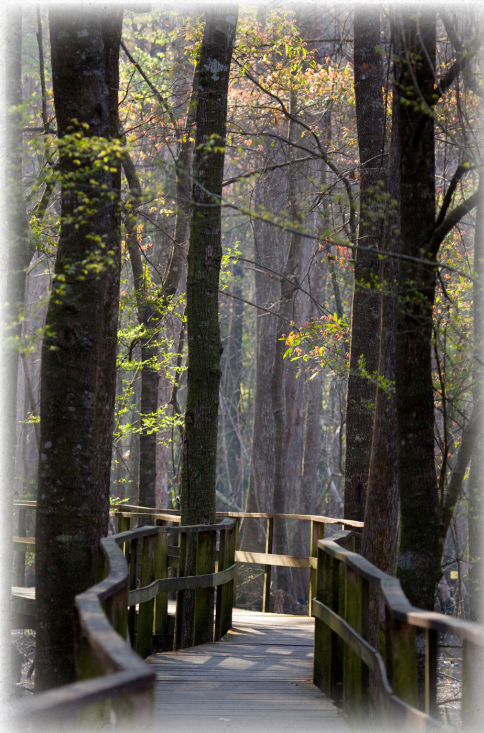


1 | Time to Get Swamped

The Francis Beidler Forest encompasses over 16,000 acres of Four Holes Swamp, the heart of which is the 1,763-acre virgin stand through which you are about to walk. It is a swamp as nature intended. Beidler Forest has been neither improved nor enhanced:

NO attempt is made to lure wildlife to the boardwalk;
NO artificial plantings are made;
NO removal of dead or overturned trees takes place.

The total walk is just over 1.75 miles. There are ten rest stops—two with rain shelters—along the way. Take your time, keep your eyes and ears open, and have a great day!



Boardwalk in the morning



Audubon

2 | What to Look For



Carolina Anole

Since nothing is done to lure wildlife to the walk, all animals here are truly wild. You need to...

LOOK: Up, down, and all around.
For the "out of place" color or shape or movement.
With a casual gaze until movement or color catches your eye.

LISTEN: For rustles in the leaves.
For splashes in the water.
For singing in the trees.

OBSERVE: Go slowly enough to discover.
Go quietly enough to hear.
Visit in different seasons.
Enjoy the plants. This is not just about animals!

Remember, patience is a virtue where nature observation is concerned. Every day, every minute is different. Have a great walk!



Audubon

3 | A Swamp by Any Other Name

A swamp is a flooded forest. There are many different types of swamps, but one thing they all have in common is trees in the water, for at least part of the year.

Is there water here right now? If not, is it still a swamp? Remember that the definition of swamp implies that they are sometimes dry!

In the Carolinas, there are many wetland types in addition to swamps. Marshes (flooded grasslands), Carolina bays (mysterious oval-shaped depressions), and Pocosins (poorly-drained flat woods), are some examples.

It just won't do to call every wet place a swamp!



Tupelo gum and bald cypress trees

4 | And Hugo was his Name-O

On the night of September 21, 1989, Hurricane Hugo slammed into the South Carolina coast, packing winds of up to 150 miles per hour. Hugo continued inland with the eye of the storm passing over Beidler Forest early on the 22nd. Much of the damage has now rotted and new, young trees are busy replacing the losses. This huge cypress toppled during the hurricane, taking the boardwalk with it.



Knees help to anchor the bald cypress during high winds

As you continue your tour, you will see examples of Hugo's strength. Hurricane debris was not removed, except when necessary to rebuild the damage to the boardwalk. Our philosophy was simple: Beidler Forest is a natural area and Hurricane Hugo was a natural force—not so much an instrument of destruction as a carrier of change. The swamp is still a swamp: downed trees rotted, thick brush has thinned out, and wildlife adjusted, just as it always has. Life goes on here; it simply looks different.

5 | Cypress/Tupelo "Trivial Pursuit"



Baldcypress needles

BALDCYPRESS

Largest in U.S. --- 17 feet in diameter, Cat Island, LA
Largest at Beidler Forest --- 10 feet in diameter
Oldest Known --- 1600 yrs, Black River Swamp, NC
Oldest Known at Beidler Forest --- 1500 yrs (2nd oldest in the world)

Uses: Wood used for dugout canoes, shingles, fence posts, outdoor furniture, railroad ties, caskets, paneling. Nesting sites for hawks, owls, swifts, swallows, bats.

TUPELO GUM

Largest in the U.S. --- 8 feet in diameter, Kinder, LA
Largest at Beidler Forest --- 5 feet in diameter
Oldest Known at Beidler Forest --?? Most over 18'' are hollow.

Uses: Wood used in particle board and pulp wood. Buttress wood prized for decoy carving. Fruits used in jelly. Flowers used by bees to make Tupelo Honey. Superb roost and nursery sites for rare Eastern Big-eared Bats.



6 | Cypress Knees What's the Point?

Despite much research, cypress knee function remains a mystery. One thing is certain – knees grow in response to the presence and depth of water. A Bald Cypress growing on dry ground will have only a few small knees, if any. One in deeper water will have taller knees. Generally, the trend we find is the older the tree, the more gnarly the knee.

You may have noticed one of the fattest knees along the walk, at #5. One of the tallest knees is just ahead about 300 feet. It stands at seven feet tall! Look for the arrow on the handrail.



Cypress knee



7 | The Four Holes Family

Mammals: 44 Species



Insects and Invertebrates: ?? Species

Amphibians: 40 Species



Reptiles: 50 Species

Birds: 140 Species



Fish: 39 Species

8 | The Truth About Reptiles



Cottonmouth (Water Moccasin)

- **NO** turtle can leave its shell.
- **NO** venomous lizards exist in South Carolina.
- **NO** venomous snakes with lengthwise stripes in South Carolina.
- **NO** such thing as a Hoop Snake or Pilot Rattlesnake.
- **NOT** all snakes in the water are venomous.
- Milk snakes do **NOT** milk other animals.
- Coachwhip snakes do **NOT** chase and whip people.
- Copperheads are **NOT** female rattlesnakes.
- Of 38 snake species in South Carolina, **ONLY 6** are venomous!
- Glass Snakes are legless lizards and should be called Glass Lizards



Yellow-bellied Slider



American Alligator

9 | Swamp Myths

How would you have described a swamp BEFORE your visit here? Look around. Smell the air. Notice the lack of bugs? Is the swamp what you expected?

MYTH: FACT

- "Buggy" Mosquitoes prefer not to lay eggs in flowing water.
- "Snakey" Most snakes prefer to sit still on a log, and of all the water snakes, only the cottonmouth is venomous.
- "Gatory" Alligators prefer deeper water and sunshine, not the shallow and shadowy channels in a swamp.
- "Smelly" Abundant plant life acts as an air filter. Plus, periodic floods help to flush decaying material.
- "Muddy" The swamp floor is mostly hard-packed sand.
- "Polluted" The water that flows through Beidler Forest is some of the cleanest in South Carolina due to miles of filtration and percolation.
- "Evil" Walking through a swamp is a peaceful and relaxing activity.
- "Spooky" No monsters or mythical creatures have been reported...yet.



Gray Treefrog

10 | Swamp History and Facts



Tupelo Gum at Mallard's Lake

Four Holes Swamp is approximately 60 miles long, originating near St. Matthews, SC and emptying into the Edisto River just upstream from Givhan's Ferry State Park. The swamp encompasses roughly 40,000 acres, but drains nearly 430,000.

As you have already observed, topographic changes are very subtle in the South Carolina Lowcountry. The difference in elevation from the upper end of the sanctuary to the Edisto River is about 30 feet. That is a drop of only 1.5 feet per MILE!! The visitor center is 35 miles from the coast, and yet the elevation there is only 55-60 feet above sea level.

11 | Got the Blackwater Blues?

Four Holes Swamp is called a "blackwater" swamp. The dark appearance of the water comes from a natural leaf and barkstain called tannin. It's the same thing that makes tea brown. Use the cup to your right to collect a sample, pour it into the plastic container and see how clear the water actually is.

Four Holes Swamp is a tributary of the Edisto River, one of Charleston's auxiliary drinking water sources. The water would be treated before entering the drinking water supply, but because of its high quality, little treatment is necessary.

Swamp water levels vary dramatically (as much as 5 feet per year) because the majority of the flow comes from rainfall. This can result in an 18-inch rise in one or two days after an upstream downpour, or a drop of 2 inches per day during a drought. The ONLY thing constant about the water levels in the swamp is that they are always changing!



Cypress knees and blackwater along the "Swamp Stomp"

12 | Problems in the Wetlands

MAJOR THREATS TO SWAMPS...

LOGGING: A cutover swamp is still a swamp, but it has been compromised. Water flow is disturbed and water temperature rises as shade is lost. Soil layers are scrambled by equipment and critical wildlife habitat is lost. Consequently, the swamp's beauty is diminished for decades.

POLLUTION: Sewage and industrial waste are dumped into rivers that flow through swamps. Also, agricultural and urban runoff can be laced with fertilizers, pesticides and herbicides, which are harmful to swamp plant and animal life.

DRAINING: Ditches are dug to withdraw water from swamps so the land can be put to another use (farming, timber, etc.).

DAMMING: Dams are built to make swamps into "recreational" or hydroelectric power lakes.

CHANNELIZING: Deep channels are cut through a swamp to control flooding and redirect water flow for agriculture.

FILLING: Swampland is eliminated by filling with soil as a prelude to building on the elevated land.

INAPPROPRIATE NEARBY DEVELOPMENT: Because swamps are generally "downhill" from surrounding land uses, they are easily impacted by polluted runoff, septic system leaching, siltation from land disturbances, etc.

13 | More Than Just a Big Puddle

You have now discovered that water depth varies and that some areas are even dry. Although subtle, the swamp has quite a bit of topography. It is more than just the stagnant pool that many people imagine. Traversing the swamp could find you:

- ... high and dry crossing a palmetto island;
- ...ankle deep passing through a shallow cypress flat;
- ...waist deep wading across a primary channel;
- ...or even swimming across a lake!



Cypress and tupelo gum on Mallard's Lake

These changes in elevation may appear insignificant, but because of how they affect water depth and the duration of flooding, they make a big difference to the location of plant communities.

The presence of Dwarf Palmetto is a good indicator of an elevation transition. They will only survive in the zone between higher, drier ground and the lower, wetter areas.

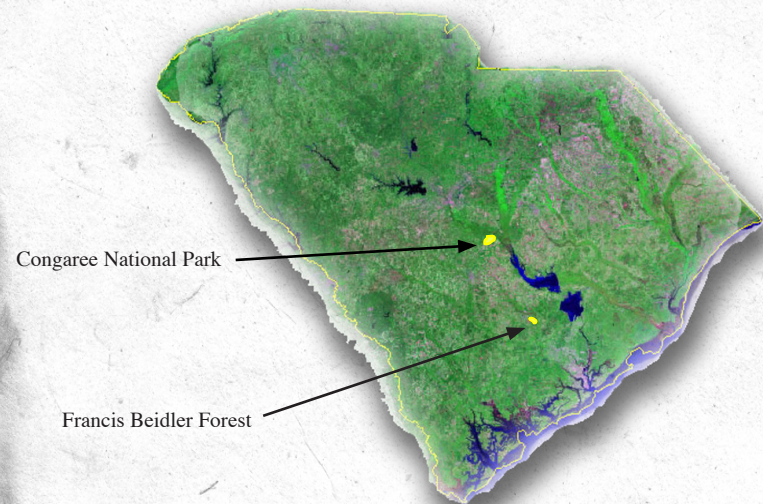


Dwarf Palmetto



14 | The Life Cycle of a Cypress

You are standing in the middle of 1,763 acres of old-growth forest – it has never been altered by people! This huge cypress and others nearby could be over 1000 years old! Beidler Forest protects a rare slice of what this region used to be like. While common at the turn of the century, giants like this were prized for their rot-resistant heartwood and were logged extensively through the 1930s. Today, virtually all of South Carolina's forestlands have been logged, leaving only parts of the Beidler Forest and the Congaree National Park (near Columbia) in virgin condition.



Map of South Carolina. The yellow areas represent the state's remaining virgin forests

As water levels drop in the summer, cypress seeds will germinate on the moist swamp floor. In most years, the ground is too wet and the seeds can't get started. When seedlings do emerge, they usually drown the following spring, or die in the shade of the dense canopy. The right conditions for success occur about once every hundred years, seriously delaying a logged swamp's recovery by decades.



15 | Swamp: Wasteland or Wonderland?

Although often considered disposable tracts of mud and mire, swamps actually play a vital role in maintaining the ecological balance of South Carolina.

WATER SUPPLY: Charleston uses water originating and filtered in the swamp as a back-up water supply.

AIR FILTRATION: Abundant vegetation pumps out oxygen and takes in carbon dioxide.

WILDLIFE HABITAT: Many animals find their very best habitats in the swamp. Over 300 vertebrate species live here.

NATURAL FLOOD CONTROL: Trees, knees, logs and other forest debris slow water flow and limit downstream floods.

RECREATIONAL: Canoeing, fishing, photography, nature study, hunting, birding, and even boardwalking are great in swamps!

AESTHETICS: An undisturbed swamp is a place of extreme beauty and peace.

AQUIFER RECHARGING: Some swamps play an important role in ground water levels by "injecting" water into subsurface layers.



****CALL TO ACTION**** Support laws and regulations that protect wetlands, especially the agencies and organizations that enforce them. Avoid cypress products. Start by adopting your local wetland. THEY NEED YOUR HELP!!



16 | Lessons from Hugo

The ribbons, stakes, and metal tags visible here mark the location of a Hurricane Hugo research plot. We have recorded information for every tree found on 16 plots located throughout the sanctuary. We have learned how the forest was changed by the storm, and over time, we'll be monitoring its recovery.



Hugo recovery research tag

HOW HUGO HURT (AND HELPED!)

1. Upland sites lost up to 80% of their canopy.
2. Lowest cypress sites lost 10% of canopy cover.
3. Pines tended to snap. Hardwoods tended to uproot. Cypress tended to stay put due to their extensive root systems.
4. Most pines injured by Hugo died within two years.
5. The bigger the hardwood tree, the more likely it was to blow down.
6. Birds preferring mature woods decreased in number (e.g. Yellow-throated Warbler, Red-eyed Vireo).
7. Birds preferring brushy conditions temporarily increased in number (e.g. White-eyed Vireo, Swainson's Warbler).
8. Dead trees resulted in increased woodpecker numbers.
9. Fallen trees smashed 3,000 of the boardwalk's 6,500 feet.



17 | How Old is Old Growth?



Canopy over the boardwalk

There is no official consensus on how old a forest must be before it can be called "old growth," but it takes several hundred years for a swamp forest like this one to regain its old-growth characteristics and values after a clear cut.

MORE THAN JUST ANCIENT TREES...

An Old-Growth Forest Offers:

1. Habitat for wildlife that require very old trees or fallen logs.
2. Increased availability of tree cavities for wildlife nesting.
3. Watershed protection and filtration.
4. Protection of fisheries production.
5. Aesthetics (natural beauty and more).
6. Increased stability (many different species can better defend against diseases and other disturbances).
7. Opportunities to learn how nature works in the absence of people.



Audubon

18 | Birds and Old Growth Forest

Since 1979, Breeding Bird Censuses have been conducted on two 20-acre plots on the sanctuary. One is located in the old-growth stand, the other in woods cut in the 1960's. Routinely, the old-growth plot has been found to contain some of the highest densities of nesting songbirds per acre for forested habitats in the eastern U.S.

The diversity of tree species, the variety of tree ages, and the multi-layered structure of the forest cover found in the old-growth stand all work together to provide spectacular habitat for birds of many species.

That's the good news. The bad news is that, despite their nesting success here, many species are in decline due to habitat loss in their summer breeding grounds, along their migratory routes, and in their Central and South American wintering grounds.



Prothonotary Warbler

CALL TO ACTION

Create the best "backyard habitat" possible by:

1. Providing feeding and watering stations;
2. Planting native trees, shrubs and flowers beneficial to birds;
3. Minimizing chemical use.

DO YOUR PART to ensure that your grandchildren will be able to enjoy the same birds you do! Ask at the visitor center for more information.



Audubon

19 | Bats and Old Growth Forest



View from inside a hollow cypress tree

The Eastern Big-eared Bat, a species being considered for endangered status, is especially fond of the old-growth portions of the Beidler Forest. One reason Big-eared Bat numbers are so low may be their preference for roosting in hollowed out trees near water. This means a swamp provides an ideal habitat for these animals. Most swamps, however, have been logged and few trees are allowed to get old enough to hollow out. The Beidler Forest, with its great number of ancient cavity trees like this one, may be the "last best place" for the Big-eared Bat.

Although there are currently no bats taking advantage of this tree, it is an example of what they might be looking for. If water level allows (and your courage is up to it), carefully use these steps and walkway to take a look inside this tree. You can see the sky through its top!



20 | National Audubon Society

The National Audubon Society, with its staff of scientists, educators, land and wildlife managers, environmental activists and its 600,000+ members make up an extensive grass roots network, striving to protect the habitats and natural resources critical to the quality of life on our planet.

The Audubon Society is a non-profit organization, and receives NO state or federal support. Admissions, gift shop sales, donations, and memberships in Audubon are what keep the Beidler Forest financially stable. If you would like to help through a donation or Audubon membership, it would be greatly appreciated.

If you join Audubon here today, you can do so for a special introductory rate of only \$20.00 (regular membership is \$30.00). You will also have one adult admission refunded.

Do a world of good for the environment...

JOIN THE NATIONAL AUDUBON SOCIETY TODAY!



Audubon

*Ask at the front desk for details



Other Swamp Activities



Paddling along the canoe trail

While the boardwalk proves a wonderful way to see the swamp, it is not the only way. Beidler Forest offers a variety of activities and events scheduled year-round including:

- **Canoe and Kayak Tours** - Accompanied by one of our trained guides, let us take you through the heart of the swamp on a peaceful paddle for either a 2- or 4-hour trip. Bring the whole family to experience close encounters with wildlife. It's a wonderful trip for great photography!
- **Night Walks** - See the forest under a new light. The swamp is particularly active when the sun goes down. Walking beneath a moonlit sky guided by an Audubon naturalist, we listen to the music of the night and search for nocturnal animals.
- **Other Walks and Events** - Scattered throughout the season we have a slew of great activities including bird walks, swamp stumps, flower walks, and social events. Ask the staff at the visitor center for more information.



Francis Beidler

It is particularly appropriate that a forest preserve in South Carolina should be named for Francis Beidler. From 1875 until his death in 1924, he championed conservation practices on public and private land. The fact that the last two remaining stands of old-growth forest left in the state were both once Beidler properties bears witness to his philosophy.



His views were formed at an early age. In 1875, when he was 21, Beidler went to explore the West. He heard stories of a strange land of bizarre natural phenomena in Wyoming, hired a guide and set out on a trek to the northwest. Mud geysers, sulfur springs, Old Faithful, Yellowstone Lake and Falls were a delight to explore in their pristine condition. It was Beidler's contention that Yellowstone was the "First Wonder of the World," and his lifelong support of conservation was born on that trip.

In 1907, Beidler went to Europe to study forestry practices in order to apply them to his own holdings in South Carolina. The Audubon's Beidler Forest tracts were a part of his holdings and form the core of this sanctuary. Francis Beidler stood in the front rank of conservationists more than a century ago and long before the word and the cause became popular.





Audubon

CENTER AT BEIDLER FOREST



IN FOUR HOLES SWAMP



Audubon

CENTER AT
BEIDLER FOREST

Spread the Word!



Thank you for coming to visit us! Word of mouth has always been our most effective means of advertising Beidler Forest. Please help us by telling someone about this special place. We appreciate you "spreading the word!"

336 Sanctuary Road | Harleyville, SC 29448 | (843) 462 - 2150

www.BeidlerForest.com

Guidebook design and photography by Mac Stone
www.MacStonePhoto.com



Illustration by Ricky Covey