
Post-Hugo Vegetation Studies Shed Light on Forest Dynamics

What have we learned from long-term vegetation studies in the Congaree?

Very few examples of old-growth floodplain forests exist, fewer still have been studied long-term. The Congaree National Park has provided one of the best places to study how floodplain forests respond to hurricanes. It also has provided insights into forest development patterns that have not been observed at other sites. Floodplain forests respond to very different forces than upland forests; floods regularly deposit sediments on the forest floor and kill plants that can't survive prolonged inundation. The repetitive effect of floods and wind disturbance produces a perpetually disturbed forest dominated by shade-intolerant trees species, quite different than the forest primeval associated with upland old-growth forest.

**by
Bruce Allen**



Dr. Rebecca R. Sharitz set up ten 100x100 m permanent vegetation plots immediately after Hurricane Hugo hit the Congaree in September 1989. Every four years since, I have led teams that re-sampled the plots to see which trees and vines have died and which have grown into the plots. Tree and vine growth rates have also been monitored. We have followed more than 11,000 trees, shrubs, and woody vines for 16 years.

What have we found? The most obvious changes after Hugo were the massive trees scattered across the forest floor. The largest trees were more likely to be blown over by the hurricane winds. Rapid decomposition associated with warm temperatures and ample moisture quickly reduced the massive blow-downs to detritus. Within eight years, even the largest trees could not be used as bridges across guts and creeks. The slough forests that are dominated by cypress and tupelo suffered only minor damage, primarily branch loss. The large oaks and sweetgum in the bottomland hardwood forests were much more likely to tip-up or snap off. The number of large woody vines increased a tree's likelihood of being blown over regardless of its size.

How have the forests changed since Hurricane Hugo? The biggest changes have occurred in the understory. Subcanopy trees like pawpaw and ironwood responded to the increased light level after the hurricane by more than doubling in density within

President's Corner



Dr. John Grego

Ivory-billed Woodpecker presentation

Read our coverage of the Ivory-bill event within these pages for details of the occasion. There are a lot of people to thank for this special event, most notably Dan Tufford of our co-sponsor, Columbia Audubon, for organizing the event under difficult personal circumstances. In addition to our speakers, I would like to acknowledge Virginia Winn for helping with publicity and overseeing ticketing and advertisement, Jim Welch for serving as emcee on short notice, John Cely for supervising Bobby Harrison's schedule, Sharon Kelly for helping with publicity, and Andy Fiffick and Robin Carter for taping John Cely and Alex Sanders' talks. Friends was responsible for catering the event; Dennis and Linda Hiltner of the Gourmet Shop did us a great service by essentially charging us for the event as though we had self-catered. The success and scope of this event was revelatory, and suggests that we can organize similar events in the future with the right partners.

February Trail Clean-up

The February trail clean-up had a lot of experienced hands—Alice Steinke, Bob Render, Allen Gibbes, Vicky Swank—as well as some newer faces: Vicky's husband Larry Gandy, Kasha Krul, Johannes and Claudia Stratman, and Gene Allen, one of the original members of the Congaree Swamp National Preserve Association. Bob Render led the Weston Lake crew, and I covered the Oakridge Trail. With enough people on hand, we decided to send a team to the River Trail just to see if it was practical to include it in the clean-up. Allen led a group including Alice

and Kasha, and they completed their clean-up about an hour after we finished Oakridge Trail. I would like to thank the members of Friends who continually come out to help. We now routinely cover the Boardwalk Loop and Sims Trail as well as our two designated trails; it would be wonderful to include River Trail on that list.



Land Acquisition Funding

With acquisition of the 2395-acre Bates Fork tract completed in November 2005, Friends of Congaree Swamp is requesting a congressional appropriation of \$4.5 million for the National Park Service in FY 2007 toward acquisition of the 1886-acre "Riverstone tract," the tract between Bates Fork to the east and the rest of Congaree National Park to the west.

Specifically, Friends provided testimony on March 16 to the House Appropriations Subcommittee on Interior, Environment and Related Agencies in support of the funding from the Land and Water Conservation Fund. At the time the testimony was submitted, I was in Washington on other business and met with staff of both Senator Jim DeMint and Senator Lindsey Graham to discuss the importance of the Riverstone tract. Besides connecting the aforementioned tracts, it also serves as a link to connect Congaree National Park and the 16,700 acre Upper Santee Swamp Natural Area.

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Action Alert Updates

Reclassification of waters within Congaree National Park

Last year, the National Park Service requested the S.C. Dept. of Health and Environmental Control (DHEC) to consider changing the classification of waters within Congaree National Park from “Freshwaters” (FW) to “Outstanding Resource Waters” (ORW) and to consider classifying a portion of Cedar Creek within the park as “Outstanding National Resource Waters” (ONRW).

Following staff’s initial evaluation, DHEC proposed proceeding with the multi-step process to reclassify waters within the park. The public participation process began with DHEC’s “Notice of Drafting,” published August 26, 2005 in the *State Register*. Several subsequent steps in this process were reported in the Friends’ Fall 2005 newsletter and Winter 2006 newsletter.

Since then, the S.C. Board of Health and Environmental Control (“DHEC Board”) met February 9, 2006 and conducted a public hearing about the proposed regulation to reclassify waters within Congaree National Park. Friends of Congaree Swamp President John Grego spoke in support of the proposed reclassification, as did Richard Watkins, who expressed the S.C. Wildlife Federation’s support.

Immediately following the public hearing, the DHEC Board unanimously approved a motion “to find for the need and reasonableness of the proposed regulation and approve it for submission to the legislature for review.”

On February 21, the proposed regulation was submitted to the S.C. General Assembly for legislative review. In the S.C. House of Representatives, the regulation was referred to the Agriculture, Natural Resources and Environmental Affairs Committee. Following approval by the

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Annual NatureFest at CNP



Friends joined other organizations in celebration of NatureFest at Congaree National Park.

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In addition, the Riverstone tract contains the Buckhead tract, the “island” inside the Great Bend of the Congaree River. Bounded by Bates Old River, this part of the tract contains a uniquely large ridge-and-swale system, and historical resources, including much of the old path of McCords Ferry Road.

On April 27, Friends of Congaree Swamp submitted testimony to the Senate Appropriations Subcommittee on Interior and Related Agencies. In the past, Senator Ernest Hollings served on this subcommittee and was a strong advocate of land acquisition for the Park. The Senate testimony was provided on behalf of additional conservation groups including South Carolina Wildlife Federation, Audubon South Carolina, Columbia Audubon Society, Coastal Conservation League, Sierra Club—South Carolina Chapter, and Congaree Land Trust. I would like to thank these organizations, and particularly thank Prof. Dan Tufford for preparing on very short notice a graphic of the Riverstone tract and surrounding natural areas that accompanied the testimony.

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Upcoming Field Trips & Events

June Butterfly Count Saturday, June 10th Congaree National Park Harry Hampton Visitors Center 10 AM

Saturday June 10th at 10 AM. will be a day to join park staff and butterfly enthusiasts from around the state in search of butterfly species in Congaree National Park. Results will be reported to the North American Butterfly Association to help with monitoring butterfly population trends and distribution throughout the country. Binoculars, field guides, sturdy shoes, lunch, snacks, water, sun protection and insect repellent are needed for full participation. All ages and experience levels are welcome. If you are new to studying butterflies, free training on butterfly species identification will be offered at the Harry Hampton Visitor Center on Saturday, May 13th from 1:00-3:00 PM and Thursday May 18th from 3:00-5:00 PM. If you are an experienced butterfly enthusiast please consider taking on the role of leader for small volunteer groups during the count. To register for the count or one of the training sessions, please contact Christina Hulslander at 803-926-9494, or by e-mail at ploverbug@msn.com. Rain date is Sunday, June 11 at 10 a.m.



Asterocampa celtis
(c) Virginia Winn

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committee, the proposed regulation was introduced March 21 in the House of Representatives as a Joint Resolution (H.4858). After approving this resolution on April 6 and April 7, the House transmitted the Joint Resolution to the S.C. Senate.

As of April 30 (the deadline for this Friends of Congaree Swamp newsletter), the Senate had not yet considered the Joint Resolution. However, we are optimistic that the Senate will approve the Joint Resolution before you receive this newsletter.

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A Fiscal Year 2007 appropriation of \$4.5 million from the Land and Water Conservation Fund will provide the National Park Service with funds to purchase this critical Riverstone tract, thereby ensuring permanent protection of its outstanding natural and cultural resources, and connecting the 22,000 acres upriver with the 19,000 acres downriver.

Bates Fork Research

I first visited the Bates Fork tract (in waders) as part of the Congaree Christmas Bird Count in December when much of the tract was flooded. The two main roads on the tract are in excellent shape; one leads to a large clearcut, while the other skirts two other large clearcuts and crosses Sampson's Island, a large point bar.

The presence of large clearcuts is initially dispiriting, but provides interesting research and management opportunities. As our lead article demonstrates, Hurricane Hugo represented an opportunity to study forest succession after a natural disturbance; here was a chance to study succession after a man-made disturbance. The Friends' Research Committee met early this spring to discuss ideas for research at Bates Fork centered on its hydrology and the opportunity to study forest regeneration in the clearcuts.

As a part of this effort, Professor John Kupfer of USC's Geography department recently received a

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Events in Review

Ivory-billed Woodpecker Lecturer Comes to Columbia



Bobby Harrison speaks to a packed audience.

On Saturday, April 8, Bobby Harrison gave a lecture to a full house at the South Carolina Department of Archives and History auditorium about his 30-year obsession and search for the Ivory-billed Woodpecker. Harrison recently gained national exposure as one of the discoverers of the Ivory-bill in Arkansas and is featured prominently in Tim Gallagher's book *The Grail Bird* (Houghton-Mifflin, 2005). Harrison's 80-minute PowerPoint presentation was a fascinating blend of Ivory-bill natural history, the bird's gradual slide to near extinction for most of the 20th century, and his efforts, along with others, to find the bird in remote southern swamps. Although given up for gone by most authorities, Harrison and a few other hard-core Ivory-bill believers, notably the late John Dennis, held out hope that a few of the big woodpeckers were still out there. Their beliefs were vindicated when the Cornell Laboratory of Ornithology announced to the world in 2005 that Harrison and others had found the bird in eastern Arkansas in 2004.

Harrison's lecture was part of a program that included an introduction by Judge Alex Sanders, who talked

about the Ivory-bill's role in saving the Upper Santee Swamp from logging in the early 1970s and John Cely, who talked about the rediscovery of the Ivory-bill in South Carolina in 1935 in the lower Santee Swamp.

Friends and Columbia Audubon gave Harrison a tour Saturday morning of the Congaree National Park, the "Singer Tract of the East." This was his first experience in an old-growth bottomland forest and he was very impressed with the area.

For the first time he could understand how James Tanner, who studied the Ivory-bill in the Singer Tract in the 1930s, could walk or ride a horse for "seven or ten miles" in one day while chasing after the bird; most of the swamps Harrison has experienced were "deep water" and required a canoe or john boat.

Harrison's presentation provided some persuasive arguments and documentation, including video clips and audio recordings, that probably convinced more than one Ivory-bill skeptic in the audience that there is at least one woodpecker still alive in the "big woods" of eastern Arkansas.

The event, which also included a wine and hors d'oeuvres social, was sponsored by the Columbia Audubon Society and Friends of Congaree; co-sponsors included the South Carolina Wildlife Federation, South Carolina Association of Naturalists (SCAN), the Institute for Southern Studies at the University of South Carolina, the USC School of the Environment, Audubon South Carolina (ASC), Explorer's Club and the Happy Bookseller. Norman Brunswig, Director of ASC, was the moderator.



Ivory-billed Woodpecker expert Bobby Harrison beside a 15-foot circumference sweetgum at Congaree National Park

Events in Review

Hikers Seek Spring Flowers at CNP

16 members of Friends set out April 1 on a botany hike from Bannister Bridge to the entrance road. The hike followed the Park boundary, tracing the transition from the bluff to the muck swamp. Prof. John Nelson from USC identified plants along the way, while John Grego made sure we did not get lost on this off-trail hike.

We lingered at Bannister Bridge for some time as John Nelson discussed roadside species such as toadflax, vetch, shepherd's purse and chickweed. Stands of joe-pye weed and New York ironweed can be found there in the fall. From the bridge, we plunged into an early successional forest and pine plantation. The undergrowth was thick here and this was definitely the least pleasant part of the hike. We were rewarded for our efforts though, when we found three brown water snakes within 20 yards of each other in the bushes along the edge of Cedar Creek.

We soon entered a pleasant open beech forest characteristic of the remainder of our trip. The understory tree here was mostly American holly, though we would encounter areas with sweetleaf and beautyberry later on. Wayne Grooms found the remnants of a feral hog nest, and we stopped to admire arrowwood, wild azalea, and sparkleberry, the latter somewhat out of place on this relatively low bluff. Groundcover plants included heartleaf, crane-fly orchid, partridgeberry, and green-and-gold.

We spent the rest of the hike on the bluff's slope or at the edge of the muck swamp, whichever provided the easiest going. At a small seep, we found a nice stand of atamasco lily, though the promised jack-in-the-pulpit could not be found. Later on, at Little Lake, Mike Turner found a three-lined salamander; though not nearly so common as the marbled salamander, it is one of the species most likely to be seen at the Park. Mike served as a rover, and also turned up a northern racer and a newly-emerging luna moth in his explorations.

Throughout the hike, we found possible remnants of moonshining; at one definitive site though, we

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Bright orange slim mold was collected for analysis.

(c) Virginia Winn

Atamasco lilies were a favorite of everyone.



(c) Virginia Winn

John Nelson, left, is joined by Mike Turner and John Galbary, as he leads our botanical trip.



(c) Virginia Winn



(c) Virginia Winn

Three brown water snakes were seen within twenty yards of each other.



(c) Virginia Winn

John Grego explains the working of a moonshine still.

eight years. As light levels dropped, subcanopy tree densities have consistently declined since 1998. Woody vines nearly doubled in density as well. Unlike subcanopy trees though, vines have maintained high densities through 2006, although the rate of increase appears to have slowed. The canopy dominant tree species, which were not present in the understory prior to the hurricane, reproduced only in areas of high damage. The oaks and sweetgum are shade-intolerant and needed ~60% damage to large trees to open up the canopy so they could regenerate. Loblolly pine, another shade-intolerant species did not reproduce after the hurricane. The four-year drought from 1998-2002 allowed patches of loblolly pine seedlings to establish in the heavily damaged areas along the high boardwalk but the prolonged flooding of 2003 wiped out most of these seedlings.

Even in areas of low damage, the forests have continued to change through time. Trees have had a mortality rate of about 1%/year, so densities have declined while the surviving trees get larger. Surprisingly, woody vines have had much higher mortality rates than trees or shrubs, about 5%/year. This implies a much shorter life expectancy for most



(c) BruceAllen

woody vines. So the answer to the age-old question of whether the vine is as old as the tree it's growing on appears to be no. Grape vines may be the exception because they are tendril climbers and have very low growth and mortality rates.

Why are some of the trees so large? Growth rates are the key. Oaks grow about a centimeter a year in diameter. Fast-growing oaks can approach 3 centimeters a year. Champion trees have a short life expectancy once they achieve large size because they are vulnerable to hurricane winds.

\$18K grant from USC to establish vegetation research plots to study impacts of site conditions and feral hogs (through the use of exclosures—fences that would keep the hogs *out*) on post-logging forest succession. Exclosures will also allow researchers to study the effects of site conditions (hydrology and topography) and feral hogs on forest succession in the established second-growth forest that covers much of the site. In addition to basic research, we anticipate that information from such studies can help Park staff better manage the clearcuts.

Bill Hulslander, the Park's Resource Manager, is currently applying to the National Park Service for a grant for additional research at Bates Fork, including an archaeological survey to identify interesting sites on the tract. The money from John Kupfer's grant can be used as cost share on the NPS grant.

With successful baseline studies this summer, researchers hope to fund long-term grants for more extensive research at the site. Though much of Congaree National Park floods periodically, flooding at the Bates Fork tract is more frequent and persistent. In addition, Bates Fork may be flooded by the Congaree River, the Wateree River, or both, so that the interplay between the water quality and hydrology of these two rivers, sediment deposition, and distributions and changes in vegetation communities over time provide an opportunity for cross-disciplinary research on an ambitious scale.

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stopped at the remains of a "cooker"—two welded 55-gallon drums with a cylinder, formerly attached on top, lying nearby. The cooker was used to cook corn mash, which would ferment in 55-gallon drums. A water source was needed to help cool the steam from the cooker in a condenser.

Friends would like to thank Professor John Nelson for sharing his expertise with our members. Everyone attending enjoyed the botanical focus of the trip, and we would like to see an early-Spring botanical hike become a regular feature of our outings.



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Spring 2006

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