onearth

VOLUME 25, NUMBER 4 WINTER 2004

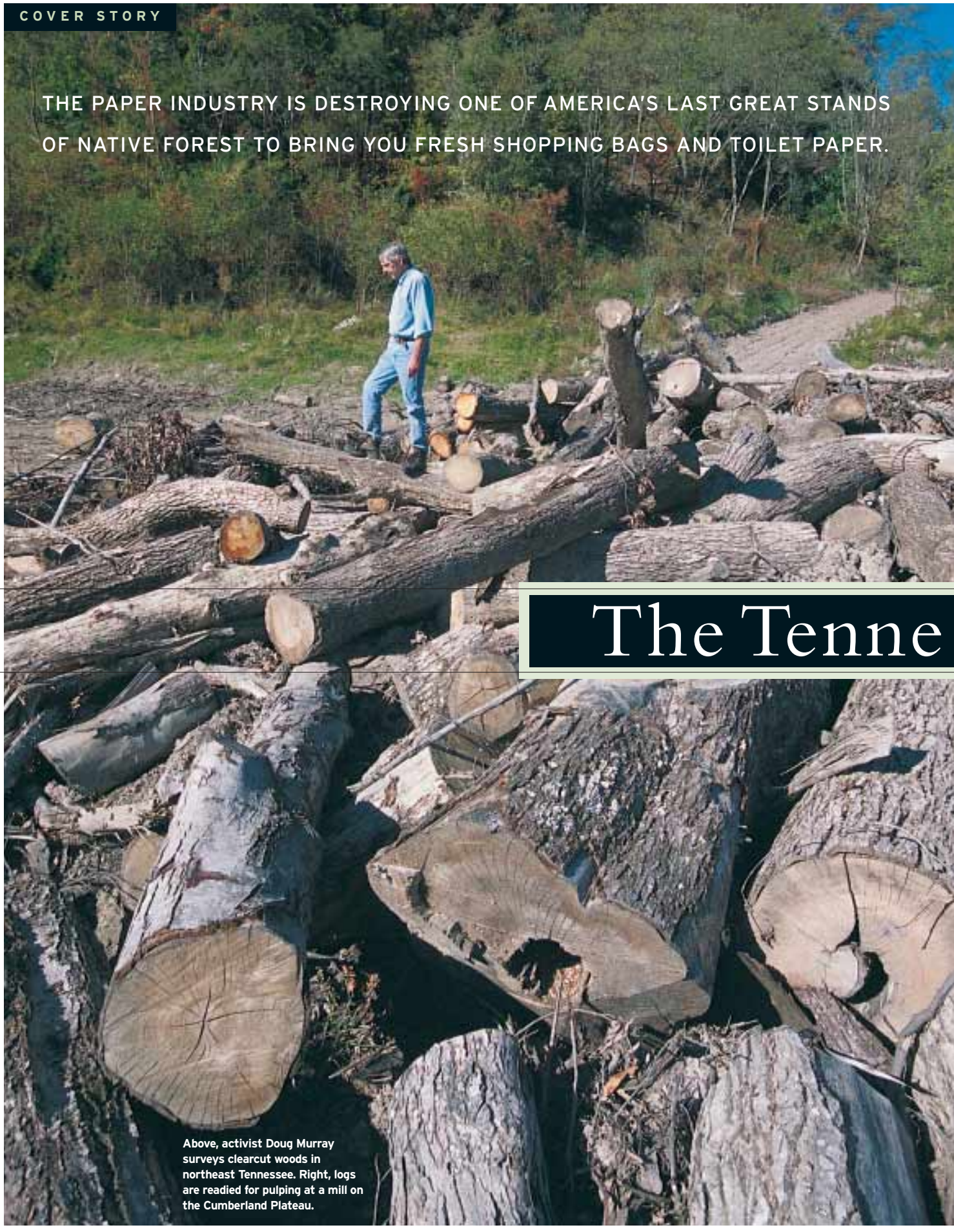
14 COVER STORY **The Tennessee Tree Massacre**

by Alex Shoumatoff

The paper industry is one of the filthiest and most destructive in the world. And in the southeastern United States, the Cumberland Plateau is ground zero. A close-up look at how paper companies are decimating some of the most beautiful native forests in all of North America and at the local folks who are most deeply affected.

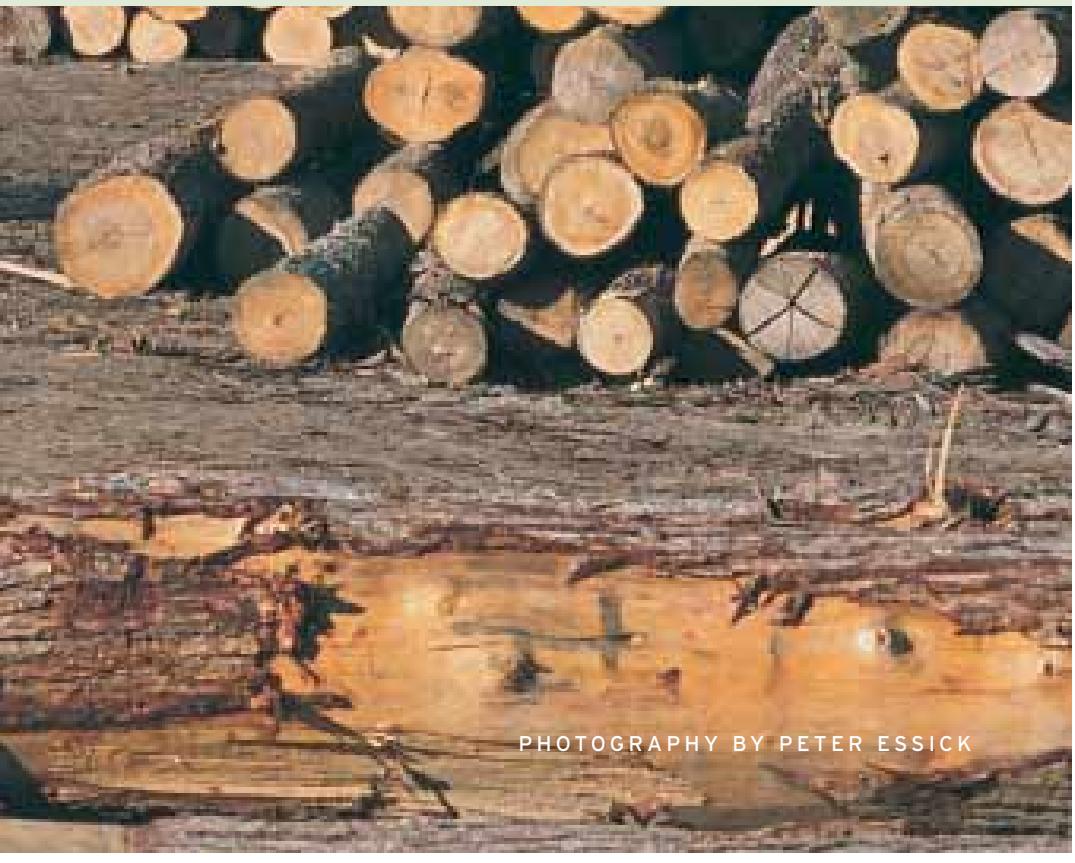
THE PAPER INDUSTRY IS DESTROYING ONE OF AMERICA'S LAST GREAT STANDS OF NATIVE FOREST TO BRING YOU FRESH SHOPPING BAGS AND TOILET PAPER.

The Tenne



Above, activist Doug Murray surveys clearcut woods in northeast Tennessee. Right, logs are readied for pulping at a mill on the Cumberland Plateau.

ssee Tree Massacre



PHOTOGRAPHY BY PETER ESSICK

The Flyover

A SPECIAL INVESTIGATION
BY ALEX SHOUMATOFF

If there were an international tribunal that prosecuted crimes against the planet, like the one in The Hague that deals with crimes against humanity, what is happening on the Cumberland Plateau in eastern Tennessee would undoubtedly be indictable.

The crime—one of many clandestine ecocides American corporations are committing around the world—has taken place over three decades. About 200,000 acres on this tableland have already been clear-cut by the paper industry, and the cutting continues. Where once grew some of the most biologically rich hardwood forest in North America's Temperate Zone (which extends from the Gulf of Mexico to southern Canada), there are now row after row of fast-growing loblolly pine trees genetically engineered to yield the most pulp in the shortest time. But the paper industry's insatiable appetite for timber has met with unexpected competition from an equally voracious insect. In the last four years, an estimated 50 to 70 percent of the pines planted on the plateau have been devoured by the southern pine beetle. The entire South has been ravaged by the worst outbreak in its history of this native predator of pine trees, caused by the tremendous increase in the amount of pine available for it to eat on the

industry plantations that have replaced the native forest. Unable to salvage its dead timber, the paper industry has been losing hundreds of millions of dollars. Yet it seems still committed to destroying what remains of the extraordinarily lush forest on the Cumberland Plateau, which, along with eastern Tennessee's Great Valley and the Cumberland Mountains, has the highest concentration of endangered species in North America. The loss of biodiversity is tragic but also absurd economically; it doesn't even make good business sense.

Not many people are aware of what is taking place. Nearly 90 percent of the Cumberland Plateau is in private hands and exempt from all but a few government regulations. The federal and state agencies that are supposed to be regulating the paper, timber, and mining industries are populated with these companies' former executives and have come to view these industries as clients whose permits and projects should be facilitated rather than scrutinized. The cozy relationship that exists between Tennessee's public and private sectors, and the impunity and magnitude of the environmental destruction taking place on the plateau, are what you might expect in Guatemala or deep in the Brazilian Amazon, not in our republic, where there are supposed to be laws that protect our wilderness treasures and prosecute conflicts of interest. But a quarter of the world's paper and 60 percent of America's wood products are being produced in the South, and the will to address the abuses of the paper industry, which contributes millions of dollars to the campaign coffers of politicians around the country, just isn't there—certainly not in Tennessee.

There's another reason for the lack of public awareness: Much of the devastation is hidden from view by thin "beauty strips" of native forest left along the plateau's highways. The only way to get the full picture is to go up in a small plane and see it from the air.

MILLS ON THE CUMBERLAND PLATEAU PURCHASE TIMBER FROM LOCAL LOGGERS BUT ASK FEW QUESTIONS ABOUT WHERE OR HOW THE TREES WERE HARVESTED.

SO EARLY THIS PAST SEPTEMBER I took off from Knoxville in a Cessna 182 piloted by Hume Davenport, the founder of a nonprofit, conservation-minded aviation service called SouthWings. Hume, whose ancestors came to the Cumberlands in 1801, has provided his "flying classroom" to dozens of journalists, environmentalists, and policymakers trying to grasp the enormity of what is happening on the plateau.

The Cumberlands (some dispense with the *s*) are made up of the Cumberland Plateau and the mountains and foothills on its edges. The plateau itself is a 400-mile-long tableland that is the tail end of the Appalachian Plateau; it extends from West Virginia and Virginia down into Kentucky and Tennessee on a southwesterly diagonal and peters out in Alabama. The part in Tennessee tapers from 55 miles wide to about 38 and covers 6,875 square miles—an area larger than the state of Connecticut. About 85 percent of it is still covered with the native woodland. Some of the last remaining large stands of the Appalachian mixed mesophytic forest (where a variety of hardwoods grow in moderately moist conditions) are here, but the plateau was "pretty much raked over the coals a century ago," Hume explained, and most of the trees are second growth. East of the plateau, plunging a thousand feet in a steep escarpment

CAMERON DAVIDSON (LEFT AND RIGHT)

Left, an aerial view of a huge clearcut, divided by a swath of remaining forest. Above, native woods logged 100 years ago were allowed to regrow; now clearcut areas are turned into single-species pine plantations.

that was a formidable barrier for the westering pioneers until Daniel Boone forged a route through the Cumberland Gap in 1769, is the Great Valley of East Tennessee, where Knoxville and Chattanooga are and where the Tennessee River winds.

Soon we were over the Cumberland Mountains, whose peaks range from 2,000 to 4,000 feet. Hume's aeronautical map indicated "numerous strip mines," and we could see that some of the mountains had been cored like apples. Others had been decapitated, or "cross-ridge mined" in the industry's euphemism. The heyday of the mining was between 1920 and 1970, and its scars are mostly overgrown with vegetation. But mining is making a comeback. We circled Zeb Mountain, which the Robert Clear Coal Corporation had just gotten a permit to cross-ridge mine. Roads and sediment ponds had been put in on its slopes, and the trees had been clearcut, like a person who'd been shaved before an operation. Mud was oozing down into a stream below, smothering the habitat of a striking little fish called the blackside dace, which is found in only 30 streams on earth.

"Mining and clearcutting go hand in hand," Hume explained.

In nearby Pioneer, we made a few passes over the Royal Blue chip mill, owned by International Paper, the biggest paper company in the world. A chip mill is a satellite facility, where hardwoods of smaller diameter and plantation pines are diced into wafers that are taken to a mother mill, to be dissolved into pulp. The larger hardwoods are sawed into boards at another mill.

There are 156 chip mills and 103 pulp mills in the 13 southern states. More than a hundred of the chip mills were constructed between 1987 and 1997, when chip exports (mostly to Japan) escalated by 500 percent. Eleven mills get their wood from the plateau. Royal Blue alone eats up 7,000 acres of hardwood trees a year—oaks, tulip poplars, and half a dozen other species—from within a 75-mile radius. We could see two miniature logging trucks coming down the highway far below us, another being unloaded, and four waiting behind it. A huge claw suspended from a crane picked up the logs and fed them into the chipper, which spewed the chips out a pipe directly onto railroad cars that would take them to the Blue Ridge Paper Company's Pigeon River mill in Canton, North Carolina. Most of the wood here is "gatewood": Few, if any, questions are asked about where the timber comes from or the manner in which it was harvested.

WE BANKED SOUTHWEST and, heading right down the middle of the plateau, began to see massive devastation. "This isn't Ma-and-Pa, let's-clear-40-acres stuff," Hume yelled through the headphones. "It's big, industrial tree farming. When they took out the big trees a century ago, at least they left the little ones to take their place. But now they're scraping off the soil, right down to the bedrock. Because it's thin and sandy, they have to spray massive amounts of fertilizer from crop dusters so the pine trees can grow. It's complete insanity. Most of the trees they're planting are being chewed up by beetles. Look at these plantations. It's a graveyard."

Below us, vast stands of dead gray loblolly pine, covering hundreds of acres, had been skeletonized by the southern pine beetle, *Dendroctonus frontalis.* The beetle breaks out every 10 to 30 years—what triggers the outbreak is not understood—and attacks native longleaf, shortleaf, Virginia, black, yellow, Table Mountain, and white pines that are sparsely scattered in the hardwood forest. But with many tens of thousands of acres of monoculture pine on the plateau, the beetles have been having a field day. The beetles are even chewing up saplings and the prize conifers in people's yards. In a race against the plague, the paper companies are forced to harvest their

This article was made possible by grants from the Josephine Albright Patterson Fund for Investigative Journalism and the John Neu Family Foundation.

timber before it is mature, creating a glut of scrawny "bugwood" on the market. This has severely depressed the price of pulp. Couple this with the hundreds of millions of dollars of lost revenue from the timber the beetles have beaten them to, and competition from Canada's timber, and it' clear why the South's paper companies are in trouble.

The biggest landowner on the southern plateau is Bowater, the biggest manufacturer of newsprint in the country and one of the largest producers of the free-sheet coated paper used for glossy magazines and catalogs. Now, as we flew south over Crossville, the commercial hub of the southern plateau and a burgeoning retirement community, houses abruptly gave way to Bowater's industrial tree farms and huge squares of mangled wasteland that had been hacked out of the forest and not yet replanted. "This plateau has been ransacked," Hume said sadly. He took us over a particularly vast mutilated swath that some activists have dubbed the Triangle of Destruction, but it is only one of many.

The only clearcutting I had seen on this scale was in the Amazon 25 years ago. Every merchantable stick below us had been taken, streambeds and banks had been torn up and gouged by recklessly driven machines, and the understory shrubs and stripped-off branches and other debris had been bulldozed into windrows, some of which had been torched and were shooting up sooty flames. "It used to be just Bowater," Hume said, "but in the last few years International Paper and J.M. Huber—a wood products company—have gotten into the act. When Huber showed up in '97, we saw a vast increase, maybe a doubling, of the clearcutting." Four million additional acres of the South's forests are being converted to pine plantations each year, according to the U.S. Forest Service, and the conversion rate is expected to double by 2040.

On the plateau, this translates to an annual holocaust of about 3 million trees, 14 million if you count smaller trees and pines. What's driving this? Consider that a quarter of the world's paper is produced in the South. The average American consumes about half a ton a year—that's factoring in toddlers and oldsters and people on life support. This is 111 times the per capita consumption in India, 300 times that of some African countries. Much of this consists of glossy catalogs and other junk mail, which I get a two-foot stack of each week; the sections of the paper that I chuck without even glancing at them (the *Washington Post* and other newspapers are printed on Bowater paper taken straight from the plateau); the inch-high stack of napkins we're handed whenever we get takeout; the 10 feet of toilet paper we rip off to clean ourselves. As one environmentalist put it arrestingly: "We're wiping our asses with habitat."

The Forest Primeval

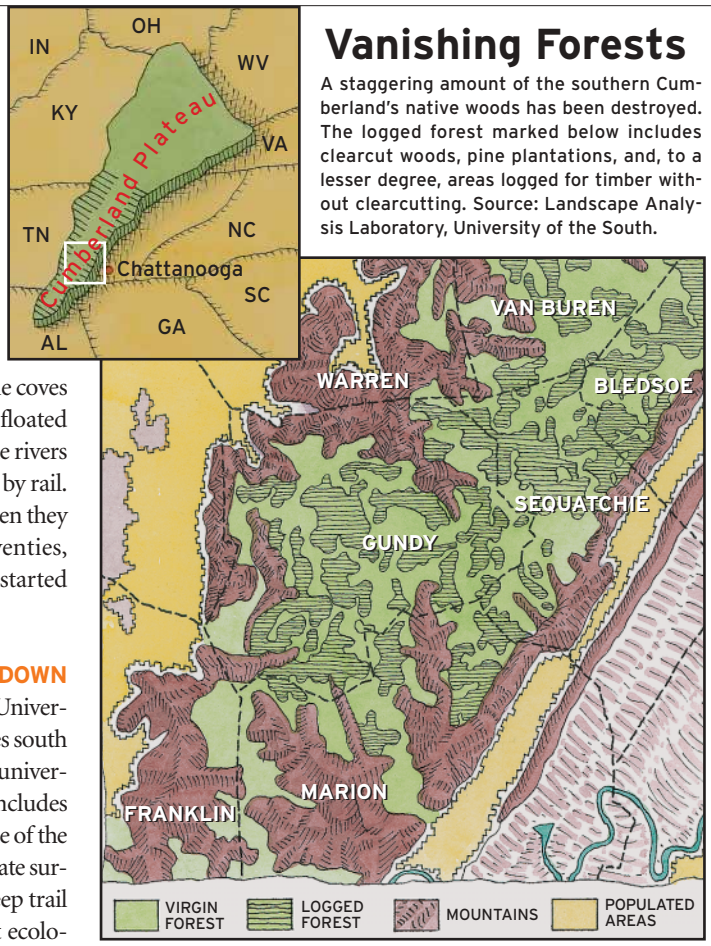
The Appalachian mixed mesophytic forest, which still covers five-sixths of the Cumberland Plateau, evolved without disturbance for hundreds of millions of years, because the glaciers never got this far south. Genetically distinct populations of plants, salamanders, and other organisms arose in the hollows, coves, and gulfs that pleat the plateau. There are nine endemic species of lungless plethodon salamander here. But amphibians are among the first victims of deforestation and of the desiccation and silting up of streams that ensue. The plateau also boasts 20 mussel and 40 crayfish species that evolved here and are found nowhere else. Even more diverse are the 231 fish species, of which 67 are endemic: 16 minnows, five suckers, two cave springfish, one killifish, one pygmy sunfish, one sculpin, and an incredible 41 darters. New species are being discovered all the time; others will probably be wiped out before they are identified.

The Cumberland Plateau is believed to have the highest concentration of caves and of cave-dwelling invertebrate species in North America. Three species of bat are endangered or threatened, and 12 of rodent. The plateau is also a major nexus for migratory birds, a pit stop for many species as they wend their way back and forth from South America or the Caribbean to the Canadian boreal forest, as well as the home of many year-round inhabitants.

The original forest still stands in only a few places on the plateau. Starting in the l870s, as the Northeast was industrializing and its

Below, ecologist Jon Evans stands in Shakerag Hollow, one of the most species-rich forests in America. When such woods are converted to pine plantations, heavy pesticide use has sickened locals like Bobby Clark, right.

cities were mushrooming, there was a great demand for wood. The agents of coal and timber corporations came down and hornswoggled the unschooled people of the Cumberlands out of their trees, paying 40 cents (in the coin of the day) for a 175-foot-tall tulip poplar, offering a new squirrel gun for 3,000 acres of timber rights. Pretty much every decent-sized tree, except the ones in the most inaccessible coves and hollows, was sawed down and floated down the Cumberland or Sequatchie rivers or, beginning in the l890s, taken out by rail. The logging boom ended in l901. Then they went after the coal, and in the seventies, when most of that was gone, they started in on the trees again.



Vanishing Forests

A staggering amount of the southern Cumberland's native woods has been destroyed. The logged forest marked below includes clearcut woods, pine plantations, and, to a lesser degree, areas logged for timber without clearcutting. Source: Landscape Analysis Laboratory, University of the South.

MARIO STASOLLA (MAP)

HUME BROUGHT HIS CESSNA DOWN at a small airstrip belonging to the University of the South, in Sewanee, 50 miles south of the Triangle of Destruction. The university has a 10,000-acre campus that includes most of Shakerag Hollow, where some of the last virgin, old-growth forest in the state survives. We picked our way down a steep trail into it with Jonathan Evans, a plant ecologist at the university, and his colleague David Haskell, who is an animal ecologist.

David, a lanky, long-bearded Englishman who looks like the young Alfred Russell Wallace or one of the other Victorian naturalists, said he'd like to get his hands on the local fishermen who came down into the hollow with buckets and filled them with salamanders for bait. Mountain dusky, spotted, marbled, and slimy salamanders live here. A dozen or so large, dazzling butterflies were flapping around: pipevine swallowtails, red-spotted purples, tiger swallowtails, a gulf fritillary, and a lone monarch fueling up for the long flight it would soon be taking to its winter hibernaculum in the volcanic highlands of central Mexico.

A hundred feet down we paused on a ledge under an overhanging wall of algae-greened sandstone, whose cracks David said were home to "a mysterious green plethodon." Jon pointed out a rare perennial, *Silene rotundifolia*. Another 30 feet down we came upon several papaw trees. Papaw must be one of the least-known fruits in America—it tastes like a cross between papaya, banana, avocado, and mango—as well as one of the few that can ripen without direct sunlight.

As we continued our descent, the trees began to get very tall, 150, 200 feet high or even more: soaring, pencil-straight red oaks, tulip poplars, black walnuts, buckeyes, sugar maples, and mockernut, pignut, and shagbark hickories. Some were cabled with grapevines so thick you couldn't enclose them with your hands.

Jon pointed out some wild yam, a yellow mandarin (in the lily family), rattlesnake ferns, a rack of ghostly-white oyster mushrooms on a fallen, rotting log. David identified curiously approaching Carolina chickadees and tufted titmice, the flirtatious *tawee-tawee-tawee-tee-o* of a hooded warbler, the wheeze of an Acadian flycatcher, and found a mountain dusky salamander and a green frog below a spring spurting out of the steep slope of the hollow. Jon picked up a stout five-inch-long green caterpillar whose head was bristling with menacing red horns. This was the biggest caterpillar I had ever seen or imagined could exist. He said it was called a hickory horn devil and would become a royal walnut silk moth. "We have the full complement of silk moths here," he told us proudly.

I ducked behind a boulder that had broken off from the cliffs above to find a four-foot-long black rat snake frozen in midslither and staring at me intently. It looked as if it had just eaten something, probably another snake. Black rat snakes are expert climbers and spend much of their time in trees, look-

"LOCALS HAVE BEEN SPRAYED BUT HAVEN'T COME FORWARD BECAUSE THEY DON'T THINK THEY CAN DO ANYTHING ABOUT IT, AND HAVEN'T GONE TO DOCTORS BECAUSE THEY CAN'T AFFORD INSURANCE."

Cielo Sand, cofounder of the Dogwood Alliance, which works to protect southern forests, sits in the middle of a 20,000-acre area of clearcut devastation that activists have come to call the Triangle of Destruction.

ing for nestlings or bird eggs. They kill by constriction. Very agile and fast, they are also known as pilot black snakes, because they den with timber rattlesnakes and copperheads (also denizens of Shakerag Hollow) and lead them to safety when the den is threatened. We returned up the path a few minutes later and peered behind the boulder where the snake had been. It was gone.

The forest was so lush and teeming with life, I half expected to see monkeys flinging themselves through the trees. Shakerag Hollow has one of the most riotously species-rich forests in the South. By contrast, the pine plantations that are rapidly replacing these fecund ecosystems have 90 percent fewer species, according to one estimate by Harvard biologist E.O. Wilson. Who in his right mind would sanction this devastation, I wondered. Why? So we can have more reading matter, more toilet paper? So the beetles can have another smorgasbord? Is this a reasonable trade-off, or is it a kind of blasphemy?

Spinning the Landscape

We had not come to Sewanee to take a walk in Shakerag Hollow. That was my idea: I wanted to get a clear picture of what is being lost. We had come to talk to Jon about the study he and his colleagues at the university's Landscape Analysis Laboratory put out last year. Called "An Assessment of Forest Change on the Cumberland Plateau in Southern Tennessee," it is the first scientifically rigorous quantification of the havoc that the paper industry has been wreaking, going back to 1981, in the seven southernmost of the 16 counties on the Tennessee part of the plateau. Jon was the principal investigator. David assessed the impact on the birds and the salamanders. Not surprisingly, he found that the salamander populations in the clearcuts were dramatically smaller and that the bird communities in the native forest, which have some of the highest biodiversity in the Southeast, could not be supported by the pine plantations and residential areas taking the forest's place.

Jon had come from Rice in 1994, attracted by the size of the campus and the opportunities it offered to study natural forest change. One day he went up in a plane to see what the forest looked like from the air, and he saw, as we just had, the clearcuts on Bowater land bordering the campus. "It's sickening, isn't it?" he asked us. "I can't go up there anymore. When we started our study, in the late 90s, the plateau wasn't on anybody's radar. Zack Wamp, the congressman from Chattanooga, had been hearing from his constituents who were alarmed by what was going on, but the paper industry was spinning the landscape." Industry representatives were telling officials: There's always been pine on the plateau; we aren't doing anything different up there.

"So we put a macroscope on this landscape and showed it for the world to see," Jon went on. In numerous flyovers and by poring over satellite photos and aerial shots taken by various federal and state agencies, Jon and his colleagues studied a 616,000-acre area, comprising about 38 percent of the seven southernmost counties that had originally been plateau forest (as opposed to the less accessible cove forest like Shakerag Hollow). They discovered that 12 to 15 percent of their study area—or about 73,000 acres—had been converted to pine farms. They also found that the conversion rate had doubled in the last three years of the study, from 1997 to 2000. Only three years prior to Jon's study, the Tennessee Division of Forestry and the University of Tennessee Forestry Extension Service were maintaining that an extensive conversion of native forest to pine was not taking place. Using state-of-the-art computer mapping, Jon and his colleagues precisely documented, for the first time, the horrible reality. A veil that had been kept in place by industry, state foresters, industry-friendly academics, and number crunchers had finally been lifted.

Bowater

Climbing back into the Cessna, we rose above the University of the South's Gothic spires and flew southeast, off the plateau and into the Great Valley. Before long an enormous industrial complex—Bowater's Calhoun Mill—hove into view. The largest manufacturer of newsprint in the United States, it has been operating since l954 and sits on the Hiwassee River, a tributary of the Tennessee. As we circled it from several thousand feet above, the rotten-egg fumes of methyl mercaptan and hydrogen sulfide emitted by its digesters penetrated the cabin of the Cessna and gave us all nausea. This is a pervasive smell in much of the rural South. Bowater alone has 12 pulp and paper mills in the U.S., Canada, and South Korea, supported by 1.4 million acres of owned or leased timberland in the U.S., a large portion of which—about 700,000—is in the Southeast. It also owns 32 million acres of timber-cutting rights in Canada. Besides manufacturing 18 percent of North America's newsprint and 7 percent of the world's, Bowater produces five kinds of "market pulp," one of which—Calhoun southern bleached hardwood kraft pulp—is made here, from "premium grade southern mixed hardwoods," as the company's website explains. The hardwoods come from the Cumberland Plateau, where Bowater owns about 160,000 acres. We could see a continuous procession of logging trucks entering and exiting the compound, adding their loads to a pile of logs covering an area the size of several football fields and three stories high. "The scale of this operation is just intimidating," Hume said. "It's hard to fathom how many trees, how many acres of forest, it must take to feed it."

Plantation pines are ravaged by the southern pine beetle.

After being unloaded, the logs, both the native hardwoods and the plantation pines—scrawny bugwood, for the most part—are debarked in a drum. What happens next is typical of any pulp and paper mill. The bark is used with coal (of which there was a small mountain near the entrance of the complex) to fire the plant. The logs are fed into a chipper, and the chips conveyed to digesters, where the natural glue that binds the cellulose together in rigid columns of wood is dissolved in a soup of highly toxic chemicals (including the ones we were gagging on). The broken-down fiber then undergoes varying stages of pulping, from gray to off-white. The lower-grade, softwood pulp is pressed into newsprint and wound on rollers, which are trucked to the printing plants of the *Washington Post* or one of Bowater's dozens of other customers. Some of it is sent to the Kimberly Clark mill in nearby Loudon, Tennessee, to be made into an assortment of tissue products, including Cottonelle toilet paper.

Converting the timber that comes to the Calhoun Mill into pulp and paper requires tons of chemicals a day. Some of them are produced by a plant that the Olin chemical company built close by. Instead of delivering the chemicals in hundreds of truckloads, Olin pipes them directly to the mill. The residue after the wood is broken down includes some of the most hazardous and toxic substances in existence, such as polychlorinated dibenzo P dioxins, mercury, and lead. Most of the mill's contaminated effluent is discharged into several huge sludge ponds that we could see beside the river. There it is broken down chemically and eventually discharged into the river.

"Generally, the paper industry's view is that the solution to pollution is dilution," explained Allen Hershkowitz, a senior scientist at the Natural Resources Defense Council (NRDC).

In the early nineties, the Calhoun Mill had a "color issue": Its effluent changed the color of the Hiwassee. "But the state worked with them on it," an activist told me, "by raising the threshold of permissible visible color change so the mill could meet its water-quality standards."

A FEW DAYS LATER

I put in a call to Barry Graden, Bowater's southeastern woodlands operations manager. I asked him if I could come down and talk to him and get a tour of the mill and maybe go up with him to the plateau and take a look at Bowater's operation up there. We did a little Tennessee waltz, with me proposing six days, one after the other, when I could come, and Barry telling me that he was booked on all of them.

"What about somebody else, then?" I asked. "Is there somebody else who could show me around?"

"I'm running into a brick wall on that one," Barry said.

"What about Dave Smith, your timberlands manager?" I suggested. "He must know all about the operation."

"Dave isn't authorized to talk to the media," he said. "We have a strict policy regarding the media."

"Well then, could you just tell me someplace that I could go to on my own where I could see what you're doing?" I asked. Here he was no help either.

Barry and I did end up having a long talk on the phone, during which he described all the good things Bowater was supposedly doing on the plateau. But it bore little resemblance to what I had seen from the air and from the ground. Barry explained that Bowater subscribed to something called the Sustainable Forestry Initiative (SFI), whose ob-

BARRY GRADEN, SOUTHEASTERN WOODLANDS OPERATIONS MANAGER FOR THE BOWATER PAPER COMPANY, ASSURED ME THAT "EVERYTHING WE DO IS VERIFIED BY AN ENVIRONMENTAL AUDITOR."

jectives included "protecting wildlife habitat, biodiversity, and watersheds, conserving soil," and attending to the "visual impact" and "the aesthetics" of timber operations. Barry himself was in charge of Bowater's compliance with the initiative for the Southeast. More than 100 million acres of American forestland are enrolled in the program. But not everyone shares Barry's enthusiasm for the initiative. Activists contend that it competes with—and intentionally obscures—another protocol known as the Forest Stewardship Council (FSC), which was developed in 1993 by environmental and other activist groups and businesses. A number of large corporations, including Home Depot and Ikea, now participate in the Forest Stewardship Council by agreeing to purchase wood, whenever available, that is FSC-certified—that is, harvested in accordance with sustainable logging and plantation practices.

"The paper industry's response was to confuse the issue," Allen Hershkowitz explained, "and counter the market momentum generated by the Forest Stewardship Council. International Paper will stamp on its paper that it is complying with the SFI, and people will think it's the FSC. It's a classic weakening technique. But the SFI sucks; it allows enormous habitat destruction. It's a fig leaf that tolerates all kinds of bad practices, business as usual. Everything that is happening on the plateau is SFI-certified."

Barry assured me, "Everything we do is verified by an environmental auditor. We provide our customers, the media, and environmental organizations the opportunity to see for themselves that we're doing what we say we do." Apparently that didn't include me.

Barry also claimed that Bowater made every effort to protect endangered species, but Lee Barclay, the supervisor of the U.S. Fish and Wildlife Service's field office in charge of protecting the federally listed endangered and threatened species in Tennessee, complained that he often can't get on the paper companies' land to see what is there.

"They have to give us permission to enter," Barclay told me. "It's private land, so we have no authority unless we have proof that they are knowingly thumbing their noses at the Endangered Species Act, and you need dead bodies to do that. Their attitude is, if we let them get a foot in the door, we'll never be able to close it."

Just this October, the discovery of a new species of salamander on the plateau was announced. Who knows what other undiscovered flora and fauna are on the 90 percent of it that is in private hands?

The Neighbors

I spent a week poking around on the plateau, talking with activists, victims of spraying, government bureaucrats, local people in the "hollers." In the Cumberland foothills west of the plateau, near Pleasant Shade, which is near Difficult, which is near Defeated (where Confederate soldiers lost a battle to the Union), I walked out on a knife-edge ridge into some plateau forest that had never been cut. I saw some of the biggest black walnuts and beeches in the country, so thick a class of 15 schoolkids would have had trouble encircling one of them with their joined hands. Twenty or so wild turkeys were rooting around in the leaf litter. Pileated woodpeckers were calling exultantly, having just ripped into a dying tree and slurped up a meal of carpenter ants. It was like the sound of the jungle. I came across an old, fallen-down farmhouse and barn that had been built with massive, dovetailed chestnut planks eight inches thick, two feet high, and 15 feet long. Straight-grained, rot-resistant, easy to split and to plane, and lasting forever, chestnut is an almost perfect wood, and the first tree that the settlers and loggers went after.

I bought some watermelons from 84-year-old Willard Bouldin, who lives on a farm above the Triangle of Destruction. "That clearcutting was the worst thing that ever happened around here," Willard told me. "I mean they took everything, till the only thing left was burrs. What're they gonna do when they run out of wood?" he mused. "I guess they'll have to make paper out of something else."

I spent a night at Rita Pruett's bed-and-breakfast, on the edge of Fall Creek Falls State Park, which is in the heart of the plateau and boasts the highest waterfall east of the Rockies. "Most of my guests are out-of-state leaf peepers," said Rita, whose people have been living on the plateau since the l830s. "They come over from the Smokies and say that our leaves are the prettiest. They don't come here to see clearcuts or pine plantations." She took me for a drive, past the one-room schoolhouse that she had walked to as a child, past the boarded-up garment factory where she had worked to put herself through college, past her parents' homestead up on Spencer Mountain, where we looked out over thousands of acres of Bowater clearcut. "This is where it really hits me," she said sadly. "The devastation is so vast, and it's all happened in just the last few years."

An endangered marbled salamander nests with her eggs.

THE FOREST WAS SO LUSH AND TEEMING WITH LIFE, I HALF EXPECTED TO SEE MONKEYS FLINGING THEMSELVES THROUGH THE TREES. BY CONTRAST, PINE PLANTATIONS HAVE 90 PERCENT FEWER SPECIES.

Joe Rogers, whose people have lived up the road from Rita, in Spencer, for generations and now look out on thousands of more acres of Bowater clearcut, drove me out to the park's Cane Creek Gulf overlook. It was a magnificent wilderness vista, like a canyon in the Southwest except that it was full of trees. Its rims bristled with native old-growth conifers that had escaped the beetle and never been cut because the terrain was so rugged. Joe had worked for the National Park Service, teaching its employees how to combat highly invasive exotic species like kudzu and Japanese honeysuckle, until the program was terminated by the Bush regime last year. "This is what it all looked like," he told me, "and given the right circumstances, it could all come back like this. But the forest isn't being given time to renew. I've seen this clearcutting going on for years, and it's just greed from my point of view. There's a way to farm these forest products, as they're called, without decimating the environ-

ment. But they're just looking at their quota sheets, trying to generate money."

We drove down to Highway 8 and headed up Rocky River Road, which runs right through the Triangle of Destruction. Because it's a back road, Bowater hadn't bothered to leave beauty strips, so you could see the mutilated wasteland spreading in every direction. Much of it was bare earth, with a few branches and other debris scattered on it. We passed three flatbeds loaded with scrawny bugwood waiting for trucks to come and take them down to the Calhoun Mill, and stands of dead gray pine, and long lines of smoldering windrows separated by naked earth.

"This is all SFI-certified, if you can believe it," Joe said. We saw no effort to prevent erosion by revegetation, no buffers of native forest along the streams (the stream management zones touted by Barry Graden). The machines had just plowed right into the water, destroying the banks and streambeds.

"We gotta have more stringent laws here," Joe said. "A lot of the loggers"—locals whom Bowater contracts to cut their trees—"have only an eighth-grade education and don't know any better. There has to be environmental education, too, starting in elementary school, so when the kids grow up they can educate their parents."

"The northern corporations have taken advantage of these people for a hundred years," another longtime resident told me. "They feel powerless, and they are. When a corporation opens up a mine, they line up for a job that lasts five years, then they're right back where they started, except the land's all chewed up."

Looking for a Place to Call Home

SPECIES ON THE CUMBERLAND ARE FACING NEW THREATS

EASTERN COUGAR

RED WOLF

VIRGINIA BIG-EARED BAT

The Cumberland has the highest number of endemic species anywhere in North America. Some animals, above, are already rare (the cougar) or endangered; the red wolf is locally extinct due to overhunting. The pine plantations that replace forests after they're clearcut—"environmental disaster zones," says plant ecologist David Haskell—will only make it worse.

EVEN LOCALS WHOSE HEALTH has been damaged by the aerial spraying of herbicides and fertilizers hesitate to come forward. After an area has been clearcut, herbicides like Arsenol, Roundup, and Escort are routinely sprayed to keep hardwood sprouts from competing with the pine that is going to be planted. Then, and repeatedly during the pine's 12–15 year growth cycle, fertilizers like diammonium phosphate and urea are sprayed to help them grow. The spraying is done by AT-802 crop dusters with 58-foot wingspans that fly low over the clearcut or right over the growing trees, dropping enough fertilizer to cover 20 to 30 acres per flight. The main outfit contracted by the paper companies is Thrash Aviation, which in the fall of 2001 sprayed more than three million pounds of fertilizer on Bowater lands in eastern Tennessee. Another company, AirTech, sprays herbicides.

"The local residents are not notified, and the toxic compounds frequently drift over their property and cause physical ailments like headaches, nausea, burning lungs, nosebleeds, skin rashes, and SARD, or severe airway restrictive disorder, with which dozens of plateau people have been diagnosed," said Mike Knapp, who is working on the issue for an organization called Save Our Cumberland Mountains. "Many others have been sprayed but haven't come forward because they don't think they can do anything about it, and haven't gone to doctors because they can't afford insurance. Only a few have substantiated their claims with blood tests and a full toxicological profile, which cost several thousand dollars." In April 14 families in Cumberland County filed a class-action suit against Bowater and AirTech.

Mike Crews was sprayed four years ago, and again last September 9, along with his 77-year-old mother and his 10-year-old grandson. They are preparing to sue AirTech and International Paper, which owns the clearcut bordering his mother's land in Pinkney, west of the plateau, where the latest incident took place. Mike is a 53-year-old employee of Murray International, where he transfers garden tractors from the paint line to the final assembly line, but he hasn't been able to work for a year because of his poor health. "We went over there when they were putting more poison into the helicopter and pleaded with them not to spray," he told me. "I was already exposed to drift in l999 and my health was weakened. I got heart and respiratory problems, and they have to keep an eye on my liver as well. I told them the way you're spraying, it's going to drift over our trees and kill them, and over the cattle in our pasture and our hayfields. They aren't supposed to spray when the wind velocity is more than 10 miles per hour, and I showed them how the leaves on the ground were blowing and said the wind velocity must be more than that. But the man kept filling the chopper with poison, and the pilot said to me, 'We have the right to spray and we're going to proceed.' So we drove over to the pasture and parked there, hoping that would stop them. My mom went into the woods, thinking it would shelter her from the mist. They flew over us seven times. We could feel the mist hitting our faces.

"The next morning all three of us were having trouble breathing, so we went over to the clinic in Columbia and had blood and urine tests. My hemoglobin was dangerously low, which it had never been before." Crews contacted a researcher at the Organic Crop Improvement Association, which investigates pesticide contamination. "He took samples off our shoes, clothing, and hats and found traces of 2-4 D, Bromacil, and another herbicide," Crews continued. "He hadn't compiled all the poisons last time I talked to him. And I had a light stroke a week ago last Wednesday, so I haven't been able to find out if he's finished the report.

"I've been battling this thing since l999. Someone in my shape, it kills you pretty quick. But I just want to say, on behalf of the communities of Pinkney and West Point, that we're keeping vigil. We're all trying to work together to do something about this."

The Forest Watchers

I spent a day tromping around in the Cumberland Mountains with Doug Murray, the founder of a grassroots organization called Tennessee ForestWatch, which he runs out of his house. An easygoing chain-smoking, 59-year-old Californian, Doug took me to his fa-

FAIRMAN STUDIO (ILLUSTRATIONS)

vorite beautiful places and showed me the horrible things that had been done to them. He objected to being described as an activist. "*Activist* to me implies some kind of a tree sitter or banner hanger or professional environmentalist," he said. "We are forest watchers," which in this case includes Doug, two naturalists, and a neighbor's 13-year-old boy, among others; none are paid. Doug, who has a master's degree in animal behavior and biology from Sonoma State University in California, puts in 10-hour days, walking in the mountains by day, and by night writing up reports of the violations of forests and streams and the laws protecting them.

"We are just ecokeepers, housekeepers of the larger house," Doug explained. "No expertise or Ph.D. is required. It takes nothing to recognize a ruined stream; it's innate, like the ability to recognize a bleeding wound or an ugly growth."

When Doug first settled in the Cumberlands 20 years ago, he built himself a cabin deep in the woods, but no sooner had he banged the last nail than chain saws started screaming all around him. The Champion paper company was cutting the 75,000-acre forest next to his land. They were his neighbors. "I discovered that there were no regulations, no notification of intent to cut, no protection for endangered species, a complete hands-off policy, because it was private property, and private property rights are sacred in this part of the world," Doug recalled. "Nobody knew what was happening, and nobody cared. Nobody was minding the store, so who was going to do it? Concerned citizens." Doug started to monitor and systematically document what he saw. "It was dicey," he recalled. "Who wants to march through private lands in the South, to tattle on really bad abuses? A guy could get his head blown off." He called his one-man watchdog organization the Center, "to keep it as low-key and ambiguous as possible."

Doug gradually became an expert on the intricacies of the Clean Water Act. "It's the only hook we have," he explained. "People think we're out to protect the water. We are, but it's only a mechanism for stopping the rape."

Doug took me into the Royal Blue Wildlife Management Area and showed me where an orange, highly acidic brook from an abandoned mine was pouring into a hemlock-lined creek called Straight Fork, wiping out the aquatic life downstream. This is what is known as point-source pollution and is a violation of the Clean Water Act. So are the destruction of stream banks and the diversion of their channels. These are the main things that Doug looks for. But getting anybody to do anything about such localized abuses is a major battle. Doug wrote up dozens of detailed reports and documented them with photographs and affidavits from natural scientists. Finally, five years ago, the Tennessee Department of Environmental Conservation, which had maintained that point-source pollution was only something that came out of a pipe, began to come around and decided that point-source pollution is, as Doug put it, "anything you can point a finger at."

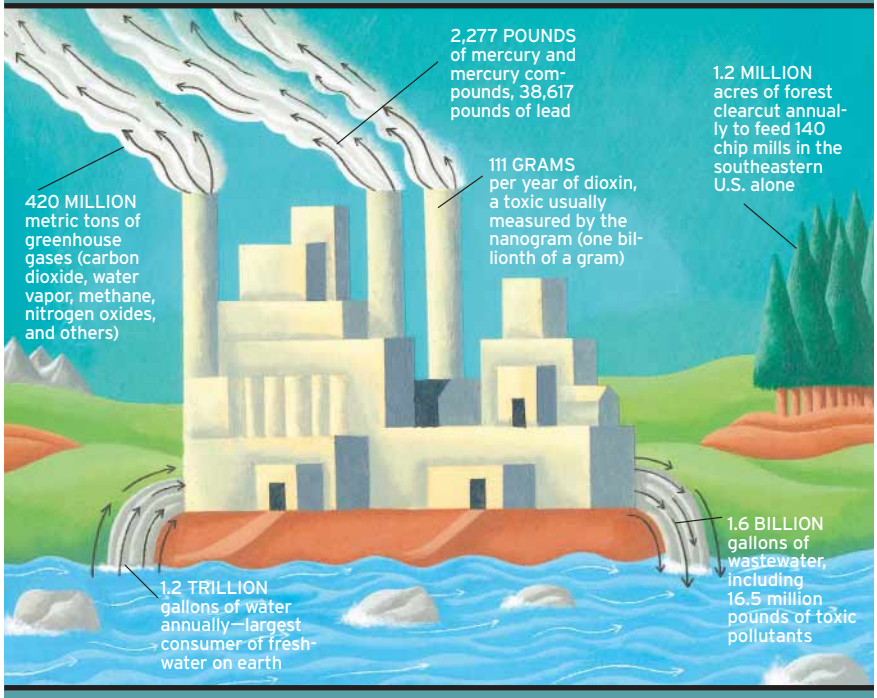
Doug's latest battle is to save the blackside dace from being wiped out by the sediment from Zeb Mountain. But a federal judge denied the motion for a temporary injunction, which would have stopped the mining until an environmental impact assessment was done. The judge, Thomas Varlan, one of President Bush's new judicial appointees, was a partner at Bass, Berry, and Sims PLC, which represents polluting companies and other bad actors, including Bowater. So the outlook for the dace in this stream is not good.

IN 1993 DOUG STARTED COMMUNICATING with an equally dedicated forest watcher named Cielo Sand. A Hoosier, she changed her name to Cielo after a vision quest in northern New Mexico in the late sixties. "I had no intention of becoming an activist," she said, "but the river called me."

Cielo is married to Leaf Myczack, who plies the 652-mile long Ten-

Doug Murray, the founder of ForestWatch, and his band of volunteers prowl the Cumberland woods to document illegal practices by industry. On this day he's accompanied by two helpers, Ann League and Jeff Clark.

A DIRTY BUSINESS, BY THE NUMBERS



HOW THE PAPER INDUSTRY POLLUTES: All statistics are for the U.S. per year (except where noted), and they paint a grim picture. The industry is the third-largest source, after chemical and steel manufacturing, of greenhouse gases; these emissions are expected to increase 100 percent by 2020. It is the fourth-largest source of dioxin emissions. The amount of timberland destroyed to feed the paper industry is projected to increase globally by 50 percent in the next 35 years. Source: Compiled by the Natural Resources Defense Council

nessee, looking for bad actors, in a 30-foot sailing ketch that he and Cielo built in the late eighties. The homemade tickets they issue have no official status or financial clout but are, rather, "moral wake-up calls," as Cielo explained, though they often prompt a response from the local press and, eventually, state authorities.

A few evenings after my day with Doug Murray, I pulled into the marina at Sale Creek, on the north bank of the Tennessee, half a mile north of Chattanooga. Cielo had invited me for dinner on their boat, the *RiverKeeper*. The sun was setting as we boarded it and headed upriver. We passed three brand-new mansions perched on a bluff, each of them 15,000 or 20,000 square feet and mostly glass. Three-story, swept-back cabin cruisers were moored at the docks beneath them. Their owners, the new American rich—a stark contrast to the dirt-poor plateau people living only 20 miles northwest.

On the other side of the river was a lower-middle-class waterfront community. We cruised past a family—a husband and wife and their three grown kids, all in the 300-pound range—sitting on their dock in aluminum deck chairs, drinking beers in the twilight.

Cielo has a disarming way of hanging out at convenience stores and getting information out of loggers. Under her gauzy New Aginess is a woman of grit and determination. She developed a relationship with the Environmental Quality Staff of the Tennessee Valley Authority (TVA), and they alerted her to the fact that 17 to 24 new sites were being considered for chip mills on the Tennessee.

Cielo and other activists demanded an environmental impact statement be done for three mills that were to be built on the river; as a result, in 1993 the TVA denied the mills permits. It was a huge win and discouraged other chip mills across the Southeast from applying for river permits. But off-river permits, which don't require an environmental impact statement, continued to proliferate.

In 1996, Cielo and Danna Smith, who had worked on forest-protection campaigns for Greenpeace, founded the Dogwood Alliance, an umbrella group of 72 grassroots religious, student, and community activist organizations concerned with protecting the forests of the South. Last year Dogwood and its partners got Staples, the $11 billion office supply company and one of International Paper's biggest customers, to commit to phasing out products from endangered forests and to use an average of 30 percent postconsumer recycled fiber for all its paper products, which was an enormous victory. Dogwood considers "market strategy"—leveraging the paper companies through their consumers—as the best way to stop what they are doing on the plateau. "Hitting them where it hurts is the only language they understand," Allen Hershkowitz agreed. "Some of Staples' paper probably comes from the Royal Blue mill, and they need to know this. A lot more chain-of-custody work—tracing the fiber from the forest to the mill to the consumers—has to be done. Office Depot is another big customer of International Paper, and it also buys from the Weyerhaeuser paper company's mill in Kingsport, Tennessee, which is just off the plateau and probably sources from it. Office Depot has to be pressured into making the same commitment that Staples and Home Depot have. Then we can get the three of them competing to have the greenest paper on the block. But first, a lot more dots have to be connected."

As for Bowater, because some of its mills supply newsprint or market pulp to practically every major publication in the country—the *New York Times*, the *Boston Globe*, the Knight-Ridder and Gannett chains; *The New Yorker, Vanity Fair, Vogue, GQ, Condé Nast Traveler* (which gives an annual environmental award), and the rest of the Condé Nast empire; *Golf Digest, TV Guide*—the leveraging potential is very promising. With the Dogwood Alliance as its main local partner, Allen is organizing an NRDC campaign that will invest five to seven million dollars into saving the Cumberland Plateau over the next 10 years.

"So what's that going to do for it?" I asked.

"It means we don't leave until we win," he said.

So things are starting to move. The Nature Conservancy and World Wildlife Fund have initiatives of their own to save the plateau, and a new democratic governor in Nashville, Phil Bredesen, and his progressive circle offer a window of opportunity for passing regulatory legislation with some teeth. The Cumberland Plateau is poised at a critical moment in its history. If the opportunity is squandered, if people simply keep playing the "Tennessee Waltz," they will awaken one day to an irreversible tragedy, just as the song says: *Now I know just how much I have lost.*

RUSSELL COBB (ILLUSTRATION)