

# THE GENUS *LINDERA* IN FLORIDA

by Robert B. McCartney, Kenneth Wurdack, and Julie Moore

“Although the plants of Florida have been studied and written about by Europeans since the early 15th century, our knowledge of the subject is far from complete. *Lindera*, a small genus of plants, was little known in Florida until investigated by McCartney, Wurdack, and Moore. The authors provide a significant insight into the distribution of genus *Lindera* in Florida by their personal research in field, herbarium, and literature. Many more of our lesser known Florida plant species could benefit from such a careful study as this.”

Dr. Richard P. Wunderlin

Drawings by Kenneth Wurdack

## Introduction

The flora of Florida is an intriguing mix of endemics and tropical and northern components. It is a showcase of the effects of geologic forces on shaping plant distribution.

*Lindera*, a largely Asiatic genus of about 100 species in the Lauraceae or Laurel family, is ubiquitous throughout much of temperate eastern North America, though only one of three recognized native species is common. Our native *Lindera* species all appear to reach the southern limits of their ranges in Florida, but their distribution and biology in Florida has not previously been studied.

Until recently what was known of *Lindera* in Florida by most contemporary Florida botanists is evidenced by the treatments in their floras: R.P. Wunderlin (*Guide to the Vascular Plants of Central Florida*, 1982); A.F. Clewell (*Guide to the Vascular Plants of the Florida Panhandle*, 1985); and R.K. Godfrey (*Trees, Shrubs, and Woody Vines of Northern Florida and Adjacent Georgia and Alabama*, 1989). Historical and additional field evidence presented here expands our knowledge of the distribution of *Lindera* in Florida, and may pose interesting questions for the taxonomist, the phytogeographer, and the conservationist.

## The Three Native *Lindera* Species

*Lindera benzoin* (L.) Blume — commonly known as spicebush for the spicy aroma of its fruits, leaves, and brown twigs — is the most common and widespread species. It ranges throughout eastern North America from Maine and southern Ontario southward to Florida and westward to central Texas. It is typically an



**Native *Lindera* and *Litsea*.** A. *Litsea aestivalis*. A. Habit from Wheeler Co., Georgia. B-C. *Lindera melissifolia*. B. Fruit pedicel from Mississippi (Morris 2596). C. Habit from Wheeler Co., Georgia. D-G. *Lindera subcoriacea*. D. Fruit pedicel from South Carolina (McCartney s.n. Aug. 12, 1988). E. Female flower buds from South Carolina (January). F. Male flower buds collected at the same time as the female buds. G. Habit from North Carolina. H-M. *Lindera benzoin*. H. Female flower (adapted from Addisonia). I. Male flower (adapted from Addisonia). J. Male buds of *L. benzoin* collected at the same time as the *L. subcoriacea* buds. K. Fruiting branch (adapted from Addisonia). L. Habit from Pennsylvania (Schaeffer 53285). M. Fruit pedicel.



understory shrub to 15 feet tall occurring in rich, moist woodlands. Its thin leaves, lanceolate (lance-shaped, wider below the middle) to oblanceolate (lance-shaped, but wider above the middle), have distinct "drip tips". As with our other native species, they shed their leaves after they turn yellow in the fall, and plants are either male or female (the female plants produce red fruits in late summer and fall).

*Lindera melissifolia* (Walter) Blume is a rare species declared endangered by the U.S. Fish and Wildlife Service in September, 1986. The common name, pondberry, has been used for this species because it is usually found around intermittent natural ponds. It may form extensive thickets or colonies in the zone where the water depth fluctuates from zero up to two feet. This species has greenish-yellow stems, is typically less than six feet tall, and has soft, somewhat velvety, thin leaves with a broadly obtuse base. It has an aroma similar to sassafras. It is presently known to occur in only a few locations in the Carolinas, Georgia, Mississippi, Arkansas, and Missouri, and historically in Alabama, Florida, and Louisiana.

Historic records of apparently extirpated populations in Alabama and Louisiana were not considered relevant in this article, though we have researched these documented records quite thoroughly in the archives and in the field. The historic Florida record is, of course, discussed below. We have found no evidence to substantiate J.K. Small's inclusion of Illinois in the range. "Presently known" are the operative words.

The third species has been given the common name bog spicebush because of its preference for this habitat. Since the late 18th century, specimens of *Lindera subcoriacea* Wofford have been placed in herbarium collections under various names. It was not until 1983 that Eugene Wofford of the University of Tennessee formally described and named it as a new species. It had previously been confused with *L. benzoin* or with *L. melissifolia*, but the specimens from Mississippi which alerted Wofford to the possibility of a new species had actually been labeled as the related genus *Litsea*!

First thought to be endemic to southern Mississippi and adjacent Louisiana, it was soon identified by authors Julie Moore in North Carolina and Robert McCartney in Georgia, South Carolina, and Alabama, and very recently in Virginia! Several early

collections from the New Jersey Pine Barrens found in herbaria by author Kenneth Wurdack also appear to be this species.

This shrub occurs in springhead seeps or bogs adjacent to sandy uplands. It has somewhat leathery, elliptic to obovate (top wider than bottom) leaves with pointed to rounded tips. Unlike other native linderas, it is not highly aromatic — the subtle lemony fragrance is not always detectable. The winter flower buds and fruits are on short stalks. While flowering is perhaps a week later than *L.*

*benzoin*, the fruit matures in early August, much earlier than that of *L. benzoin*. Nowhere common, this shrub occurs inconsistently and in small numbers in its very specific and rapidly disappearing habitat.

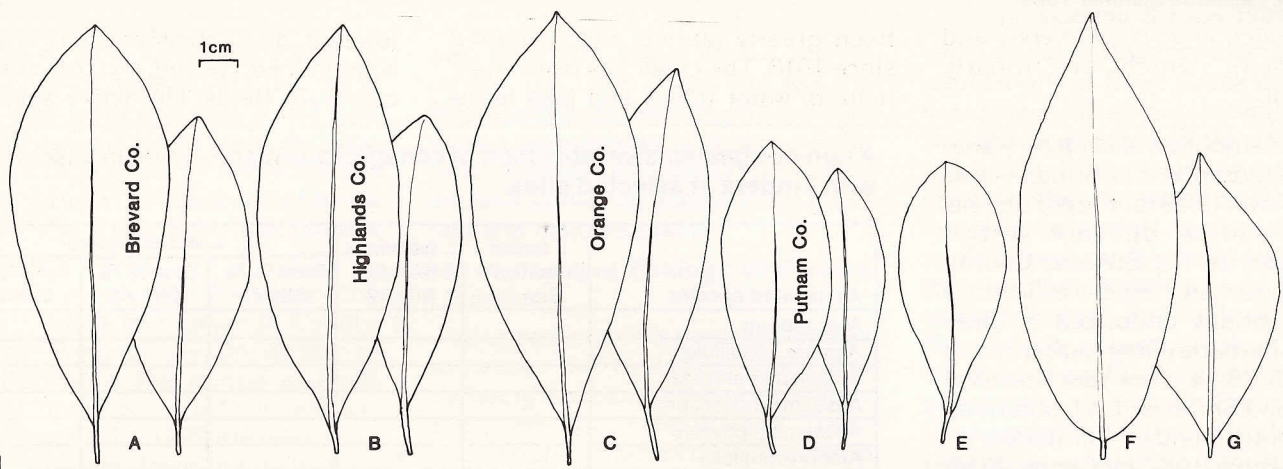
#### Published Historical References to *Lindera* in Florida

The first published reference to the presence of *Lindera* in Florida appeared in Andre Michaux's landmark *Flora Boreali-Americana*, published in 1803. In his description of "*Laurus pseudobenzoin*" (at that time, *Laurus*



Bob McCartney examines a *Lindera* while his dog, Strutter, waits patiently.





**Leaf comparison. A-D.** *Lindera* aff. *subcoriacea*. **A.** Brevard Co. (McCartney s.n., 25 Jun 88). **B.** Highlands Co. (Harbison 3). **C.** Orange Co. (McCartney s.n., 11 Feb 89). **D.** Putnam Co. (left, McCartney s.n., 14 May 88; right, Simons & McCartney s.n., 20 Sep 87). **E.** *Lindera subcoriacea*, typical material from North Carolina (Boynton 10279). **F.** *Lindera melissifolia* ("Florida", Chapman s.n.). **G.** *Lindera benzoin* from Jackson Co., Florida (Gholson, Jr. 8894).

had a very broad circumscription, encompassing genera such as *Persea*, *Litsea*, and *Sassafras*, as well as *Lindera*, Michaux notes that it grew "near rivers and in swamps from Canada to Florida." Examination of Michaux's herbarium in Paris reveals a mixture of *Lindera benzoin* and *L. subcoriacea* elements under his new name with no indication of which collection might have come from Florida. Inspired by William Bartram, Andre Michaux made his only trip to Florida in 1788, collecting from February until July of that year. His itinerary, reconstructed from his journal (C.S. Sargent, "Portions of the journal of Andre Michaux, botanist, written during his travels in the United States and Canada, 1785-1796", 1889) reveals that, after making Spanish St. Augustine his base, he made several trips into the interior, going as far south as Lake George.

*Lindera* is not mentioned in any of his brief journal entries, and its locality and identity are impossible to ascertain. Later writers, F.T. Pursh (*Flora Americae Septentrionalis*, 1814), and Nees von Esenbeck (*Systema Laurinarum*, 1836) drew on Michaux's distribution when adding "Florida" to the range of *Lindera benzoin* in their treatments.

More specific published references to the genus in Florida did not appear until 1845. That year, Alvan Wentworth Chapman, who had come to Quincy in Gadsden County ten years before, published "A list of the plants growing spontaneously in the vicinity of Quincy, Florida." This list actually encompasses Gadsden and Jackson counties, and in it, Chapman includes both *Lindera benzoin* and *L.*

*melissifolia*.

Documenting this latter discovery are herbarium specimens at the New York Botanical Garden and the Smithsonian Institution representing late spring and fall collections. These were presumably from the same population whose location beyond "Florida" or "West Florida" was not given ("West Florida" was historically that part of the state west of the Apalachicola River). Chapman's correspondence with John Torrey indicates that *L. benzoin* was discovered sometime between March and June, 1835. In 1860, while living in Apalachicola, Chapman published the first edition of his *Flora of the Southern United States*. In it, Chapman notes: "*B. [benzoin] odoriferum* Nees. [= *Lindera benzoin*], Banks of streams and low woods, Florida and northward," and "*B. [benzoin] melissaeefolium* [= *Lindera melissifolia*], Margins of ponds, West Florida to North Carolina." Later, John K. Small (*Shrubs of Florida*, 1913, and *Manual of Southeastern Flora*, 1933) recognized both *Lindera benzoin* (as *Benzoin aestivale*) and *L. melissifolia* (as *Benzoin melissifolium*) for Florida.

#### Additional Historical Records

The earliest reference we have found to *Lindera* at a specific locality in peninsular Florida is from Manatee County. This is an intriguing note in an unpublished manuscript by the amateur botanist, Joseph Herman Simpson (whose name is commemorated in the names of such plants as *Sambucus simpsonii* and *Zephyranthes simpsonii*). Simpson knew *Lindera benzoin* from his home in Illinois but stated that he had not personally seen it in Florida. However, his brother, Charles Torrey Simpson, noted conchologist and

author, had found a single specimen at Fogartyville while homesteading near there from 1882 until 1886. Fogartyville, long since incorporated into West Bradenton, is now a highly developed area. There is no further evidence that *Lindera* occurred or has been looked for in Manatee County.

The next known discovery of *Lindera* in peninsular Florida was by the keen field botanist, Roland Harper, who was at the time working for the Florida Geological Survey. While passing through Brevard County on February 8, 1915, Harper discovered an unusual assemblage of plants including *Lindera*. He recorded the event in his diary which is now preserved at the University of Alabama. After getting off the train at Indian River City, Harper

"... went behind a shed at Indian River City, put on old coat and pants, hid suitcase, etc., in bushes and walked back down railroad about 1/2 mile to investigate a swampy low hammock seen from a train a few days ago. It extends back from Indian River 1/4 mile or more and railroad goes right through it. It is more hammock than swamp, having only a few wet spots in it. It contains an interesting mixture of northern and tropical plants. Besides *Sabal palmetto*, *Acer rubrum*, *Magnolia glauca*, and *Myrica cerifera*, pretty widely distributed in Florida, there are *Gordonia*, *Liquidambar*, *Fraxinus*, *Magnolia grandiflora*, *Quercus hybrida*?, *Celtis*, *Ulmus floridana*, *Tilia*, *Berchemia*, *Decumaria*, *Benzoin aestivale* [= *Lindera benzoin*], *Cornus stricta*?, *Arisaema triphyllum*, and *Dryopteris floridana*, which do not range much farther south,



and *Psychotria*, *Nephrolepis*, and *Rapanea?*, which are mostly tropical.”

As the distribution of *Lindera* — and, indeed, of most plants in Florida — was poorly known in 1915, Harper and his contemporaries did not attach significance to his Brevard County *Lindera* specimen. Harper's collections went essentially unnoticed in three northern herbaria (Gray Herbarium of Harvard University, New York Botanical Garden, and Smithsonian Institution), until recently found by Wurdack.

In December, 1987, McCartney briefly visited the Brevard locality described by Harper, and found it essentially as Harper had described it 72 years earlier! However, *Lindera* was not found until he made a second visit in February, 1988. A number of plants were found at that time, and more were located throughout the hammock in June, 1988, by Moore and McCartney.

Harper's Brevard County site was the southernmost limit for *Lindera* until July 28, 1918, when Thomas G. Harbison collected a single branch of spicebush “in low hammock, Sebring,” Highlands County. Charles S. Sargent, who was occupied with his duties as director of the Arnold Arboretum in Jamaica Plain, Massachusetts, had hired Harbison to collect southern woody plants. The significance of this presently acknowledged southern limit for *Lindera* in the western hemisphere was not recognized at the time, and this specimen, long buried in the Arnold Arboretum Herbarium, was also located by Wurdack.

In June, 1988, Moore and McCartney attempted to relocate the Highlands County site discovered by Harbison. Considerable effort had been made a month or two earlier to find the plant in Highlands Hammock State Park, which seemed a logical location. This search by McCartney and Nancy Bissett of The Natives nursery discovered what seemed very good habitat for the species along Tiger Branch, but no plants were located. Local botanist Carol Beck, retired from the Florida Department of Natural Resources, who knows *Lindera* from the North, has not observed it in Highlands Hammock after many years of botanizing there. These factors, and close examination of Harbison's correspondence to Sargent, in the archives of the Arnold Arboretum, led us to believe that the likely site of his discovery was the Jackson Creek swamp just south of Sebring. Unfortunately, Jackson Creek swamp has

been greatly altered and degraded since 1918. The creek has been channelized, water tables and lake levels

Associated species	L. benzoin Jackson Co., Fla. Site #1	L. subcoriacea Mobile, Ala. Site #2	L. affin. subcoriacea		
			Putnam Co., Fla. Site #3	Orange Co., Fla. Site #4	Brevard Co., Fla. Site #5
<i>Acer rubrum</i>		X			
<i>Agarista populifolia</i>			X		
<i>Ampelopsis arborea</i>				X	
<i>Arisaema dracontium</i>	X				
<i>Arisaema triphyllum</i>					X
<i>Aronia arbutifolia</i>		X			
<i>Arundinaria gigantea</i>				X	
<i>Asplenium platyneuron</i>	X				
<i>Blechnum serrulatum</i>					X
<i>Bumelia lycioides</i>	X				
<i>Calycocarpum lyonii</i>	X				
<i>Carex abscondita</i>	X				
<i>Celtis laevigata</i>	X				X
<i>Cephalanthus occidentalis</i>				X	
<i>Chamaecyparis thyoides</i>			X		
<i>Cliftonia monophylla</i>		X			
<i>Cornus foemina</i>				X	
<i>Corydalis micrantha</i>	X				
<i>Cryptotaenia canadensis</i>	X				
<i>Dryopteris ludoviciana</i>				X	
<i>Fraxinus profunda</i>			X		
<i>Gordonia lasianthus</i>			X	X	
<i>Ilex cassine</i>					X
<i>Ilex coriacea</i>		X	X		
<i>Itea virginica</i>				X	X
<i>Leucothoe axillaris</i>		X			
<i>Liquidambar styraciflua</i>	X				
<i>Liriodendron tulipifera</i>	X				
<i>Lonicera japonica</i>	X				
<i>Lygodium japonicum</i>	X				
<i>Lyonia ligustrina</i>			X		
<i>Lyonia lucida</i>		X	X		
<i>Magnolia grandiflora</i>				X	
<i>Magnolia virginiana</i>		X	X	X	
<i>Microstegium vimineum</i>	X				
<i>Myrcianthes fragrans</i>					X
<i>Myrica cerifera</i>					X
<i>Myrica heterophylla</i>		X			
<i>Nyssa biflora</i>		X	X		
<i>Osmanthus americanus</i>		X			
<i>Osmunda cinnamomea</i>		X			
<i>Parnassia grandiflora</i>			X		
<i>Persea borbonia</i>		X	X	X	X
<i>Platanus occidentalis</i>	X				
<i>Prunus caroliniana</i>	X				
<i>Quercus laurifolia</i>	X				
<i>Rhododendron serrulatum</i>			X		
<i>Rhus radicans</i>					X
<i>Rhus vernix</i>		X	X		
<i>Sabal minor</i>	X				
<i>Sabal palmetto</i>			X	X	X
<i>Salix floridana</i>			X		
<i>Sambucus canadensis</i>	X				
<i>Smilax laurifolia</i>		X	X		
<i>Smilax smallii</i>	X				
<i>Smilax tamnoides</i>	X				
<i>Thelypteris palustris</i>			X		
<i>Tilia caroliniana</i>					X
<i>Tradescantia fluminensis</i>	X				
<i>Ulmus americana</i>					X
<i>Vaccinium corymbosum</i>			X		

areas or small streams were found. In some of the remaining wooded areas there was evidence that a fire had burned deep into the peat perhaps thirty years ago. While many species associated with *Lindera* at other Florida sites persist, it is unlikely that *Lindera* exists there today.

Eleven years after Harbison collected *Lindera* in Highlands County, Erdman West of the University of Florida found the genus at Rock Springs, near Apopka in Orange County, on October 10, 1929. He referred to it as *L. benzoin*. Prior to his death in August, 1965, he told Daniel Ward, also of the University of Florida, about the *Lindera* near Apopka. While Ward failed to locate the plant at Rock Springs on visits in the early 1960s and in the spring of 1973, his urgent action during the earlier visit may have prevented its extirpation. Ward was able to halt clearing by Orange County Parks personnel along Rock Springs Run, intended to benefit sunbathers and people floating the stream on tubes. However, Olga Lakela of the University of South Florida did rediscover *Lindera* at this locality on February 16, 1964, noting that it was "occasional" in "deep wet muck."

#### Other Recent Discoveries

Fifty-five years after West's discovery in Orange County, *Lindera* was found at a new site in peninsular Florida. On August 24, 1984, while inventorying the southernmost stand of Atlantic white cedar (*Chamaecyparis thyoides*) along Morman Branch, a tributary of Juniper Creek in the Ocala National Forest in Marion County, Daniel Ward with Bob Simons and Tom Morris collected *Lindera*. Ward's notes say, "only one plant seen." Ward recalls that it was found near the end of a hard day in the field, and when they discovered a plague of seed ticks on themselves, they decided not to search for more *Lindera*. We have not seen the specimens in Ward's possession.

It was through Bob Simons that the authors originally learned of the Morman Branch find, and it was Simons who, in the fall of 1986 with Steve Christman of Florida Museum of Natural History, made the next find — a single *Lindera* plant on Deep Creek south of Interlachen in Putnam County. On September 20, 1987, Simons and McCartney relocated the plant, and an additional plant was found about a half mile from the first. A subsequent visit to the site with nurseryman Steve Riefler located two additional plants.

and later McCartney found several others. The Deep Creek site and the Morman Branch area support the only known populations of Atlantic white cedar in peninsular Florida. These sites are well known to botanists for other rare and disjunct plants.

#### Taxonomy and Ecology of Florida Linderas

*Lindera benzoin* is presently known to occur in Gadsden, Jackson, Calhoun, and Liberty counties, chiefly along the Apalachicola River. These populations represent the southern tip of the continuous general range of the species and specimens appear typical for the species. The Chapman specimens of *L. melissifolia*, possibly from Jackson or Gadsden counties, also appear typical for that species.

However, taxonomic questions arise with the material found in the widely disjunct populations in peninsular Florida. In species with discontinuous ranges, members of disjunct populations may exhibit distinctive morphological characteristics as a result of long isolation. All peninsular Florida *Lindera* populations were referred to as *L. benzoin* by their discoverers, but we feel that the plants have closer affinities with *L. subcoriacea*. Final identification awaits a detailed study.

Based on habitat and associated species, it seems much more likely that the Putnam County site would support *Lindera subcoriacea* rather than *L. benzoin*. The nearest known populations of *L. subcoriacea* are in Burke and Jones counties, Georgia, approximately 250 miles north and north northwest respectively. The nearest documented populations of *L. benzoin* are in northwest Florida, almost 200 miles west northwest. Examination of the Putnam County plants in the field revealed that they were essentially non-aromatic, that the flower buds and fruits were distinctly stalked, and that, like *L. subcoriacea* populations elsewhere, there were but few individuals, and these were growing in very wet substrates of active seepage zones. These factors led the authors and Walter Judd of the University of Florida to place the Putnam County plants with *L. subcoriacea*, although Eugene Wofford, author of the species, has been noncommittal. A taxonomic question arises only because the leaves tend to be much longer and more narrow than typical *L. subcoriacea*. *Lindera subcoriacea* has been found in association with Atlantic white cedar in the Carolinas. In peninsular Florida,

white cedar occurs only as disjunct populations at Deep Creek and Morman Branch. The plants in Orange and Brevard counties and the Harbison specimen from Highlands County show further divergence from the typical leaf shape of *L. subcoriacea*, but again appear most closely allied with that species on the basis of habitat, stalked flowers, and lack of aroma. Subjectively chosen "typical" leaves from various *Lindera* species and populations are shown in Figure 1. The Orange and Brevard county plants appear to be semi-evergreen or tardily deciduous, perhaps due to their extreme southern location. In 1988 and 1989, green leaves from the preceding growing season remained on the branches after flowering and after the emergence of new leaves in late February.

A representative sampling of species associated with *Lindera benzoin*, *L. subcoriacea*, and the peninsular Florida linderas is given in Table 1.

#### Present Status of Florida Populations

Populations of *L. benzoin* along the Apalachicola River are protected in Torreya and Florida Caverns state parks where they are common. *Lindera melissifolia* is endangered throughout its range and has not been seen in Florida since Chapman's collections almost a century and a half ago. Presently the nearest known population of this species is in Baker County, Georgia, about 50 miles northeast of Chattahoochee. We have investigated some areas with suitable habitat for *L. melissifolia* near Gretna and elsewhere in Gadsden County without finding the species. Further searches should be conducted in Gadsden County, in Jackson County, and perhaps in other western counties such as Bay County with its numerous sinkhole ponds. All populations of this rare plant deserve protection.

The status of *Lindera subcoriacea* throughout its range is under investigation. It usually occurs in very small, widely scattered populations. While many sites have been found, the total number of plants remains very low. Furthermore, the specific habitat it requires is being lost through drainage, impoundment, fire suppression, grazing, and development. In peninsular Florida, the populations of *Lindera aff. subcoriacea* are very small; in most cases, only a few plants are present. The Marion County site is remote and protected within the Ocala National Forest.

The Orange County plants are on county-owned property that is managed as a public park and recreation area. The Putnam and Brevard county populations are on private property. All populations could be seriously affected by any land use changes. Each Florida site is significant and should be preserved and appropriately managed.

Further investigation should be made of potential habitats in Highlands and Manatee counties where *Lindera* was historically reported. Many areas which appear suitable for *Lindera subcoriacea* can be found in western and central Florida. Searches by the authors in Gadsden, Madison, Clay, Bradford, Marion, Lake, Polk, and Highlands counties have located much good habitat but no new populations of *Lindera*. As this relatively inconspicuous shrub occurs in such limited numbers in uninviting and difficult-to-explore habitat, additional populations probably await discovery.

*Robert B. McCartney, one of the owners of Woodlanders, Inc., Aiken, S.C., is an active member of FNPS (Heartland Chapter), cultivates a wide range of Florida native plants, and is*

*involved in field work and efforts to preserve rare species and ecosystems throughout the South.*

*Kenneth Wurdack, a student at the University of Maryland with close ties to the Smithsonian Institution, is an authority on rare and endangered plants. His research and field observations have made a significant contribution to our knowledge of southern botanical history and plant distribution.*

*Julie Moore, a botanist and currently Protection Planner with the North Carolina Natural Heritage Program, is widely known and respected for her work in rare plant and natural area preservation for the State of North Carolina and for cooperative projects with federal, state, and private agencies throughout the South.*

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