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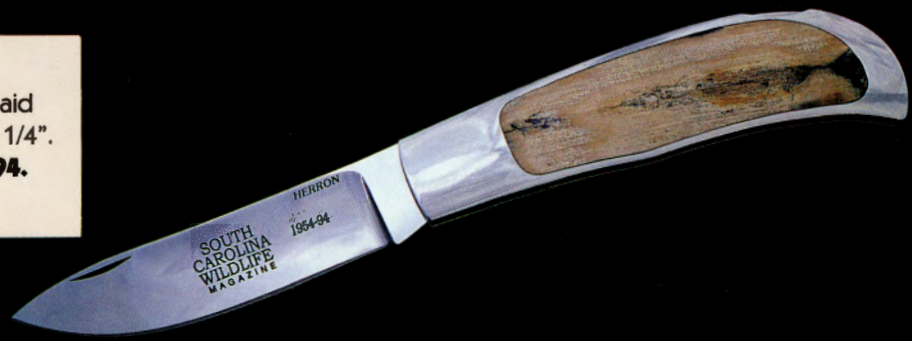
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May-June 1994 \$3.00



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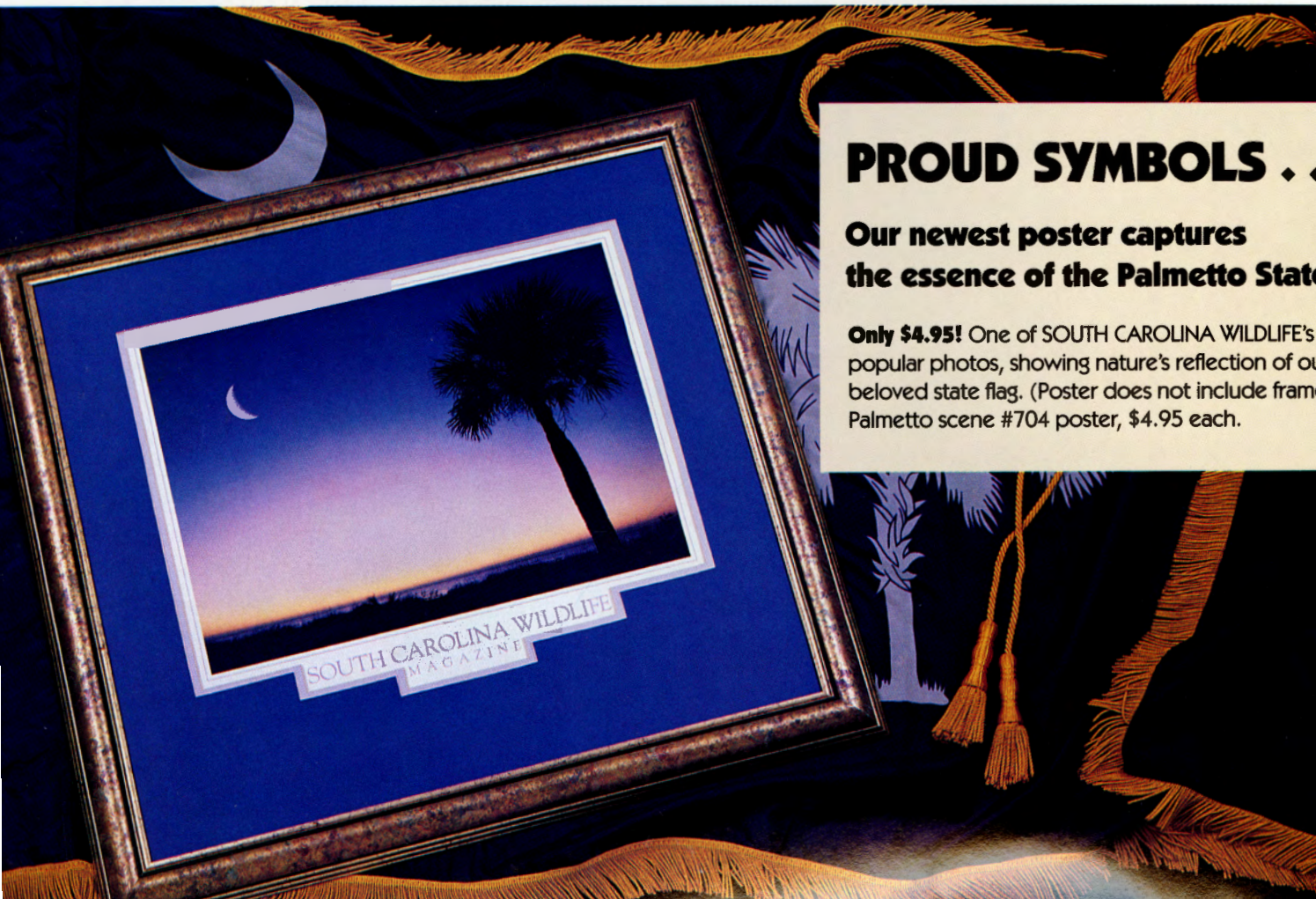


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SOUTH CAROLINA WILDLIFE

MAY-JUNE 1994, VOL. 41, NO. 3

Dedicated to the Conservation, Protection, and Restoration of Our Wildlife, And to the Education of Our People to the Value of Our Resources.

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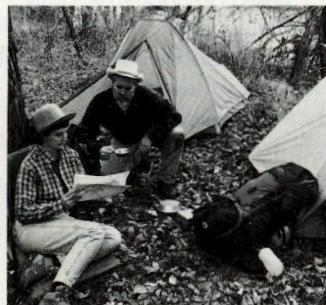
The Cover by Michael Foster

Protecting the state's rural lands, waters and wildlife will be the focus of the new South Carolina Department of Natural Resources. (See page 36.)

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BIOSPHERE

Some things won't change.
We promise to maintain the level
of excellence that has earned
SCW national acclaim.

YOU HOLD IN YOUR HANDS A COLLECTOR'S ITEM: *South Carolina Wildlife* magazine's last issue as a publication of the S.C. Wildlife and Marine Resources Department. Legally, that agency will cease to exist on July 1, 1994. In its place will be the S.C. Department of Natural Resources, our new publisher. (Yes, SCW will still be here!)

Fine-tuning will undoubtedly go on for some time within the various DNR divisions and programs. However, no one should expect the DNR to miss a beat when it comes to making recommendations and taking actions to benefit and protect our natural resources. As one director said, "This joining of agencies may have been a shotgun wedding, but it's a marriage that will work very well."

For this issue, SCW editors and writer Dot Jackson asked the DNR's director designee and his deputy directors to speak briefly about their responsibilities and the ways the individual divisions will address the issues facing the new agency. They agree that having this amount of expertise under one roof will be good for the resource and the various publics who use it.

South Carolina Wildlife will also undergo change, but, like the agency that publishes us, we will stay true to the interests of those who have traditionally supported us. The comments and interests of our subscribers have been, and always will be, of primary importance to us.

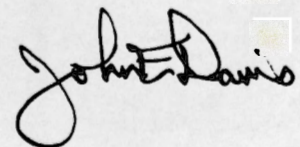
Our fine-tuning begins with our next issue, when you'll notice some changes in a few of our more familiar departments. Our goal is to improve our presentation and content to bring you more information about the new agency and the challenges it confronts.

Some things won't change. We promise to maintain the level of excellence that has earned SCW national acclaim. You can also count on the very best photographs and informative, accurate articles about a variety of topics relating to South Carolina's wildlife and its natural and historical resources.

Every few years, we mail a reader survey to a randomly selected group of subscribers to determine your preferences. In an effort to gain more frequent reader feedback, we're going to an annual survey. Within the month, some of you will be receiving our 1994 survey. We ask that you complete and return it as soon as possible so that we may gauge your reactions and incorporate your likes and dislikes into future issues.

In the meantime, we hope you'll continue to enjoy SCW. You'll find that we haven't changed the basic product. We're still giving every effort to bring you the best magazine on South Carolina available.

Finally, to those of you who are still guessing about my challenge to name the editors of SCW, try Eddie Finlay, John Culler, yours truly and, the mystery editor — Roger Seamans, Summer 1970, Vol. 17, No. 3.



Carroll A. Campbell Jr.
Governor of South Carolina

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AN EQUAL OPPORTUNITY EMPLOYER.

**MODERN TACKLE
CRAFT** by C. Boyd Pfeiffer,
*Lyons and Burford, 31 West 21st
Street, New York, NY 10010,
(212) 620-9580. Hardbound,
black and white photographs,
index, charts, appendices,
glossary, 549 pages, 1993.*

The classic work on tackle building is back. Fully augmented and updated, **Modern Tackle Craft** is a completely new edition of its predecessor, **Tackle Craft**, of which the great "Tap" Tapply said, "Now fishermen have an authority they can turn to with confidence. Pfeiffer really knows his stuff."

Pfeiffer's latest volume contains more than 25 chapters and seven helpful appendices on a variety of topics including basic and advanced rod-building, spinners, bucktails, jigs, sinkers, plastic lures and plugs, wire leaders, painting and finishing methods, basic and decorative wraps, necessary knots and splices, tackle care and repair, suppliers and manufacturers, and much more. While one chapter is devoted entirely to tools, others list both essential and helpful tools to accomplish the tasks covered in that chapter.

Pfeiffer calls on his lifetime of experience to describe in down-to-earth terms the steps of each process. The result is a book of immense value to any tackle tinkerer and one that can save the home tackle-builder thousands of dollars.

Destined to become a second classic, **Modern Tackle Craft** far surpasses the original in details, range of knowledge, and helpful information for the tackle-building hobbyist.

**FIELD GUIDE TO
COASTAL WETLAND
PLANTS OF THE
SOUTHEASTERN
UNITED STATES** by Ralph
W. Tiner, *University of
Massachusetts Press, P.O. Box
429, Amherst, MA 01004,
(413) 545-2217. Paperback,
illustrations, maps, glossary,
index, 329 pages, 1993.*

Among our most valuable natural resources, coastal wetlands reduce flood and storm damage, maintain water quality, and provide vital habitats for fish, shellfish and other wildlife.

Ralph W. Tiner's **Field Guide To Coastal Wetland Plants** is an attractively illustrated handbook on the Southeast coast's wetland vegetation. It is designed for nonspecialists and should be useful to biologists, planners, environmental consultants, landscape architects, naturalists and students. Intended primarily for use along the South Atlantic and Gulf coasts (from Virginia to Florida and west to Texas), it will also be valuable as far north as New Jersey, as far south as Mexico.

The book is arranged in four major sections: coastal wetland ecology, identification of coastal wetland and aquatic plants, wetland plant descriptions and illustrations, and distribution of coastal wetlands in the Southeast. More than 250 plants of tidal marshes and swamps are fully described and illustrated, and over 200 other plants are catalogued. Each plant listing includes its common and scientific name, description, flowering period, habitat, wetland identification status,

and range. Easy-to-use nontechnical keys guide the reader in plant identification.

**COMPLETE GUIDE TO
THE MOUNTAIN BRIDGE
TRAILS**, *Naturaland Trust,
P.O. Box 728, Greenville, SC
29602, (803) 242-8215. Soft
cover, trail maps, 3-D perspective
maps, 225 pages, 1994.*

The Mountain Bridge, a spectacular 40,000-acre wetland located in the northwestern corner of South Carolina, spans the area between the Table Rock and Poinsett reservoirs. A system of trails has been constructed in the Mountain Bridge over the past decade, centered around Jones Gap and Caesars Head state parks, yet relatively few hikers know about them. These trails should become more frequently traveled with the publication of the **Complete Guide to the Mountain Bridge Trails**.

The guide contains complete descriptions of each of the Mountain Bridge's 18 trails stretching over some 45 miles; trails are detailed in both directions. The trail descriptions were written by *South Carolina Wildlife* staff writer Greg Lucas. All trails except one can be hiked in a day, although many involve climbing or descending more than 2,000 feet and are quite strenuous.

In addition to trail maps and descriptions are sections on the unique flora, fauna and geology of the Mountain Bridge Wilderness Area. All proceeds from the sale of the **Guide to the Mountain Bridge Trails** will be used for trail maintenance. 🐾

EVENTS

MAY - JUNE.

"Hooked On Fishing, Not On Drugs"

Fishing Rodeos. Parents and kids 15 years old and under enjoy a day of fishing together; baits and poles provided; free to the public; prizes, awards, Weefutt special appearances, food. Dates, locations and contacts: **May 7** — Horse Creek, Graniteville, Mark Carey, 642-5768; Lake Cherokee, Gaffney, Frank Crocker, 288-1131; **May 14** — Burrells Ford Campground, Walhalla, Larry Holbrooks, 288-1131; Lake Paul Wallace, Bennettsville, Capt. Jack Driggers, 661-4766; **May 21** — Lick Fork Lake, Edgefield, Capt. Stanley Smith, 637-3397; Richardson's Pond, Marion, Capt. Jack Driggers, 661-4766; **May 28** — Lake Johnson, Spartanburg, David McSwain, 288-1131; Veterans Lake Park, Union, Wayne Hutcherson, 684-4078; York City Waterworks Pond, York, Capt. David Yongue, 684-4078; **June 4** — Star Fort Pond, Ninety Six, Capt. Stanley Smith, 637-3397; Styx Fish Hatchery, West Columbia, Capt. Barry Carson, 734-4303 (pre-registration is required); Singing Pines Recreation Area, Lake Hartwell, Anderson, Mike Loftis, 225-5123 or Corps of Engineers, 376-4788; **June 11** — U.S. Fish Hatchery, Oconee, Larry Holbrooks, 288-1131. This program is sponsored by the wildlife department and the Harry Hampton Memorial Wildlife Fund. For more information, contact local wildlife department officers or Donna Swygert, S.C. Wildlife Dept., P.O. Box 167, Columbia, SC 29202, 734-3954.

THROUGH AUGUST '95.

The Big One That Didn't Get Away Exhibit. S.C. State Museum, Columbia. A presentation of S.C.'s record fish featuring trophy mounts of blue marlin, largemouth bass, striped bass and other species. Contact State Museum, 301 Gervais Street, Columbia, SC 29202-3107, 737-4595. **MAY 11-14, 25-28; JUNE 22-25; JULY 20-23.**

Sixth Annual Governor's Cup Billfishing Tournament Series. Coastal

South Carolina. Sanctioned fishing tournaments promoting the tagging and releasing of blue marlin, white marlin and sailfish; awards, prizes. Contact Governor's Cup, P.O. Box 12075, Charleston, SC 29422-2559, 762-5025.

MAY 14.

International Migratory Bird Day.

South Carolina. Bird-banding demonstrations, field trips, and educational presentations. Contact John Cely, S.C. Wildlife Department, P.O. Box 167, Columbia, SC 29202, 734-3893.

MAY 14-15.

1994 Marine Fishing Fair. Marine Resources Center, Fort Johnson, James Island. Theme: A Marine Science Experience. Events throughout the weekend — education/information displays and how-to sessions on offshore fishing, shark fishing, bait rigging, artificial reefs, shellfishing, aquaculture, seafood cooking, environmental research, knot tying and knife making and sharpening; learning activities/games for children; marine-related vendor exhibits; open house; food; door prizes and raffles; free to the public. Contact Marine Resources Center, 217 Fort Johnson Road, P.O. Box 12559, Charleston, SC 29422-2559, 795-6350.

JUNE 4.

National Trails Day. Statewide. Explore South Carolina's scenic trails as part of a nationwide show of support for building a national trails network. Organized hikes, trail maintenance projects, educational programs. Contact S.C. State Parks, 1205 Pendleton Street, Columbia, SC 29201, 734-0156, or U.S. Forest Service, 1835 Assembly Street, Columbia, SC 29201, 765-5222.

JUNE 11.

National Garden Week Observance. Clemson University, Clemson. Sponsored by the Garden Club of South Carolina and Clemson University; a flower show and educational exhibits; guided tours of 15 gardens and trails; lectures on landscaping; presentation on bats by Mary Strayer of the state wildlife department; possum slide

show. Contact Elva S. Henry, The Garden Club of South Carolina, P.O. Box 995, Greenwood, SC 29648-0995, 227-8935.

JUNE 11-12.

Seventh Annual Edisto Riverfest.

Colleton State Park, Walterboro. Canoeing and kayaking trips along the Edisto River, outdoor education workshops, entertainment, displays of outdoor equipment; half-day, full-day and overnight canoe excursions; fee; register by May 24. Contact Charlie Sweat, P.O. Box 1763, Walterboro, SC 29488, 549-5591.

JUNE 24-26.

S.C. Festival of Flowers.

Greenwood. Arts and crafts exhibits, Park Seed Company flower day, jazz festival, square dancing, photography exhibition, softball/volleyball/tennis tournaments, antique car show, community play, flower shows, aircraft display, kids' fest, medical conference, private garden tours, bike tour, swim meet, fashion show; a flotilla on Lake Greenwood. Contact Lori Hajost or Frank Cuda, Greenwood Chamber of Commerce, P.O. Box 980, Greenwood, SC 29648, 223-8411 or 223-8431.

JUNE 25.

Fishing Frenzy II. Moncks Corner. Kids 12 and younger compete for the biggest fish; bring a parent, cane pole, and bait; register by June 19. Contact Old Santee Canal State Park, 900 Stony Landing Road, Moncks Corner, SC 29461, 899-5200.

JULY 1-4.

Freedom Weekend Aloft.

Greenville. Hot-air balloon rides/races, a craft show, amusement rides, entertainment, and a gigantic fireworks show. Contact Freedom Weekend Aloft, 10 Sevier Street, Suite 202, Greenville, SC 29602, 232-3700.

NOTE: Dates are subject to change, so call before traveling to an event. All area codes: 803. To list an event, please send information three months in advance of the magazine's publication date to Tricia Way, South Carolina Wildlife, P.O. Box 167, Columbia, SC 29202-0167, 734-3972. 🐾

Sample the activities of 17th-century settlers along the Ashley River
at Charles Towne Landing State Park's **Colonial Life Days.**

**HISTORY COMES ALIVE AT
CHARLES TOWNE LANDING
JUNE 5 AND 6**

Charles Towne Landing State Park offers Lowcountry visitors a glimpse into our colonial past year-round, but especially during its Colonial Life Days. Exhibits and demonstrations by park staff and volunteers illustrate daily life when the Ashley River site near Charleston was first settled in 1670.

Visitors of all ages are invited to attend Colonial Life Days, held June 5 and 6 from noon until 6:00 p.m. each day. Park officials emphasize that it's a real family affair, providing opportunities for fun as well as education.

During these two days park interpreters and volunteers bring past life to reality, but life as it existed in colonial times is on display all year at what park officials call their Living History Area.

"It's called Settlers' Life," says park interpreter Scott Alexander, "and it consists of three permanent structures, a woodworking shop, a blacksmith shop and a print shop." During Colonial Life Days, these shops are busy with demonstrations of colonial trades, crafts and activities.

"We demonstrate various activities that had to do with the period when the town was here from 1670 until 1680," Alexander says. Among the many demonstrations are chair making; operating a wood lathe; log hewing; blacksmithing and gunsmithing; and working with tin and pewter. A popular event is black-powder firing with period muzzleloaders throughout the afternoon each day.

Other demonstrations include flint knapping, pot turning and pottery, leather tanning, spinning and weaving, candle dipping, soap making and open-hearth cooking. "Colonial games are played, and these are of particular interest to young children," Alexander notes.

Many visitors enjoy investigating the experimental crop garden. "When the colonists left to come here, not knowing



what the climate was like," Alexander explains, "they brought along a wide variety of seeds and set up an experimental garden."

The park's garden is a smaller version, but otherwise much like the original. "The colonists tested different crops, planting at different times of year to discover the most favorable seasons and find out what crops would be successful here," he added.

"Everything we do here at the park is tied to education," says Alexander. The park is both historical and natural.

Since Charles Towne Landing relies heavily on volunteer interpreters, the program from one year to the next is never the same, Alexander points out. "It depends on who we are able to recruit at the time."

Several thousand people enjoy Colonial Life Days each June, but Alexander says crowds are not a problem. "I don't want folks to be discouraged by thinking the park is going to be crowded." The 660-acre multipurpose park can comfortably accommodate large numbers.

Visitors at any time can enjoy the park's regular features, which include the *Adventure*, a 17th-century coastal trade ship; the animal forest where native wildlife of the period, including bison and elk, are exhibited in natural habitat settings; an 80-acre botanical garden; and a nature trail.

Visitors also have access to ample picnic facilities, walking and bicycling as well as a narrated tram tour of the park that takes about 30 minutes. There is also a gift shop, snack bar, and a movie theater where a film featuring the Lowcountry is shown every hour on the half hour.

Charles Towne Landing State Park is open seven days a week year-round, except for two days at Christmas. Hours are 9:00 a.m. to 5:00 p.m. daily during the off season and 9:00 a.m. until 6:00 p.m. from Memorial Day through Labor Day. An entrance fee is charged at the gate.

For more information, write Charles Towne Landing State Park, 1500 Old Town Road, Charleston, SC 29407, or call (803) 852-4200. 🐾

Flying Shadows

An unseen presence haunts South Carolina's woodlands after sundown.

It's neither a bird nor a bat, though it sails as silently through the evening air.

by Chris Handal

illustration by John Sill

As the world turns black and white at dusk, images dim to resemble pen and ink drawings. At that moment when a little light remains, but not enough to discern color or to read a newspaper, the flying squirrel ventures from its shelter and glides into the night.

In South Carolina, flying squirrels are common in both rural and urban areas, yet a person can go a lifetime and never see one. The reason, of course, is that these tiny creatures, measuring about eight and a half inches from head to feathery tail, belong to the night.

During the daylight hours they sleep in nests, usually in the cavity of a hardwood tree such as an oak or hickory, and they also sleep in exposed leaf nests or in house attics. Then, as sunlight fades away to darkness, they awaken and become active. The little animals may be glimpsed in these few dusky minutes as they set out to forage, but the window of opportunity to view a flying squirrel is brief. A feeding area, stocked with nuts and acorns, can be established near their habitat to attract them within viewing range, but there is no guarantee that flying squirrels will come to feed.

Two species of flying squirrels occur in the United States: the Southern flying squirrel, *Glaucomys volans*, and the Northern flying squirrel, *Glaucomys sabrinus*. The Northern species ranges as far south as the Appalachians in North Carolina and northward through the spruce/fir forests of the United States to Alaska. Southern flying squirrels prefer the deciduous forests east of the Mississippi River and have been recorded from upper Michigan in the North as far south as Central America.

In *Flying Squirrels: Gliders in the Dark*, Nancy Wells-Gosling states that the origins of the two species are unknown; the best guess is Asia, which has thirty-three species of flying squirrels. The Southern species arrived in North America 20 to 25 million years ago, while the Northern flying squirrel is a relative newcomer, having been here for 10 to 15 million years, theorizes Wells-Gosling.



Although their name implies that these little animals fly, gliding more accurately describes their aerial travel. A flying squirrel's silent movement from tree to tree provides another reason for the species' obscurity from the human population.

A membrane stretching from front leg to hind leg on each side of the mammal's body acts as a "wing" and allows the glide. This dark brown membrane separates the brown fur on the top half of the squirrel's body from its white-furred underbelly. The flying squirrel leaps from a tree and pulls the membrane on either side of its body taut. In full sail, the squirrel resembles a square with a head and a flat tail. During flight, the tail serves as a rudder, and the animal's feet become the landing gear. As quickly as it comes to rest against a tree trunk, it darts away to search for food or to seek a new tree cavity in which to nest or to store food.

"Flying squirrels usually start either from a roughly horizontal surface, such as a branch, or while hanging head downward on a tree trunk. If necessary, the agile glider can launch itself from virtually any position, even executing a backward somersault and twist to become airborne," says Wells-Gosling. The flying squirrel is also capable of helicopter-like landings. By fluttering its membrane during flight, the squirrel stalls and gently floats to the ground. The glide is usually carried out at an angle of about 30 degrees and can reach more than one hundred feet, an impressive sight to witness. Longer glides are possible from the tops of very high trees or cliff edges.

In the wild, the life of a flying squirrel is brutally short. A researcher in Virginia estimated the average life span of flying squirrels at eighteen months. In contrast, the life span of a flying squirrel in captivity can be much longer, up to fifteen years in zoos and research laboratories.

Unlike rabbits, which compensate for a short life span with a prodigious reproductive capability, flying squirrels breed only a few times during a lifetime in the wild. In colder climates, such as Michigan and Wisconsin, Southern flying squirrels breed almost exclusively in the early spring. In South Carolina, with our milder weather, flying squirrels have litters throughout the year with spring the most likely time for newborns to arrive.

The gestation period for a flying squirrel is forty days, and the litter size ranges from one to five babies, with an average of two. For rodents, the young develop relatively slowly. The mother is very protective and nurses her young for twelve weeks. After weaning, a young flying squirrel continues to grow throughout its first summer, but it is not ready to breed until the following year at over half a year of age or about halfway through its expected life span in the wild. (By comparison, a hamster is able to breed at the age of about forty days.)

Even though flying squirrels don't reproduce prolifically, their stealth and the fact that they refrain from daylight activity evidently protect a sufficient percentage of the population long enough to reproduce and sustain numbers.

The main predators for flying squirrels are owls, whose ability to hunt and locate prey at night is unmatched. If flying squirrels could not glide between trees but had to forage on the ground, they would make easy victims for owls. Even so, an owl can pick off a flying squirrel as it drifts through the air.

Other dangers come from snakes and weasels that attack during the daylight hours as squirrels rest in the cavity of a tree. If these predators are able to gain entry to a

Spreading the membrane between its front and hind legs like a parasail, a flying squirrel glides from tree to tree and uses its broad, flat tail to break its fall. The tiny rodent lands on its feet, then scurries to the other side of the tree or branch to escape notice by owls or other predators. Scientists conjecture that flying squirrels' habit of occupying red-cockaded woodpeckers' nesting holes (like the one illustrated on page 7) further jeopardizes the already endangered bird.



nesting cavity, an awakened squirrel has virtually no chance to escape.

Besides predators' threats, environmental challenges face flying squirrels. They cannot survive longer than a day without fresh water, and during dry weather, they lick the early morning dewdrops off leaves. It is also possible for flying squirrels to starve if acorns and nuts, their preferred foods, are scarce. Although the little flyers will eat shelled pecans, their teeth are generally not sharp enough to crack a pecan shell. (Insects also form part of their diets, particularly moths.)

In South Carolina, observers have found that flying squirrels may range a half mile or more from a nest. The squirrel does not limit itself to one nest, rather moving from nest to nest and sometimes staying in one for a couple of weeks before moving. During a three-month period, a flying squirrel can occupy five or more nests.

Sick flying squirrels are rarely encountered either in nature or the laboratory as they seem to be very resistant to disease. Wells-Gosling's book, which was published in 1985, states that only three cases of rabies in flying squirrels have been reported.

For those fortunate enough to spot them, flying squirrels are fascinating to observe in nature. They have also been intensely studied by research scientists. University of South Carolina professor Patricia DeCoursey, recognized as an expert in her field, has studied the "biological clocks" of flying squirrels and has published several articles on her research.



Description: Upper body fur is grey-brown. Black line divides the upper and lower body, made up of a dark-rimmed fold of skin from foreleg to hind leg on each side. White on the underside. Large, bulging eyes; short ears. Average length of 8 inches from head to tail. Weight 60 to 120 grams or 2 to 4 ounces.

Distribution: Widely dispersed population from eastern Texas to Minnesota to the East Coast with some scattered populations in Mexico and Central America. A similar but larger species, the Northern flying squirrel, *Glaucomys sabrinus*, ranges farther north and west.

Habitat: Mainly hardwood trees, but will nest in pine trees as well as in leaf nests and in the attics of houses. Flying squirrels have been found in urban areas.

Feeding Habits: Nocturnal; eats acorns, hickory nuts, seeds and insects, usually moths. Cannot survive much more than 24 hours without fresh water.

An internal neural pacemaker awakens the flying squirrel at dusk every day in the wild. To test the properties of such a clock, flying squirrels have been taken out of their natural habitat and placed in an environment free of light cues. Under these conditions, an animal's free-running clock becomes evident. (The term free-running implies that no outside stimulus is acting on the clock.) In spite of the lack of environmental cues, a flying squirrel's activity period shows very high precision and takes place with only a few minutes' deviation each day. These highly accurate biological rhythms are called circadian rhythms.

Dr. DeCoursey uses this analogy to put the flying squirrel's biological clock in perspective: imagine being kept in a dark room for one hundred days. There is no light. In fact, there is nothing to indicate time of day. Each day, however, you wake up at exactly the same time. This is what the flying squirrel accomplishes with remarkable accuracy.

Along with their circadian rhythms, the community ecology aspects of flying squirrels have also been extensively studied. These appealing little rodents with the bulging eyes and amazingly accurate biological clock are suspected of contributing to the tenuous status of the red-cockaded woodpecker. This endangered woodpecker, called by some the spotted owl of the Southeast, is associated with older-growth forests.

Susan Loeb, a research ecologist with the Threatened and Endangered Research Unit of the Southeast Forest Experiment Station is involved in several projects that over the next few years could provide answers to the relationship between the red-cockaded woodpecker and the Southern flying squirrel.

The red-cockaded is the only woodpecker that excavates its cavities in living pine trees. Suitable pines with heartwood rot are sixty to eighty years old. "Trees that meet the birds' needs are limited because of cutting in the Southeast," Loeb says. Flying squirrels many times move into the cavities painstakingly created by red-cockaded woodpeckers, probably attracted to these pine-tree holes because the openings are too small for grey squirrels or fox squirrels to enter. In other words, the Southern flying squirrel has less competition for these cavities.

In a number of cases, flying squirrels have taken over the endangered birds' nests that contained eggs. "They have basically destroyed the nest," Loeb says, and "probably ate the red-cockaded woodpecker eggs."

Studies continue, and Loeb notes, "We're still not sure whether the flying squirrels are having a significant impact on woodpeckers."

One study that may shed some light on the interaction between the two species is taking place in the Sandhills National Wildlife Refuge. That study will look at what happens to the woodpecker population if flying squirrels are removed from part of the refuge. Another study in the Francis Marion National Forest is gauging the effect of artificial cavities on the interaction between the species.

Somewhat clouded now, the true relationship between the red-cockaded woodpecker and the flying squirrel should be better defined during the coming years. It is clear that this little glider has proved it can survive and thrive despite predators and challenges from the environment, remaining unobtrusive to humans while living in their midst.

A glimpse of a shadow at twilight may be the best that a person can hope for when trying to see a flying squirrel in nature, but what a unique shadow it is. 🦨

Chris Handal is a full-time technical writer and free-lance writer/editor based in Charleston.

READERS' FORUM

Kudos From The "Coast"

What a pleasure to thank the South Carolina Wildlife staff for the great article entitled "Our Sunset Coast," in your March-April 1994 edition. Thanks to Ted Borg and others for the photographs of our beautiful resources and some of the people who contribute to our special place — Johnny Talbert, the McAllisters, the Self family who appeared on horseback, Bob and Brenda Hughes and Noel Brown.

What great style writer Emily Clements possesses. It was an extreme pleasure to work with her while she was researching the piece. Thanks again for sharing "A secret worth telling. But quietly."

Nancy Lindroth
McCormick County
Chamber of Commerce
McCormick

Commemorative Knife Too Pricey

This reader has never been disappointed in your magazine through the many years I have enjoyed it. However, in the March-April issue, there was a major disappointment to me and, I'm sure, to many others. We are talking of the exorbitant minimum bid for George Herron's commemorative knife.

For many good ol' boys who work for \$7.50 per hour, \$600 is out of reason. These guys work hard to support the family and their addictions of huntin' and fishin'. No doubt these same men and women are the majority of your subscribers.

Don't cater to an elitist group of M.D.s, lawyers and other

assorted robber barons. They alone will not support your publication and agency.
Herschel Browne
Roebuck

Editor's Note: We appreciate your support and admit not everyone can afford a one of a kind custom-made knife, magazine editors included! That's why we're offering a limited edition of another top-quality blade, the Gerber Folding Sportsman I, for the modest price of \$50.

Let you think us greedy, many of Mr. Herron's knives fetch far more than our minimum bid of \$600, and that's without the commemorative blade etching and a hand-crafted heart pine case, made by our own Pete Laurie. Our thanks to George Herron and Pete. Their donations keep your subscription costs down.

Wanted: Sandhogs

I think it would have been more appropriate to call Julie Frick's fish sandhogs (as per tunnel diggers) or dredges.

If, as stated in the center of page 9, March-April 1994, they prepare bowl nests which are three to eight feet deep I would like to secure several of the males. I have a canal which I would like to have developed.

I like your magazine.
J.T. Landrum
Dunnellon, Florida

Editors' Note: We suggest you read that sentence again ("shallow bowls at depths of three to eight feet.") before hiring any sandhogs to dig your canal. They do their best "work" on a fly rod, a cane or a platter.

Oops!

Editor's Note: What troublemakers four-letter words can be. In this instance, the offender is the word "late."

Much to our distress, this adjective crept undetected onto page 16 of our March-April issue and attached itself to Beaufort carver Gilbert Maggioni's name! Our faces are still red as mountain apples.

Mark Twain said it best: "Reports of my death have been greatly exaggerated."

History Buffs

Thank you so much for the wonderful article, "Treasures out of Time" by Dot Jackson, January-February 1994. It helped to answer a lot of questions my wife and I had about the Cherokee site on the Chattooga River.

In the summer of 1993, while on our way back home from Highlands in North Carolina, we pulled over at the old farm site and attempted to figure out how to get out to the field through the briers and overgrowth around the ruins of the farm structures. We were about to give up when two gentlemen came up a path from the river and introduced themselves as amateur rock-hounds and arrowhead collectors. As we inquired about the dig they explained how they had helped to locate it because of the concentration of artifacts found there on their weekend outings.

No archaeologists were present that Sunday morning, but these local men led us out to the site and told us about the area, the family who had

inhabited the farm and a little bit of history revolving around the Cherokee. We were careful when walking about so as not to disturb anything.

Though my wife and I spent over half an hour back at the car removing ticks from one another, the moments we spent on that site will remain special to us forever. I applaud Mr. Schroedl and his team for the great job they are doing. Also, special thanks to the two Carolina gentlemen for sharing their find with all South Carolinians by reporting it and for sharing their morning with us. Paid tour guides could not have done a better job.
Gary K. Duncan
North Augusta

Fellow Clay Breakers

"Breaking Clay" by Rick Leonardi in your November-December 1993 issue was extraordinarily well written. It provided me with rarely begotten audible laughter, not mere grunts. It was a true-to-life essay, provoking visual images of my own experiences and those of my two sons.

Thank you for your fine work. It was not only enjoyable and accurate, but inspirational. I and my sons, Lawson and Judson, are now anxious to try other sporting clay facilities based on your descriptions of some of the South Carolina facilities which are obviously more creative than the one we have patronized in southwest Atlanta.

Warner L. Smith
Marietta, Georgia

P.S. I plan to subscribe, even though I live in Jaw-Ja.

LOOK BEYOND YOUR WINDOW...

Their own back yards and school grounds offer more wildlife habitat possibilities than they ever realized, say the winners of our 1993-94 Young Outdoor Writers' Competition.

Students across the Palmetto State opened their eyes and imaginations to the concept of urban wildlife habitat during *South Carolina Wildlife* magazine's seventh annual Young Outdoor Writers' Competition.

We invited young people in grades five through twelve to consider the basic ingredients of good wildlife habitat (food, water, and cover or shelter), explore the habitat opportunities within their communities, and express their thoughts in essays about backyard and schoolyard habitat's importance.

Students competed at their own school level, with the best essays sent on for statewide judging by a panel of retired educators and the magazine's editorial staff. It was apparent that the participants had worked hard, and exceptional essays made final selection difficult.

In addition to the three first-place winners whose essays appear on the following pages, these students and their sponsoring teachers were honored at the Palmetto Sportsmen's Classic in Columbia:

In Category I, grades 5 and 6, second-place winner was Brett Gardner, grade 5, Holly Hill Academy, Holly Hill, Emily W. Simons, teacher; third-place winner was Gini Girardeau, grade 5, Colleton Elementary School, Walterboro, Cynthia Westbury, teacher.

In Category II, grades 7 through 9, second-place winner was Latonya Townsend, grade 8, Johnakin Middle School, Marion, Vickie L. Skipper, teacher; third-place winner was Amanda Bradham, grade 8, Timmerman School, Columbia, Liz Jordan, teacher.

In Category III, grades 10 through 12, second-place winner was Emily Smoak, grade 12, D.W. Daniel High School, Central, Nancy V. Swanson, teacher; third-place winner was Kristi Smith, grade 11, Mullins High School, Mullins, Charlene Proctor, teacher.

Winning students received \$500, \$200 or \$100 U.S. savings bonds along with a commemorative plaque and other gifts, and each teacher was presented a \$50 check. The Harry R.E. Hampton Memorial Wildlife Fund, sponsor of the Palmetto Sportsmen's Classic, provided bonds, cash gifts and other financial assistance.

Past and Present Wildlife

Category I
First Place

Look beyond your window . . . what do you see? You see a whole different picture from the one our ancestors saw when they first set eyes on the New World. They witnessed an abundance of game and quantities of fish. Natural resources seemed limitless. Since then, Americans have learned that even bountiful resources can disappear. In its brief history, South Carolina has lost at least twenty-seven species of wildlife. The passenger pigeon, the ivory-billed woodpecker, the Carolina parakeet, the wood bison, elk, timber wolf, red wolf, cougar, and others have disappeared. Many other species are showing signs of stress.

Some people may ask, "Why is protecting the wildlife habitat so very important?" We should all be concerned, especially the hunters, because as public hunting lands dwindle, hunters may eventually be an endangered species themselves. South Carolina citizens should have a deep and abiding interest in protecting and ensuring that these resources will be available for the enjoyment of future generations.

Each of us can do something to help save our state's endangered heritage. One may ask, "As a child, what can I do at home to protect and preserve our wildlife habitat?" The Backyard Wildlife Habitat Program established by the National Wildlife Federation encourages everyone at home, school and in the community to plan their landscaping with the needs of wildlife in mind. "Why? Because wildlife is enjoyed by nearly everyone, and habitat restoration is a critical need for urban and suburban settings where building and development infringe on natural areas needed by wildlife to thrive."

Providing wildlife habitat in your yard — food, water, cover, and places to raise young — is easy, and the results are rewarding. One fun suggestion: for the last three years, my brother, Biff, and I have gathered all the extra pecans left on the ground at our Pop's house and brought them back home with us to spread around our yard at random for the squirrels to find. It has been so much fun standing at our window and watching the squirrels scamper around our yard scooping up the nuts and dashing back to their nests with their treasures.

Schools can also do their part to help improve wildlife habitat. Teachers might have their students do a class project such as create a habitat box. Choose an animal and learn about its basic needs — food, shelter and water — as they construct its shelter. Students could make a variety of bird feeders and place them around the school yard. Students could keep a wildlife journal with pictures about the types of wildlife they see. Teachers might choose to participate in Project WILD, an award-winning environmental and conservation education program of instructional workshops and supplementary curriculum materials for grades K-12 . . .

The community as a whole could help by making tax-deductible contributions that help threatened or endangered species and that also help manage one-of-a-kind natural areas called Heritage Preserves. Tree farmers could be encouraged to replant after clear-cutting and to create food plots consisting of grain, clover and millet to attract deer and wild turkeys. If we all work together as individuals, schools and communities, hopefully our children will look back and say "thank you" for a job well done.

— John R. (Chip) Blocker III, grade 6
Northside Middle School, West Columbia
Docia S. Jones, teacher

Beyond Your Window

Category II
First Place

Look beyond your window and see the widespread influence that we can have on our environment. Conservation of our native plants and wildlife is needed so we can preserve natural evolution rather than disturb it. Since oxygen is provided by plants and we need this oxygen to live, it is a serious mistake to overlook its importance and the importance of all living organisms and natural resources.

Preserving the world as we know it today can begin just beyond our windows, in our yards, communities and schools. Our own habitats are good places to start. Looking at the whole world or trying to solve all of the problems at once can be overwhelming and stop us from doing anything.

Just beyond our window, we could start with a flower box of butterfly-attracting plants like bright red salvia. We could also grow herbs that we could use in our kitchens. Herbs like basil discourage annoying mosquitoes. The pitcher plant, which is endangered, eats insects. It might also be used.

Nearby, deciduous poplar tree limbs can be used for hanging bird feeders, including syrup feeders for hummingbirds. Poplar trees are also used for medicinal purposes, such as rubbing on burns. South Carolina's evergreen pine trees provide excellent shelter for birds and squirrels. Beneath the trees, a bird bath can be placed for birds to get water during dry weather.

Wildflowers native to South Carolina can be planted to attract bees for pollination. Lamb's ear is a fun, soft variety that grows wild, and bees love its bright yellow flowers.

Lawns which are thick with grass will keep water from running away from large trees too fast and will also help discourage erosion of topsoil. Grass cuttings and leaves can be a natural fertilizer if they are used to make a compost pile. This is better than burning them and further destroying the ozone layer.

Flower beds can be planted with perennials, annuals and vegetables, as well as shrubs and fruit trees. Many plants that are endangered, like Schweinitz's sunflowers, can be planted in our yards so their numbers can increase. Giving cuttings or seeds to friends and neighbors can also help propagate these plants.

If heavy equipment like a backhoe is available, we can dig a small pond and grow water lilies in it. Goldfish are also fun to watch and feed. A worm farm is easy to start, not just to use for fish bait, but also for aerating soil to prevent water run-off. Providing places for the little life forces usually means that you might be doing something to help man in return.

Educating everyone by taking the time now to make a difference in your own backyard is the key. Schools and towns can encourage recycling, provide bluebird trails, plant wildflowers and other plants on highway medians, and have contests on backyard habitats. Getting businesses in the picture can help provide funds to get some of these projects started. Young people can participate in this. Who can resist a teenager pleading for new life for his environment?

— Joel LeVine, grade 9
West Florence High School, Florence
Barbara K. James, teacher

South Carolina Wildlife magazine's Young Outdoor Writers' Competition has as its goal the promotion of young people's interest in the out-of-doors and wildlife conservation and the encouragement of outdoor writing among students in grades five through twelve. Information on the 1994-95 competition will be available this fall when rules and a topic will be provided to schools wishing to participate. Interested teachers may request competition materials from YOWC, P.O. Box 167, Columbia, SC 29202-0167. 🐾

Habitat For Today And Tomorrow

Category III
First Place

Look beyond your window into your own back yard. Imagine butterflies, birds, foxes, rabbits, squirrels, frogs, toads, lizards, and other small creatures communing with each other in one sheltered area. Continue your mind's journey, and watch as the secluded spot begins to shrink. As the environment for wildlife diminishes, the animal population also decreases.

As a naturalist and a home gardener, I feel that we as responsible students must try to create and maintain wildlife habitats, beginning in our own back yards. I enjoy planting flowers, herbs, shrubs and trees which are not just ornamental, but which provide shelter and food for animals. For instance, sweet fennel attracts butterflies with its lacy, fern-like leaves. It makes a good nest for larvae and for the following year's inhabitants. Flowers such as honeysuckle, sweet William and verbena help to lure hummingbirds to the protective branches of a dogwood tree where bottle-type feeders hang, filled with specially formulated liquid food. Fruit-bearing pear trees and berry-laden pyracantha bushes provide many meals for our feathered friends. Oaks and hickory trees give forage for squirrels as well as a haven for nesting time. English ivy planted around foundations and tree trunks yields evergreen ground cover and shelter for small animals such as lizards and granddaddy long-legs.

My family also sets out bluebird boxes in open areas. These wooden boxes are built to special specifications in order to discourage predators from taking over the shelter and destroying tiny blue eggs. Since bluebirds are relatives of the woodpecker and can cling to the side of a birdhouse, the boxes do not have any kind of perch — something that most bluebird enemies need for balance.

I believe that students should look beyond their own back yards and try to establish nature parks at school. Garden trails traversing a landscaped area of shrubs and small trees would be inviting to small animals and humans alike. Students could study, think, or just enjoy the beauty of nature while surrounded by flowers and herbs, which are also inviting to wildlife. Students could organize fund-raisers for items such as plants, bird feeders, bird baths, bird houses and wooden benches. They could provide the labor themselves by scheduling group times for the preparation of the park. Clubs could adopt certain areas of the park that they would plant and maintain on a regular basis. This personal involvement on the part of students would help prevent damage to the newly created wildlife habitat.

I believe that as communities expand, they should make real efforts to give back some of the natural habitats that they have taken in the name of progress. Legal restrictions should be placed on residential, commercial and industrial developers so that they do not threaten the present and future of native animals and plants. For each acre of natural habitat that is lost to development, another should be designated in a protective environment.

We must remember that all animals are dependent on some other form of life for their existence. When we kill one type of creature through the destruction of his natural habitat, another animal — somewhere along the food chain — will die. Therefore, we are indirectly killing all animals when we irresponsibly alter wildlife environment. We must be more conscious of the needs of all creatures, not just our own human needs. We must preserve and protect natural habitats for today and tomorrow. Can wildlife depend on us?

— Daniel Jackson, grade 11
West Florence High School, Florence
Harriett Whitlock, teacher

PUMPING UP TROUBLE

After six years of legal wrangling,

the jury remains out on a hydroelectric project

that so far has killed more than a million fish

and cost taxpayers \$125 million.

by Scott Keepfer

It is nighttime, and an ominous rumbling emanates from deep within the concrete bowels of the dam at Lake Richard B. Russell.

The top of the 190-foot-high structure vibrates a bit, as if a giant is awakening.

Within seconds, the water behind the massive dam wall becomes a swirling, churning focal point of activity, fed by a huge turbine near the bottom that sends a stream of water jetting toward the surface. The effect could be compared to holding a fast-flowing garden hose under water in a child's wading pool.

But the Russell pump-back is anything but child's play. As it attempts to harness the potential energy of the Savannah River, each pump turbine moves more water than the Savannah's average flow. If all four units are running, 30,000 cubic feet of water per second will be pumped upstream, more than five times the average flow of this mighty river.

Huge lights pierce the darkness, reflecting off a series of buoys and illuminating a remarkably large fish net that has been lowered and pulled taut amid the turbulence.

"It is a fairly eerie sight," says Jim Parker, of the U.S. Army Corps of Engineers.

Perhaps, but not nearly as frightening as the repercussions of this nighttime activity.

It's "testing time" again at Lake Russell, where the Corps of Engineers' pumped-storage project has raised the ire of officials with the S.C. Wildlife and Marine Resources Department and other conservation organizations, tested the creativity of the Corps of Engineers, and piqued the interest of local folk, whose attentions would only be passing if not for the enormity of the fish kills.

"Yeah, the kills are a big topic of conversation," said George Trammell, who runs Lake Russell Bait & Tackle in nearby

Lowndesville. "Most fishermen are worried about it. I've heard a lot of talk, and I haven't heard anything positive yet. The big question seems to be, 'Why do they keep spending our tax dollars doing this?'"

That's also a favorite query within the wildlife department, as well as among members of the National Wildlife Federation and its South Carolina and Georgia affiliates. Those four groups jointly filed suit against the Corps in 1988 in an effort to block installation of the four reversible pump-back turbines at the dam, centering their argument around what they believed to be inadequate environmental impact research on behalf of the Corps.

The Corps' original Environmental Impact Statement didn't come close to estimating the potential for fish kills, predicting only that "an occasional large fish would be struck by a turbine blade." Buford Mabry, chief counsel for the state wildlife agency, says the Corps should have known better, based on its experiences with the ill-fated Truman Dam in Missouri in the early 1980s.

"During a three-hour test in 1982, they ground up two thousand pounds of fish at Truman," Mabry said. "That created some consternation, and they shut it down."

The pump-back project at Truman has been inoperable since, serving as a reminder of wasted federal monies and the Corps' lack of foresight.

"The money poured into Truman went down the drain, so our stance was that they shouldn't be doing the same thing here," said Trish Jerman, executive director of the S.C. Wildlife Federation. "Now the turbines are just adding insult to injury. Everything negative that was predicted to happen has happened so far."

But Parker, who serves as chief public affairs officer for the Corps' Savannah District, says you can't compare the Russell and Truman projects.

"The pump units are an entirely different design and are located differently in the water column," Parker said. "Truman has a very constricted tailrace, so there's no refuge area for the fish to go to. There were also a lot of bottom-feeding fish there — fish that were actually living inside the penstocks — which is not a real safe place. All in all, I think we learned a lot from Truman."

Says Mabry: "They both grind up fish."



Controversy swirls every time the Corps of Engineers pumps water from Lake Thurmond back up into Lake Russell, a process that generates power but kills fish. A net slung from the tall structure atop the dam, above, lets biologists assess the effects of testing at the facility.

According to fisheries biologist Gerrit Jöbbs, with the state wildlife department, more than a million fish were assumed killed during 45 pump-back tests at Russell between July 1992 and January 1994. Most of these were four- to seven-inch blueback herring and threadfin shad, but an alarming number of game fish up to twenty-eight inches were killed, particularly during spring tests. The herring and shad are important, too, as they provide a chief food source for the heralded striped bass fishery at Lake Thurmond (formerly Clarks Hill Reservoir).

The Corps of Engineers began construction of the Lake Russell dam in 1983, with the first power production coming via conventional generation (one-way turbines) in 1985. Accommodations had been made for the addition of four pump-back units — turbines that pump water from a source below the dam back into an upper reservoir, in this case Lake Thurmond

and Lake Russell, respectively.

Pump-back turbines are economically feasible because they are able to use cheap power during low-demand periods (nights and weekends) and allow the water to be reused for power generation during high-demand periods when electricity is most expensive.

The Corps currently has two other pump-back projects in operation, one in Georgia and one in Missouri. But neither approaches the size of the Lake Russell facility, which at full capacity would be the Corps' largest hydropower project east of the Mississippi River, packing a power punch of more than 600 megawatts.

Initially, it appeared as though the Corps' installation of the four pump-back units would be stopped. A District Court in Charleston agreed with the wildlife department's contention that the Corps had not performed adequate environmental testing. The agency also argued that federal money should not be committed to a project that, like Truman, might never be operable.

"The District Court basically said to the Corps, 'You have not done your required homework,'" recalled Mabry. The Corps appealed to the 4th Circuit Court of Appeals in Richmond, Virginia, which modified the lower court's injunction and cautiously allowed the Corps to proceed with installation of the pump-back turbines. The ruling may have afforded the Corps the opportunity it was looking for, according to Mabry.

"Once you get a steamroller going, it's hard to stop it," Mabry said. "The Corps now argues, 'We've spent all this taxpayer money, so let us go ahead and complete the project.'"



PHOTOGRAPHS BY PHILLIP JONES



During a test run, water gushing to the surface carries fish from the lower reservoir to be collected with a recovery net, then sorted and counted. Excessive numbers of fish — 88,000 in just over an hour — passed through the turbines in the spring of 1993, halting daytime tests.

Now that the pumps are installed, Mabry and state fisheries biologists are still awaiting what they call an “adequate” Environmental Impact Statement. In the meantime, both parties are operating under a court order that includes three phases. Phase I — the mechanical certification of the pump-back turbines — is, for the most part, complete. The current focus is on Phase II — actual, limited testing of the units to determine the environmental impact. (Phase III will be six months of commercial operation simulation.)

Fisheries biologist Jöbsis has been the “hands-on” representative for the wildlife department, teaming up with a graduate student from Clemson University to be present and help monitor activities during the pump-back tests. The student’s stipend is paid by the Corps under the court order, which also requires the Corps to reimburse the wildlife department for all fish killed during testing.

During the initial Phase II test of a single pump-back unit in July of 1992, Jöbsis said an estimated 55,700 fish, 99 percent of them blueback herring, were killed in less than three hours, cutting short the test and sending the Corps back to the drawing board. “That really set things back because of the sheer number of fish involved and the flaws that were very evident in the equipment being used in sampling,” Jöbsis said.

After a brief hiatus, the Corps requested permission to conduct “experimental” testing to try to eliminate or reduce fish kills. Testing began again in March of 1993 but once more resulted in what Jöbsis called “catastrophic” entrainment rates. Entrainment, or the passage of fish along with the water through the turbines, isn’t always fatal. Although some fish emerge in pieces, effectively chopped up by the turbine blades, the result isn’t exactly the “Bass-O-Matic” effect feared by some. But

because of the stress of entrainment — from hydrostatic pressure and sheer forces encountered upon ejection — many of the fish that avoid direct hits by the blades eventually die.

During the tests, which are conducted two nights per month, November through March, and four nights a month from April through October, a pontoon boat attached to the recovery net is anchored behind the dam. Entrained fish funnel toward the boat via the net. Here the fish are collected, sorted and counted. Recent testing has been confined to nighttime hours, which is logical considering that the Corps’ plan calls for more than 90 percent of the pump-back operations to eventually take place during those non-peak hours.

That approach is also in the best interest of the fish. “During the day, blueback herring tend to hug the bottom, so they’re more vulnerable,” Jöbsis said. “There has been far less entrainment at night.”

Because of the high entrainment rates, unacceptable even to the Corps, daytime testing was abandoned following the May 1, 1993, test during which 88,000 fish passed through the turbines during one hour and seventeen minutes’ operation.

Several other steps have been taken to try to cut down on entrainment. Bar grates have been placed in front of the dam to prevent the passage of fish greater than fourteen inches. The Corps has also installed an underwater sound system in an attempt to drive away blueback herring and a light system to attract them to areas away from the turbine openings. The effectiveness of these tactics is still unproven. In all, Parker said the Corps has devoted \$13.5 million to “environmental testing” at the pump-back project, or roughly 11 percent of the total \$125 million poured into the pump-back operation alone. The

total cost of the Lake Russell Dam project is approaching \$600 million, Parker said.

But even if fish were passed into Lake Russell completely unharmed, there would still remain some serious questions, according to Val Nash, the wildlife department’s chief of freshwater fisheries.

“Even if they do survive, what about the movement of that many fish from one impoundment to another?” Nash wonders. “What are the effects of suddenly putting a large biomass into a lake that has an established fish population? It could cause problems by giving an edge to the introduced species, and it doesn’t do much to help the trout fishery Georgia DNR is trying to establish in Lake Russell.”

Fish entrainment at Lake Russell is inarguably increased by the simple location of the dam. The structure blocks the main artery of the Savannah River, effectively cutting off the migration route for spawning fish such as striped and hybrid bass and nongame fish like blueback herring and threadfin shad. Fish are attracted to the area by the influx of cold water and the presence of oxygenated water produced above and below the dam.

But Parker said the Corps believes the fish entrainment situation can be remedied and the project eventually brought into full operation.

“We are diligently working on systems that we believe will protect the fishery,” Parker said. “And we have stated, unequivocally, that we will not operate the project unless it can be done in an environmentally safe manner.”

Parker admits the Corps was a bit unreceptive to both public and private outcry in the beginning but has since changed its thinking.

“We may have misread the concerns of the agencies a bit earlier, and we should have used a consensus approach earlier by holding meetings and workshops,” Parker said. “But that’s what we’re doing now. Our partnerships need to be productive and there has to be productive criticism. We felt it was important to get into a partnership with the wildlife agency rather than sling words across a courtroom.”

However, there seem to be two distinct entities with two distinct agendas — one focusing on protection of a resource, the other on production of power. Could ever the twain meet? Perhaps.

Although state fishery biologists and scientists from the Vicksburg, Mississippi-based Waterways Experiment Station — the research arm of the Corps of Engineers — aren’t always in full agreement, be it on problem-solving, calculating dead fish totals or any other of the myriad questions arising from this vast project, they are at least willing to discuss and debate in the ultimate pursuit of agreement.

“We’re not against the Corps running that plant’s pump-back turbines,” Nash said. “We’re just there to make sure it’s done as they promised, in an environmentally safe manner.”

Mabry concurs.

“The bottom line is that if a federal agency proposes to take action that adversely impacts our natural resources, they’re supposed to tell the people — and Congress — before they get the taxpayers’ money to do it.

“Are we just putting off the inevitable? Maybe . . . maybe not. Maybe they can demonstrate that they can operate in an environmentally safe manner. And if they can, more power to them.”

Scott Keepfer is an Upstate outdoor writer.



WILD SIDE OF THE GRAND STRAND

While enjoying the sun, sand and surf, more vacationers are discovering the natural world just a shell's toss from Myrtle Beach's main drag.

by Glenn Morris

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What's really wild on the Grand Strand isn't neon, nor is it what you find when you hit an errant fairway wood. (Although golfers in the rough do see more native birdies!)

Just off the beaten cart path or boardwalk, within easy commute of the Myrtle Beach amusement park, alligators bask like beached logs on muddy flats and foxes slip quietly through the coastal plain thickets. That's not all — bald eagles nest in a state park and bears prowl nearby Lewis Ocean Bay, one of the state's newest and largest heritage preserves. South Carolina's most popular tourist destination is a very "wild" place indeed.

Close encounters of the natural kind can surface in an unexpected manner, in places unexpected simply because those places are here, in the Grand Strand. Surprised? Thankfully, there are havens that jar the illusion of civilization declared by rows of beachfront hostelries and championship courses.

TED BORG

Tourists hooked on the Grand Strand's commercial attractions little suspect that they're also visiting the Lowcountry home of abundant wildlife. Watchful travelers on less-frantic byways are sure to spy wading birds like great and snowy egrets or the green-backed heron below; grey foxes may be more elusive. Alligators bask regularly in the freshwater habitat of Huntington Beach State Park (pages 20-21).

That it's wild out here is old news to Steve Roeff, naturalist at Huntington Beach State Park, just south of Myrtle Beach. Wildlife becomes familiar, and familiarity, while not necessarily breeding contempt, sometimes engenders a casual assumption of "no problem, see-'em-all-the time." But it's the ones you don't see that can be startling. So when the youthful Maryland native (his home is the Eastern Shore) begins to reach into the rising

tidal waters beneath the park boardwalk to retrieve a small fish trap, he hesitates, recalling something he saw earlier beneath the pier: a four-foot-long alligator.

The gator bobbed to the surface beside the boardwalk during Steve's estuary interpretive talk, floating in the lazy, lagging, proprietary manner that seems prevalent in large-toothed reptiles. The marble-like eyes and nostrils breached the surface, the shadowy body fading in the turbid creek. It looked toward the boardwalk with a reptilian objectivity as if measuring the yardage to the nearest visitor, then slowly sank out of view.

Not out of mind, however. Even though most of a four-foot-long alligator is tail, there's enough at the other end to be concerned about, so Roeff rethinks sticking his personal handful of snacks into the water. Instead, he snags the line with a hooked stick, hauling in the minnow trap.

"I almost forgot who was down there," he admits. "There was one on the causeway that was about twelve feet long earlier today, just on the other side of the fence. Just hanging out."

"Where?" I query, casually.

"At the turnout, as you turn onto the causeway. It was lying in the grass. Big gator."

Well, somebody tipped off the critter; it was gone, leaving behind a wallow of crushed grass the size of a rowboat. This was just the one that got away. Before the end of that particular three-day foray along the Grand Strand, four more gators, a gopher tortoise, several deer, a fox, two fox squirrels, a nesting osprey, four bald eagles, a dredge-full of cannonball jellyfish, one shell-backed crab, a brittle sea star and a flock of ibises would pass for review. We heard a pileated woodpecker, too, but never saw it.

In short, more than sunbathers can be sighted at the Grand Strand if you know where to look.

More astute observers than I can confirm the fact that some of the nation's most prestigious and rare guests return to the Grand Strand each year, albeit to wallow in the mud, tuck eggs in sandy depressions or move ghostlike through the piney woods. The place can be packed with wildlife that is hoofed, furred or feathered — and doesn't travel by RV or motorcycle.

A stone's throw from the busy Huntington Beach State Park entrance, high in the top of a towering loblolly pine, is a nest where two youthful bald eagles successfully took to the wing last year.

Nearby, least terns swoop and plunge above the tidal creeks of



PHILLIP JONES

PHILLIP JONES



Murrells Inlet, later in the year to deposit their fragile eggs atop undulating sands of an off-limits-to-people secondary dune field.

In fifteen minutes a wayward gull could fly west of Myrtle Beach to be above woods so thick that a dog has to back up to bark. A map from the early 1800s labels the tangle Impassable Bay, which is more a declaration than a name. These “woods” sidle up to the western side of the Atlantic Intracoastal Waterway, a barrier so effective it might as well be as wide as the Atlantic itself. If you did cross it, you would be in Lewis Ocean Bay Heritage Preserve and you might not get very far, either. This is not necessarily a place to visit in the “Let’s-go-for-a-stroll-in-the-natural-area” sense of an outing, but it’s an invaluable spot for wild things, both flora and fauna. This is where people-shy black bears have been seen. Are they resident? Who would know in this tangle? It’s thick enough and large enough to swallow a parked bus, let alone a peripatetic bruin.

More immediately evident in Lewis Ocean Bay is the unusual coastal plain vegetation. Multiple soil and water combinations, from dry pine uplands to dense, very dense, swamp thickets, sustain a variety of rare and endangered plants. The isolation, near-desolation and roadlessness act like a security fence. It’s

disorienting and there are few landmarks, but it won’t remain that way.

According to Steve Bennett, inventory coordinator of the S.C. Wildlife and Marine Resources Department’s Nongame and Heritage Trust Section, which manages the preserve, future plans call for an interpretive center as funds become available. On a recent visit, hoofprints in the sandy roads hinted at four-legged visitors, and tire marks betrayed a person’s passing through, but there were no other sign of humans’ intrusion, no sound but the calls of birds and insects. This close to Myrtle Beach, that’s eerie.

Still, it’s a treasure of a preserve that will be increasingly important as a refuge as the coast develops further.

The closer you look, the more you’ll discover that there’s still a bit of wilderness out there that’s more convenient. At the very least, you’ll find multiple environments nearby with a fragile grip on “wild.” The several parks, preserves and waterways in Horry and Georgetown counties are windows on the natural world that also let you peek into the region’s past. Because of these places, that past is ever present; what you see is what has been, with a little modification, for a very long time.



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The Grand Strand — sixty or so miles of coastline in Horry and Georgetown counties between the Little River inlet at the North Carolina line and Winyah Bay — is singular in the Southeast for several reasons. Most noticeably, there are no offshore islands and only two other “deepwater” inlets south of Little River (before Winyah Bay), Murrells Inlet and North Inlet in Georgetown County.

Coastal geologists refer to this length of coast as the arcuate strand, a gently curving, gently sloping edge where land greets sea. The resort cities of North Myrtle Beach, Myrtle Beach, Surfside Beach and Garden City, all in Horry County, are built on top of an ancient barrier ridge dune system that may have been part of an “offshore” island system, 100,000 years ago.

Behind this seemingly solid, though sandy, two-county ocean front lies a remarkable wetlands network that includes swamps, forbiddingly dense marshy coastal plain forests and an extraordinary watery network formed by the confluence of the Black, Little and Great Pee Dees and Waccamaw rivers. These rivers edge very close to the ocean front near Murrells Inlet in Georgetown County, and, since the 1930s, the Atlantic Intracoastal Waterway has linked this system with the Little River in northern Horry County. Essentially, along the Grand

Strand, you have salt water east and fresh water west.

This unique geography shaped the culture of the area right down to the nearly inexplicable line between the counties. The boundary, which otherwise flows with the natural river and creek bends, suddenly follows a straight line to the Atlantic Ocean just north of Murrells Inlet from midstream in the Waccamaw River. It’s the only straight segment between the two.

South of that boundary, the tidal influence of Winyah Bay could be (and was) harnessed to grow rice in a flourishing plantation agrarian economy. During the 18th and 19th centuries, the rice plantations made Georgetown County one of the

wealthiest regions in the world. Horry County, configured with tangled upland swamps and forests, too wet for cotton and too dry for rice, remained an isolated, sparsely populated region, “the independent republic of Horry” through the Civil War — even Sherman avoided marching through its wetlands and bays.

By the turn of this century, many of the huge Georgetown County plantations had been purchased intact as winter retreats or hunting resorts for wealthy Northeastern industrialists. Traditional planter beachfront retreats such as Pawley’s Island gained greater desirability as summer places. To the north, in Horry County, many of the swamps became timber plantations, while the beachfront property fell to steady subdivision as small parcels.

What is most important here is the present-day survival of several large landholdings in both counties as public parks and reserves or privately owned preserves that are living laboratories of coastal plain ecology managed for the wild things in residence.

Among these are, of course, the obvious and most accessible places such as the two state parks, Myrtle Beach and Huntington Beach, and the influential, privately managed

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History blends with nature near South Carolina's coastal resorts. Dirleton, former home of publisher Thomas Samworth, now houses the center of operations for Samworth Wildlife Management Area (facing page), while Brookgreen Gardens, showplace for the works of sculptor Anna Hyatt Huntington, hosts thousands of visitors wishing to enjoy art and outdoor wonders at the same time.



public attraction, Brookgreen Gardens. This complex's famed sculpture-lined paths balance against its large natural habitat areas where wildlife-watchers can observe native flora and fauna.

But Brookgreen's more than 9,100 acres are dwarfed by the 17,500-acre Hobcaw Barony, once the home of Belle Baruch, who constructed a home, Bellefield, named after one of the ten rice plantations that compose the property. Hobcaw means "between the waters," and nearly everything you see south and east of the US Highway 17 bridge crossing Winyah Bay is part of Hobcaw. The landmark for this refuge is the low-key Bellefield Nature Center on the east side of US 17 just north of

the Winyah Bay bridge. It serves as a taste of this immense tract, offering programs on the history of Hobcaw and the coastal research conducted on the property by both Clemson University and the University of South Carolina.

Offshore from Hobcaw and south of North Inlet is North Island, which forms the headland to Winyah Bay to the south. The island is part of another piece of the preservation puzzle, the Tom Yawkey Wildlife Center. This tremendous gift, willed to the state wildlife department in 1976 by Tom Yawkey, former owner of the Boston Red Sox, lies on both sides of the bay. Consisting of North Island, South Island and Cat Island, the

Perhaps nothing contrasts more sharply with the Grand Strand's bustling Ocean Boulevard than the placid expanse of the Waccamaw River. One of several waterways that snake across the coastal plain toward the ocean, the Waccamaw meanders through Horry County to empty with the Pee Dee, Sainpit and Black rivers into Winyah Bay at Georgetown.



MICHAEL POSTER



PHILIP JONES



PHILIP JONES

Guided educational tours unveil a side of the Grand Strand unknown to most vacationers. Capt. Sandy Vermont (above, in red, with Brookgreen Gardens president Gurdon L. Tarbox) salts natural history lessons with local lore as he leads excursions from Georgetown's docks. Capt. Dick's cruises out of Murrells Inlet allow school groups and families to explore beach and saltmarsh habitat up close.

20,000-acre complex of marsh, old rice plantations, barrier island and uplands is a state heritage preserve, endowed by Yawkey's will and managed as a sanctuary for game and nongame wildlife. Yawkey Center is accessible only by boat, and visitation is limited to tours scheduled well in advance, although boaters may enjoy the beach areas only of North and South islands.

You must combine any stop at these preserves with time on the knot of rivers flowing into Winyah Bay or the tidal creeks of Murrells Inlet. To investigate these waters is to explore simultaneously the natural and social history of the Grand Strand. For, as these waters have ebbed and flowed, so have the fortunes of those who lived beside them.

Murrells Inlet, a labyrinth of tidal creeks, is a fragile nursery that fuels a traditional, independent way of coastal life — fishing. Its waters seethe with creatures in all stages of development, that live at all depths of water, that fill all of the many benthic and tidal niches. As an estuary, the waters of Murrells Inlet are nothing if not wild below the surface, but you

need a boat, specialized equipment and even an instructor to weave the living “dots” collected from the waters into a coherent web of life. Pair an interpretive talk at Huntington Beach State Park (South Murrells Inlet close to shore) with a guided saltmarsh explorer cruise from Capt. Dick's Marina. Both are seaside enrichment.

Similarly, you can only see the world of wildlife left behind by the rice plantations from the cross-stitched creeks and rivers where the Pee Dee is siphoned into the Waccamaw north of Georgetown. Such cruises are unavoidably “behind the scenes” and offer perhaps the only way to glimpse historical legacy engendered by the waters themselves. You will miss the rich social history unless you take a guided ride, for in most cases what you will see at places like White House Plantation or Dirleton is far less than you can hear while in the company of a Lowcountry resident. From Georgetown, Capt. Sandy Vermont operates such excursions, also providing transportation downriver to Tom Yawkey Wildlife Center. The plantations remain relatively silent otherwise.

While you can't shag to the call of a tanager or boogie to a

plover's plaintive cry, they are beach music nonetheless, songs that have turned ears for many generations. Long before neon lit the strand there were nightly glows along these shores, twinklings in the tops of moss-draped trees, the firefly show.

It was that time of evening when I checked into a small Murrells Inlet motel during one of the busier weekends last year. Myrtle Beach was packed to brimming and I was spillover.

“I got the same crowd of bikers I've had for years,” declared Earnestine Russell, handing me a registration form — my trip coincided with the annual Harley-Davidson assemblage. I registered while she continued.

“They rent the same rooms every year and they know my rules. They're down at the far end, and I think you'll be pleased. It's never too wild down here.”

Which is how I found the Grand Strand during my visit: never too wild. As a matter of fact, it's just as wild as you need it to be, a little or a lot. 🐾

Glenn Morris is a free-lance travel and outdoor writer from Greensboro, NC, and the author of North Carolina Beaches: A Guide To Coastal Access.

Where the Wild Things Are at the Grand Strand

■ **Lewis Ocean Bay Heritage Preserve.** Nearly 9,300 acres between SC Highway 90 and the Atlantic Intracoastal Waterway west of Myrtle Beach. Carolina bays and the unique plant communities within and surrounding them afford opportunities for hiking, birdwatching and nature study. Contact the Nongame and Heritage Trust Section, S.C. Wildlife and Marine Resources Department, P.O. Box 167, Columbia, SC 29202; (803) 734-3893.

■ **Myrtle Beach State Park.** 312-acre multiple-use park offering beach access across from the Myrtle Beach Air Force Base property. This grand old Civilian Conservation Corps park features a self-guided interpretive walk, the Sculptured Oak Nature Trail, which provides an introduction to the flora and fauna. Park interpreters also conduct daily programs on the natural history of the Grand Strand. Contact Myrtle Beach State Park, US 17 South, Myrtle Beach, SC 29577; (803) 238-5325.

■ **Brookgreen Gardens.** 9,127-acre preserve featuring a formal sculpture garden, but way out in front with interpretive programs showcasing the flora and fauna of the coastal plain. The wildlife park features an education center, a bird sanctuary, a raptor aviary and a white-tailed deer savannah, among other wildlife exhibits. Daily programs for adults and children focus on resident creatures. Contact Stuart Dudley, Director of Education, Brookgreen Gardens, 1931 Brookgreen Gardens Drive, Murrells Inlet, SC 29576-5101; (803) 237-4218.

■ **Huntington Beach State Park.** 2,500 acres, once the oceanfront property of the Huntington Estate. Campsites and interpretive programming on the ocean and saltmarsh boardwalk. Excellent birding. Huntington Beach State Park, Murrells Inlet, SC 29576; (803) 237-4440.

■ **Hobcaw Barony.** 17,500 acres that's an educational preserve with limited visitation. Tours to Bellefield House are scheduled one day a week, usually Thursday, on a first come, first served basis. Bellefield Nature Center is open daily, 10-5 Mon.-Fri.; 1-5 pm Sat. Contact The Bellefield Nature Center, P.O. Box 1413, Georgetown, SC 29442; (803) 546-4623.

■ **Tom Yawkey Wildlife Center.** 20,000 acres south of Georgetown. One-half day field trips once a week beginning in the afternoon; limited to fourteen participants. To make reservations, contact Robert L. Joyner, Project Leader, Tom Yawkey Wildlife Center, Rt. 2, Box 181, Georgetown, SC 29440; (803) 546-6814.

■ **Murrells Inlet.** Saltmarsh Explorer Cruise, a 2.5-hour ecologically minded tour of Murrells Inlet where you sample organisms of the different habitats within Murrells Inlet. Captain Dick's Marina, P.O. Box 306, Murrells Inlet, SC 29576; 1-800-344-FISH.

■ **Waccamaw River/Winyah Bay.** These tours blend the history and culture of the rice plantation and riverfront economy while cruising the river. Excursions to barrier islands for shelling as well. Captain Sandy's Tours, 725 Front Street, Georgetown, SC 29440; (803) 527-4106. Conway Marina and Campground, 4 Elm Street, Conway, SC 29526, (803) 248-4033. 🐾

Finding the Right Resort

You can easily find resorts perched on the edge of golf courses or lined with a bank of tennis courts. You might even be able to locate lodging with a health spa where you can be packed in mud, fed wild nuts, and made to row for hours on a boat that goes nowhere. (Although many outdoorsmen might have done those things at one time or another, they certainly didn't pay extra for the experience.) The trick is to find a resort that caters exclusively to the outdoorsman . . .

For starters, most hotels are located where outdoorsmen don't want to go, such as in large cities or near airports. When was the last time you got lost, came to the end of a gravel road, slid into the ditch, got stuck, then looked up to find yourself in front of a Marriott?

Most hotels are far too upscale for the average outdoorsman on safari. You can tell you're in the wrong place if the bellboy takes one look and tells you to drive around back to pick up the garbage.

Hotel chains even offer the wrong kinds of niceties to attract the average outdoorsman. For example, bathroom accessories usually include things like soap, shampoo and lotion. You never check in and find free samples of Buck Lure, Fish Formula and Deet.

Some modern hotels seem to go out of their way to remind you of your problems. The cable TV offers around-the-clock updates on world disasters, then first thing in the morning they personalize the news by sliding the bill under your door. What I'd really like is for my bill to be mailed home and a fishing forecast slipped under the door.

These same hotels provide plastic bags for overnight laundry service. Just once I'd like to drop my baitcaster in one of those bags to see if someone would oil it, pick out the backlashes, and return it with new line.

Even hotel food seems designed for someone other than

outdoorsmen. Most of their menus have little symbols indicating "Heart Healthy" foods; what we really need is a symbol for foods that counteract the gastronomic disorders associated with eating out of cans for extended periods.

If you think about it, most hotels are planned for people who consider their lodging a key part of their vacation. Outdoorsmen, on the other hand, usually just come to hunt, fish, and otherwise stomp around. Most, in fact, would consider it a luxury to have over their heads a roof that doesn't leak.

Shuttle service from the hotel to the airport is a frivolous waste for outdoorsmen, who have no desire to go to an airport. Of course, it might be great to have hourly shuttle service to the bait shop.

Perhaps hotels could trade in their vans for four-wheel-drive vehicles with CB radios. Then, instead of carrying you to and from the airport, they could be winching you out of the mud.

Outdoorsmen are actually discouraged from staying at most hotels. Some establishments have policies that downright discriminate against us, rules such as "No dogs," or "No waders in the lobby." I once stayed in a hotel that had a sign in the room that read, "Don't clean birds in the bathtub."

Luckily, it was fishing season. I have since noticed that they now advertise scales in every bath.

Now, if a resort were to cater to outdoorsmen, it would stay booked and be outrageously profitable, mainly because outdoorsmen are so easy to please. Designing the ideal outdoor resort, therefore, would actually be quite simple.

For starters, the perfect outdoor resort would be cheap. A high-class place may pay someone to turn the sheets

Good hunting and fishing resorts are more scarce than pigs with pilot's licenses.

by Jim Mize

down for you, but at \$14 a night, I'll bet you'd be willing to unzip your own sleeping bag.

The ideal hotel would be off the beaten path, so obscure you would never see a celebrity there, unless you include in this category the Orkin Man.

For sure, it wouldn't have a computer. Most hotels spend exorbitant amounts on systems that track your stays, credit them to an account, and after a certain number of visits are accumulated allow you to cash them in for free lodging. These people don't understand human nature. Anyone spending that much time lounging around a resort needs to be kicked out and sent back to work before he loses his job.

Some slick marketers are beginning to recognize the need for resorts in the outdoors, so be on the lookout for impostors. Just recently, I heard one hotel trying to jump on the bandwagon with a radio ad aimed at outdoorsmen. You might have heard it, too. It ended with, "C'mon by, we'll leave the bug zapper on for ya'."

It's a dead giveaway when these hucksters call their rooms by fancy names to disguise what they really are. For example, a "bungalow" is a cabin so small your Lab couldn't turn around in it. If they call it a "lodge," then there's probably no heat. And if they offer you a "loft," they've rented all their rooms and are putting you upstairs at the local fire department.

When they advertise double beds, this implies you get a mattress *and* box springs.

Individual climate control? Another fancy phrase they use. All it means is that the windows aren't nailed shut.

Usually pretty reliable, travel guide books won't always help. One resort I looked up had a puzzling little symbol by it that looked like a "plumber's helper." I didn't know whether that meant each room came equipped with one

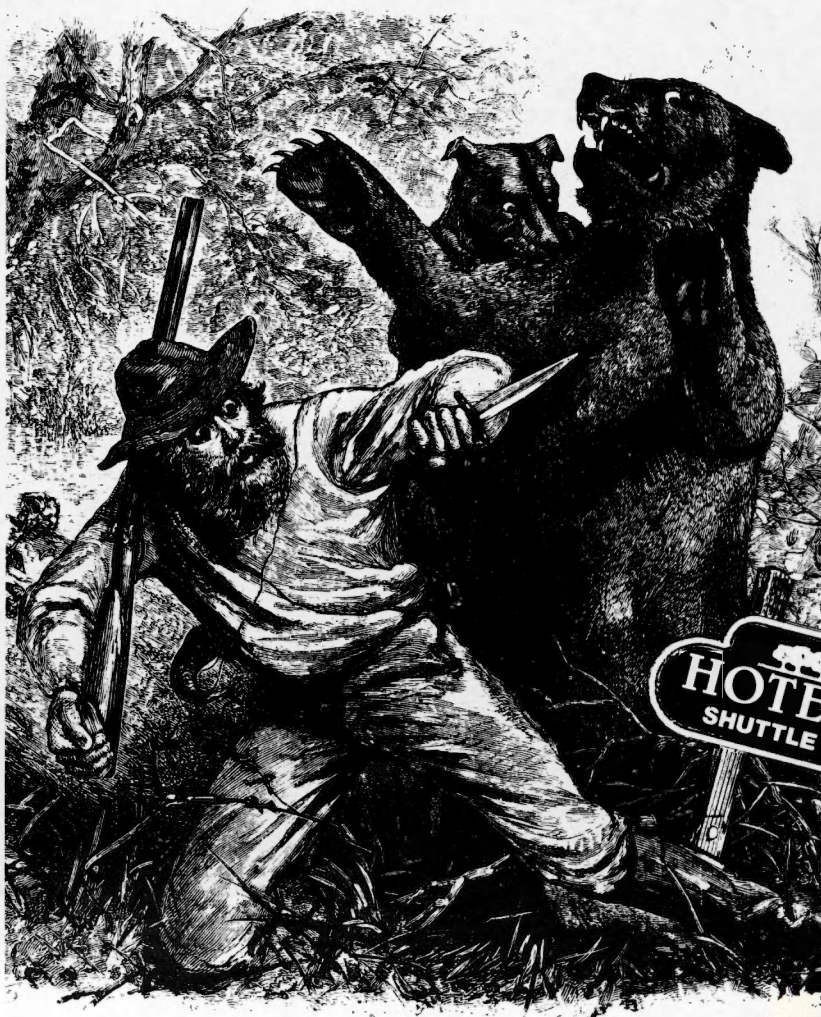
or that guests should bring their own.

Since it was the only hotel near the lake I wanted to fish, I booked a room there anyway. What a mistake. At check-in, I requested a wake-up call and the clerk handed me a rooster. Evidently I looked hungry because he also asked for a deposit.

Probably the only way you can screen out unacceptable resorts is to ask the proprietor if he likes to hunt and fish. If he says "Yes," then you'll know the food, room and services are designed to suit an outdoorsman's tastes.

Of course, you can also bet that on any opening day, his inn will be closed. 🐷

Jim Mize is an Upstate outdoor writer often mistaken for the Orkin Man, probably because of the company he keeps.



PACKING LIGHT



Featherweight materials and lithe designs have eased the burdens and boosted the fun of backcountry camping.

by Bart Stidham

photography by Michael Foster

W

ith more than three hundred hiking trails lacing the Palmetto

State's parks, forests, preserves and other public lands, more South Carolinians are discovering the simple pleasures of backpacking and primitive camping. If you've never tried 'packing, now is as good a time as any to start, and if it's been a few years, there are some new incentives to resume.

In the last decade and a half, the greatest obstacle to backpacking — weight — has been largely overcome by a new generation of gear. From stoves to sleeping bags, flashlights to food, tents, packs and everything inside, weight is down; comfort and functionality are up. Consider:

Jones Gap's shady trail beckons, and Kim, a relative newcomer to the sport of backpacking, has done her homework. Over the last several months she's lengthened her outings to get in shape for a weekend trip. She's talked with hiker friends and read *Backpacker* magazine's annual gear review issue. If she likes the new pack she's rented for this trip, she'll buy it when she returns.

Andy's an "old pro." Although he hasn't been backpacking in several years, he's assured Kim he'll give her any tips she needs. He's had his external-frame pack since 1980; it's filled with gear of the same vintage and weighs a little over forty pounds. He carries half the food, his sleeping bag, the stove, assorted other gear, and his clothes. The load on his back looks cumbersome and heavy.

Kim's new pack is black and pink, and she shoulders it with ease. It weighs less than thirty pounds, even though she's carrying her half of the food, her sleeping bag, clothes, and the whole tent.

They exchange remarks about the other's boots. Hers "look like they belong in an aerobics class"; his "look like they're left from World War II."

Two hours later, at their campsite, Kim begins setting up the tent. "Stake down that corner, and we'll have this up in a minute," she says, responding to Andy's offer to help.

He looks skeptical. A minute? And this thing weighs less than four pounds? The tent goes up quickly and easily, and even Andy is impressed. Maybe there is a revolution at hand.

While new backpacking gear won't make you an old pro, it can make life a whole lot easier on the trail. Many features of outdoor equipment have changed, with comfort and ease of use the result.

Perhaps the most significant change has come to the center of the sport, the backpack. In 1980, most backpacks had an external frame. While these packs weren't too heavy, they lacked comfort. The external frame tended to shape your body to it, instead of the reverse. They were also prone to shifting radically at the worst times, like right in the middle of crossing a creek. Most backpacks are now ergonomically designed internal-frame models in attractive colors and designs — they're hip, and they won't kill yours.

Today's backpacks are not only light and comfortable. Many are also modular, allowing them to be used as easily on a weekend trip as on a week-long outing. This comfort was achieved by totally redesigning the pack. Some feature frames made of carbon composites and high-strength plastics that have been permanently formed to match the shape of a person's back. These materials flex as the wearer moves, making surprise shifts unlikely. Good-quality backpacks now cost between \$150 and \$300, with some excellent designs at the low end of this range.

Manufacturers also finally learned an interesting thing about us — men and women have different shapes. Backpacks of the past were designed to fit men. Several modifications have been made to allow greater comfort for women. In addition to being smaller in size, these packs have frames and suspension systems designed for the female body. Kelty, Lowe, and Gregory were leaders in this new era, but other manufacturers have followed suit.

Stoves are now lightweight, too, as well as being much safer and easier to use. The lightest stoves burn white gas and feature a modular design. The stove's pump screws directly into a standard spun-aluminum fuel storage bottle, making it also the fuel tank and eliminating the need for refilling the stove after every meal. Most stove designs accommodate different sized bottles. This means you can take a small bottle for a weekend and one or more large bottles on longer trips.

Several new stoves use bottled gas in small containers. One of the nicest of these is the MSR Rapid Fire, which burns IsoButane. Cooking with the Rapid Fire is as easy as cooking at home on a gas stove or grill. Plug in the cartridge, turn on the stove and light it. It adjusts easily and can both boil water rapidly and cook (not burn) pancakes, a range of heat levels not achieved by most backpacking stoves.

The Rapid Fire itself costs less than white gas stoves, but the price of its fuel will tip the scales in favor of white gas after a number of trips. Today's stoves range in price from \$38 for the Rapid Fire to \$80 for the top-of-the-line white gas model. Most weigh less than two pounds with a full fuel bottle.

If sleeping on the ground makes the Holiday Inn more inviting than the great outdoors, you owe it to yourself to try a sleeping pad. Getting a good night's sleep makes any camping experience better, and a good pad is critical to comfort and also

Roughin' it, '90s-style, is a far cry from what it used to be. Tents and sleeping bags, backpacks and boots, stoves and water-treatment kits and filters — all have been slimmed down and made lightweight, a breeze to carry into the great outdoors.

insulates the sleeper from loss of body heat to the ground. Sleeping pads come in all thicknesses, shapes, sizes, colors and forms.

Try before you buy. If it's not comfortable on the concrete floor of the store, it's not likely to improve much on uneven ground.

Many people find that self-inflating pads are more comfortable than foam pads. If you opt for a foam pad, make sure it's made of closed-cell foam, which won't absorb water. Foam pads cost about \$15 while self-inflating pads cost \$45 to \$65. In addition to being inexpensive, foam pads also weigh less.

Sleeping bags have been steadily improved over the years. Man-made fibers are rapidly catching up with natural down in their ratio of insulation value versus weight. A down bag, however, is still hard to beat in terms of packing size and insulation — provided it doesn't get wet. Unlike down, artificial fibers retain much of their insulating ability when damp, a condition fairly common in South Carolina and the Southeast.

Several different man-made fiber types are competing in the outdoor market, including Quallofil, Hollofil II, Microloft and Thinsulate. Unless you plan on making extended trips where weight is critical and need a sleeping bag rated below 15 degrees Fahrenheit, Polarguard is still the best value for the money.

Most people consider semi-rectangular bags to be more comfortable in warm climates than mummy designs. Some bags of this type now offer "double-zone" design. One side of the bag will have more insulation than the other, offering a cooler bag in warm weather and a warmer bag in cool weather. If you plan on doing any late fall camping, consider a bag rated to 10 degrees Fahrenheit; otherwise 20 or 25 degrees should be sufficient. For trips in cold weather, a bag liner can be added to the 20-degree bag, lowering its rating another 10 degrees. Bags in 10- to 20-degree range weigh between three and four pounds with more expensive bags weighing less.

Some sleeping bags can be converted into two-person bags by zipping in a doubler. This is a great way to save weight when traveling with a "significant other." A doubler is simply a nylon section twice the width of the bag with slots for sleeping pads. Since most pads offer more insulation than the bag and are



much thicker, this system works well and saves additional weight. You will need two matching, full-length sleeping pads to use with your doubler.

Tents are now stronger, lighter and easier to put up. Unlike the Erect-O-Set puzzles of the past, most new designs feature clips and shock-corded poles. Sierra Designs started this revolution with the Clip Flashlight, but other manufacturers such as Eureka have followed suit. The poles basically erect themselves when taken out of their bag, and the tent clips to them.

Older tents took as long as thirty minutes to set up. Plan on spending two to five minutes erecting your tent once you have learned its pattern.

Most tents are now computer designed and tested in wind tunnels. (They hold up much better in storms, but they haven't solved the problem of finding the perfect campsite!) Many two-person, three-season tents weigh four to five pounds and cost less than \$150. If you plan on doing most of your camping in the warmer months, look for tents with good ventilation and detachable rainflies. This will allow you to sleep bug-free and cool on clear nights. The Eureka! Timberlite or Clip Cirrus, the Kelty Windfoil Ultralight and Sierra Designs Clip Flashlight are all good values for Southeastern spring, summer and early fall camping.

With all the weight savings in new gear, today's backpackers can carry more food — real food. Many people now prefer to carry and cook plain old grocery store items. While this is certainly an option, today's dehydrated foods offer several advantages. Dried preparations can save a tremendous amount of weight, even on a weekend outing. In addition to being lighter, many meals can now be prepared in their pouches, eliminating the need for a big heavy pot. You will need something in which to boil water, but a single aluminum pan will do.

The best news is that dehydrated food is now much tastier. While there are still some disappointing meals out there, most are quite good, and some are excellent. Expect to pay about as much as you would for a meal at a fast-food restaurant.

Naturally, water continues to be as heavy as ever, but our wet climate usually means that you won't have to carry too much too far. In the past you either had to carry all you planned to drink or live with the taste of chemically treated water. Water filters now offer a safe and good-tasting alternative. Several companies have recently developed portable water filters that can safely and quickly treat stream water. Make sure that the brand you choose removes *Giardia*, the most common cause of sickness for backcountry travelers.

Another option is to chemically treat your water and then remove the chemicals. The CI → OUT® Wand removes chlorine and iodine from water and both costs and weighs less than water filters. This is an especially good option for short trips when you don't want to lug along a filter. The wand costs \$25 and has a storage compartment in the handle for water purification tablets.

Clothing should be light and layered. Avoid cotton fabric in all but the warmest weather. Wool is still your best insulator, wet or dry, and can be worn over synthetics that wick moisture away from the body. Windproof rain gear is now extremely light and often packs into its own pocket for carrying ease when not needed.

Last but not least, boots have slimmed down as well. While all-leather boots still exist, their features have been combined with those of running shoes to create a more comfortable fit. The typical boot is now mostly nylon and plastic, weighs much less than older leather models, and is less likely to give you blisters. Breaking in a pair takes only a few days, not weeks. Models are also available that are lined with Gore-Tex and other waterproof/breathable materials.

All these advances have affected the cost of the products. Prices of some items like stoves, packs and boots have fallen, but others have risen. All in all, prices have remained about the same for a complete outfit for backpacking, but you get much more value and function for your money.

Getting involved is the best way to gain experience. Hiking and backpacking are great exercise as well as a good way to meet people. South Carolina has a number of active outdoor groups, including the Boy Scouts of America, the Sierra Club, the Audubon Society, the Foothills Trail Conference and others. Most of these groups also offer free education classes and outings, in addition to sharing knowledge at monthly meetings. Many retail stores also conduct outings and workshops, usually for a nominal fee — check the Yellow Pages.

Backpacking is a relatively safe sport, but it can be strenuous, so consult your physician before heading out.

Today's lighter gear makes it a lot less work than ever before, and that can double your outdoor fun! 🐾

Bart Stidham is a professional outdoor instructor who has worked for numerous organizations including the National Park Service.

A UNION FOR STEWARDSHIP

On the eve of the DNR's formation, South Carolina Wildlife magazine's editors and writer Dot Jackson talked with the new agency's leaders about the issues they and their staffs face.

One of the earth's most extraordinary treasures lies at the hand of every South Carolinian.

This treasury holds marshland and cropland and mountaintops, lush grain fields alive with whistling wings, game-rich scrub and timberland, thriving shellfish nurseries, pockets of rare native plants and untouched woodland, abundant good water, geological wonders and mineral wealth, bountiful freshwater and saltwater fisheries, vast lake and river systems, and trout streams glittering like tinsel through rhododendron shade.

The caretakers of these diverse riches have a never-ending job. So do those who oversee the investment of resources for the public good, and for posterity.

From the days of the Chief Game Warden's Office, set up in 1910 as the first of South Carolina's resource management and protection entities, agencies have been spawned and expanded and divided to serve specialized areas and needs.

Come July 1, a massive restructuring project will bring several of these departments and their scientists, planners, educators, lawmen, technicians, office workers and other staff members — a total of 898 employees — together under one commodious umbrella called the South Carolina Department of Natural Resources, or DNR.

Joined within the new agency will be the current divisions of the S.C. Wildlife and Marine Resources Department, along with portions of the Water Resources Commission, Land Resources Conservation Commission, Geological Survey and Mapping and Geodetic Survey, and the Migratory Waterfowl Committee.

James A. Timmerman Jr., the Director Designee, and his key staff discussed their thoughts and ideas on the challenges faced by the new DNR and the ways these will be addressed . . .

James A. Timmerman Jr.
DIRECTOR DESIGNEE

Restructuring is a positive step. Of course, any change as major as this one brings challenges, but more importantly, it offers opportunities. We're going to pool our strengths and work out our differences during transition.

A team of division directors from all agencies involved has been working for nearly a year to identify the new DNR's priorities. We have also been meeting with groups representing various recreational and conservation interests, seeking their ideas about the mission of the new agency and its focus.

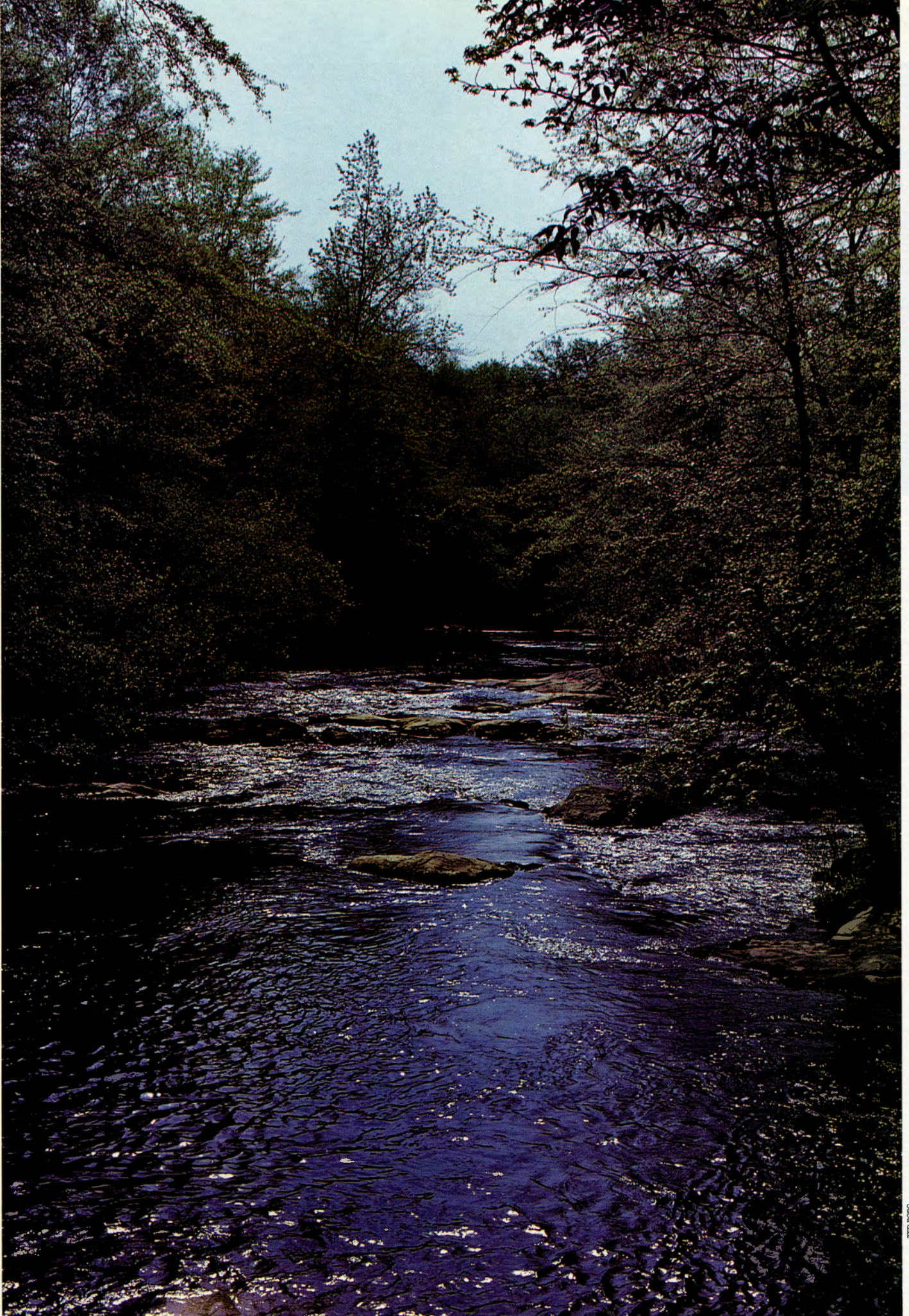
In terms of economic support and personal effort, we realize that no group has contributed more than the hunter and fisherman. The DNR will continue to serve the sportsmen and to rely on their support. We will also continue to serve and call upon the many conservation groups and others who use and care for our wildlife and other natural resources.

The welfare of these resources, coupled with our constituents' needs, is our first concern. We're assessing our programs and abilities by this yardstick to avoid duplication and to strengthen those areas that need more emphasis.

Combining the budget, finance and accounting functions will result in greater accountability and a streamlined administrative system embracing all the agencies forming the DNR. Purchasing accountability for the entire agency will be assured by bringing the separate functions under a single purchasing office. Careful scrutiny of these processes will ensure that monies are used wisely and that all laws and regulations are followed. Such vigilance will enhance the agency's ability to serve its constituents.

The Department of Natural Resources will deal with many issues, some ongoing and some yet to be defined. Those that weigh most heavily involve protection of the state's land, water, wildlife and marine resources, the allocation of these resources for preservation, land use planning and growth management, economic development and recreation.

Our ultimate concern must be the state's natural resources. We face serious issues, and some may call for unpopular actions. But by forging into one strong union the talents and scientific expertise of the dedicated professionals from these separate agencies, we will meet the challenge.





DNR Director Designee James A. Timmerman Jr. will receive strong support from his team of deputy directors, shown above: (from left) Cary Chamblee, Sid Miller, Sonny Baines, Freddy Vang, Larry Cartee, Dr. Timmerman, Benny Reeves, Paul Sandifer, Bill Chastain and Brock Conrad. Their responsibilities will encompass management and conservation of land, water, wildlife and marine resources.

Larry Cartee
ASSISTANT DIRECTOR

One of the most significant opportunities afforded by the creation of the DNR is that we will be able to play a stronger advocacy role through the environmental permitting process. With the additional technical expertise through the inclusion of Water Resources, Land Resources and Geological Mapping/Geodetic Survey, a more comprehensive and unified approach to commenting on environmental permits will exist. More than ever before, the state's natural resources will have a powerful voice — based on science and unified commitment.

Within the Executive Office, restructuring will enable the development of a vigorous human resources management program, what is usually called Personnel. Efforts will be initiated by the DNR's Office of Human Resources to implement Total Quality Management, the highly successful strategy for accomplishing goals such as those we are setting for our agency.

Restructuring will also provide an expanded legal section within the DNR Executive Office, offering greater legal expertise and capabilities in environmental matters and law at the local, state and federal level.

John B. "Benny" Reeves
DEPUTY DIRECTOR, DIVISION OF ADMINISTRATIVE SERVICES

Our role in restructuring began very soon after legislation creating the new DNR was passed by the General Assembly and signed into life by Gov. Carroll Campbell in June 1993. We had to prepare a budget covering all the new divisions by this past October, at a time when details about the fiscal operations were still very uncertain.

A complicating factor in doing the business of the DNR is that we're not all under the same physical roof. Although this has been true for years about the wildlife agency, several other locations are now involved.

Marine Resources headquarters face Charleston Harbor, and their operations also include a mariculture center in Bluffton; the Dennis Wildlife Center is in Bonneau, and the Webb Center is near Garnett. Freshwater fish hatcheries and field offices of many of the divisions sprinkle the state, from the mountains to the coast. The main office for the wildlife department is in the Dennis Building, on Columbia's Statehouse grounds.

The new divisions have their offices in several other facilities around Columbia, and some also have field personnel in

Guardian of the Resource

Carrying memories of homelands where the remaining haunts of pheasant, hare, salmon and stag were barred to all but the richest and the royal, pioneer South Carolinians ran amok amid a wealth of wildlife that appeared to have no limits.

In time Colonial law did attempt to curb the entrepreneurial fish-dealers' habit of stunning and netting masses of fish by poisoning streams. Then, during the Revolution, the young state government voted to ban fire hunting, providing that convicted violators would serve in the Continental Army for the duration of the war.

But it was not until early in this century that a concerted effort was made to stop the waste. The Audubon Society of South Carolina, founded in 1900, raised an organized outcry and became, by default, for several years the recognized caretaker.

In 1910, Audubon member James Henry Rice was named to a newly created state office: Chief Game Warden. That office evolved and was expanded over the years until 1952 when Gov. James F. Byrnes named the first Board of Commissioners to take charge of the protection and management of fish and wildlife. That was the predecessor of the current South Carolina Wildlife and Marine Resources Commission.

On July 1 the new South Carolina Department of Natural Resources comes into being. That same commission will become the board that governs the new agency. Like the present commission, the board is made up of representatives appointed by the governor from each of the state's congressional districts and one member at large.

Current wildlife commission chairman is Marion Burnside of Hopkins. "Our first duty is to protect South Carolina's resources," says Burnside. "We are the overseers of the department; we are involved in setting policy."

What will be the fate of the boards such as those that have governed the Land Resources Conservation Commission and Water Resources Commission? One, the Waterfowl Committee, under law retains its identity and continues its mission of funding waterfowl projects in the Atlantic Flyway through conducting the annual "Duck Stamp" art design competition and sale of the print. It will become an "arm" of the DNR. Of the others, "Most are still going to be used in an advisory capacity," Burnside believes. "It's not costing anything to have them. I think we need them — when we can get this much input from across the state and it's costing sportsmen and other taxpayers nothing, why not keep them? They give the public added access to the department."

Under the 1993 statute that creates the new agency, the DNR board's terms are six years, but members serve at the pleasure of the governor and may be replaced at any time. Under this law incoming administrations may choose to replace board members whether or not their terms have expired.

The board also appoints the DNR's executive director, who in turn appoints the deputy directors who head various internal divisions. James A. Timmerman Jr., executive director of the S.C. Wildlife and Marine Resources Department, has been designated the new director. 🐾



Vision Statement

The South Carolina Department of Natural Resources is the guardian of the state's natural resources and ensures these resources are conserved for future generations.

Mission Statement

The South Carolina Department of Natural Resources is the advocate for and steward of the state's natural resources. The Department of Natural Resources develops and implements policies and programs for the conservation, management, utilization and protection of the state's natural resources based upon scientifically sound resource assessment and monitoring, applied research, technology transfer, comprehensive planning, public education, technical assistance and constituent involvement. The Department of Natural Resources is pro-active in protecting the state's natural resources for use and enjoyment by future generations of South Carolinians.



Efforts by the S.C. Wildlife and Marine Resources Department to protect and provide wildlife habitat will be augmented by the new agency's expanded information technology capabilities. Law enforcement officers' jobs will remain much the same, and the public will still regard them as a critical point of contact with the department.

outlying districts. Linking the administrative obligations for all of these sites has been an enormous job.

While only a little over a hundred people will join the wildlife department's staff of about 770, accounting duties for the DNR increase considerably. Administrative Services is assimilating the record-keeping of all divisions, coordinating all the computer operations, and taking over the responsibility of purchasing for everyone, including all supplies and equipment. Just changing the logo on uniforms, vehicles, letterhead and so on presented a major challenge. These details, although they're not immediately evident when the public thinks about restructuring government, must be considered.

The agency's engineering office functions within our division, building and maintaining all the boating access facilities, or boat ramps, in the state. The scope of the engineer's duties should not change, and additional expertise should come from the new divisions.

A question often being asked is, "Will the new DNR save tax money?" My answer is, "This fiscal year, no." Eventually administrative dollars will be saved, but any difference will probably go toward programs in the field. While this may not be as dramatic on paper as some would like, I believe that anything that can result in serving the public and the resources represents true savings.

Prescott "Sonny" Baines

DEPUTY DIRECTOR, DIVISION OF CONSERVATION EDUCATION
AND COMMUNICATIONS

Our media specialists, writers, editors and education professionals cover the state, meeting the communications needs of Wildlife and Marine Resources. As the DNR comes together our role expands. We're looking forward to working with these new divisions, and we're depending on them to assist us by telling us of their programs' priorities.

CEC personnel produce *South Carolina Wildlife* magazine and a departmental newspaper, *Resources*, as well as videos and weekly news releases. We also provide graphic support and expertise for the special publications the agency prints and distributes.

In the last decade, our agency's leadership has established education as a high priority, and our division has expanded its efforts to meet this challenge through a variety of education programs and materials. "Project WILD" is an in-school program teaching terrestrial and aquatic ecology. Through WILD, we have trained 18,000 teachers in wildlife education methods.

Our division sends education teams into the schools with exhibits that never fail to get response. Alligators, owls, snakes and possums are taken into the classrooms and materials distributed to teachers. Through these efforts the DNR will have direct contact with the school systems. A teacher-grant program for on-site wildlife encourages projects like building ponds and planting butterfly gardens — projects that create awareness and stimulate action.

Education continues to be a top priority with us, as it also will be for the DNR. Our task will be to coordinate and focus the education and information efforts of the DNR.

Both Land Resources and Marine Resources have developed educational outreach programs that reflect the specialized needs of their audiences. The Marine Division's program, for example, is centered around their ability to access coastal environments and is already carefully coordinated with the larger, broader efforts of our division. Land Resources' educational programs also will coordinate with others within the DNR. Finally, we'll develop programs to inform the public about work under way in Water Resources and Surveys and Mapping.

Of course, a major part of our job is responding to the public's interests and need for information. By having the various divisions under one roof we should be able to provide more complete information about our state's resources and their use, including recreation. Direct association with the scientists and professionals who have expertise and experience in all of these related fields will be a big plus for our division's information and education specialists and for the public.

Bill Chastain

DEPUTY DIRECTOR, DIVISION OF NATURAL RESOURCES
LAW ENFORCEMENT

Conservation officers lead our hunter education and boating safety programs and enforce fish and wildlife laws across the state, including along the coast and three miles out. There's no such thing as a routine day.

Dawn may find an officer conducting surveillance on waterfowl or deer baiters. By midday he may be presenting a conservation program to a school class or investigating a landowner's complaint involving illegal hunting or fishing. This same officer may later join a search for missing hikers or stake out an area where night hunting has been reported.

I see the formation of a DNR as a very positive approach to the whole picture. Since the time of the Chief Game Warden, it's been our job to see that the wildlife and marine laws are obeyed, so we've been a major player as the wildlife department has evolved. We'll continue to accept that responsibility under restructuring.

We have airplanes, boats, four-wheelers; we have full police powers and a radio system compatible with the State Law Enforcement Division's. We've crossed paths a lot with other agencies — we're often called in with equipment and service — but we've needed more contact and communication among those agencies charged with managing and protecting wildlife and marine species and maintaining the quality of the waters and habitats these animals depend on. Restructuring offers that chance.

A conservation officer is this agency's first line of contact with the public who use the resource. That will not change with the DNR, although, I guarantee you, our people will have to know more. The variety of questions these officers are expected to be able to answer always amazes me.

Our men and women are equipped with a variety of skills to enforce our laws and to assist the public using these natural resources. All must pass the high physical and mental standards of the S.C. Criminal Justice Academy's training program. In addition, the DNR will give us specific training, offering direct contact with experts from each area and program within the agency. This type of information and backup is invaluable to our uniformed officers.

We'll also benefit from many of the programs and technical abilities these divisions will bring to the new agency. For example, we'll be able to establish pinpoint location while making cases and have detailed photographic and mapping data at our fingertips for certain surveillance purposes.

Brock Conrad
DEPUTY DIRECTOR, DIVISION OF WILDLIFE AND
FRESHWATER FISHERIES

The new DNR and its Wildlife and Freshwater Fisheries

Division have a solid constituency in the state's many hunters and fishermen, and a growing number of constituents who simply enjoy observing or photographing wildlife. For years, our division has been considered a leader among natural resources agencies across the nation, and now our constituents will be even better served by expanding our expertise and capabilities. We will continue to prioritize our efforts, providing ample opportunities for hunters and fishermen, as well as protecting critical habitats and unique ecosystems.

Staff members within our division are responsible for biological research and management of our state's game and freshwater fishery programs. Other scientists in the division inventory and work with nongame and endangered species, both plant and animal, within our state's Heritage Trust Program, now encompassing 58,318 acres of unique and significant habitat.

The formation of a DNR offers us new challenges and opportunities in addressing resource issues. The agency as a whole will have greater access to computer GIS and mapping capabilities, allowing a more complete and thorough view of environmental questions.

As an example, Water Resources can help provide detailed information on hydrology modeling and water quality analysis, assuring that those who make the decisions involving freshwater fisheries management will have immediate access to all available data. Land Resources will be able to provide information on nonpoint pollution, while the Division of Surveys and Mapping can help through watershed mapping.

The Game Section will benefit by advanced computer capabilities, assuring faster analysis of biological data. Also, the availability of GIS will permit monitoring of long-range statewide habitat changes, possibly assisting with prediction of fluctuations in certain wildlife species. Providing biologists this additional management tool will help ensure healthy wildlife populations.

Improved GIS capabilities will enhance work within the Nongame/Endangered Species Section. Having immediate access to data shared among the divisions should increase their ability to obtain landscape level and community level information. This will assist in locating potential habitats for rare and endangered species. Monitoring significant changes in land use on a regular basis can guide habitat protection decisions and land use policy.



Enhanced research and monitoring programs within the DNR will benefit shrimpers and other commercial fishermen, along with recreational anglers.

ROBERT CLARK

Paul Sandifer
DEPUTY DIRECTOR, DIVISION OF MARINE RESOURCES

Responsibilities and programs once fragmented among several agencies will be organized in the DNR into a single, integrated and sharply focused entity that has the technical skills and the broad mandates to solve problems before they become crises. For the first time, we'll be able to take a holistic view of the state's natural resources and then deal with each one in the context of the others.

In the Marine Resources Division, our responsibilities are to carry out management, research, and habitat protection programs needed to ensure the health of coastal ecosystems and the recreational and commercial fisheries they support. Among many duties, MRD staff build and maintain artificial reefs, manage public shellfish grounds, monitor populations of popular seafood species such as shrimp, blue crabs, oysters, red drum, snappers, groupers and many others, improve technology for mariculture, and conduct applied research to provide answers to resource management and environmental questions.

Since the living resources in the coastal ocean do not recognize political boundaries, MRD staff often must work with them over a broad geographic range. In some cases, this means conducting research and monitoring programs from roughly Cape Fear, North Carolina, to Cape Canaveral, Florida, and sometimes farther afield. Also, division personnel constantly work with a diverse array of users of the resources, including recreational fishermen and boaters, commercial fishermen, non-

consumptive users, and others. The views, interests, needs and knowledge of these people are carefully considered as we develop and implement fishery management plans, habitat protection and enhancement efforts, legislative agendas, and many other programs.

The Marine Division is headquartered in Charleston and also operates a field station, the Waddell Mariculture Center, near Bluffton. The division's Charleston campus at Fort Johnson is truly a marine resources center, since it includes laboratories and offices of two federal agencies (the National Marine Fisheries Service and the U.S. Fish and Wildlife Service) and two academic institutions (the University of Charleston and the Medical University of South Carolina) along with the division's Office of Fisheries Management, Marine Resources Research Institute, and administrative offices.

The mix of state and federal marine resource scientists, academic researchers and students provides a dynamic atmosphere where resource utilization, management and conservation issues can be addressed. Long-standing cooperative arrangements exist, so that numerous projects are conducted jointly, utilizing a much richer bank of talent and resources than any of the organizations could provide alone. The new DNR will provide even broader opportunities for development of some of the strongest interdisciplinary teams of scientists and resource managers available anywhere. As a result we should be able to do a better job of managing and conserving the state's vital marine resources.

Freddy Vang
DEPUTY DIRECTOR, DIVISION OF WATER RESOURCES

New technology and capabilities will be available through the DNR. The Water Resources Commission will bring mapping and data analysis technology that will allow the agency to make decisions based on the best and most complete data available. One such technology is Geographic Information Systems, or GIS, a computer mapping technology that joins computerized data with automated mapmaking. The Water Resources Commission began a federally funded project six years ago utilizing this technology and has created a database containing information on a broad spectrum of natural resources and environmental features such as wetlands, endangered species, land use and permits for approximately 65 percent of the state. GIS will give wildlife and fishery managers insight into more variables than could previously have been considered.

One way we use GIS technology as a decision-making tool is in our River Conservation Program. This program uses scientific evaluation and local values to establish guidelines for future use and protection of river basins. The process pulls together experts and citizens from all around a particular basin. During agency-sponsored workshops, participants learn about the resource evaluation process and how GIS will be used in the study.

Restructuring will not change how we currently study and evaluate the water resources of the state. We will continue to manage nuisance aquatic plant populations in public waters, evaluate instream flow needs, provide climatological data and

As South Carolina evolves from an agrarian state, wise land use planning must take place to safeguard natural resources. Creation of the DNR, a union of agencies with similar priorities, will strengthen the efforts of all its new divisions.

services to the state, and provide a comprehensive plan for response to drought conditions in the state.

Other functions of our division include conducting hydrologic and computer modeling studies and providing technical assistance and information to water users, consultants, well-drilling contractors, and state and federal agencies. Our newest program, conducted jointly with the S.C. Sea Grant Consortium, addresses the potential threat of zebra mussel infestation in South Carolina waters. A task force was established last fall to work on ways of reducing this threat to the state's freshwater resources.

We've been working for years with all the agencies merging into the new DNR. Now, what we will collectively be able to do is comprehensively address scientific issues and processes — thereby providing the ability to answer the questions and come up with solutions. The cross-discipline expertise is here.

Cary Chamblee

DEPUTY DIRECTOR, DIVISION OF LAND RESOURCES AND CONSERVATION DISTRICTS

With the state's population expected to exceed 4 million by the end of the century, careful study and planning must accompany and hopefully precede this rapid growth if we are to maintain our quality of life. Environmentally sustainable economic development is a feasible goal for the 21st century.

Our division will provide information for natural resources management and land use planning decisions and will direct land-related technical assistance through the state's forty-six soil and water conservation districts. Our vision is that South Carolina's land-related natural resources be sustained and enhanced to meet the needs of the present without compromising the future! By coordinating input from both urban and rural landusers to the DNR, we more closely tie soil, water and wildlife conservation together.

In 1937, the South Carolina Legislature passed the Soil and Water Conservation Districts Law, part of a national effort to protect and conserve soil and water resources. We've come a long way since 1937. Originally, conservation districts were formed to assist farmers and help South Carolina evolve from a cotton economy. Our streams were red and soil was eroding.

Soil and Water Conservation Districts are subdivisions of state government and their boundaries correspond to county

lines. Responsible for conservation work within their boundaries, conservation district commissioners plan and direct a comprehensive program to meet the fundamental need of assisting urban and rural citizens to solve land use, water and related natural resource problems.

Today's program addresses water quality problems, soil erosion, technology transfer, education, growth management, and land use planning on urban and rural lands. This also includes working with and developing land trusts and land resource information systems and coordinating FEMA's National Flood Insurance Program in South Carolina. The agency also promotes such best management practices as conservation tillage and drip irrigation and maintains equipment in districts throughout the state to demonstrate these methods.

The management of land resources is an ever-broadening field, reaching increasingly into growth management and land use planning related to economic development.

Sophisticated technologies such as satellite imagery, high altitude aerial photography and state of the art computer application allow for accurate resource inventory and assessment capabilities. Up-to-date statewide land cover assessments for the state show forest, agricultural, natural and urban environments. The Land Resources' Cartographic Information Center located in Columbia is a hub of activity, open to the public and offering a wide variety of cartographic and land resource planning information. Technical staff also provide guidance and assistance for the use of this information for a wide range of land planning, management and land development interests.

Sid Miller

DEPUTY DIRECTOR, DIVISION OF SURVEYS AND MAPPING

Our division includes three sections that will work well with the other units in the new DNR.

The S.C. Geodetic Survey establishes horizontal and vertical control monuments. They serve as the reference framework for all geographic and land information systems and provide engineering and surveying firms with control for floodplain and boundary surveys. Instead of using labor-intensive conventional surveying techniques, the geodetic survey crew now determines geographic positions for these monuments with the Global Positioning System (GPS), a precise positioning system using signals from twenty-four orbiting satellites.



SC LAND RESOURCES CONSERVATION COMMISSION

Miniaturization of once-bulky receiving systems has created opportunities for other divisions to use this technology. Natural resources law enforcement officers, using hand-held receivers, will be able to locate their position within minutes when arresting wildlife law violators. DNR scientists in the field will be able to enter survey information into data loggers attached to hand-held GPS receivers, then download the data into their office computers.

Imagine a state where each county has its own mapping system. Also imagine various departments within each county funding and maintaining their own separate mapping systems. That was the case in South Carolina until 1986, when the State Mapping Office began working with counties to establish a uniform statewide system.

The program is creating the most accurate and detailed framework needed for statewide geographic and land information systems. The State Mapping Office provides participating counties assistance in planning and executing the projects and checking the quality of the delivered products. Sixteen counties are presently in the program.

Geological maps enhance a society's ability to make wise decisions about protecting the environment, developing mineral resources, disposing of wastes and avoiding or minimizing damage from natural hazards, such as earthquakes, landslides and sinkholes. At the Savannah River Site, S.C. Geological Survey geologists are mapping the surficial sediments as part of

extensive environmental studies being done. Others are mapping the distribution of rock types in Laurens County to determine the potential for undiscovered vermiculite deposits. Because of the "Enoree vermiculite district," South Carolina ranks first nationally in vermiculite production.

Restructuring will allow a closer working relationship between survey geologists and their counterparts at the Division of Water Resources who depend on geological information for surface- and ground-water studies. In return, the Geological Survey will benefit by having access to Water Resources' GIS in order to create a digital geological map file.

Dr. Timmerman —

July 1, 1994, will mark the culmination of intense strategic planning and preparation. What emerges from the mandate of restructuring is a new agency with a hefty and sobering charge, but one that is rich in its potential. South Carolina's DNR will be an agency with many responsibilities, but one with much to draw upon as it meets the challenges that lie ahead.

Change is inevitable. Some processes will bend; others will break. The new agency will certainly experience growing pains along the way to becoming a fully developed DNR. But from all indications, these will be minor. More importantly, the abundant natural treasury that is South Carolina and its people will be the beneficiaries. 🐾

“Eat More Possum!”

And Other Healthy Advice.



Take heart, hard-core carnivores of America!

There's a way you can enjoy meat and stay healthy, too.

by Dennis Chastain

photography by Ted Borg

In the dietary war of words waged over the last two decades, perhaps no single category of food has taken it on the chin more than red meats. Red meats, we have been told, are too high in fat and cholesterol. Too much red meat consumption, we are constantly reminded, has been firmly linked to coronary heart disease and cancers of the breast, colon and, most recently, the prostate.

These dire pronouncements have sent a shiver up the collective spine of health-conscious consumers and have caused many people to cut back on red meat; some have simply given it up altogether. A recent survey by the Food Marketing Institute found that 65 percent of American food shoppers say they are eating less red meat, and interest in vegetarianism is at an all-time high.

If you're one of the last holdouts, one of that dwindling number of hard-core carnivores who still crave a mouth-watering slab of savory red meat at the evening meal, you should know that there is good news on the horizon. Moderation in all things, the watchword of the 1990s, still makes good advice, but the word in culinary circles is that there is a nutritionally sound way to have it both ways. The answer, many experts are now saying, is wild-game meat.

A second look at some lean red meats, especially cuts from wild game, reveals that not only are they not harmful, they can actually be good for you. If you've been passing up the venison roast at dinner because of what you may have heard or read about red meats, fat and cholesterol, maybe you should take another look, too.

It's important to understand how red meats originally got a

bad name. In the 1970s, when a link was first established between red meat consumption and the incidence of coronary heart disease and several different forms of cancer, a well-orchestrated campaign was begun to steer Americans away from red meats. The thinking was that red meats were the single biggest source of saturated fat and cholesterol in the diet, which still holds true for most fatty cuts of grain-fed domestic meats. The problem is, in the rush to judgment, most people, many health professionals included, made the unfair assumption that wild-game meats also fit into this same category. It is now clear that it was simply a case of guilt by association.

We now know that there were two fundamental problems with the assumption. First, wild-game meats, unlike most domestic grain-fed beef, are not high in fat at all; in fact, they are extremely low in fat, averaging only around 4 percent total fat. In *The Paleolithic Prescription*, a popular diet book that recommends a diet of lean meat and vegetables, the authors note, “the carcasses of today's domesticated animals are 25 to 30 percent fat, while a survey of forty-three different species of wild game animals from three continents has revealed an average fat content of only 4.3 percent.” The authors go on to proclaim, “Many of the drawbacks attributed to red meats in general should actually be attributed only to modern fatty meats; game meat is leaner, and its fat less saturated.”

Meat from wild game animals has also, from time to time, been condemned because most game meats contain more cholesterol than domestic beef. Recent research, however, has revealed that the slightly higher cholesterol content of wild-game meats may not be a problem after all.





Wild foods offer healthy alternatives to the rich red meats Americans consume. For years shrimp and shellfish were considered taboo for dieters; nutritionists now say seafood's low fat content makes it a wise choice. Venison, shown in a hearty stew on page 47, tempts any meat-eater, but at a fraction of the fat of domestic beef.



Contrary to conventional wisdom, it is not necessarily the cholesterol in foods that predisposes one to heart disease. The real problem, the experts are now saying, is the level of serum cholesterol, the cholesterol that is actually in the bloodstream. Cholesterol in foods does not necessarily translate into cholesterol in the blood.

Also, it is now known that not even all serum cholesterol is bad. There is good cholesterol and bad cholesterol. The ratio of good cholesterol, called HDL (high density lipoprotein) to LDL (low density lipoprotein) is much more important than the absolute amount of total cholesterol in the blood.

Also, the amount of cholesterol in the diet pales in comparison to the amount the human body is capable of making on its own. While the recommended dietary intake of cholesterol is a mere 300 milligrams per day, the human body can manufacture between 800 and 1500 milligrams of cholesterol per day, even if there is no cholesterol in the diet.

In most individuals, the body synthesizes cholesterol for its own internal needs almost irrespective of how much is in the diet, and it has a very precise mechanism for controlling its own serum cholesterol levels. This may come as a surprise to most people, but among the factors that affect serum cholesterol levels, *the amount of cholesterol in foods is only a minor one.* (However, individuals differ in the way their bodies handle dietary cholesterol, and everyone should strive to keep dietary cholesterol intake down to the American Heart Association's recommended 300 milligrams per day.)

"Most nutritionists are not emphasizing total cholesterol as much as total fat," says Elizabeth Kunkle, a registered dietitian on the faculty of Clemson University. "For most people, the body makes much more cholesterol than it can use — so cutting back on dietary cholesterol is not going to lower serum cholesterol significantly."

Indeed, extensive research has shown time and again that only the most spartan low-cholesterol diets have any significant effect on serum levels, and doctors are sharply divided on the wisdom of extremely low-cholesterol diets. The result has been that many low-fat dietary sources of cholesterol like wild game have been completely vindicated.

The emphasis in heart disease prevention has now shifted to dietary fat. Dietary fat, not dietary cholesterol, the experts now say, is the real culprit. The amount and kind of fat in foods really determine the levels of both HDL and LDL cholesterol and thus can lead to coronary heart disease. Saturated fats, the kind generally associated with animal products, have indeed been shown conclusively to raise the levels of the LDL, the so-called bad cholesterol. Polyunsaturated fatty acids, on the other hand,

those normally found in vegetables, have been shown to raise levels of HDL, the so-called good cholesterol, and can actually help prevent heart disease.

Most nutritionists are not accustomed to thinking about meats as sources of the "heart smart" polyunsaturated fatty acids, but some game meats have been found to have as much as five times the amount of polyunsaturated fats as the fat from domestic animals. White-tailed deer and cottontail rabbit, for example, both have nearly 20 percent of their total fat as polyunsaturated fatty acids. Even wild boar comes in at a respectable 14.6 percent polyunsaturated fatty acids, and squirrel rates even better at 29.3 percent.

Perhaps the most exciting discovery about wild-game meats is that the polyunsaturated fats contained in them include EPA, (eicosapentaenoic acid), one of the Omega-3 fatty acids usually associated with coldwater ocean fish. Omega-3 fatty acids have been shown to lower blood cholesterol levels and are thought to provide protection against heart disease.

It was the Omega-3 fatty acids, especially EPA, that created a great deal of excitement several years ago when researchers discovered that even though Greenland Eskimos consume a high-fat diet, they have a relatively low incidence of coronary heart disease. The accepted explanation is that the Omega-3 fatty acids, those found in the coldwater fish Eskimos frequently consume, provide a protective effect. Most wild-game meats, on average, have about 2.5 percent of their polyunsaturated fats as Omega-3 fatty acids, while the levels in domestic meats are barely detectable.

All this new information, taken together, makes naturally low-fat game a very attractive alternative for health-conscious meat lovers. Wild-game meats are now an accepted alternative in the low-fat American Heart Association Diet and even the ultra-conservative Pritikin Program Diet.

It really should come as no surprise that wild-game meats would finally emerge as a healthy alternative to our modern high-fat domesticated meats. Man has been eating wild game for a very, very long time, and now the nutritional wisdom of the ages has finally come home to the kitchen.

If you're not a hunter and don't have access to such meats, don't despair. Mother Nature offers plenty of healthful dietary choices. Fish and seafood are both widely accepted as healthy meat selections. All types of edible fish provide excellent nutrition with very little concern about fat or cholesterol. Even the more fatty species of fish, like trout, salmon, tuna and bluefish, have the approval of most nutritionists, because of their high Omega-3 fatty acid content.

Shellfish, somewhat like red meats, got an undeserved rap some years ago, because it was thought at the time that they were too high in cholesterol. It turns out that because of an analytical error whereby all cholesterol-like substances, called non-cholesterol sterols, in shellfish were erroneously reported as cholesterol in many food composition tables, many shellfish were labeled as taboo. Many dietitians gave these nutrient-packed seafood delicacies the thumbs down. But the error has now been cleared up, and such shellfish as clams, mussels, scallops and oysters have all been given a clean bill of health. Crustaceans like shrimp, crab and lobster do in fact have virtually all of their sterols as cholesterol, but, since they are very low in fat, they are also now regarded as acceptable low-fat meat selections.

If wild game, fish and seafood aren't your bag, stay tuned. Coming soon to a supermarket near you are a host of other low-fat, semi-wild meat alternatives. It may be some time in coming to all areas of the country, but there could be an ostrich burger or a buffalo steak on your plate sometime in the future. A growing number of agricultural entrepreneurs are banking on a bull market for full-flavored, low-fat, low-cholesterol meat alternatives, like buffalo and, yes, even ostrich.

According to meat-industry analysts, consumers are developing quite an appetite for buffalo meat, along with the meat from its hybrid bovine cousin, the beefalo. The American Bison Association reported in 1992 that sales of buffalo meat reached 600,000 pounds, and the market is still growing rapidly. The association estimates that commercial buffalo herds in the U.S. now total about 100,000 head — a far cry from the 125,000 beef cattle slaughtered each day, but promising enough to fuel the hopes of South Carolina entrepreneurs.

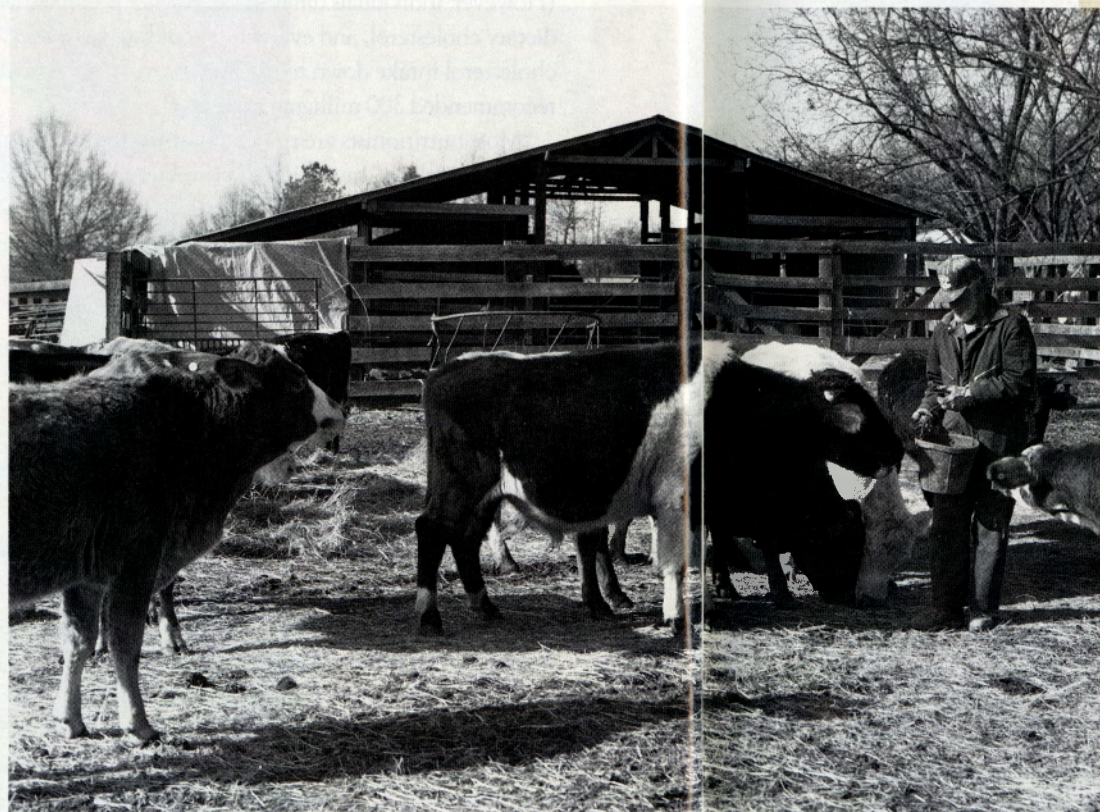
Doug Layton, a buffalo rancher from the Spartanburg area, says the future looks good for buffalo meat, which has the rich flavor of beef but less fat and cholesterol than domestic cattle. While Layton recognizes that the popularity of buffalo meat is on the rise all across the country, he believes the real future is in the cow/buffalo cross, commonly known as beefalo. But don't expect to find either buffalo or beefalo meat in local grocery stores just yet. While both specialty meats can be found on meat counters in several neighboring states, Layton says South Carolina consumers have been slow to accept this somewhat novel meat item.

At some point in the near future, ostrich meat may appear at your local meat counter. Like buffalo and beefalo, ostrich also reportedly tastes a great deal like beef, minus the fat and cholesterol. Operators of South Carolina ostrich farms, one near Columbia and two in the Anderson area, are gambling on the American public's enduring concern about dietary fat and cholesterol, coupled with our seemingly insatiable appetite for meat. Meanwhile, keep an open mind and . . . eat more possum!

Dennis Chastain is an Upstate free-lance writer who has both a masters degree in Food and Nutrition and a freezer full of wild game.



Banking on the tastes of the future, Henry Stanley raises ostriches for breeding stock on his Two-Toe Ranch at Anderson. Spartanburg's Doug Layton, below, crosses buffaloes with domestic beef cattle to produce beefaloes, whose meat has beef's full flavor with little of the fat.



CHECK THE NUMBERS

There's encouraging news on the diet and health front for those who take nutrition seriously but don't want to go vegetarian. Wild game, fish and shellfish offer sensible choices over domestic meats.

The following tables profile fat/cholesterol values for various types of meats. It is important to remember that in making health-conscious selections, total fat should be considered, not the cholesterol in the food itself. Also, the amounts of saturated fat and polyunsaturated fat are critical. Polyunsaturated fat is desirable; saturated fat is undesirable.

Fish & Shellfish	CALORIES (kcal)	TOTAL FAT (grams)	FATTY ACIDS (%)*		CHOLESTEROL (mg)
			SATURATED	POLYUNSATURATED	
Blue crab	95	1.4	12.9	38.4	72
Catfish	100	2.7	23.7	25.5	54
Clams	36	0.6	9.6	28.3	57
Crayfish	101	0.4	17.0	31.4	170
Dolphin	109	0.9	26.8	23.4	94
Flounder	91	0.7	23.8	27.6	60
Lobster	87	0.8	18.1	15.4	81
Mackerel, king	105	1.7	18.1	23.0	53
Mullet	112	3.7	29.4	18.9	49
Oyster	66	1.9	25.5	29.9	47
Scallops	97	0.9	10.4	34.3	36
Seatrout	105	2.3	27.9	20.1	106
Shark	81	0.4	20.5	33.4	36
Sheepshead	126	1.63	22.1	23.4	N/A
Shrimp	99	1.08	26.8	40.7	151
Snapper	98	1.1	21.2	34.2	38
Spot	120	4.5	29.6	22.2	N/A
Sunfish (crappie)	94	1.5	19.9	35.1	71
Trout, rainbow	151	6.8	19.3	35.7	41
Wild & Domestic Meat					
Alligator, tail meat	143	2.9	28.3	34.5	65
Beef, domestic	322	23.6	39.7	3.63	88
Beefalo	188	6.3	16.4	3.16	58
Boar, wild	143	4.4	29.7	14.6	N/A
Buffalo	188	2.4	37.6	9.9	82
Chicken, domestic	223	13.4	27.9	21.8	76
Deer	158	3.2	39.2	19.4	112
Duck, domestic	404	39.3	33.6	12.9	76
Duck, wild	211	15.2	33.2	13.3	80
Pork, domestic	273	17.2	36.2	8.4	91
Quail	134	4.53	29.1	25.8	N/A
Rabbit, domestic	154	6.3	29.7	19.3	64
Rabbit, wild	173	3.5	29.9	19.4	123
Squirrel	136	3.7	11.8	29.3	95

All values calculated for 100 grams, edible meat (approximately 3.5 oz.). Sources: USDA Agricultural Handbooks; #8-5, #8-10, #8-15 and #8-17; and A Nutrient Data Base For Southeastern Seafoods, University of Florida, Florida DNR, Florida Sea Grant. * Given as percent of total fats.



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Way up on the roof of South Carolina, where the Blue Ridge Mountains tumble across the state line into Oconee County, the world drops off, taking with it every river and stream and creating dozens of exquisite waterfalls. Supreme among them is Lower Whitewater Falls. Plunging 800 feet into the tranquil backwaters of Lake Jocassee, Lower Whitewater ranks as one of eastern America's loftiest cascades.

Little-known compared to its famous North Carolina counterpart, Upper Whitewater Falls, the remote lower waterfall was for many years inaccessible to all but the most stalwart backpackers and death-defying four-wheelers. That situation changed in 1992 when Duke



Mountain laurel in bloom.

Power, owner of this superlative parcel of mountain scenery, in concert with local outdoor groups and government agencies, developed a network of hiking trails and an observation deck overlooking the thundering cataract.

This Field Trip will explore two trails: the 3.4-mile (round-trip) Waterfalls Overlook Trail, and a 2.2-mile spur trail into the Coon Branch Natural Area, which harbors one of the last pockets of virgin forest remaining in the Southeast. Together, these two footpaths open to hikers a gloryland of delicate wildflowers, gargantuan trees, cascading water and abundant wildlife.

1 Before embarking, it's a good idea to stock a daypack with lunch, water, field guides, camera and binoculars. (Birding is excellent here in May and June.) Be aware, too, that you're venturing into one of the wettest places in the continental United States, drenched by up to 80 inches of rainfall annually. Wear shoes or boots suitable for muddy trails, and carry a poncho or other rain gear in case of thunderstorms.

From Walhalla, follow the Cherokee Foothills Scenic Highway (SC 11) north approximately 10 miles to SC 130 and a sign pointing the way to Whitewater Falls and Duke Power's Bad Creek Hydroelectric Station. Car engines groan and travelers' ears pop for the next 10 miles as the twisting road climbs more than a thousand feet in elevation before arriving at the entrance to Bad Creek.

After registering at the gate, follow the signs ahead to the Foothills Trail/Whitewater River parking area, about two miles distant. Along the way, views unfold on the right of the rock-lined Bad Creek reservoir. Perched atop a mountain 1,200 feet above Lake Jocassee, this storage basin enables Duke Power to generate electricity on short notice during periods of peak demand, such as on hot summer afternoons.

When power is needed, water stored in the reservoir is released into a long, underground tunnel. Like water draining from a sink, it rushes down the shaft, driving a set of enormous turbines before emptying into Lake Jocassee. The same steep terrain and abundant rainfall that make these mountains an Eden for waterfall fans also allow engineers to produce more than a million kilowatts of electricity using only the force of gravity and falling water.

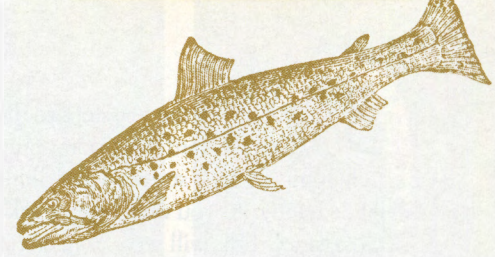
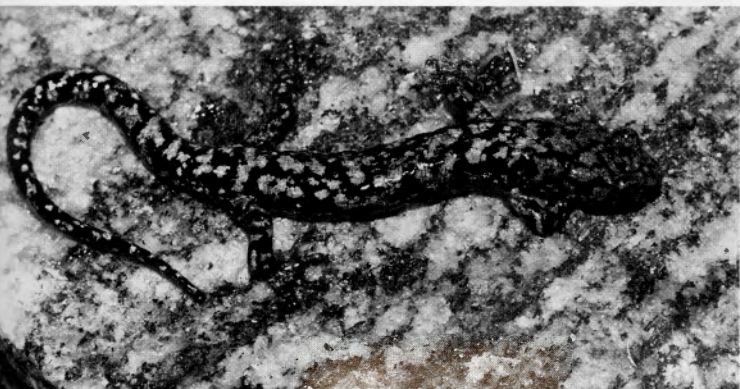
2 The trail to the falls begins at the far end of the parking lot, which served as an equipment storage area during construction of Bad Creek. Security guards watch over this area night and day on closed-circuit television, so visitors can leave their vehicles here with little worry of theft or vandalism. A pay phone and portable toilets are provided.

Departing the parking lot, the trail climbs a gentle slope, then bears left across a flat expanse picketed at regular intervals by upright plastic pipes. At first glance the scene resembles a drive-in theater, complete with row upon row of speaker posts. In reality, this mound of earth was moved here from the Bad Creek reservoir and is being reforested. Inside each of the hollow plastic tubes known as tree shelters grows a tender young sapling, protected from uprooting wind and hungry deer.

The trail enters the woods where it's marked by two paint blazes that appear every so often on bordering trees. Blue blazes indicate the route to Lower Whitewater Falls; white blazes identify the Foothills Trail, which parallels the waterfall path



Lower Whitewater Falls plummets 800 feet over a dizzying precipice that offers a highrise home to sure-footed green salamanders. Lichenlike patches speckling the back of this rare amphibian make it difficult to discern against moist rock surfaces.



for a short distance before veering off toward North Carolina.

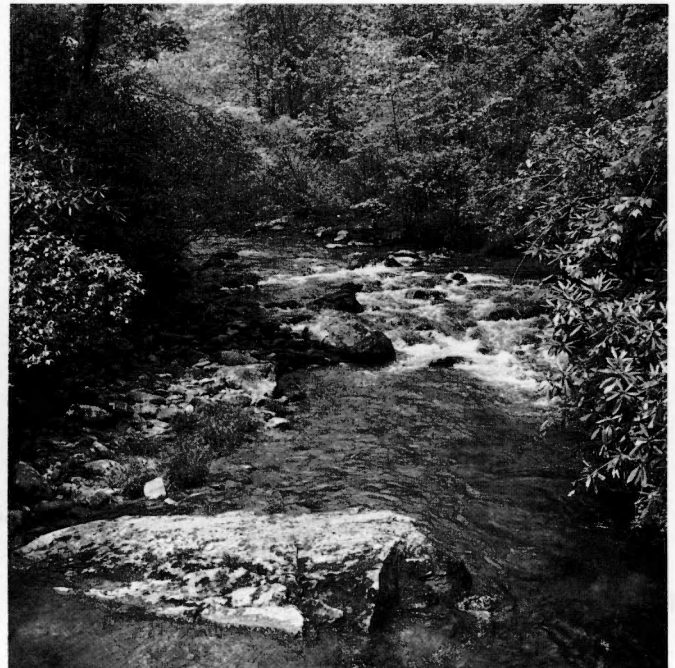
Following the trail up a wooded ridge, hikers labor for a half mile through mountain laurel thickets and past towering white pines, then coast down the opposite slope before arriving on level ground within earshot of the Whitewater River. New York ferns carpet the floor of this damp, shady woodland, accompanied by green mats of running cedar, also called ground pine. Both plants are primitive species whose ancestors were around 300 million years ago when dinosaurs prowled steaming jungles.

Nearing the river, the waterfall trail intersects the Coon Branch spur trail. For the moment, continue on the main path across the small steel footbridge that leads to a longer span over the Whitewater River. From the middle of the bridge, drink in the sights, sounds and smells of this splendid mountain stream, one of only a few South Carolina waterways clean and cold enough to host a self-sustaining population of wild trout.

In order to maintain healthy numbers of rainbow and brown trout without stocking the river with hatchery-reared fish, the wildlife department requires anglers to use only artificial lures here and to keep no more than seven trout per person per day.

For its part, Duke Power has gone to extraordinary pains to safeguard the Whitewater's purity. During construction of the hiking trails, for instance, the company hired a helicopter to lower the two steel footbridges into place without muddying the river or squashing so much as a fern. In recognition of its conscientiousness, the S.C. Wildlife Federation in 1992 presented the utility with its Conservationist of the Year Award.

Whitewater River.



3 Backtrack the few steps to the wooden sign that directs hikers toward the Coon Branch Natural Area. The 1.1-mile route ahead is strewn with wildflowers, so have your field guide handy. As you walk, keep track of how many bridges you cross, since these will serve as reference points for the description that follows.

Bridge number one appears a short distance ahead. A large rock outcrop juts from the bank beside it, offering a promising place to search for salamanders, which thrive in the damp forests of the southern Appalachians. Numerous salamander species are known to inhabit the Whitewater gorge, including the dusky, black-bellied, red, Jordans, and the rare green salamander, which biologists fear is endangered. If you're keen-eyed and lucky enough to spot one, be careful not to disturb it.

Wildlife much larger than salamanders also enliven this forest — raccoons, beavers, bobcats, black bears and feral hogs, to list a few. Chances of glimpsing any of these elusive creatures are slim, but careful attention to the forest floor might reveal their tracks or droppings.

After crossing the first wooden bridge, the trail passes beneath towering hemlock trees and aged hardwoods. Although the official Coon Branch Natural Area lies near the end of this spur trail, pockets of old-growth forest occur along the path's entire length.

The trail soon crosses a second wooden bridge, then merges with an old roadbed that follows the river upstream. Keep your eyes peeled along this stretch for haber-leaved, sweet white and yellow violets, as well as galax, distinguished by its round, slotted leaf that's shaped like a Pac Man.

A fierce snowstorm pelted this area in March 1993, toppling several large trees along this stretch of the trail. Sunlight streaming through the hole torn in the forest canopy has ignited an explosion of vines, shrubs and young trees racing for a place in the sun.

4 Once over the next wooden bridge (number three), the trail slips quietly past skyscraping hemlocks and poplars, then passes through a shady tunnel of rhododendron. Farther ahead on the left, watch for a large, dead tree, or snag, riddled with woodpecker holes. Teeming with insects, this decaying pillar serves as both buffet and inn for numerous kinds of birds.

The abundance of nesting cavities in this old-growth forest, coupled with its location smack in the middle of a major migration route, make this area prime for birding. On spring mornings during peak migration, colorful warblers, tanagers, vireos and flycatchers throng the treetops, charging the woody air with their exuberant trills, buzzes, chirps and whistles.

Back at ground level, a variety of spring wildflowers adorn the trailsides over the next half mile. Among the earliest to bloom are the trilliums, putting forth delicate pink, white or pale yellow blossoms during March and April.

May belongs to the mayapples, naturally. You must lift their large, umbrellalike leaves to behold the single, chaste white flower that nods beneath. Only don't pull too hard, especially if you're a girl! An old mountain superstition warns that a woman who uproots a mayapple will soon find herself "in the family way."



Old-growth forest along Coon Branch Trail.

Another plant seen here that carries feminine associations is squaw-root, so named because Indian medicine men reportedly used it to treat menstrual disorders. Growing in clumps on the roots of trees, mainly oaks, the fleshy, tan stalks of this parasitic plant stand out boldly against the dark forest floor.

5 As hikers pass over the fourth wooden bridge, they cross the official boundary of the Coon Branch Natural Area. One of 14 South Carolina sites included in the Society of American Foresters' Natural Areas Program, this 20-acre grove of never-felled timber grants modern-day visitors a glimpse of the American wilderness as it looked half a millennium ago. As such, it provides an important benchmark for assessing environmental change and a living laboratory for studying the natural processes of a forest.

South Carolina's state champion fraser magnolia grows here, measuring more than 6 feet around and 86 feet tall. Other titans include a tulip poplar with a trunk 11 feet in circumference, a former state record chestnut oak with a girth of 11 feet 5 inches, and an immense hemlock more than 13 feet around!

The trail crosses one last bridge before coming to an abrupt dead end a few hundred yards shy of the North Carolina state line. On the return trip, stay alert for any surprises that went unnoticed from the other direction.

6 Back at the junction with the waterfall trail, turn left across the Whitewater River, then pause on the other side long enough to gain your bearings. A sign here points the way to the falls overlook, 1.3 miles away.

As you resume hiking, notice how young the trees growing here appear compared to the hoary Methuselahs at Coon Branch. Look carefully and you might also discover rock piles scattered throughout the woods. These telltale signs offer clues to the land's past.

Although it's hard to imagine now, a farm occupied this area as recently as 1950. The Nicholson family grew vegetables and cotton in the rich bottomland along the river and operated a fishing lodge for well-to-do businessmen. The old home place that stood on the opposite bank has all but vanished, save for some mossy chimney stones and a row of daffodils that bloom faithfully every spring.

At least two pieces of evidence point to the conclusion that Native Americans camped along this stretch of the Whitewater. An elderly member of the Nicholson family recalls unearthing scores of arrowheads while plowing here. And French botanist André Michaux, who visited the lower falls while on a plant-collecting expedition in 1788, noted in his journal, "The Indians said that at night fires could be seen at this place."

Departing the river bottom, the trail ascends a wooded ridge for about half a mile, eventually arriving at another sign. Here the Foothills Trail branches to the left; stay on the blue-blazed overlook trail, which continues straight ahead. The path joins a dirt road for a few steps, then plunges again into the woods over an earthen mound designed to block vehicles from entering.

Follow the clearly marked trail as it twists and turns through piney woods and mountain laurel thickets. Along the way, watch the trailsides for bird-foot violets, trailing arbutus, and the occasional snake resting in the sun. Copperheads, black rat snakes and Eastern garter snakes are fairly common among these mountains.

7 Less than an hour's walk from the old farm site, the whisper of falling water reaches the ear, causing hikers to quicken their pace down the homestretch. The whisper swells to a roar at the observation platform, hung on a steep ridge opposite the falls.

Now's the time to relax, pull out a sandwich and cold drink, and enjoy this marvel of nature. Across the gorge, the foaming

Squaw-root.



Wood lily.



Fairy wand.

cascade gleams like pearl against a backdrop of forest green. Visitors who packed a camera will rejoice that they did, for spreading before their eyes is one of the prettiest pictures anywhere. Binoculars or a telephoto lens also allows spectators to get close-up views of the falls.

A word of caution is in order here. Desiring to get near these falls has been the undoing of more than one person. A private pilot crashed his small plane while buzzing the falls in 1988. (The wreckage is still visible to the left of the falls during months when the leaves are off the trees.) Remarkably, no one involved in the accident was killed.

A Clemson student hiking near the brink of the cataract in 1991 wasn't so lucky. His tragic death was a major reason Duke Power constructed the viewing platform opposite the falls. It's also why the cliffs surrounding the waterfall are now strictly off-limits to visitors.

Refreshed in body and in soul, hikers can now retrace the route back to the river, then on to the parking lot and home. You may want to pause long enough at the steel bridge to unlace your boots and dip those hot, tired feet into the chilly water, which seldom tops 68 degrees, even on hot summer days.

For a panoramic view of Lake Jocassee and another view of Lower Whitewater Falls, leave the parking area and drive to the first stop sign, then turn left and go 1.5 miles to the visitors overlook. The gazebo here affords a sweeping vista of the lake and a distant glimpse of the falls.

The Lower Whitewater Falls access road and trail are open year-round for day use only. Overnight camping is prohibited along the river, but backcountry campsites are available along the Foothills Trail outside the Whitewater River corridor. Full campground facilities are offered at Devils Fork State Park on Lake Jocassee. 🐾

— Glenn Oeland

Special thanks to Duke Power employees John Garton and Allen Nicholson for their assistance in researching this Field Trip.

ROUNDTABLE

DIRECTIONS: HELP FOR SONGBIRDS

For the past several years, a unique international organization called Partners In Flight has focused on the alarming decline in numbers of our migratory songbirds.



One of more than 50 species of neotropical songbirds that breed in South Carolina, the prothonotary warbler nests in tree cavities and hollow cypress knees.

Through research, management and education, this group leads efforts to protect breeding habitat for these birds in North America and calls attention to their plight.

Work in South Carolina on behalf of neotropical migratory birds has taken several important initiatives:

- The formation of a network of biologists, managers, academicians, amateur birders and others interested in migratory birds.
- Establishment of a bird-banding station at the Congaree Swamp National Monument.
- Cooperative efforts with other state and federal agencies to look at the effects of wildlife openings and clearings on neotropical birds and the effects of widespread

deforestation through Hurricane Hugo.

■ Compiling a Breeding Bird Atlas to document the nesting distribution and status of migratory birds and monitoring of neotropical birds in key habitats such as bottomland hardwood forests have been under way for several years.

This agency's Heritage Trust Program currently owns and manages 42 properties totaling more than 58,000 acres. Most of this land provides good breeding habitat for migratory songbirds and includes 8,000 acres of excellent bottomland hardwood habitat.

Our department also owns and manages seven barrier islands that encompass nearly 4,000 acres of upland maritime forest, important habitat for neotropical birds during migration. Like some other states, South Carolina is leaning toward a state plan for the conservation of migratory songbirds within its boundaries.

Partners In Flight concentrates on groups of species and their habitats rather than single-species management. Although some targeting of certain high-priority species will be necessary, it will not be possible to come up with enough resources to devote to each of the more than 50 neotropical migratory bird species under our care in South Carolina.

Protecting breeding habitats for neotropical birds need not conflict with managing for forest products and other wildlife. Since some of these birds, such as prairie warblers, require brushy cutover areas for nesting, timber harvest practices including small clear-

cuts can benefit some species. Recommended forestry practices such as leaving trees uncut along rivers and streams serve both to prevent erosion and to provide habitat for birds.

To achieve the goals of conserving songbirds and other nongame (nonhunted) wildlife, we need dependable and long-term financing such as game and fish managers have through the Pittman-Robertson and Dingell-Johnson programs. Such a program would benefit not only the resource, but also those who enjoy and profit from it. Manufacturers and suppliers might sell more of their products if recreationists have more opportunities to use them.

The International Association of Fish and Wildlife Agencies plans to advance federal legislation next year that would mandate a small excise tax on binoculars, camping equipment, hiking boots, field guides, bird seed and feeders, and other similar gear. This push for adequate nongame funding at the national level should be a priority championed by the diverse constituents who enjoy nongame wildlife and the many local and national nongame advocacy groups.

While we have little control over land-use practices on the tropical wintering grounds of migratory birds, we need to do all we can in North America to prevent the "Silent Spring" Rachel Carson predicted 30 years ago. A spring season without the buoyant song and flashing color of birds would greatly diminish the appeal of South Carolina's outdoors. 🐦

—James A. Timmerman Jr.
Executive Director, SCWMRD

RELOCATION SCHEME NO PANACEA FOR RARE WOODPECKERS

Moving endangered woodpeckers from private lands slated for logging to government refuges could prove costly and may not be the solution some forest industry workers suppose, state wildlife officials caution.

The relocation proposal, currently under review by the U.S. Fish and Wildlife Service, has been hailed by timber interests as the best way to resolve the gridlock between forest landowners whose property harbors red-cockaded woodpeckers and federal regulations that forbid cutting timber near the birds' nests.

But state wildlife officials say the scheme, termed a Habitat Conservation Plan, offers no "magic bullet" for dealing with the birds.

"This proposal has received a lot of positive press, but unfortunately it's not the cure-all some people have assumed it is," said Tom Kohlsaad, supervisor of the state wildlife department's Nongame and Heritage Trust Section. "People need to look at the whole picture before jumping to any conclusions."

Only those woodpeckers with the least chance of survival would be considered for relocation, Kohlsaad said. Birds that live in isolated woodlots cut off from others of their kind are at greatest risk since they are susceptible to predators and a host of other threats.

Healthy groups of woodpeckers living on timber company lands, hunting preserves or other large tracts of

suitable habitat would be ineligible for relocation, as would those located near national forests or other public holdings.

An estimated 1,000 groups of red-cockaded woodpeckers remain in South Carolina, according to Kohlsaad. Of these, about 600 occur on public lands and 400 on private property.

"The wildlife department lacks both the money and the manpower to monitor nest sites and move any woodpeckers that might warrant relocating under the proposal," Kohlsaad said.

An alternative approach under consideration would offer landowners economic incentives to safeguard any woodpeckers (or other endangered creatures) that live on their property, Kohlsaad said. Incentives might include tax breaks, government-funded leases or special easements that reduce property and income taxes in exchange for preserving habitat.

"We're working with the state forestry commission to explore the possible options," he said. "Ultimately, we believe incentives are the key to good wildlife management on private lands, including endangered species protection." 🐿



Expansive woodlands offer prime habitat for deer, turkeys, quail, songbirds and other wildlife at the newly established Palachucola Wildlife Management Area in Hampton and Jasper counties.

CORPS BUYS 6,000 ACRES TO REPLACE FLOODED HABITAT

Twelve years after pledging to replace wildlife habitat inundated by Lake Richard B. Russell, the U.S. Army Corps of Engineers has lived up to its commitment.

The federal agency earlier this year paid \$7.9 million for almost 6,000 wooded acres bordering the Savannah River in Hampton and Jasper counties. Under an agreement with the state wildlife department, the property, now called the Palachucola Wildlife Management Area, will be used exclusively for wildlife and outdoor recreation.

"We made a commitment to the people of South Carolina and Georgia to purchase management areas, and we have kept that commitment," said Col. Wayne W. Boy,

district engineer for the Corps' Savannah District.

Encompassing longleaf pine uplands, hardwood bottomlands and other natural habitats, the Palachucola WMA hosts a variety of wildlife and plants, including threatened and endangered species. The state wildlife department, which operates the Webb Wildlife Center adjoining the new property, will manage the tract as a multiple-use area for nonhunted species such as migratory songbirds, as well as game animals like deer, turkeys, rabbits and quail.

Scheduled deer hunts will be held on the property next fall, with participants selected by public drawing. To request an application form, or for information about other recreational opportunities, write SCWMRD, WMA Program, P.O. Box 167, Columbia, SC 29202. 🐿

ROUNDTABLE



Brimming with smiles, six-year-old Kimberly Gootee hefts a reard sunfish, also called a shellcracker. South Carolina's Free Fishing Days, June 11 and 12, offer an ideal chance to introduce kids to the pleasures of fishing.

GRATIS FISHING DAYS PROMOTE CLEAN FUN, CLEAN WATER

South Carolina's fourth annual Free Fishing Days are set for June 11 and 12, the Saturday and Sunday at the end of National Fishing Week.

During Free Fishing Days, any resident of South Carolina except commercial fishermen may fish without buying a state fishing license. Coastal anglers may also fish on those two days without a saltwater fishing stamp.

Offering people a chance to fish for free not only promotes the sport of fishing, but also helps them appreciate the need for healthy aquatic resources,

said Val Nash, chief of the state wildlife department's freshwater fisheries section.

"People who fish understand the importance of keeping our waters clean," he said. "That kind of concern carries over to all areas of environmental stewardship."

Some 842,000 people, or about one out of every four people in the state, fish in South Carolina, studies show. Lumped together, their spending adds \$400 million to the state's economy each year.

As important, fishing offers wholesome fun that families can enjoy together, Nash said. And it creates a lifelong interest in preserving the state's natural resources. 🐸

MERCURY WARNING ISSUED FOR 13 RIVERS, TWO PONDS

State health officials are advising people to limit their consumption of some types of fish from 13 South Carolina rivers and two Aiken County ponds because of elevated concentrations of toxic mercury.

Rivers affected by the advisory issued March 4 include the Intracoastal Waterway, Edisto, North and South Fork Edisto, Black, Waccamaw, Santee, Coosawhatchie, Combahee, Pocolaligo, Lynches, Little Pee Dee and Great Pee Dee. Langley and Vacluse ponds in Aiken County also are under the advisory.

Elevated mercury levels were detected in largemouth bass, bowfin, catfish, bluegill and reard sunfish. Other types of fish and more waterways may be added to the advisory as ongoing tests are completed, officials said.

Pregnant women, infants, children and anyone with neurologic diseases face the highest risk for health problems and *should not eat any fish* from the affected waters, said Douglas Bryant, commissioner of the S.C. Dept. of Health and Environmental Control.

Consumption guidelines for women who are not pregnant and adult men range from one-half pound a month for some species in certain rivers to 5 1/2 pounds a month in others. People can call their local DHEC Environmental Quality Control office for specific guidelines.

"There is no identified source

of the mercury," said Russell Sherer, chief of the Bureau of Water Pollution Control. "We are aware that twenty-nine other states are also seeing elevated levels of mercury in fish. Florida and the EPA have studies under way to try to determine the source, and we will be watching for their results."

State wildlife officials said the advisory should not prevent the use and enjoyment of the state's fisheries.

"People can continue to fish," said the agency's executive director, James A. Timmerman Jr. "But when it comes to consumption, that's when precautions should be taken."

People who have eaten fish from these rivers often or in large quantities throughout their lives may not show any symptoms of illness, according to Robert F. Marino, director of DHEC's Division of Health Hazard Evaluation.

"We don't have any reports of mercury poisonings in South Carolina," Dr. Marino said.

DHEC's Sherer said mercury has not been detected in drinking water or sediment samples collected from the rivers. 🐸

Hooked on fishing!
NOT on drugs.
Take the family fishing!
See Events, page 4.

FISHING LAKE TO REOPEN FOLLOWING OVERHAUL

Fishing will be fine when Star Fort Pond at Ninety Six National Historic Site in Greenwood County reopens June 1.

The state wildlife department has been working to rejuvenate the pond's fish population since 1992, when the agency took over management of the 27-acre impoundment from the National Park Service.

Wildlife workers during the past two years stocked the pond with more than 30,000 fish, including bluegills, redear sunfish, largemouth bass and channel catfish. The pond has been closed to anglers since August 1992 to allow the fish time to grow.

"Our surveys show that many people prefer to fish on smaller bodies of water such as Star Fort Pond," said Gene Hayes, district fisheries biologist in Greenwood. "There are no other public lakes this size in the western part of the state, so this will be a great addition for area fishermen."

The lake will be open for fishing on Wednesdays and Saturdays only June 1 through November 1. Boats with electric trolling motors are allowed; anglers are requested not to use minnows for bait.

On Saturday, June 4, parents and kids 15 years old and under are invited to Star Fort Pond for a "fishing rodeo" sponsored by the state wildlife department's Hooked On Fishing, Not On Drugs campaign. For more information, contact Capt. Stanley Smith at (803) 637-3397. 🐾

AT YOUR SERVICE: JOHN CELY



*If birds could talk,
they no doubt would sing the praises of John Cely.*

As a wildlife biologist with the Nongame and Heritage Trust Section of the state wildlife department, Cely devotes most of his time and energy to improving the lot of South Carolina's birds — whether that entails banding migratory warblers deep in a majestic forest, or writing a research report at his office in downtown Columbia.

A graduate of Clemson University with a bachelor's degree in zoology and a master's in wildlife biology, Cely's passion for birds was sparked at an early age when, as a youngster walking to grade school, he spied an orchard oriole perched in a tree on a vacant lot.

"I didn't know what kind of bird it was, so I went to the school library and asked for a book on birds," Cely recalls. "The librarian showed me a Peterson's Field Guide, and I was hooked. I read every bird book they had."

His work on behalf of birds began soon after graduation from Clemson when he was among a handful of conservationists most responsible for the protection of Congaree Swamp National Monument in lower Richland County. Today, the 22,000-acre monument safeguards one of the last old-growth bottomland forests remaining in the South and provides an important sanctuary for migratory songbirds.

The plight of tanagers, warblers, vireos, flycatchers and other migratory birds has captured worldwide interest recently, but Cely has been working to conserve these species for years. In 1989 he headed an important study using aerial photography to document widespread clear-cutting of South Carolina's bottomland hardwood forests, a crucial habitat for migratory birds and a host of other wildlife.

Cely has been involved with the international bird conservation organization Partners In Flight since its inception in 1990 and is coordinator for the South Atlantic Coastal Plain physiographic region. He also serves as South Carolina coordinator of Migratory Bird Day, part of a nationwide effort to focus public attention on the decline of songbirds through field trips, banding demonstrations and media presentations. (See Events, page 4, for information on this year's activities.)

Five years ago, Cely launched an ambitious endeavor to map the breeding areas of all South Carolina birds using a statewide network of volunteer birdwatchers. Field work is expected to be completed later this year, and publication of a Breeding Bird Atlas sometime in 1996 will mark an exponential leap in information about the birds that nest here.

Not content simply to gather information about wildlife, Cely regularly shares his expertise through presentations to conservation groups, news releases and magazine articles. His Backyard Naturalist column appears regularly in *South Carolina Wildlife* magazine. (See page 61.)

In honor of his diligent labors, the S.C. Wildlife Federation last year presented Cely with its Wildlife Conservationist of the Year Award. According to the federation, "John's quiet, inspired leadership by example invites others to follow him in his quest to preserve and protect South Carolina's wildlife." 🐾

ROUNDTABLE



LEONARD LEE RILE III

Bats favor hanging out in man-made nest boxes that receive at least four hours of daily sun, an ongoing study by Bat Conservation International has found. Other hot properties include boxes with ventilation slots and tin roofs.

BATS PREFER SUNNY HOMESITES, STUDY REVEALS

Bat researchers have been playing the role of realtors to discover why bats choose some man-made houses and refuse others.

The rising interest in bats as natural insect exterminators has led backyard naturalists across the country to erect bat houses in hopes of attracting the flying bug zappers, often with disappointing results.

But an ongoing study by Bat Conservation International involving hundreds of people who have either bought or built bat houses is shedding new light on the needs of these shadowy creatures. The most surprising revelation so far is their apparent affinity for sun.

Solar heating seems to play a vital role in bats' domestic satisfaction, researchers are discovering. Bat houses are more often too cool than too hot, so maximum solar exposure is crucial in Northern latitudes. Even in the South, the majority of occupied houses receive at

least four hours of daily sun, while those that receive little or no sunlight usually remain empty.

In central Georgia, Ronald Spears put up four bat houses. Three that are shaded are unoccupied, Spears reports, while one in full sun on a utility pole in a corn field has bats. This despite the fact that on summer afternoons the temperature inside the box has been recorded at 136 degrees!

According to the newsletter of the North American Bat House Research Project, "Reports thus far indicate that most successful bat houses are occupied within the first year, and that most failure results from too little exposure to the sun." 🦇

COASTAL FISHING FAIR SET FOR MAY 14, 15

Experts on saltwater fishing, bait rigging, artificial reefs, shellfishing, seafood cooking, knot tying and knife making will share their know-how with visitors at the 1994 Fishing Fair, South Carolina's largest saltwater fishing and marine exhibition.

The Fishing Fair will be held Saturday, May 14, from 10 a.m. to 6 p.m. and Sunday, May 15, from noon to 5 p.m. at the state's Marine Resources Center located at the end of Fort Johnson Road on James Island. Admission is free.

During the two-day event, the Center's historic grounds on the edge of Charleston Harbor will host more than 60 educational exhibits by state and federal agencies, private conservation organizations and commercial vendors.

An open house at the Marine Resources Research Institute will offer visitors a peek at some of the fascinating research projects conducted by division scientists.

The Fishing Fair is sponsored by the state wildlife department, the Harry Hampton Memorial Wildlife Fund and S.C. Sea Grant Consortium. For more information, call (803) 795-6350. 🦇

CAR PHONES HELPING CURB WILDLIFE CRIMES

Poachers and others who commit wildlife crimes are finding it harder to outfox the law as more and more motorists pack mobile telephones, state wildlife officials say.


"Motorists who see suspicious activity can report it immediately on a cellular phone, and that time factor can make a major difference," said Lt. William F. "Chip" Sharpe, coordinator of the state wildlife department's Operation Game Thief Program.

Last year almost 2,000 people called the toll-free number, resulting in more than 350 arrests for offenses ranging from night hunting to trespassing to littering.

"Our calls were up seventy-eight percent last year, with more calls coming in from people who provided good, solid information," Sharpe said.

People who call in a tip don't have to give their names and may receive from \$100 to \$500 in reward money for information that leads to arrests. The program last year paid out \$9,000 in rewards.

The toll-free hotline number, 1-800-922-5431, is printed on the back of state hunting and fishing licenses and also appears on the inside cover of local telephone directories under "Wildlife Law Enforcement." 🦇



**OPERATION
GAME THIEF**
1-800-922-5431
STOP GAME AND FISH VIOLATORS.

Over 6,400 people were convicted of breaking wildlife protection laws in South Carolina last year and paid a total of \$631,787 in fines.

BACKYARD NATURALIST: Who Pays For Birds?



Sixty million Americans spend nearly a billion dollars annually attracting birds to their homes. What does this economic clout mean for birds?

Every five years or so, the U.S. Fish and Wildlife Service conducts a nationwide survey of fishing, hunting and other wildlife-associated recreation. The latest study, completed in 1991, shows what a lot of us knew all along: bird feeding and other backyard wildlife activities are big business.

According to the survey, South Carolina residents in 1991 spent almost \$22 million on bird feed and another \$5.6 million on feeders, houses and baths. Approximately 855,000 South Carolinians, or about one out of every four people in the state, participated in a wildlife-related activity within one mile of their homes, including feeding, observing or photographing birds or other wildlife. Nationwide, an estimated 60 million Americans spend nearly a billion dollars annually attracting birds to

their homes.

Bird feeding has become so popular, in fact, that some species apparently don't need to migrate as far south to find adequate food in winter, causing us Southerners to charge our Northern countrymen with "keeping the birds to themselves."

Moreover, spending by birders now supports a thriving industry. Besides the many fine garden centers and feed and seed stores that carry feeders, Columbia, Charleston and other South Carolina cities now host retail establishments that specialize exclusively in feeders, baths, boxes and other birding hardware.

What does this economic clout mean for birds and other so-called "nongame" wildlife? It could offer a source of sorely needed funds for helping a host of creatures that now receive

little more than benign neglect.

The sad fact is, adequate conservation programs exist for only about 20 percent of the wildlife species in this country; the other 80 percent must get by as best they can. Most of the time we can only guess as to the status of these animals, what problems they may be having, and what we can do to help them.

A case in point is the neotropical migratory birds — the warblers, vireos, thrushes, flycatchers, tanagers, swallows, hummingbirds and others that make the annual sojourn to the tropics each winter, then return to North America in spring to nest. These migrants comprise over 40 percent of our breeding land birds in South Carolina.

Thanks largely to volunteers, we know something about the outlook for these species, which is gloomy for most and alarming for some. Yet within the past three years the state of South Carolina probably has spent less than \$25,000 on their behalf.

When faced with declining game and fish populations years ago, hunters and fishermen solved the problem by voluntarily taxing themselves through the purchase of hunting and fishing licenses, firearms, tackle and ammunition. Today, many outdoorsmen don't realize that they're paying a tax in the range of 10 percent every time they buy gear. Levies are imposed at the manufacturers' level and disbursed back to the states. This program has funded the comeback of many game and fish species and has proven so successful that most of us now take it for granted.

Could a similar program work for nongame wildlife? Congress passed the Conservation Act of 1980 that was supposed to do for all wildlife what the Pittman-Robertson and Dingell-Johnson Acts have done for game and fish, but so far not one nickel has been appropriated for the program. Items suggested for nongame excise taxes have included bird feed and feeders, field guides, binoculars, and certain photography and camping equipment.

Would such a tax be fair? One bird fancier I posed this question to recently replied indignantly, "I spend money feeding the birds and helping them, so why should I be taxed for doing so?" She may have had a valid point, but I pointed out that by spending a few more pennies on bird seed, she would help ensure there would always be birds around to feed.

The connection between camping and backpacking equipment and wildlife may be less obvious, but we know that both activities affect the land and can disrupt wildlife behavior, and that wildlife viewing and appreciation are often a big part of the camping experience.

We know that current funding for nongame wildlife is not getting the job done, and help from general appropriations (tax dollars) is highly unlikely. An excise tax system will work, but it remains to be seen if we have the will to enact one.

If you'd care to share your opinion on this subject, write to me at SCWMRD, P.O. Box 167, Columbia, SC 29202.

— John Cely

THE WILDLIFESHOP

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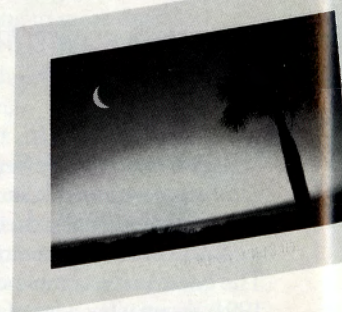
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