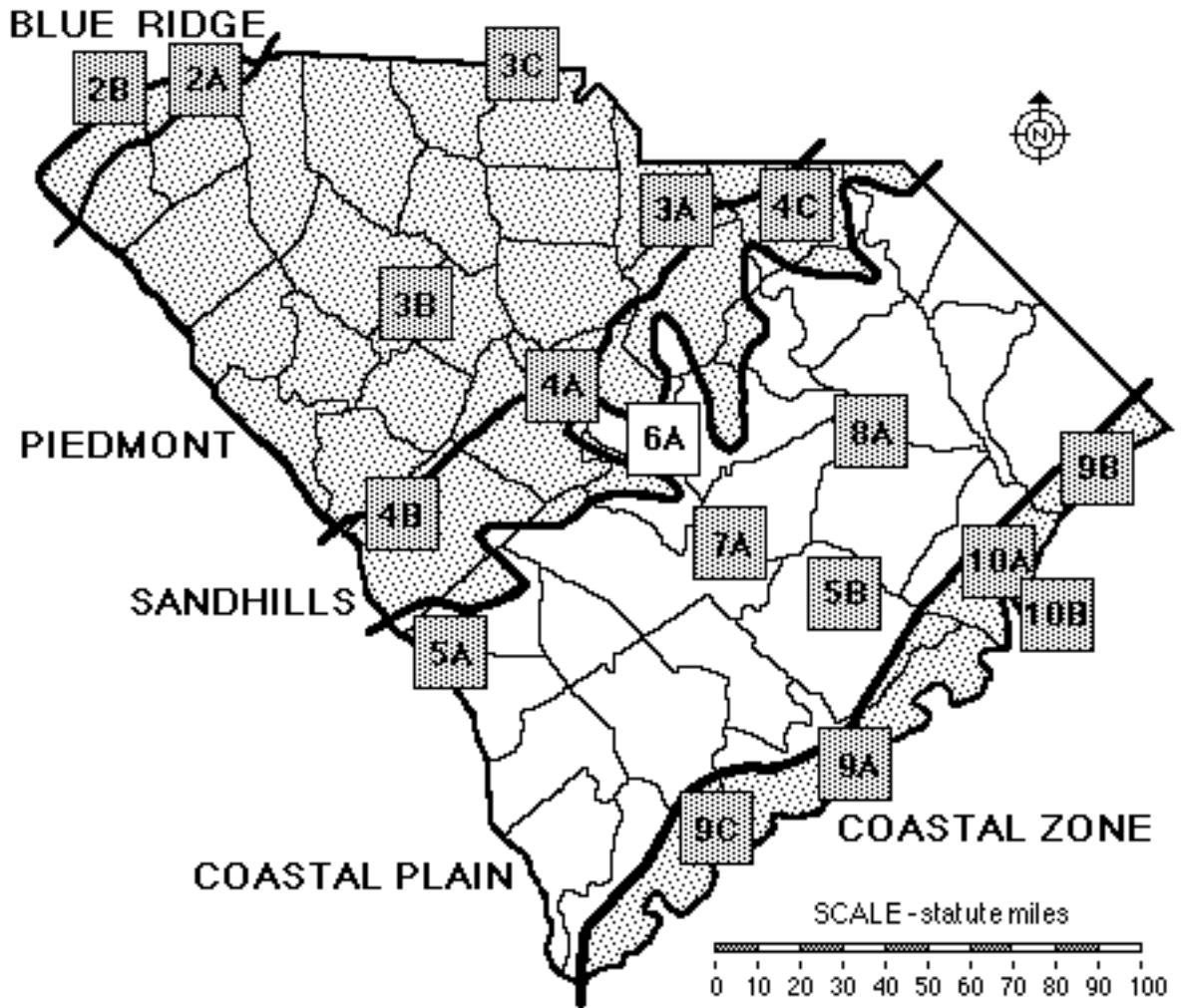


SECTION 6

COASTAL PLAIN REGION / RIVER FLOODPLAINS



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**(ICONS)** Overv = → Sci = ⚙ Math = 📖 Hist = 📖 Lang Arts = ✍

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## SECTION 6

### COASTAL PLAIN REGION / RIVER FLOODPLAINS

#### **POWER THINKING ACTIVITY - "Bobcat Buffet"**

Suppose you are a bobcat walking along the highest bluff on the south side of the Congaree River looking for food. Locate this spot on the **CONGAREE SWAMP TOPOGRAPHIC MAP** and on the **CONGAREE SWAMP LITHOGRAPH**. You know from past experience that there is a public trash dumpster that you can raid across the swamp where the Southern Railroad line crosses Highway 48. Locate this spot on the topographic map. Sometimes people are not as careful as they should be about how they dump their trash and the site has attracted a small population of plump juicy rats and mice who love to eat the spilled trash whenever they get the chance. Bobcats, on the other hand, always prefer well-fed, tasty rodents for dinner.

But, to get to the dump site you must first swim across the river and make your way through the swamp, all the time being sure to stay out of sight of any people who might want to shoot you. Trace your best route on the topographic map, being very careful to avoid populated areas. How many creeks do you have to swim across before reaching the dump site? How many total miles will you have to travel? What are some of the other animals that you might encounter on this trip through the swamp? What types of vegetation will you see? What kind of natural bobcat food might you find along the way? What would be the best time of day to attempt this crossing? What problems might you encounter? Where would you encounter them? How would you solve these problems?

#### **PERFORMANCE OBJECTIVES**

1. Identify and locate major river floodplains in South Carolina.
2. Explain why escaping slaves, fugitives, and others traveling secretly favored river floodplains as hideouts.
3. Predict location and explain process of future oxbow lake development.
4. Estimate time of day by analyzing angles of tree shadows relative to coordinate system of lithographs.
5. Outline historical events leading to establishment and preservation of Congaree Swamp National Monument and other environmentally sensitive sites.
6. Read and practice telling and retelling swamp tales and legends.
7. Graph frequency distribution of record tree heights and other environmental data of floodplain forests.
8. Analyze floodplain landscape features, ecological functions, and ground cover variations relative to differences in elevation and moisture content of soil.
9. Evaluate potential land uses of floodplains to maximize economic gain and minimize environmental impact.

## BACKGROUND INFORMATION

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### Description of Landforms, Drainage Patterns, and Geologic Processes

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#### Characteristic Landforms of Coastal Plain River Floodplains

River **floodplains** represent one of South Carolina's most intriguing and mystifying natural environments. Some would argue that floodplains are synonymous with **swamps**, but in actuality, a floodplain is composed of several different sub-environments, of which swamps are but one example. While the edges of a floodplain may exhibit steep hills or bluffs, which may rise quite a distance above the river level, swamps themselves contain very few significant areas of topographic **relief**. They are essentially flat, low-lying, featureless areas broken only by river **meanders**, **oxbow lakes**, and slightly elevated parallel ridges, called levees, along river banks. Levees form when swiftly flowing river water overtops the banks, slows down, and drops its coarsest sediment near the river's edge. Also within the floodplains are low swampy depressions called **sloughs** usually filled with mud. Most of this landscape has been created by the deposition of sediment from flooded rivers as they overtop the levees and spread out over the surrounding bottom land. As the water spreads out, it loses energy and can no longer carry its full load of sediment. The resulting soil, because of all the naturally deposited mineral content, is some of the best in South Carolina.

#### Geographic Features of Special Interest

Typical **Coastal Plain** river bottomland is found throughout the Coastal Plain Region of South Carolina and includes the swamps found along the Congaree, Wateree, Santee, Pee Dee, Little Pee Dee, Lynches, Black, Cooper, Edisto, Salkehatchie, Coosawhatchie, and Savannah rivers. The most famous of these is the Congaree Swamp National Monument along the Congaree River, which has been preserved because of its pristine forest and record sized trees. It contains the oldest sizable group of old growth river bottom hardwood trees in the United States and also typifies the rich plant and animal diversity of the floodplain environment.

Other notable sites include Four Holes Swamp, near Harleyville in Dorchester County, and Webb Wildlife Center, near Garnett in Hampton County. Four Holes Swamp flows for almost 60 miles before it empties into the Edisto River. One virgin stand of bald cypress and tupelo gum trees in this pristine **wetland** is thought to contain the largest such trees in the world. This stand of trees has been preserved as the Francis Beidler Forest and is managed by the Audubon Society as a wildlife sanctuary. The Webb Wildlife Center is located on the Savannah River floodplain and is home to several rare plant and bird species. It is managed by the South Carolina Department of Natural Resources for a variety of land uses, particularly as a hunting and fishing preserve for sportsmen and as an outdoor laboratory for scientists. The Center is also known for its large deer population.

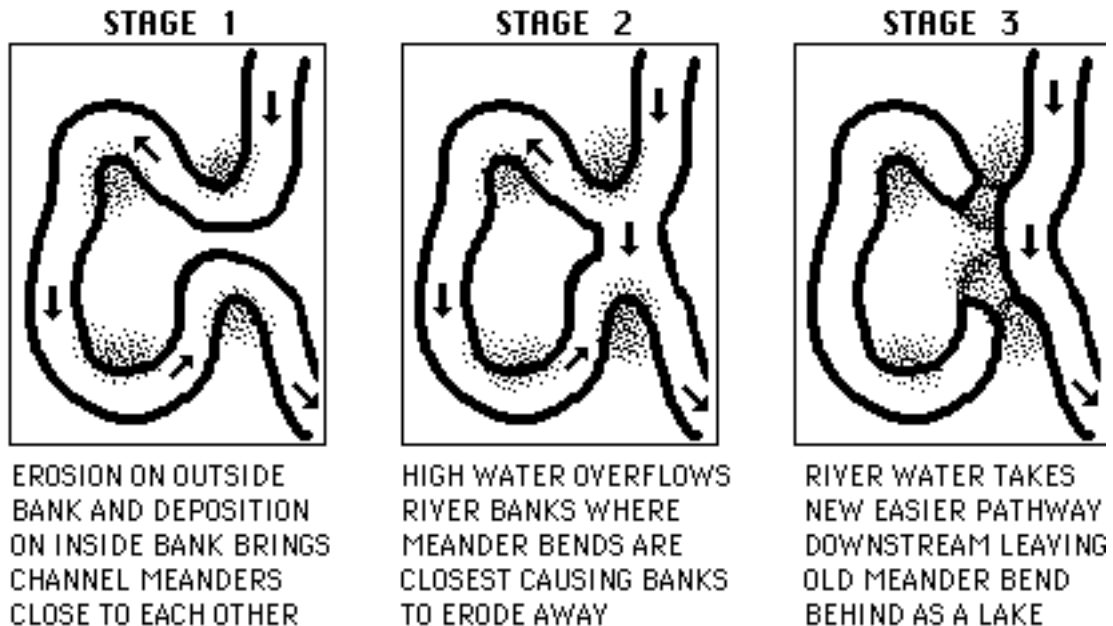


## Meandering Rivers and Oxbow Lakes

Coastal Plain rivers are often called lazy or meandering rivers because they wind their way to the ocean, forming curves and loops, called meanders, along the way. Such behavior is favored by the low slope or gradient of the river and the easily eroded Coastal Plain deposits. The rivers flow from side to side, wearing away the outside of the curves and depositing sediment on the inside, thereby forming bends in the channel creating a series of meander patterns on the landscape. This process occurs because river currents flow faster on the outside of curves compared to the inside, just like race car drivers who must drive their cars faster around the outside of a track to keep up with the cars on the inside. Material is eroded from the outside of curves, where the water is flowing faster, and deposited on **point bars** on the inside of curves downstream where the water is flowing slower. Thus the curvature or bending of the channel creates a U-shaped feature whose curvature is continuously made more extreme through time. Eventually, during high water, the river may swell and flood over the banks, cutting a new straight channel across the narrow neck of a meander and leaving behind a crescent-shaped abandoned meander containing a body of water called an oxbow lake. The term oxbow refers to a curved wooden yoke or collar used to harness oxen. Most Coastal Plain rivers meander extensively across their floodplains and have left behind a large number of oxbow lakes and old meander scars as evidence of their former channel locations.

Figure 6-1: Formation of Oxbow Lakes

### STAGES IN THE FORMATION OF AN OXBOW LAKE



## Geologic Change Through Time in Floodplains

The geological process of stream meandering gradually widens the floodplain as new channels form and new meander bends cut deeply into the adjacent bluffs. Most floodplains contain a large number of old oxbow lakes, some of which are located a considerable distance from the present-day river. However, it is not necessarily true that the oxbow lakes farthest from the present day channel are the oldest. The main river channel may have wandered back and forth across the entire floodplain many times in recent geologic history. A better estimate of relative age is provided by measuring the amount of water still present in the lakes. Many of the older oxbow lakes have partially filled in with sediments and are now grown over with trees. Lakes with deeper open water are usually younger.

An unrelated factor also influences the changing position of the main river channel through time. **Tectonic** uplift in the eastern portion of South Carolina, along what is called the Cape Fear Arch, has caused the landscape surface of the entire state to tilt slightly towards the southwest. Although this uplift is slow enough so that erosional processes are able to keep pace and maintain a relatively level land surface, there is still a slight tendency for rivers in South Carolina to slide to the west over time and preferentially erode their southwestern banks. Partially in response to this effect, most major river floodplains in the state have developed a dominance of high bluffs on their southwestern sides and low flat floodplain deposits on their northeastern sides.

In geologic terms, river floodplains have developed their present day shape and size over millions of years. The physical forces associated with meandering rivers depositing sediments and eroding bluffs on their way to the ocean are never-ending. The large volume of flood water and suspended sediment in the larger rivers (although less now after the construction of major **reservoirs** upstream from the swamp) greatly enriches the soil in both organic matter and mineral nutrients through the deposition of large amounts of silt and clay. Since the building of dams, less sediment has been supplied to the floodplains, which eventually may result in lower fertility levels for river bottomland soils.

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## **Influence of Topography on Historical Events and Cultural Trends**

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### **River Trade and Transportation**

The earliest colonial settlements in South Carolina were restricted to major rivers because those rivers provided the only readily available form of transportation. The Ashley and Cooper rivers, in particular, provided easy routes for expansion into the coastal interior of the state. The continuing desire for more and bigger canals in the early 1800's highlighted the state's dependence on its waterways for commerce and trade. For a time, over 80 percent of the cotton produced in the state and shipped to Charleston came by water. Even after the railroads took over most of the major commercial cotton shipping, small businessmen and farmers still took advantage of cheaper water transportation, as did local inhabitants living along the river.

In addition to facilitating commerce and trade, Coastal Plain rivers were also used for a variety of smuggling operations, both of commodities and people. While the almost deserted swamps which often surrounded rivers were a nuisance to some travelers, they were a sanctuary to others. Following the Civil War, the Provost Marshal General of the Federal Department of the South held hearings to learn how several contingents of Yankee soldiers had escaped from Confederate prisons and traveled safely out of enemy territory down a series of lonely coastal rivers. At one such hearing, he heard testimony from a black merchant named Alonzo Jackson, who was asked whether he had ever helped the Union forces.

#### **Alonzo Jackson Rescues Union Soldiers**

Yes--about 8 months before Georgetown was occupied by Union soldiers--while I was in the freighting business on my flat boat on Mingo Creek (up Black River) about 30 or 40 miles from Georgetown by water, 3 white men came near the boat which was at the bank of the river--- I was on the boat with only one person a colored man (in my employ named Henry) As soon as the 3 white men saw we were colored men they came to the boat and said "we are Yankee soldiers, and have escaped from the rebel 'stockade' at Florence, we are your friends, can't you do something for us we are nearly perished." As soon as I saw them, before they spoke, I knew they were Yankee soldiers by their clothing. They were all private soldiers--so they told me--I invited them to come on the boat and told them I would hurry and cook for them, which I did and gave it to them in my boat-- As soon as they entered the boat I shoved off from land and anchored in the creek about 60 ft from shore-- I was loading cord wood in my boat when the soldiers came and had completed my load within about 4 cords. I did not wait to take it all--fearing that, someone else might come and catch these Yankees-- Neither of the 3 soldiers ordered me to take them in the boat, or made any threats-- They did not go in the boat or secure it in any way so that I could not leave it-- They only entered the boat after they had told me who they were (as stated) and when I invited them-- They were very weak--and had no weapons-- They had no shoes on-- It was then winter weather, and cold-- The 3 Yankees did not suggest anything for me to do for them except to feed them--and wanted to get to the gun boats-- They did not know where the gun boats were-- I did--and I told them I would take them where they could get to the gun boats unmolested. The soldiers did not pay or give me anything--or promise anything to me at any time--

and I have never received anything for any service rendered to any Union soldiers-- They did not threaten me or use any violence-- they were very friendly and glad to get into such good hands-- They showed that they felt very grateful-- In about 3 days time we came to "North Island" (about 12 miles from Georgetown) which I then knew was in possession of the Union forces-- I did not pass Georgetown by day light for fear of being stopped by the rebels who had "pickets" all along the shore to stop all boats from going below-- In the night I floated with the ebb tide (without being seen) to "North Island"-- I got there in the night and landed the 3 soldiers in my small boat--I showed them the direction to cross the Island so as to get to the gun boats-- I knew there were many of the gun boat people on the shore there at that time-- I saw the 3 soldiers go as I directed-- I never saw or heard from any of the 3 soldiers afterwards--but through a colored man named "Miller" (who was on the shore near the gunboats) learned about 3 soldiers had got to the fleet-- "Miller" told me this about 2 weeks after I took the 3 soldiers-- he saw them and described them so that I was certain he had seen the same 3 soldiers safe in the protection of the gun boats--

Two captured Union officers who slipped their guards in Charleston, South Carolina, also received the protection and aid of black people, slave and free. Unlike the enlisted men assisted by Alonzo Jackson, however, the two officers found allies among the white populace as well. The willingness of white Southerners to abet the escape of Union prisoners exposed growing disaffection--and even disloyalty--within the Confederacy. The Union officers recounted their saga to the Provost Marshal General of the Federal Department of the South.

### Swamps as Hiding Places

Most Coastal Plain rivers have a significant portion of swampland on their floodplains and these swamps are usually uninhabited because they are too wet for most agricultural or other land uses. Yet, these riverbottom swamplands have held a certain mystery and intrigue for settlers throughout the history of South Carolina. Both Francis Marion, nicknamed the "Swamp Fox," and Thomas Sumter, the "Gamecock," attacked British troops during the American Revolution with hit and run tactics which today might be described as guerrilla warfare. They managed to elude the British by using their familiarity with the swamps to hide where the British could not follow. Likewise, during the Civil War, plantation owners hid in nearby swamps to avoid General Sherman's troops as they marched through the state.

Escaping slaves also used river floodplain swamps as hiding places in their journey northward to freedom along a route often referred to as the "Underground Railroad." In South Carolina, some followed the Pee Dee and Lynches river systems upstream into North Carolina, traveling by night and sleeping in the swamps during the day. **Abolitionist** sympathizers assisted the escaping slaves by providing food, clothing, and hiding places. While some slaves successfully reached freedom by following this route, it posed a great risk not only to those escaping, but also to the whites who assisted them.

Word of the existence of the Underground Railroad, and other escape routes, spread rapidly among the slave population, but such information could not be discussed openly for fear of discovery and punishment. Geographic landmarks, trail routes and other instructions were often hidden in code within stories and songs which slaves shared with each other. The song, "Follow the Drinkin' Gourd," contains an example of such a

code. Runaway slaves and white sympathizers would sing this song to remind themselves about certain landmarks and travel directions essential to their journey. Codes hidden in songs could be easily memorized and shared without any fear of detection. In addition to being a source of hope and encouragement, this song also contained such practical advice as "keep to the river," "sleep by day," and most importantly, "follow the drinkin' gourd." The "drinkin' gourd" refers to the stars in the night sky which make up the Big Dipper, a group of stars called an asterism, in the constellation Ursa Major. Those stars always shone in the northern sky, pointing the way towards freedom.

### **"Follow the Drinkin' Gourd"**

Traditional

Think I heard the Angel say; Follow the Drinkin' Gourd  
Stars in the heaven gonna show you the way; Follow the Drinkin' Gourd

Step by step keep a travelin' on; Follow the Drinkin' Gourd  
Sleep in the hearth till the daylight is gone; Follow the Drinkin' Gourd

When the sun comes back and the first quail calls; Follow the Drinkin' Gourd  
The old man is a waitin' for to carry you to freedom; Follow the Drinkin' Gourd

Well the river bank makes a mighty good road; The dead trees show you the way  
Left foot, peg foot, travelin' on; Follow the Drinkin' Gourd

Follow that river till the clouds roll by; Follow the Drinkin' Gourd  
Keep on movin' as you look to the sky; Follow the Drinkin' Gourd

When the great big river meets the little river; Follow the Drinkin' Gourd  
For the old man is a-waiting for to carry you to freedom; If you follow the Drinkin' Gourd

Well the river ends between two hills; Follow the Drinkin' Gourd  
There's another river on the other side; Follow the Drinkin' Gourd

There's a new day comin and it won't be long; Follow the Drinkin' Gourd  
All God's children got to sing this song; Follow the Drinkin' Gourd

#### **CHORUS:**

Follow the Drinkin' Gourd; We're gonna' follow the Drinkin' Gourd  
Keep on a travelin' that muddy road to freedom; Follow the Drinkin' Gourd

### **Timber Resources**

South Carolina's river floodplains continue to be an important source of cypress and hardwood timber once thought too difficult to harvest commercially. Originally a highly labor-intensive activity, logging before the Civil War was restricted to small localized plots controlled by plantation owners. After the Civil War, with the ending of slavery, agricultural patterns changed significantly in South Carolina and labor-intensive crops, such as rice, were no longer financially profitable. Logging activity within the state declined precipitously. Most of the land previously used for logging lay open. Because of tax payment defaults, ownership of many tracts changed hands frequently. Some tracts were sold at sheriff auctions, but even on the open market, land that was worth \$20 an acre in 1825 was selling for \$1 per acre in 1880.

In 1895, the Beidler family of Chicago began acquiring river floodplain tracts of land in South Carolina. By 1910, a 15,000 acre tract had been consolidated along the Santee River basin under the name of the Santee River Cypress Lumber Company. The acquisition dates are important, because much of South Carolina forest land was still covered in virgin timber in the 1880's and 90's. During the next thirty years, as the lumber industry began heading southward from its mid-western roots, southern forests were nearly all clear-cut, leaving only small, scattered pockets of virgin timber in isolated areas. With the development of modern harvesting equipment, lumbering has become an even more profitable industry in recent times.

A growing environmental concern is that the harvesting of timber may be taking place at too fast a rate in some areas of the state, particularly in old growth stands. Many feel that these remaining stands should serve as scientific reserves. Only 13,000 acres of old growth riverbottom forests are left in South Carolina. In Congaree Swamp National Monument, 11,000 acres are under the protection of the National Park Service and in Four Hole Swamp, 1,700 acres are protected by the Audubon Society. Both tracts were acquired from the Beidler family for scientific as well as educational purposes.

### **Habitat Diversity Based on Water Level**

Most Coastal Plain rivers undergo periodic flooding, normally during the peak rainfall season from December through April. The river banks cannot hold the additional flow and rising river water begins to enter low-lying channels, guts, and sloughs. When water overflows into the bottomland, it is already laden with rich topsoil washed from the mountains and especially from the farmland upstream. The flood leaves behind a record of its presence in the form of distinctive yellow, brown, and black mud deposits. In some floodplains, such as the Congaree Swamp in the Santee River basin, major flooding episodes can occur eight to ten times a year. As the waters recede, silt and mud settle out and are left behind making a very productive landscape for growing magnificent forests with their associated ecosystems. Trees on the floodplain grow much larger than their Coastal Plain neighbors as a result of the frequent influx of rich topsoil. The exact characteristics of the soil depend on the location of the land with respect to the river, as the type of sediment is dependent upon the velocity of the water that was carrying it. Elevation differences of even a few inches can result in the formation of significantly different soils.

Ever since **Piedmont** reservoirs were constructed upstream of the Coastal Plain floodplain swamps, engineers have tried to manage river flow to avoid extremely high or low water levels. This management practice may pose a threat to plants and animals living in marginal **habitats** which depend on extremes of water level for their existence. The type of vegetation found in each area of the swamp is primarily determined by how long and to what depth the landscape is flooded. Floodplain areas closest to the active river channel are usually lower than the older, inactive areas and therefore are the first areas to become flooded and the last to dry out. Just a few feet of elevation difference can produce dramatic changes in the plant and animal communities found on the floodplain. For example, big trees thrive on slopes between sloughs and ridges. The roots are allowed to dry out between floods, yet receive fresh nutrients each time there is a freshet. Levees can occasionally stay high and dry while adjacent floodplain areas are completely under water. Filled-in oxbow lakes are extremely wet and contain moisture-tolerant tree species such as the bald cypress and water tupelo. On the higher bluffs alongside the floodplain, black and sweet gums, dispersed pines, and various oaks dominate the forest. The highest bluffs overlooking the floodplain are comprised of pine and hardwood mixed forests.

### **Ecological Functions of Floodplain Swamps**

Once considered only as a breeding ground for mosquitoes and snakes, the mighty Carolina wetlands are now considered to be one of the state's most precious natural resources. Today, as in the past, the Carolina floodplain swamps provide an excellent recreational environment, a unique ecological function, and an abundant source for hardwood timber. Wild boars, water moccasins, raccoons, bobcats, and barred owls are just a few of the wildlife inhabitants that depend on riverbottom forests for survival, creating a rich and diverse unique habitat area for both sportsmen and naturalists.

In addition to wildlife habitat, the Carolina wetlands provide other important ecological functions, among which are flood control, ground water recharge, soil nutrient replenishment, and pollution filtration. In seasons of heavy rainfall, approximately ten times a year, the swamps provide a wide flat area to accommodate water that spills over the banks of the rivers. By slowing the water down, a greater percentage of floodwater is able to soak into the ground, raising the water table and depositing additional sediments. Pollutants in the water tend to settle out and become trapped in the newly deposited sediment, and as a result, the water leaving a floodplain swamp is usually much cleaner than the water entering.

## **River Floodplains as a Unique Natural Habitat**

Swamp forests along rivers play a key role as wildlife corridors and are home to a diverse assemblage of plants and animals. Waterfowl, migratory birds, reptiles, and amphibians thrive in these wetland environments. Three hundred years ago, when European colonists were first arriving, South Carolina had over 20 million acres of pristine bottomland hardwood forest. In 1995, only about 5 million acres remained. Population growth and increased development around swamp areas generated a relentless pressure to replace the so called useless swamps with something of more immediate benefit to the society. As a result, many swamp lands were drained and ditched, a process which removes the water, the lifeblood for a functioning ecosystem, and other lands were subjected to indiscriminate logging, which not only removes trees but also destroys surrounding soft soils and disturbs the balance of the environment. A recent environmental concern is the alarming rate at which these swamplands have been deforested for timber and converted to agricultural or commercial developments. Coupled with this concern is the possibility of contaminants entering these swampy floodplain areas through commercial waste disposal sites or polluted rivers. Many of the remaining swamp lands are now protected by law and serve as a last refuge for many threatened and endangered species.



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## Summary

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Coastal Plain Region rivers meander their way eastward to empty into the Atlantic Ocean at many points along South Carolina's coast. Sometimes along their way they shoulder up against high bluffs, but they are normally bordered by wide, low floodplains. Floodplains are formed by the meandering of the rivers so that where U-shaped curves grow larger through time, these channels are cut off from the main flow to form oxbow lakes, and eventually fill with sediment and vegetation. Floodplains provide rich and varied homes to the plant and animal communities that inhabit them.

Slight variations in elevation on these floodplains create a great diversity of related ecological **niches**, but a broad distinction can be made between two major floodplain habitats. Most of the floodplain is dry except during periodic floods, but much of the rest is swampy. Each environment is important to its plant and animal inhabitants, and each is rich enough to attract people with plans to harvest the bounty of the land, despite the access and transportation challenges of these remote and often wet lands. Timber and agriculture operations have succeeded in many areas, to the point that undisturbed floodplains are the exception rather than the rule. The Congaree Swamp National Monument and other preserves protect from development some of what remains of these floodplains.

Protection from a more subtle change, the effects of upstream reservoirs, is more difficult. A major purpose of reservoir building on South Carolina's major rivers was to control downstream flooding, for the protection of people living along Coastal Region rivers and their property. But without frequent floods, which deposit organic and mineral-rich sediments onto the floodplains, the fertility of the floodplains is lessened, which adversely affects both natural plant communities, timber, and other agricultural operations. Managing the flow of rivers to meet the sediment needs of the floodplains while providing the flood control promised by the dams is a complicated and difficult balancing act, one which is probably not always completely successful. Additionally, research suggests that contaminants from upstream urban areas are now deposited along with the sediments when there is flooding along the rivers. This contaminant-trap effect may well benefit people living downstream, but the long-term effects on the floodplain environments are unknown.

Historically, Coastal Plain floodplains have provided people with refuge. Soldiers hiding from their enemies, slaves seeking escape to freedom, hunters and botanists and bird watchers looking for a wild place away from the alterations of human kind--all of these and more have found what they sought in the wide floodplains of the Coastal Plain rivers of South Carolina. With careful, far-sighted management, these areas can continue to be a refuge in the future.

## PLACES TO VISIT 📍

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Congaree Swamp National Monument. Southeast of Columbia off Highway 48. For information call (803)-776-4396 or (803)-765-5571.

Francis Beidler Forest, Four Hole Swamp, Audubon Society. Off I-26 on to SC 28 in Dorchester County. For information call (803)-462-2150.

Playcard Swamp Environmental Center near Conway. For directions and information call (864)-756-1277.

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## STUDY AREA 6: RIVER FLOODPLAINS

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### Activity 6-1: Overview

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Materials		
6	STATE BASE MAP #1, SHADED RELIEF	1 : 500,000
6	STATE BASE MAP #2, WITH HIGHWAYS	1 : 500,000
6	GENERAL SOIL MAP	1: 594,000
6	LAND USE/LAND COVER MAP	1: 500,000
6	COASTAL SATELLITE IMAGE	1: 332,640
6	CONGAREE SWAMP TOPOGRAPHIC MAP	1: 24,000
1	State Map of Major Drainage Basins	Figure 1-2
6	Wipe-off Pens	

### PERFORMANCE TASKS

(Icon Key) Overview = →; Science = ⚙; Math = 📊; History = 📖; Language Arts = ✍

- 1. Locate river floodplains and characterize topography.** → ⚙  
Locate all areas on the LAND USE/LAND COVER MAP which are categorized as saturated bottomland forest (purple). With a wipe-off pen, outline all of these areas. Estimate the percentage of the Coastal Plain Region (be sure to exclude the Coastal Zone) that consists of river floodplains. Are these floodplains randomly distributed throughout the Coastal Plain, or are they concentrated in certain parts of that region? What is the relationship between the width of a floodplain and the size of the river flowing through it? What determines where river floodplains occur? Why are they mostly found in the Coastal Plain Region? Characterize the general topography of river floodplains? What are the major ecological functions of floodplains?
- 2. Identify major South Carolina rivers and floodplains.** →  
Using the STATE BASE MAP #1, SHADED RELIEF, and Figure 1-2, "State Map of Major Drainage Basins," review the four major drainage basins covering South Carolina. Using the map symbol for swamps as a guide, list several major rivers which have floodplain swamps. Which river system seems to have the greatest amount of swampland? Which river bottom swampland is nearest to your school? Look at the GENERAL SOIL MAP and locate all areas containing floodplain soils (light blue). Match these areas with rivers on the base map. Do floodplain soils extend all the way to the coast? Do any Coastal Plain rivers not have floodplain soils? Compare the channel pattern of the Black River, which drains only the Coastal Plain, with the Congaree River, which drains the Piedmont. What similarities or differences are there between these two rivers in terms of swampland and soils?
- 3. Determine percentage of state draining into swamp.** → 📊  
The Congaree and Wateree rivers join near the northern end of Lake Marion to form the Santee River. Each of these two tributaries forms a large river floodplain swamp before it reaches the junction point. Locate these two rivers and the two swamps on the STATE BASE MAP #1, SHADED RELIEF. Divide into two groups to determine the size of the drainage basin providing water for each of these floodplain swamps. First trace, with a wipe-off pen, all the rivers and streams which flow into your

assigned swamp. Then, with a wide-tip wipe-off pen, outline the drainage basin which contains those rivers. Use the transparent grid overlay and the scale bar on the map to determine the area of your drainage basin. To calculate the percentage of the state drained by your swamp, divide your area value by the total area of South Carolina, 31,113 square miles (80,583 square kilometers), then multiply by 100. Compare your answer with other groups. Which swamp, the Congaree or Wateree, drains a larger percentage of the state?

4. **Identify features upstream which might cause pollution.** → ✨

Several large floodplains are not far from major cities and industrialized areas. Others are surrounded by agricultural fields. Divide into groups and use the wide-tip wipe-off pen to outline, on the STATE BASE MAP #1, SHADED RELIEF, the watershed area for your assigned river. Investigate all sources of upstream pollution which might affect your particular river floodplain. Be sure to include non-point source pollution in your region. Make a list of pollutants and their possible origins, and then compare your list with those of other groups. Discuss ways of solving these pollution problems and protecting the floodplain swamps. Refer to the base map, the STATE BASE MAP #2, WITH HIGHWAYS, the COASTAL SATELLITE IMAGE, and the LAND USE/LAND COVER MAP as needed.

**Group I Savannah River, Allendale County**

**Group II Congaree River, Richland County**

**Group III Edisto River, Dorchester County**

**Group IV Black River, Clarendon County**

**Group V Pee Dee River, Marion County**

**Group VI Lynches River, Lee County**

5. **Trace Alonzo Jackson's route and write account of escape.** 📖 ✍️

Using the STATE BASE MAP #1, SHADED RELIEF, and the story, "Alonzo Jackson Rescues Union Soldiers," on page 6-5, locate Mingo Creek (Black Mingo Creek) and find where it joins the Black River. Trace a probable route that the escaping Yankee soldiers may have used to reach Mingo Creek from Florence. Explain why they followed the particular route you have laid out. How would the geography of this area have helped them escape detection? How many miles was Jackson from Georgetown? Why do you think he was so far from Georgetown? Why would he have had to come this far to cut wood? If you drew a straight line between Mingo Creek and Georgetown, how many miles would it be? What made the trip for Jackson so much longer? Before he could leave Mingo Creek with the Yankees he had to wait for the tide. How could the tide affect the river this far inland? Trace Jackson's route down the Black River to North Island. What body of water did he have to cross in order to reach North Island? Why might he have been afraid to go by Georgetown during daylight hours? Why do you think the Union gunboats were stationed at North Island?

Imagine that you are one of the escaping Union soldiers. Write an account of your trip for a Northern newspaper. Remember to include details of the landscape and the people you might have met in South Carolina, because you know people in the North are not familiar with the type of terrain or the culture found in this part of the country.

6. **Trace possible escape route for slaves on the Underground Railroad.** 📖
- Suppose your group represents several slaves on a plantation who have come up with a plan to join other slaves from other plantations to escape to freedom on the Underground Railroad. Each group will have to decide what route to travel and when to leave in order to rendezvous with the others at midnight on April 15, 1854 at the North Carolina state line along the Lynches River. Each group should compile a list of geographical or topographical landmarks, trail routes, and instructions that could be passed on to others desiring to escape. After finishing your list, write some of the instructions in code like the song "Follow the Drinkin' Gourd," on page 6-7. Share your new verse with other students and see if they can interpret its true meaning.

**Group I      A plantation near Timmonsville in Florence County**

**Group II     A plantation near Boykin in Kershaw County**

**Group III    A plantation near Oak Grove in Dillon County**

7. **Explain location of agricultural areas near swamp** ✨
- Locate the agricultural areas (white) in the northern portions of the CONGAREE SWAMP TOPOGRAPHIC MAP. What is the major topographic difference between the white agricultural areas and the green swamp area? Why do you think the white area is more suitable for agriculture?
8. **Analyze railroad's effect on town of Gadsden.** 📖
- Locate the small town of Gadsden on the CONGAREE SWAMP TOPOGRAPHIC MAP. This small community has historically been associated with the surrounding agricultural economy. Although this town is small, it is typical of hundreds of other similar agricultural communities within the Inner Coastal Plain of South Carolina. What impact did the railroads have on determining the location and development of this community? Why? What did the railroad contribute to these communities? What types of businesses and stores would you expect to be located in Gadsden that would support the small local farming community?

## ENRICHMENT

1. **Research how Four Holes Swamp got its name.** 📖 📖
- Write a short story about how you think Four Holes Swamp got its name. Then research this topic in your school or community library to see if you were close.
2. **Draft letter about protecting swamps.** 📖
- Draft a letter to the governor of South Carolina outlining your concerns for the fate of South Carolina swamps. Outline reasons for limiting the exploitation of our state's most valuable resource: timber. Why do floodplain swamps provide an excellent environment for growing big trees? Are trees a renewable resource? Explain.
3. **Explain soil productivity.** ✨
- Describe in a short paragraph the formation of the particular type of soil you would expect on these farms. Where did it come from and what has helped make it become naturally productive? What modern-day crops are probably grown here? (Note the large sizes of the fields.)

# The State

October 13, 1989

## Trees with national significance fell to Hugo in Congaree Swamp

by Dawn Hinshaw

An oak tree at the Congaree Swamp National Monument that was recognized as the largest of its kind in the nation was destroyed last month by Hurricane Hugo.

The national champion Shumard oak was 20 feet around, 155 feet tall and had a crown spreading to 116 feet. "That's a tremendous tree," park superintendent Bob McDaniel said. For example, the Shumard was taller than the 12-story Blue Cross and Blue Shield building on Alpine road.

McDaniel estimated 30 percent of the Swamp's trees are down--translating into a loss of hundreds of

thousands of trees. "There is nothing eternal in forests," McDaniel said. "What happened to us, by God and nature, is natural."

Park officials didn't know the age of the uprooted Shumard oak because it had not been cut. But of those trees cut up to re-establish access to the park, the number of rings indicates some were 140 to 165 years old, Rick Clark, resource management specialist, said. That means they could have been there a decade or more before the Civil War broke out in 1861.

To be a national champion, a tree must be the largest of its species. Before the storm, South Carolina

was home to 17 national champions. Now, Steve Muzal, a forester with the Clemson Extension service, doesn't know how many it has.

Congaree Swamp used to have five of the champions. "We have none now," McDaniel said. The park superintendent said trees in the swamp are vulnerable to high winds because, with all the water available to them, their root systems are small.

The Shumard, along with other trees blown over in the storm, probably will be left to decompose naturally. "We'll just have to see what comes back in its place," McDaniel said.

### RATIONALE

The Congaree Swamp Study Site serves as an outstanding example of a pristine riverbottom floodplain forest similar to those which used to occur along many of the old meandering rivers draining South Carolina's Coastal Plain Region. These relatively flat floodplain areas are havens for anglers, hunters, research biologists, and naturalists. Riverbottom floodplains not only provide excellent habitat for wildlife but also serve several ecological functions such as flood control after heavy rains, ground water recharge, and a limited amount of pollution filtration. In spite of Hurricane Hugo's destruction, Congaree Swamp still contains the oldest significant stand of old growth floodplain hardwood forest in the country, with a number of record trees (largest on record for the species). Most of the big trees are at least 200 years old, and much of the site is in a pristine condition. In all, more than 90 species of trees can be found within the swamp boundaries as well as a number of threatened and endangered species.

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## Brief Site Description

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### Tall Trees

The Congaree Swamp National Monument is an undisturbed mature forested floodplain situated along the Congaree River about twenty miles downstream from Columbia. In 1976, the National Monument came under the protection of the National Park System. The 22,000 acre riverbottom floodplain park now ranks among the largest areas in the world known for its tall, broad-leafed forest. Often called the "Redwoods of the East," the Congaree forest can boast of record size trees found nowhere else in the United States. A tree's girth and the shape of its crown are considerations for achieving big tree status. If height alone was the only factor to consider, Congaree Swamp would emerge as one of the most impressive forests of the world. Trees growing in the Congaree floodplain attain astounding heights. Species of trees that normally reach a height of 60-80 feet often measure in the 130-150 foot range in the Swamp. Most of the 93 identified as "big trees" are deciduous hardwood species which require many years of growth to arrive at their tremendous size. Currently, the swamp boasts six National Champion (representing four species) and 29 State Champion (representing 25 species) trees holding these titles with the American Forests Registry. It is estimated that most of these trees are approaching 200 years of age and some could be as old as 600 years. This swampy old growth riverbottom forest can boast of not only the largest concentration of big trees found in North America but also the tallest broad-leaf trees remaining in the world.

### State and National Champion Tree Selection

Congaree Swamp National Monument was surveyed for big trees in 1995, to determine the status of State and National champion trees after Hurricane Hugo blew through the area in 1989. In the process, additional trees of record or near-record size were located and measured. Furthermore, the ecological requirements of these big trees were assessed by a sampling process which divided the area into transects for plotting tree location, measuring dimensions of big trees, establishing soil type, determining type of **topography**, and identifying surrounding understory vegetation. Transects totaling 277 miles (446 kilometers) of old-growth forests were surveyed. Data were collected, the measurements were analyzed, and a list of qualifying trees was sent to the Big Tree Coordinator, Clemson University, and the National Register of Big Trees in Washington, D.C. This program, although originally designed for identification of State and National champion trees, has since become a stimulus for promoting conservation and wise use of our forest resources.

The American Forests organization keeps a register of champion trees. The formula for the point scoring system, established by the American Forestry Association, combines the tree circumference measured in inches at a level of 4.5 feet above the ground, the total height measured in feet, and one-fourth of the crown spread measured in feet. Only trees that are more than 9.5 feet in circumference, at least 12 feet tall, and possessing a well defined crown of foliage can be nominated as State or National Champions. When a tree is nominated, the exact size and location must be verified by a forester or a botanist.



**Directions for Nominating Big Trees**  
Modified from the Alabama State Tree List

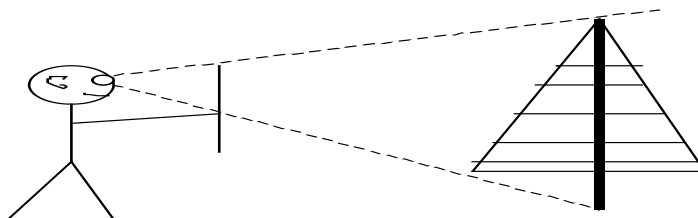
A tree is formally defined as a woody plant having one erect perennial stem or trunk at least nine and one-half feet in circumference at a point four and one-half feet above the ground, a definitely formed crown of foliage, and a height of at least twelve feet. If several stems from a single root system have grown together to form a trunk, only the largest stem will be considered.

**CIRCUMFERENCE** of a tree is measured at a point four and one-half feet above the ground, around the main stem/trunk, and is given in feet and inches.

**HEIGHT** of a tree can be measured accurately by special instruments such as a clinometer, hypsometer, or Biltmore stick. If none of these are available, a fairly good estimate of tree height can be made by using a straight stick five or six feet long. Face the tree, holding the stick horizontally at eye level with one end touching your eyebrow and the other end pointing at the tree. Holding the near end carefully to your eyebrow with your left hand, slide your right hand out along the stick until you extend your right arm fully, and grasp the stick between your right thumb and fingers. Holding your right arm in place, release the end of the stick at your eyebrow and let it go to the vertical position between the thumb and fingers of your right hand. Keep the stick at arm's length, keep your head straight up, and don't move your arm. Sight over your fingers to the point where the base of the tree touches the ground. Move closer to the tree or further away until the top of the stick lines up with the topmost branches. Mark the spot where you are standing. Measure from that spot to the base of the tree. This will give you an approximate measurement of height.

**CROWN SPREAD** can be measured by finding the two longest limbs opposite each other on each side of the tree. Mark a spot on the ground directly under the outermost part of each of the long limbs. Measure the distance between these two spots to the nearest foot. Find the shortest two limbs opposite each other on each side of the tree. Mark a spot on the ground directly under the outermost part of each of the short limbs. Measure the distance between these two points to the nearest foot. Add the two measurements together and divide by two. This will give the average crown spread which should be shown on the nomination form.

**FORMULA VALUE** is determined by the formula established by the American Forestry Association as follows: **CIRCUMFERENCE** (in inches) + **HEIGHT** (in feet) + one-fourth **CROWN SPREAD** (in feet).



**Figure 6A-1: Champion Trees Located in Congaree Swamp National Monument**

#	TREE SPECIES	TYPE OF CHAMPION	NORMAL TREE HEIGHT (ft & m)	TREE DIMENSIONS (circumference (in.) height (ft) crown size (ft))	COORDINATES (distance (feet), direction (angle in degrees))
93	Ash, Carolina	State	50' (15m)	34"/67'/20'	7800, 42° W of N
51	Cotton, Eastern	State	60' (18m)	159"/127'/62'	6000, 2° N of W
60	Elm, American	State	100' (30m)	203"/128'/76'	15500, 20° S of E
87	Maple, Silver	State	60' (18m)	81"/77'/41'	15250, 40° S of E
55	Oak, Cherrybark	State	80' (24m)	250"/158'/124'	1500, 1° N of W
23	Oak, Laurel	State	80' (24m)	222"/131'/171'	4500, 19° E of N
7	Oak, Overcup	State	80' (24m)	199"/138'/92'	4000, 28° N of W
58	Oak, Shumard	State	90' (27m)	207"/132'/106'	2500, 1° S of W
15	Oak, Chestnut	State	80' (24m)	242"/120'/106'	6800, 37° N of W
9	Pawpaw	State	30' (9m)	26"/50'/18'	5500, 31° N of W
26	Persimmon, com.	Nat'l tie	70' (21m)	95"/120'/40'	1700, 38° N of E
27	Persimmon, com.	Nat'l tie	70' (21m)	85"/132'/37'	2500, 27° E of N
1	Pine, Loblolly	State	100' (30m)	178"/158'/40'	6000, 25° W of N
19	Pine, Loblolly	State	100' (30m)	167"/169'/60'	4500, 10° W of N
20	Pine, Loblolly	State	100' (30m)	172"/164'/54'	4400, 12° W of N
88	Holly, Deciduous	Nat'l tie	20' (6m)	37"/42'/43'	15500, 35° S of E
29	Tupelo, Water	State	100' (30m)	234"/114'/58'	5000, 13° N of E
18	Elm, Water	State	40' (12m)	88"/73'/36'	7000, 28° N of W

### Ecological Factors Affecting Tree Size

Trees growing in open fields tend to produce larger trunks with broader crowns than those growing in heavily forested areas. With the canopy so dense in the Congaree River floodplain forest, trees must compete for sunlight. The American Forests' point scoring system weighs tree diameter and crown size heavily. When competition for sunlight is so intense, trees tend to grow taller, have smaller trunks, and have unshapely crowns. On the other hand, trees growing in open fields with less competition tend to spread out, thereby growing larger trunks and broader crowns, but somewhat less height. Many Congaree floodplain trees were not measured for big tree status, despite their height, due to trunk size or crown shape.

Topography, rich soil, abundant nutrient supply, and protection from past agricultural activities are the major factors contributing to the growth of big trees in the Congaree floodplain. Most record trees are found growing in broad, low, flat areas or on the edge of sloughs. Record trees thrive along the edges of sloughs and adjacent ridges because tree roots are not saturated with water but still have access to a continuous source of nutrients flushing the area. Over millions of years the soil has become very rich and

easily provides abundant nutrients for big tree growth. Attempts have been made in the past to harvest the trees and clear-cut the land for agricultural purposes; however, the necessity of using hand labor, the tremendously dense canopy of vegetation, and the lack of a nearby market for timber products played a key role in limiting these practices.

### **Life Along a Floodplain Swamp**

Mr. Booker T. Sims lives by the Congaree Swamp and has all of his life. He is now more than 70 years old. He tells stories of going into the swamp as a very young boy with his father. His father hunted and fished the swamp all of his life and died in the swamp while sitting on the bank fishing. Mr. Sims' last job was working for Congaree Swamp National Monument. He is now retired. Following are some of the stories Mr. Sims likes to share.

*Note: Mr. Sims feels that making the swamp a protected area was the right thing to do. He is worried about the land that the Georgia Pacific Company owns and is still logging.*

#### **Interview with Mr. Booker T. Sims**

By Sandy Morgan

I've been going into the swamp since I was about three or four years old. I would go with my daddy fishing. We would dig for worms and then fish. There were always plenty of worms. We fished in the creeks. At this time we were fishing for eels. Nobody fishes for eels today in the swamp. There aren't any more eels. We would also fish for catfish. We could fill up a bucket with fish in no time!

There wasn't any road into the swamp. We followed a footpath. We always went late in the day and fished at night. When I was older, my friends and I would go into the swamp and fish at night. We would have a good ole time. We built a fire on the bank and cooked those fish as we caught them. Sometimes we stayed all night in the swamp. We always kept a big fire going.

Being in the swamp was a way of life for my daddy. I loved it too. My daddy and I would hunt in the swamp also. We would hunt mainly squirrels and coons. The interesting thing about the swamp back then is that mosquitoes did not bother you like they do today. We didn't have any insect repellent back then, but those mosquitoes just didn't bother us like they do today!

The trees in the swamp are huge. Sometimes people would think they had found a tree bigger than the ones in the swamp, but they never did. My daddy said that there weren't any trees bigger than those in the swamp!

My daddy spent a lot of time in the swamp. One day he went into the swamp to fish and just died sitting right there on the bank of Weston Lake. I found him there dead and had to carry him out. I guess he died doing what he liked to do most.

My daddy believed that Weston Lake did not have a bottom to it. He told us the story about the sturgeon to keep us from getting too close to the edge of the lake.

### **The Legend of the Sturgeon in Weston Lake**

Retold by Sandy Morgan

A man was standing on the bank of Weston Lake fishing. He had his cane pole and worms and was fishing for sturgeon. The man knew there were stories about a giant fish, a sturgeon, in the bottomless lake, but he had never seen it. All he knew was that it was easy to catch fish in this lake.

All of a sudden a huge sturgeon came up to the surface of the water near the edge of the lake. The man was so excited that he jumped onto the sturgeon's back. The giant fish carried this man around and around Weston Lake. He rode the sturgeon like a man rides a horse. The man was having a good time until he remembered the lake had no bottom. He knew he couldn't swim. Suddenly the fish swam rapidly to the middle of the lake and shook off the man. He is probably still going down.

It is said that on clear nights on Weston Lake, if you listen carefully, you can hear the laughter of a man riding a sturgeon around the lake.

### **Legends and Tales of the Congaree Swamp**

Much of South Carolina's culture has been recorded in folk tales. Swamp tales are no exception. Events could easily be recounted and embellished as stories were passed on to friends and families gathered around the fireplace at night or on fishing trips in the swamp during the day. Many tales were made up to explain eerie sounds often heard in the swamp. Other tales reported what happened to those who stayed in the swamp too long. Several stories taken from Tales of the Congaree, recounted originally by C.L. Adams, are reprinted here as examples of swamp tales. Adams was a physician who lived in the Hopkins area near the Congaree Swamp. These tales are excellent examples of stories depicting an exciting part of South Carolina's heritage.

#### **The Big Swamps of the Congaree**

From Tales of the Congaree by Edward C.L. Adams, edited by Robert G. O'Meall

*Tad:* Gentlemens, how is you-all?

*Voice:* Howdy! how you been?

*Second Voice:* Tolerable.

*Tad:* I been down in de big swamps on de Congaree.

*Voice:* Tell us, brother?

*Tad:* I been down to de Congaree in de big swamps, where de trees is tall an' de moss long an' gray, where de Bullace grow, an' where I hear de tune of de bird in de morning'; down wey de wild turkey gobbles, way down on de Congaree; wey God's mornin' leads to de devil's night; down on de river, where night make her sign, where owls on a dead limb talks of de dead, talks wid de dead and laughs like de dead, way down in de big swamps of de Congaree; down where de blunt-tailed moccasin crawls in de grass, where de air is stink wid he smell; where de water is green, where de worms is spewed out of de groun', where de groun' is mud, where de trees sweat like a man; down in de home of de varmint an' bugs, down in de slick yellow mud, de black mud an' de brown, way down in de big swamps of de Congaree; down in de land of pizen, where de yellow-fly sting, in de home of de fever an' wey death is de king. Dat wey I been, down in de big swamps. Down in de land of mosquito, in de big swamps, down on de Congaree.

### Spirit Dogs and Barking Snakes

From Tales of the Congaree by Edward C.L. Adams, edited by Robert G. O'Meall

*Preb:* [Enters scratched and bleeding, clothes torn, muttering:] Huh, pup, huh! Huh, pup, huh!

*Voice:* Wha' ail you, Preb?

*Preb:* Ain't nothin' ail me. You must be ailin' yourself. Is you blind? Can't you see dem dogs?

*Second Voice:* Preb must be lossin' he mind.

*Preb:* What make I loss my mind?

*Voice:* How come you call dog when dey ain't no dog? How you say you see dog when dey ain't no dog, how come?

*Preb:* Brother, if you been wid me you see dog, 'en you see more'n dog? You see snake, an' hear 'em bark, bark like dog. I come out 'er mill pasture an' I hear dog bark, an' I like, an' heap 'er little dog an' snake all tangled up 'twixt my feets an' hit look like I guine step on 'em, an' I ain't step on 'em, an' all down mill-dam dog bark and snake tangle up 'twixt my feets, an' I lef de mill-dam an' I to'd out theu de brier an' dey dept wid me, an' dey tangle up 'twixt my feets an' dey bark, an' dey come here wid me, an' you ain't hear 'em bark, an' you ain't see 'em. Ain't nobody see 'em but me. Ain't nobody hear 'em but me, an' dey tangle up 'twixt my feets.

*Spencer:* Brother, you see 'em an' I see 'em. Dem is sperrit dogs, an' dey run dese woods wid de barkin' snakes, and dey run on certain night an' dey wait dey own time an' dey fun in mill-pasture an' Black Lake, an' dey home is God knows way, an' dey is a sign, a onlucky sign, which pass dis way 'afore de earthquake, an' dey come here wid de storm, an' 'afore death, an' 'afore war, and it is a sign of 'stress. Dey is de barkin' snakes an' sperrit dogs, an' dey travel in de night of storm, an' dey travel in de night of 'stress, an' dey tangles 'twixt de feets of men, and all men is feared ur de sperrit dogs an' de barkin' snakes. Dey come 'afore death an' in time of 'stress, an' dey tangles 'twixt de feets of men.

### A Freshet on the Congaree

From Tales of the Congaree by Edward C.L. Adams, edited by Robert G. O'Meall

*Leck:* Gentlemens!

*Voice:* Sorter slow. Wuh's de time, Ber Leck?

*Leck:* Time ain't so much.

*Voice:* Wey you come from?

*Leck:* Jes come out of de Congaree swamp.

*Voice:* How come time ain't so much, Ber Leck?

*Leck:* Jes come out de Congaree swamp and de ole river sho' is ragin'. I never is seen a wusser freshet. De logs spin 'round a hundred feet long and roarin' 'gainst de big trees like dey guh tear de heart out de earth wey de go,--varmint a settin' on limbs and ridin' on logs, and I seen er drove er cow swimmin'. Each one had a head a restin' on de tail of de other cow. Den de call come and de first cow sink and all de other cows sink. After while I see 'em whirlin' over and over. Sometime dey feets in de air, sometime dey horns, and de river been mess up de cows' horns and foots and it th'owed 'em every which er way, and I see hog cut dey own throats tryin' to swim out of dis torment and de river, and it look like God Almighty must a wrop he arm 'round de flood and whirl it back in He anger. Every which er way I look I see 'struction. I see sturgeon tangle up in a wire fence and de birds quit singin' and went to hollerin', and I look down on de yaller water and I see wey buzzard cast his shadow. Everywhere I look I see buzzard. I been prayin' to God to help me and I been fightin' de angry waters and 'struction been rollin' at me and I been lookin' death in de face. And God save me dis time, and I reckon I'll stay 'way from de big swamp and try and don't do nothin' to defy Him.

Brother, when de Congaree gits riled, it mighty nigh look like Jesus Hissself forgits de poor critters, it look like he stan' back and give de devil a chance to do he do. And if your heart ain't right, my brother, de big swamps will 'stroy it. Dey 'stroy your body and if dey ain't 'stroy it, look like dey 'stroy you soul.

*Voice:* Did you hear Ber Leck? He ain't tell no lie. I see a heap of mens come out de big swamps. If dey stay dere long enough, when dey come out, dey look more like beasts or varmint dan dey does like mens. Brother, God ain't make dem swamps for mens. Dey de home of de devil, de home of 'struction; dey de home of serpents, de home of buzzards, and if you put mens in dem swamps, de only way dey can live is to be like de critters dat live dere, and take on dere ways. Yes, my brother, stay 'way from de big swamps.

### Jack-Ma-Lantern

From Tales of the Congaree by Edward C.L. Adams, edited by Robert G. O'Meall

*Jake:* Who you reckon dat walk up and down dat ditch an' 'bout dat mash?

*Bruzer:* I ain't know.

*Jake:* Ain't you see 'em wid dat light bob up and down like dey lost sumpen?

*Bruzer:* I ain't know who dey is, dey must be sumpen perticular make 'em walk all around in de rain an' brier. I see 'em but I ain't know wuh ail 'em.

*Hooten:* You sure God ain't know. Dat ain't no people. Dat's a Jack-ma-lantern an' you best l'um 'lone. You ain't know what kind of danger dey lead you in if you follow 'em.

*Jake:* Wuh make dey lead you in danger. Ain't you kin stop follow 'em when you see danger.

*Hooten:* If dey gits a holt on you and you follow 'em, it don't lead you to no good. When you starts to follow, one mind will tell you l'um 'lone and turn back, and another mind will tell you follow 'em, and you follow 'em.

*Jake:* What's a Jack-ma-lantern?

*Hooten:* A Jack-ma-lantern is a sperrit. It is a evil sperrit. It is ole folks. Sinful ole folks. It is folks wuh ain't 'lowed in heben and can't get in hell, and dey punishment is to wander in de bad places and on de bad night, and dey business is enticing mens to follow 'em, an' dey ain't got no res', les' dey entice mens to lef' de right road. Is you 'member Ole man Lunnen? Well you know he been a ole man, and he been wise, and ole man Lunnen tell me, he say, one time he been walking down de road and he been wid dis same ole man, July Uncle, dey call him "Hock," and say, him and Hock walk down dis road and dey see a light walking right out in dat dere mash and Hock say he guh see who it is and ole man Lunnen say he try to 'suade Hock to stay in de road. Hock say he ain't scared he guin dere and ole man Lunnen say he ain't guh have nothin' to do wid it, and Hock dat night Hock been fallin' in de hole and scramblin' in de brier, and dat night Hock ain't come home and den dey search for him and dey find him that night back in de high grass and brier on Hog-Pen-Gut, and he stan' in de mud up to he knee, and he reared back wid he head pulled back holdin' both han' out in front of him like he tryin' to 'fend hissself and he look in he face and he eye wide open and de look on he face were terrible, like it were froze, and he put han' on him and he war stiff dead.

### The Naming of the Swamp

The name "Congaree" refers to the Native American Nation who inhabited the Congaree River area until the Yemassee War of 1715. It was during this time that most of the native inhabitants were killed, driven out, or sold as slaves on the West Indian market. The remaining population moved out of the area or died of diseases introduced by the new settlers. Even though the Native Americans disappeared, the name Congaree lives on in the river formed by the confluence of the Broad and Saluda and as the home of the champion trees thriving in the Congaree Swamp National Monument. Prior to Columbia's becoming the capitol of South Carolina, the local region surrounding the river was known as the "Congarees."

## Early History of Congaree Swamp

By 1740, most of the Native Americans had left the area, and the region lay open for European settlement. The pioneers traveled mostly by river, this being the easiest means of transportation before a network of roads was established in the interior of the state. Congaree Swamp saw large numbers of people pass through, but few settled in the local area. Most settlers continued up the Congaree River until it became impassable because of the rock shoals at the **Fall Line Zone** in Columbia, where the Piedmont meets the Coastal Plain.

Prior to 1776, land was distributed to these settlers through a grant system by either the King of England or the Royal Governor of South Carolina. After the Revolutionary War, the state assumed responsibility for granting tracts of land. Those land grants were usually 100 to 500 acres, although a few reached several thousand acres. The State Archives contains some pre-Revolutionary plats (land surveys) of the Congaree Swamp region, showing the approximate location of some of these land grants. Most were along the riverbank, where access was easiest, and were usually marked "impassable swamp" or "all cane swamp." Just because land was granted to someone, laid out, and surveyed, didn't mean that it was used. Often the land remained in its natural state, unclaimed and uninhabited. "Re-grants" were common occurrences. Many of the old plats indicate the uncertain ownership of adjacent land by remarks such as "vacant" or "owner not known."

## Reclaiming of Swamp Land

By the time of the Revolutionary War, nearly all the Congaree Swamp area had been fully land granted. Planters realized the great fertility of the **alluvial** Congaree bottomlands with its rich silt deposits, and a few small areas along the riverbank were cleared for Indian corn and **indigo**, which became an early money crop for South Carolina planters. The British paid a handsome price for this source of blue dye. It does not appear that Richland County exported much indigo, however, as most of it was grown in the **Coastal Zone** Region. After the Revolutionary War, the British no longer wanted to trade with the newly independent country, and indigo declined very quickly in popularity. Soon rice took the place of indigo as the state's money crop, but rice was never grown extensively in the **Midlands** or Upper Coastal Plain because it was less profitable than as a tidewater crop. The two main crops in Richland County were Indian corn, and after 1790, cotton. But neither did well in the poorly drained floodplain soils.

In certain instances, farmers were able to drain portions of the floodplain to create fertile fields. Although crop yields were demonstrably greater in the reclaimed Congaree bottomland, most planters were reluctant to drain the swamps due to the considerable expense. Construction of an elaborate system of dikes was required to protect the crops from periodic flooding. In addition, slaves were forced to work in a disease-ridden environment, which limited their effectiveness. Other pioneer activities in the Congaree area were raising cattle and building ferries to cross the river. Cattle were allowed to range freely to feed on the lush vegetation in the swamp, and elevated cattle mounds were constructed to provide a refuge for the livestock during times of flood. These mounds were simply piled up earth built by slave labor. Two mounds still existing today are the Starling Mound, near the river, and Cooner's Mound, in the interior of the swamp, built around 1840. Cooner's Mound measures 50 feet by 90 feet and is 6 feet high.



In 1786, General Isaac Huger established a ferry crossing over the Congaree River, and a ferry road was cut through the eastern edge of what is now known as the Beidler Tract, named for landowner, lumberman, and conservationist, Francis Beidler. Although this ferry was abandoned some fifteen year later, bridge abutments remain for "Huger's Old Bridge" that was to cross the river. It was marked on a 1910 plat of the eastern Beidler Tract. In the 1840's, Daniel Zeigler operated a small ferry on the river near the center of the Beidler Tract.

As late as 1839, much of the land in the Beidler Tract was still unclaimed and unused. In that year more than 4,000 acres of the 15,000 acre tract was re-granted to the James Adams family. A plat of this re-grant shows no signs of cleared land or fields. James Adams, Sr., evidently had plans to cultivate part of this tract, since his will of 1841 mentions the "hope his children will continue the dike construction he started." His children never finished this project, as evidenced by the incomplete dike system existing today. Another re-grant was a 370-acre tract on the river bank granted to Paul Spigner in 1839. This plat does show two cleared areas, each about fifteen acres. Corn or cotton was probably grown here, and the dike enclosure for one of these fields still exists.

### **The Lumber Industry in Congaree Swamp**

The first major logging operations began in the Beidler Tract soon after 1895. The Santee River Cypress Lumber Company began cutting cypress exclusively, and by 1915 nearly all the original cypress had been removed. The cypress tree was girdled by ax, allowed to dry out, then cut and floated down the river to the sawmill. This cutting took place along the waterways, sloughs, and ponds where cypress trees grew. No roads were built to haul the logs out, none of the hardwood trees were cut, and most of the swamp was left undisturbed. Fortunately, some magnificent cypress specimens escaped cutting and are still standing today. Records from the Beidler's saw mill of 1910 indicate the average age of cypress being cut was between 500 and 700 years. One tree stump had 1600 rings. It wasn't until 1970 that the first commercial harvesting of at least thirty-five different species of hardwood trees began in the Beidler Tract.

### **Establishment of Congaree Swamp National Monument**

In 1976, a portion of the Congaree floodplain was declared a national treasure when the United States Congress purchased the 15,000 acre tract. At that time, Congaree Swamp National Monument became part of the National Park System. Now much of the mature forested floodplain has been protected for future generations to enjoy. The rationale for selecting the Congaree Swamplands for purchase was presented in the following statement:

*"In order to preserve and protect for education, inspiration, and enjoyment of present and future generations, (the Congaree swamplands is) an outstanding example of a near virgin Southern Hardwood forest."*

Our generation and generations to come can be grateful for those who saw more in the majestic Congaree forest than so many board-feet of lumber. They saw a legacy of nature which, once destroyed, could never be replaced. One of the first of these vision-minded men was Francis Beidler, a rare kind of lumberman and conservationist whose family owned most of the property which now comprises the Congaree Swamp National Monument. Mr. Beidler, recognizing the pressures that mature forest areas were facing

from exploitation even in the early 1900's, instructed his heirs that certain unique forests should be preserved as a vital national asset. Another swampland in South Carolina that bears the name of this outstanding conservationist is the Audubon Society's Beidler Forest in Four Holes Swamp, Dorchester County. It too is an area preserved for educational purposes.

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## Activity 6A-1: Meandering Rivers and Geologic Change

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### Materials

6	STATE BASE MAP #2, WITH HIGHWAYS	1 : 500,000
6	LAND USE/LAND COVER MAP	1 : 500,000
6	GENERAL SOIL MAP	1 : 594,000
6	GEOLOGIC AND MINERAL RESOURCE MAP	1: 1,000,000
6	CONGAREE SWAMP TOPOGRAPHIC MAP	1: 24,000
6	CONGAREE SWAMP LITHOGRAPH	1: 12,000
1	State Map of Major Drainage Basins	Figure 1-2
6	Wipe-off Pens	

### PERFORMANCE TASKS

**(Icon Key)** Overview = →; Science = ⚙; Math = 📊; History = 📖; Language Arts = ✍

1. **Locate the study site.** → ⚙

Locate the Congaree Swamp Study Site on the STATE BASE MAP #2, WITH HIGHWAYS, on the LAND USE/LAND COVER MAP, on the GEOLOGIC AND MINERAL RESOURCE MAP, and on the GENERAL SOIL MAP by drawing a small box around the correct site on each map using a wipe-off pen. Briefly summarize the one or two most important land uses at this site, the age (Geologic Period), the type of rock at the site, and the predominant soil type at the site. Use the scale bar on the base map to estimate the straight-line distance between this study site and your school. In which local river drainage basin (watershed) is this site located? Through which of the major river systems, Savannah, Santee, Pee Dee, or Coastal Plain, does this site drain? Refer to Figure 1-2, "State Map of Major Drainage Basins."

2. **Locate evidence of river migration.** ⚙

Using the CONGAREE SWAMP LITHOGRAPH, look for evidence that the Congaree River was once located in different parts of the floodplain. Identify several remnant river channels. Do many of these remnants still have the crescent or "U" shape typical of meanders? Refer to Figure 6-1, "Formation of Oxbow Lakes." Why are these features called cut-off meanders or oxbow lakes (if they contain water)? How many distinct oxbow lakes can you locate on the CONGAREE SWAMP TOPOGRAPHIC MAP? Compare the number of oxbow lakes on the topographic map with the number of meander traces on the lithograph. How do you explain this difference? Does the lithograph show any differences in forest type? Why? Describe the landscape of the area in general terms.

3. **Predict the occurrence of oxbow lakes.** ⚙

Locate the Congaree River on the CONGAREE SWAMP TOPOGRAPHIC MAP. In what direction is the Congaree River flowing? What evidence are you using to determine that direction? Would you expect the flow to be swift or gentle during most times of the year? Why? Using a wipe-off pen, shade in the portion of the bends of the river that are experiencing erosion. Now use a different colored wipe-off pen to shade in the areas where deposition is occurring. Circle a meander that might be cut off during a flood to form an oxbow lake. Use a blue wipe-off pen to show your predicted new course of the river, during a period of high water, which bypasses the new oxbow lake. Use the scale bar on the CONGAREE SWAMP LITHOGRAPH to measure the average width of the Congaree River. Predict where two other oxbow

lakes could form. Measure the present-day length of the Congaree River on the lithograph. How much will the length of the river be shortened after these two new oxbow lakes are formed? Summarize the action of a meandering river as oxbow lakes are formed.

**4. Interpret wetness of soils by analyzing vegetation patterns. ✪**

Examine the color patterns on the CONGAREE SWAMP LITHOGRAPH. Trace, with a wipe-off pen, some of the abandoned meanders and oxbow lakes in the floodplain. Is there any connection between your tracings and the color patterns? Explain your answer. The bright red color on this lithograph is mostly due to infrared reflection from loblolly pine trees. Although these trees can live in wet soils, they cannot live in extremely wet soils. Very slight elevation differences can change the moisture level enough to exclude the loblolly pine. Use the color differences on the lithograph to distinguish the wettest from the driest soils in the floodplain.

**5. Outline boundary of National Monument. ✪**

Locate the Congaree Swamp National Monument on the CONGAREE SWAMP TOPOGRAPHIC MAP and outline its boundary lines with a wipe-off pen. (Use map symbols to help you find this boundary.) Is most of this area swampy? Is most of this property forested? How can you tell? Using the contour lines and other symbols for guidance, determine the highest and lowest elevation points within the monument area. Describe the landforms in this area using as many descriptive words as possible. What geological processes have been responsible for producing this landscape? Describe some of the characteristics of the soil that you would expect to find in the Congaree floodplain.

**6. Make topographic profile of bluff and swamp. ✪ 📐**

Make a topographic profile across the Congaree River floodplain. Locate the bluff running along the south side of the river floodplain on the CONGAREE SWAMP TOPOGRAPHIC MAP. Find the place where the bluff comes closest to the river (at the word "Congaree" written within the river margins). With a wipe-off pen, draw a straight line starting at the 324 foot elevation mark at the top of the bluff and moving northward through the word "Monument" in the label for Congaree Swamp National Monument, across Cedar Creek, until you reach the 115 foot elevation point marked with a small "x". Determine the vertical axis scale by finding the difference between the highest and lowest elevations (the rise) along the drawn line. Mark intervals of 100 feet (based on your rise) along the vertical axis on your paper. Be sure your axis is at least one inch from the left edge of your graph paper.

Fold your paper to form the horizontal axis. Place the horizontal axis along your line so that the origin is at the top of the bluff. Starting at the origin, imagine you are walking a path along the line you have drawn. Each time you come to an index contour line (darker contour line), stop and plot the elevation corresponding to that point. Continue to walk, stopping and plotting each index contour line until you reach the end of your profile line. Connect the points you have plotted being sure to show hills and valleys as appropriate. This graph is your profile of the river floodplain.

Describe the scenery you would see along both banks while floating down the Congaree River on a raft. Do you think the top of the bluff ever gets flooded by the river? Explain your answer. Locate this exact same spot on the CONGAREE

SWAMP LITHOGRAPH. How can you distinguish between the bluff and the floodplain based on the lithographic image?

7. **Analyze and interpret Congaree Swamp flood data.** ☼ 🖨

The United States Geological Survey operates several gauging stations across the state that continuously monitor and record river, stream, and lake water levels. One of these stations monitors the Congaree River as it leaves Columbia. These readings are an excellent predictor for the water level in the Congaree Swamp, although it usually takes about 20 hours for the floodwaters to reach the National Monument boundaries. The chart below lists monthly maximum and minimum river flow. A few extra dates have been included to provide additional points for graphing purposes. Label a piece of graph paper so that the vertical axis represents the river level in feet, and the horizontal axis represents time in days. Scale your axes appropriately so your graph will fit on the graph paper. Draw reference lines indicating water levels for the five different flood stages as indicated on the chart entitled Monument Guide to Flood Stage in the Congaree Swamp. Divide into groups so that half the class is graphing data from the first year and the other half is graphing data from the second year. Compare your group's graphs with those from the other group. What was the highest river level reached during the year? When did it occur? What was the lowest? When did it occur? What could cause the river level to change so dramatically over time? Is there a seasonal pattern to river flow levels?

<b>GROUP I - FIRST YEAR DATA - GAUGING STATION, CONGAREE RIVER</b>									
DATE	DATA	DATE	DATA	DATE	DATA	DATE	DATA	DATE	DATA
01/11	3.5	03/22	3.6	06/05	11.9	07/25	6.5	10/13	6.5
01/18	8.8	03/30	12.0	06/14	3.3	08/11	2.7	10/22	8.0
02/09	3.4	04/01	8.9	07/01	10.4	08/19	20.6	11/14	3.6
02/25	10.5	04/25	3.1	07/02	3.7	09/07	6.5	11/29	6.6
03/01	4.5	05/03	5.0	07/05	8.5	09/11	3.2	12/16	3.3
03/03	13.3	05/24	2.3	07/16	2.1	09/14	7.8	12/22	14.7

Data compiled by Richard A. Clark, Chief of Research and Resources Management, Congaree Swamp National Monument.

<b>GROUP II - SECOND YEAR DATA - GAUGING STATION, CONGAREE RIVER</b>									
DATE	DATA	DATE	DATA	DATE	DATA	DATE	DATA	DATE	DATA
01/03	4.3	03/03	13.5	06/06	12.8	09/01	13.9	11/01	4.6
01/16	26.0	04/21	4.7	06/20	3.0	09/04	3.8	11/12	14.7
02/09	4.5	05/15	7.3	07/05	6.3	09/17	7.0	11/18	4.2
02/19	23.3	05/16	3.3	07/24	2.9	10/01	4.0	12/04	7.8
02/27	6.0	05/17	6.5	08/18	2.8	10/03	7.0	12/05	4.1
03/01	9.5	05/23	1.9	08/27	25.6	10/06	13.6	12/15	7.0

Data compiled by Richard A. Clark, Chief of Research and Resources Management, Congaree Swamp National Monument.

Use the chart, Monument Guide to Flood Stage in the Congaree Swamp, and your graph as references to determine how many times during your assigned year the river level reached or exceeded each stage. The area is considered flooded any time the water level is at stage 1 or above.

Divide into five groups so that each group is working with one flood stage. Sketch on the CONGAREE SWAMP TOPOGRAPHIC MAP, with a wipe-off pen, the approximate geographic limit of flooding for your assigned stage. Color in the flooded area of the map with the blue wipe-off pen so you have a clear distinction between water and land. Assume that gauge height equals elevation above the Congaree River (use 90 feet as an estimate of the normal river level). When all groups have finished, place the five maps side by side so the differences in floodwater coverage can be easily compared.

<b>MONUMENT GUIDE TO FLOOD STAGE IN THE CONGAREE SWAMP</b>		
<b>STAGE</b>	<b>GAUGE HEIGHT (feet)</b>	<b>EFFECTS IN CONGAREE SWAMP</b>
1	6.1	river waters begin to enter channels/guts/sloughs in park
2	8.4	channels/guts/sloughs overflow, flooding begins, road to Wise Lake is impassable
3	12.7	low boardwalk covered, all trails except Bluff Trail inaccessible
4	21.2	entire swamp flooded, portions of high boardwalk near Weston Lake are under water
5	23.0	most of high boardwalk flooded, some park roads near Weston Lake are under water

**8. Determine length of Congaree Swamp boardwalk. ✪**

On the CONGAREE SWAMP TOPOGRAPHIC MAP, locate and measure the length of the elevated boardwalk. Notice the position of the Ranger Station in relation to the boardwalk. Weston Lake lies along part of the boardwalk route. Locate Weston Lake on the CONGAREE SWAMP LITHOGRAPH. Can you see the boardwalk on the lithograph image? Explain. What is the advantage of having a boardwalk in a swamp? Why do you suppose the boardwalk was built in that particular area of the swamp? If you were asked to build a second boardwalk in the swamp, what location would you select? Use a wipe-off pen to mark your new boardwalk on the map. Justify your answer.

**9. Estimate time of day of photo by positions of shadows. ✪**

Locate the Congaree River on the CONGAREE SWAMP LITHOGRAPH. Note the compass symbol in the lower margin of the lithograph. Compare the appearance of the north and south banks of the river on the image. On the south bank, you should recognize black shadows of trees extending over the blue river water in the main channel. These shadows will not be present along the north bank. Why not? Use the shadows like a sundial to estimate the time of day the aerial photograph was taken. Assume the shadows will point due north at 12:00 noon. How accurate is your estimate? Explain.

## ENRICHMENT ACTIVITY

1. **Compare modern and ancient maps.** ✨ 📖

Compare today's map with the Congaree Swamp map from Mill's Atlas. Use Cedar Creek as a guide. How has the river changed course? Compare the land along the Congaree with that along the Wateree River. Did General Sumter have a valid point when he said the Friday's Ferry area was unhealthy?

2. **Complete table about life habits of five swamp animals** ✨

The different animals of the Congaree Swamp have different requirements for food, shelter, and habitat areas within the swamp environment. Also, the floodplain forest is covered with water several times a year, temporarily pushing some animals out of the swamp to higher land areas. This is especially true of the deer, bears, and wild hogs, which can't live in the trees. The table below lists seven different types of animals that live in the Carolina swamps. Complete the table with information about the life habits of each animal.

ANIMAL HABITAT CHART				
ANIMAL TYPE	HABITAT TYPES	FOOD TYPES	ANIMAL RANGE	SWAMP CONDITIONS BEST SUITED
Bobcat				
Bream				
Largemouth Bass				
Mosquitoes				
Owl				
Snake				
Wood Duck				

3. **Graph water levels of local river or lake.** 📊

Use water levels reported in local newspapers to graph fluctuations in river levels over a period of several weeks or several months. Why are these water levels printed in newspapers? Who uses this type of information?

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## Activity 6A-2: Life in a Floodplain Swamp

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### Materials

6	STATE BASE MAP #1, SHADED RELIEF	1 : 500,000
6	STATE BASE MAP #2, WITH HIGHWAYS	1 : 500,000
6	COASTAL SATELLITE IMAGE	1 : 332,640
6	CONGAREE SWAMP LITHOGRAPH	1: 12,000
6	CONGAREE SWAMP TOPOGRAPHIC MAP	1: 24,000
6	Transparent Grid Overlays	
6	Wipe-off Pens	

### PERFORMANCE TASKS

**(Icon Key)** Overview = →; Science = ⚙; Math = 📏; History = 📖; Language Arts = ✍

1. **Analyze the newspaper article.** ✍

Read the newspaper article on page 6A-1, "Trees with national significance fell to Hugo in Congaree Swamp." Explain how the story relates to the Coastal Plain Landform Region. Identify on the STATE BASE MAP #2, WITH HIGHWAYS, (refer to the COASTAL SATELLITE IMAGE if needed), where the places and events named in the story might be located. Explain why the publisher thought this story might be of interest to newspaper readers. Using the same references and setting, write another newspaper article related to the same situation, but date it far enough in either the future or the past so that you will have some changes to report. Choose an appropriate title (headline) and draw an appropriate picture to illustrate your main point.

2. **Where would you look for Native American artifacts?** 📖

The Congaree Swamp is named after the Congaree Nation, which once inhabited this area. Not much is known about the Congaree Indians because they disappeared before early explorers could record much about their lives. If you are an archaeologist wanting to learn more about this group of Native Americans and know that the swamp is prone to flooding, where might you begin looking for undisturbed artifacts? Where might you look for village sites? Where might you look for hunting artifacts? Locate these possible sites on the CONGAREE SWAMP TOPOGRAPHIC MAP and the CONGAREE SWAMP LITHOGRAPH. What route do you think a Congaree trader, traveling by canoe, would have taken to trade with a Cherokee village in the Blue Ridge Mountains? Outline your route on the STATE BASE MAP #1, SHADED RELIEF, with a wipe-off pen. Which counties would you go through today if you made this same trip?

3. **Plot location of champion trees on topographic map.** ⚙ 📏

Use the directional coordinates from Figure 6A-1, "Champion Trees Located in Congaree Swamp National Monument," to plot the positions of several record trees on the CONGAREE SWAMP TOPOGRAPHIC MAP. Use a protractor and a ruler to plot the location of the big trees from the radial coordinates given in the table. Use the letter "O" in the word "NATIONAL" on the map as your origin (starting point) and measure all angles and distances from this point. For example, the coordinate designation "2000, 30 N of E" means that the tree is located 2000 feet from the origin along an imaginary line that runs 30 degrees north of due east from the origin point.



Use a wipe-off pen to mark the location of each of your selected record trees on the topographic map. Can you locate these very large trees on the CONGAREE SWAMP LITHOGRAPH? With respect to distance from the current river channel, where are most of the big trees? Suppose you were a logger in the late 1800's; where would you plan to market your timber? After using a crosscut saw to cut down the trees, how would you get these logs to that market? Why do you think this part of the park was never clear-cut for timber and used for agricultural purposes?

4. **Graph champion trees vs. normal tree height.** ✨ 📄

Use Figure 6A-1, "Champion Trees Located in Congaree Swamp National Monument," to make a multi-bar graph comparing the height of several champion trees in the Congaree Swamp to normal size trees of the same species. Let the vertical axis represent height in feet. Place labels for the different species you selected along the horizontal axis of your graph. Note that in the data table, the champion trees have three dimensions recorded. The first is the circumference in inches, the second is the tree height in feet, and the last is the crown size, also measured in feet. You will use only the tree height number for this exercise. Select eight tree samples to analyze. Write down the tree numbers of your selections in the appropriate column in the chart below.

Use your completed bar graph to contrast the height of normal trees to the trees in the Congaree Swamp. Calculate the percentage difference between the two heights for each species of tree you analyzed. Enter your calculated differences in the last column of the data table below. Compare your tree data with other tree data from your classmates. Identify the three trees with the greatest percentage difference and the three trees with the smallest percentage difference. Do your calculations show a relationship between tree type and percent difference? What is the average percent difference for all tree types in the chart? What do you conclude about the height of normal trees vs. Congaree Swamp trees? List factors that contribute to the enormous size of champion trees? Why do trees in the Congaree floodplain grow so much larger than usual?

**Table of Heights of Champion Trees vs. Normal Trees**

#	TREE SPECIES	NORMAL HEIGHT	CHAMPION HEIGHT	% DIFFERENCE

5. **Calculate ages and sizes of trees.** 📏

If a baldcypress tree increases its diameter  $\frac{3}{8}$ " each year, what is the diameter of a tree that is 500 years old? What is its circumference? Estimate the age of a loblolly tree that was blown over by Hurricane Hugo in 1989. The tree measured 22.5" in diameter. The growth rings were an average of  $\frac{3}{16}$ " apart.

6. **Write about experience as an old tree.** ✍️

Write a story about your experiences as a 700-year-old baldcypress tree living in the Congaree Swamp floodplain. What animals or people visited you in the swamp? Did these visitors change the environment? How would you feel about being cut, left to dry, then floated to a sawmill? What was it like to change from a tree to so many board feet of lumber? How tall were you? How were you used? What did you help produce? Or maybe, you would rather be a loblolly pine, swamp tupelo, red maple, or cherrybark oak. Other stories can be written based on your experiences as a different tree. Why was it important to preserve the Congaree Swamp National Monument for future generations? Write a poem about a swampy area and read it to your classmates. Swamp tales can be frightful, because echoes of sounds bouncing off trees sound eerie.

7. **Evaluate the practice of draining swamps for farmland.** 📖 ⚙️

Robert Mills, as Superintendent of Public Works in 1826, urged that the Congaree Swamp be drained for farmland. List possible benefits and potential problems. History states that farmers used swamp land for grazing cattle. How were such uses possible? Why did the farmers construct dikes and cattle mounds? Can you find any evidence of this man-made construction on the present day CONGAREE SWAMP TOPOGRAPHIC MAP? Why or why not? During the 1980's several historic structures were found within the park. Earthen structures such as cattle mounds, earthen dikes, irrigation structures, logging roads and old bridge abutments attest to the use of the swamp for agricultural purposes. The cattle mounds themselves represent a previously unrecognized environmental adaptation in the swamp. Why did this effort prove impractical? Why does the railroad track run so far away from the northeastern edge of the swamp?

8. **Compare Sims' account with "The Big Swamps of the Congaree."** ➔ ✍️

Read the oral history presented in the story "Interview with Mr. Booker T. Sims" on page 6A-5. Then read "The Big Swamps of the Congaree" by Edward C. L. Adams on page 6A-6. Compare Adams' tale to Mr. Sims' description of the swamp. Locate as many features from the story as possible on the CONGAREE SWAMP TOPOGRAPHIC MAP and the CONGAREE SWAMP LITHOGRAPH.

9. **Locate possible site for story "A Freshet on the Congaree."** ✍️

Read the story "A Freshet on the Congaree," on page 6A-8, and make a list of all adjectives and descriptive terms relating to the swamp. Use this list to try to identify a particular location on the CONGAREE SWAMP TOPOGRAPHIC MAP and the CONGAREE SWAMP LITHOGRAPH where the story might have taken place. Defend your choice in a discussion with other groups.

**10. Rewrite Swamp Tales in your everyday dialect. ✍**

Divide into groups and read one of the stories from the section Legends and Tales of the Congaree Swamp, beginning on page 6A-6. Make a list of phrases, words, and colloquialisms which occur in the story. Translate these into your own words and rewrite the whole story. Read or tell your new story aloud to your group. Which version of your story is the most fun to read and listen to? Why? Select one story from your group to read or retell to the class. Discuss with the entire class why swamp tales are usually told with this type of dialect. What other recognizable dialects are common in South Carolina? Where in the state would you be most likely to encounter them?

**ENRICHMENT ACTIVITIES**

**1. Research the history of logging in Congaree Swamp. 📖**

Mr. Beidler purchased the land in the Congaree Swamp for the purpose of logging. Describe how this logging was carried out. How old were some of the trees that Beidler's men cut? Why did the loggers not use roads to get the logs to the saw mills?

**2. Identify historical events when trees were seedlings. 📖**

Identify the historical events in South Carolina that occurred nearest to the time the following trees were seedlings. A live cherrybark oak is estimated to be 325 years old. A 425 year-old baldcypress tree was cut in 1951. A loblolly pine tree, estimated to be 124 years old, went down as a result of Hurricane Hugo in 1989.

**3. Document record trees in National Monument. ⚙**

Prior to visiting the Congaree Swamp National Monument, investigate the flora and fauna indigenous to swampy areas of South Carolina and make leaf rubbings of as many species as possible. The most striking features of the National Monument will be the large number and variety of big trees. There are 89 species of trees; several are recorded as national champions, and many hold the state record for size. Use one of the field guides as a reference to identify baldcypress, tupelo, sycamore, sweet gum, black gum, holly, ash, swamp chestnut, green ash, pawpaw, hickory, elm, palmetto, maple, holly, and a variety of oaks. Even though Hurricane Hugo, in September 1989, took its toll on these trees, this area is still considered the largest significant stand of old growth river bottom hardwood forest in North America. Identify the reptiles, birds and fur-bearing animals that thrive in this habitat.

**4. Research Harry Hampton and his stories of Congaree. ✍**

Harry Hampton wrote a column for *The State* newspaper for many years. His Column was called *Woods and Water*. He was supposed to know more tales and stories about the swamp than anyone. Find out more about Harry Hampton by researching his stories and tales of the Congaree Swamp.

5. **Find biggest tree in community and calculate its formula.** 📄

Search your schoolyard or community to find the largest tree on school property. Follow the directions given in the Brief Site Description for calculating its numerical size using the "Big Tree" formula. Calculate its diameter by measuring the circumference and using the formula for converting circumference to diameter:

$$\text{circumference} = \pi \times \text{diameter} \quad \text{where } \pi \text{ (pi)} = 3.14$$

How many students does it take to reach around the tree by holding hands? Identify the species of tree by looking at leaves and/or bark. Is your tree a candidate for champion status compared to the Congaree Swamp trees of the same species?