Oak-gum-cypress	17.5	2.6	3.4	11.5
Elm-ash-cottonwood	0.6	0	0.1	0.5
All ecosystems	100.0	13.3	30.6	56.1

percent of the other upland ecosystems had less than 20 percent cover. More than 40 percent of the loblolly-shortleaf pine, oak-pine, and oak-hickory acreages supported 20 to 60 percent browse cover. Forty-nine percent of the bottomlands had more than 20 percent cover.

Browse plants were found on 58 percent of the longleaf-slash pine plots while browse occurred on 80 to 90 percent of all other ecosystems (Table 4). Generally, the most frequently occurring browse species were oaks *(Quercus* spp.), other shrubs and trees, greenbrier *(Smilax* spp.), other vines, and blackberry *(Rubus* spp.). Waxmyrtle *(Myrica cerifera)* was the most common browse on longleaf-slash pine plots. It was less important on other upland sites and was extremely rare on bottomland hardwood sites. Based on foliage-cover botanical composition of desirable browse species, over 80 percent of the longleaf-slash pine ecosystem was rated poor for deer, and less than 20 percent was fair to better.[1] About 55 percent of the other upland ecosystems were rated fair or better. Bottomland hardwoods had the best browse composition; nearly 65 percent was rated fair or better for deer. Yaupon *(Ilex vomitoria)*, American beautyberry *(Callicarpa americana)*, Elliott blueberry *(Vaccinium elliottii)*, dogwood *(Cornus* spp.) and vines were rated as the most desirable browse species.

Table 3. Average percentages of browse and herbage foliage cover by ecosystem.

Ecosystem	*Browse*	*Herbage*
Upland		
Longleaf-slash pine	23.5	61.6
Loblolly-shortleaf pine	32.7	33.8
Oak-pine	33.5	34.1
Oak-hickory	34.8	36.6
Bottomland		
Oak-gum-cypress	28.7	24.7
Elm-ash-cottonwood	24.9	30.0
All ecosystems	30.9	37.1

[1] Manuscript submitted to the *Journal of Wildlife Management* by H. A. Pearson and H. S. Sternitzke, "Deer browse inventories in the Louisiana Coastal Plain."

Table 4. Frequency of occurrence of understory vegetation.

Understory vegetation	*All ecosystems*	*Longleaf-slash pine*	*Loblolly-shortleaf pine*	*Oak-pine*	*Oak-hickory*	*Oak-gum-cypress*	*Elm-ash-cottonwood*
	Percent[1]						
Browse:							
Ilex vomitoria	1.8	1.5	2.6	1.1	1.0	1.8	...
Callicarpa americana	9.4	1.9	10.5	12.9	15.5	6.0	5.0
Vaccinium elliottii	7.1	1.5	9.1	9.6	9.2	3.9	15.0
Myrica cerifera	13.1	22.1	15.2	10.8	14.6	2.1	...
Rhus spp.	3.4	4.0	4.1	5.0	2.7	.2	5.0
Cornus spp.	3.8	1.0	3.9	7.1	5.3	2.1	...
Crataegus spp.	6.5	1.0	8.7	8.7	5.1	6.0	5.0
Quercus spp.	24.5	6.2	30.8	29.6	30.8	19.7	10.0
Other shrubs & trees	51.4	15.8	53.2	64.5	58.3	62.8	40.0
Rubus spp.	17.9	21.2	21.5	15.2	18.7	9.9	15.0
Smilax spp.	21.9	5.3	21.0	24.8	29.6	30.1	20.0
Other vines	45.1	20.0	51.3	45.0	44.9	55.7	65.0
All browse	81.9	57.5	86.6	88.3	88.1	84.2	80.0
Herbage:							
Andropogon tener	12.5	35.0	10.8	8.3	11.4	0.4	...
A. virginicus	10.7	28.7	8.5	10.1	9.0	.5	...
Other *Andropogon*	25.4	55.4	31.5	17.2	18.4	.2	...
Uniola spp.	18.2	2.3	18.9	25.9	29.4	16.0	5.0
Panicum spp.	42.6	72.1	43.8	41.1	40.3	17.0	25.0
Muhlenbergia expansa	4.2	12.1	3.8	2.3	4.1	...	...
Axonopus affinis	9.0	14.8	9.4	11.5	7.8	1.8	...
Aristida spp.	7.4	15.0	8.3	5.0	7.8	.9	...
Other grass	37.6	57.3	40.1	39.0	29.1	20.2	15.0
Grasslike	39.2	39.4	33.5	40.8	39.3	47.7	55.0
Legume	27.9	40.8	37.4	23.6	22.6	6.7	5.0
Other forbs	70.5	88.3	72.4	71.3	68.7	50.7	80.0
All herbage	87.1	95.6	89.4	88.7	85.7	74.5	85.0

[1] Expressed as percent of occurrence on all sample plots within specified ecosystem.

Herbage

About 2 million acres of forest had less than 20 percent herbage cover while 1.2 million acres had 60 percent or more; consequently, herbage cover averaged 37 percent for all ecosystems (Table 3). Highest amounts of herbage cover were on the longleaf-slash pine (more than 60 percent); other ecosystems had from 25 to 37 percent.

The most common native grasses were the panicums (*Panicum* spp.), which occurred frequently on all sites, and the bluestems (*Andropogon* spp.), which occurred frequently on upland sites (Table 4). Shade tolerant uniolas (*Uniola* spp.) were common on all ecosystems except the longleaf-slash pine and the elm-ash-cottonwood. Legumes were most common on longleaf-slash pine sites and least common in bottomland hardwoods. Overall, the longleaf-slash pine ecosystem had the highest frequency of herbage occurrence (96 percent) and the oak-gum-cypress had the lowest (75 percent). Based on range condition classifications (Dyksterhuis 1949), herbage on 43 percent of the upland forest was rated fair to excellent, and 57 percent was poor (Sternitzke and Pearson 1975). Eighty-four percent of the bottomlands was rated poor (Sternitzke and Pearson 1974).

Burning and Utilization

Livestock, mainly cattle, grazed 54 percent of the total forest, or 2.4 million acres (Table 5). Seventy-three percent of the longleaf-slash pine was grazed, and about half of the grazed area had been burned. On other upland ecosystems, livestock occurred on about 50 percent of the area; about 20 percent of this grazed area had been burned. In the longleaf-slash pine ranges, about one-third of the ungrazed area was burned; but only 11 percent or less of the ungrazed area on other upland ecosystems was burned. Burning was essentially non-existent in the bottomland. Since burning and grazing stimulate new plant growth and provide more nutritious forage, more burning in the uplands would probably enhance wildlife habitat quality, especially on ungrazed ecosystems.

Table 5. Livestock presence and burning history by ecosystem.

Ecosystem	*Total acreage*	*Grazed*		*Ungrazed*	
		Acreage	*Burned*	*Acreage*	*Burned*
	(1,000)	Percent			
Upland					
Longleaf-slash pine	737.9	72.7	51.0	27.3	31.1
Loblolly-shortleaf pine	1574.6	56.0	19.9	44.0	4.0
Oak-pine	815.7	47.9	19.2	52.1	4.0
Oak-hickory	588.9	48.3	20.1	51.7	11.2
Bottomland					
Oak-gum-cypress	793.4	42.2	1.9	57.8	0
Elm-ash-cottonwood	27.9	19.7	0	80.3	0
All ecosystems	4538.4	53.6	24.1	46.4	6.7

On sites with livestock present, forage utilization was generally light (less than 35 percent of the plants grazed). Nearly 80 percent of this land had light herbage use; 98 percent had light browse use. Less than 5 percent had heavy herbage use (more than 70 percent of the plants grazed); and less than 1 percent had heavy browse use. Overall, utilization of herbage and browse was light and since moderate utilization (up to 50 percent) is generally considered acceptable (Lay 1965, Dasmann 1971, Duvall and Linnartz 1967), Louisiana's forests apparently could support more wildlife or domestic animals.

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