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"GOOD SCIENCE": *Yours, or Mine?*



CRWC staff biologist accompanies Dr. Lewis Anderson, Dr. Jon Shaw and botanists from the New York Botanical Gardens to Rabun Bald: the site of a new Georgia state record for the Federally endangered Rock-Gnome lichen

I n s i d e . . .

Forest Health in the Chattooga River Watershed.....03	Monitoring Update: <i>Tuckaluge</i>20
"The Great Forest".....05	"Aldo Leopold's Name in Vain".....21
Salamanders of the Chattooga.....11	National Forest Plan Revision Response.....22
The Monarch Butterfly.....15	Chattooga Action Updates.....23
Interview w/ Forest Service Chief Jack Ward Thomas.....17	<i>The Ecology of Commerce</i> Book Review.....24
Endangered Species: "Managing For Extinction"?.....19	1996 Congressional Score Card.....25

Director's Page

Buzz Williams, CRWC Executive Director

"Science by itself has no moral dimension. But it does seek to establish truth. And upon this truth morality can be built." William Masters

It is my opinion that science and the architecture of public policy are inseparable. From the days of shamans and soothsayers through our present day penchant for seeking the counsel of a "Committee of Scientists", people in positions of power have been labeled as "good" leaders when their actions reflect the public's perception of compelling truth. Reliance on the counsel of scientists is, therefore, an essential element in governance, since science is nothing more than the search for irrefutable truth. Herein lies the rub: Irrefutable science is as elusive as the truth. Nonetheless, it is our moral duty to seek out this elusive truth, as our salvation lies in the quest for "good".

Today our political system has become so corrupt that oftentimes public policy is driven by campaign contributions, rather than by what is best for our country. Often, the public is misled by skilled politicians who wave the banner of scientific evidence to justify their voting records. To those who accept such arguments at face value I say: "Beware false profits"

Let's take a recent example. In August of this year, Congressman Charles Taylor (R-NC) attempted to green-wash himself in the wake of significant fallout from his sponsorship of one of the most flagrant and disastrous pieces of anti-environmental legislation on record, the Timber Salvage Rider. Mr. Taylor held a press conference at the US Forest Service's Bent Creek Experimental Station in Asheville, North Carolina, because he felt it was his "Christian" duty to educate the public and other Members of Congress. The subject: Forest health.

As referenced above, it was Mr. Taylor who introduced the "Salvage Rider" as a part of the 1995 Rescissions Bill, which unleashed "logging without laws" on our public lands in the name of timber "salvage". He based this legislation on the testimony of so-called "scientists" who claimed that past fire-suppression policies have produced unhealthy forests of dead and dying trees, which need to be harvested in order to restore a healthy, young forest. Thousands of old growth trees have been cut

down as a result of this salvage legislation, and scores of miles of roads have been built into roadless areas, destroying critical habitat for species whose numbers are already in serious decline. Now Congressman Taylor is working to gain support for Senator Larry Craig's "Forest Health Bill" that will be introduced in 1997 to replace Taylor's Timber Salvage Rider, which expires at the end of this year.

The Bent Creek "dog and pony show" went something like this: The public was invited to be educated by Mr. Taylor's panel of experts, which included 9

scientists all of which were advocates of old-school extraction forestry. The leader of this panel was a Dr. Chadwick Oliver, from the University of Washington's School of Silviculture and Ecology. Dr. Oliver's opinion on forest health can be found in his previous testimony at several congressional hearings on forest health. His position: Timber harvesting is the method of choice in any attempt to restore biological diversity.

Susan Andrew, ecologist with the Southern Appalachian Forest Coalition, proposed to Congressman Taylor that the panel also should include individuals who have a different scientific opinion on this issue. Mr. Taylor responded in the negative, and stated that he wanted to keep the panel "objective and without bias"

After the public had a chance to be educated by Mr. Taylor's lackeys, several other scientists in the audience were poised to express opposing views. However, Dr. Oliver (conducting the session) announced that these other scientists would not be allowed to speak, but would have a few minutes to write down questions which would be submitted to the panel for their response. Consequently, the abbreviated question-and-answer session was suppressed and quashed.

If science is indeed the search for truth, and that should be an inherent part of public policy decision-making, this fiasco by Mr. Taylor -- perpetrating biased and selective science -- was a travesty and an insult to the intelligent, caring citizens who elected him to Congress. In this case, suppression of opinion and lack of discussion is evidence enough that an otherwise valid search for the truth was not well served. In this issue we offer another view.

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THE HEALTH OF OUR FORESTS IN THE CHATTOOGA RIVER WATERSHED

Robert Zahner, Ph.D.

Professor Emeritus, Clemson University School of Forestry
*Speech delivered at the annual meeting of the Western
North Carolina Alliance, September 1996*

Why has "forest health" become such a national issue? Do we have a forest health "crisis" on our National Forests? Do we need new legislation to heal our National Forests?

Let's take a minute or two to answer these questions at the national level, then we can put the health issue in perspective for the Southern Appalachians. It all goes back to the catastrophic wildfires in Yellowstone National Park. The timber industry and the big multinationals had been searching for a sensational diversion to pull media and public attention away from the spotted owl and the clearcutting of the Pacific Northwest's ancient forests. And here it was: *All of our National Forests are going to go up in flames unless we do something. All this standing timber will be lost to the American public. Recreation, hunting, fishing, and beautiful landscapes will be charred and lost.*

The media have made no distinction between the forests that are actually at risk, that is ponderosa pine and lodgepole pine forests of the western interior, and the rest of our nation's forests. Even wildfires in the chaparral of southern California have been equated with a forest health crisis in the Pacific Northwest! All of a sudden there is a wildfire crisis, fabricated by timber

spokesmen to be a "forest health crisis". *We must salvage this timber before it is lost* they say.

Old dead and dying trees everywhere suddenly became indicators of unhealthy forests, contributing to a dangerous fuel build-up that will result in catastrophic wildfires. Industry went to Congress, and they had their congressman "Taylor-made" for their interests: Our very own Charles Taylor (Republican Member of Congress from North Carolina). And you know the rest of the story about the Timber Salvage Rider, and all the rhetoric and misinformation that brought about its justification.

There is no "forest health crisis." It is a fabricated straw man, a scapegoat, and all as an excuse to log billions of more board feet from old growth on our National Forests. The ancient forests of the Pacific Northwest are among the healthiest forests in the world: They should be left alone. The western pine forests certainly have dangerous fuel build-ups, but this is not necessarily a health problem; it is a management problem. The hardwood and pine forests of the East, including our Southern Appalachian forests, do have a few serious health problems, but any thinking person knows that the answer to solve them is not to cut them down.

This specter of a health crisis is still very much before Congress. The impending Craig Bill in the Senate (the Forest Health Protection and Restoration Act, S-391) has potential to do far more damage to our National Forests than Representative Taylor's Timber Salvage Rider. Mr. Taylor is on the House Committee for Natural Resources, and the timber industry wants him to make a report to justify the Craig Bill. This is why Taylor has assembled his so-called "scientific committee" to educate Congress and the American public that the only way to save our National Forests from certain death and wasted timber is to cut them all down and start over with young forests.

Before I detail the health of our local forests, let's find a good definition: "Forest health is a condition of forest ecosystems that sustains their complexity while providing for human needs". So the definition includes sustaining the health of all of the plants and animals. Note that the definition includes also the needs of people, but not just timber, because people need wildlife, fish, recreation, pure water, and beauty in the forest as well. Foresters, however, tend to look only at the health of the TIMBER crop.

Are dying trees a sure sign of poor health? Not at all. All healthy forests have dying and dead trees: from lightning strikes, ice and wind storms, and



The decline of red spruce forests at the highest elevations is caused by a combination of air pollution and acid rain

Forest Health *continued*

just old age. In fact, a healthy forest ecosystem must have large dead trees to provide nesting cavities for many birds and animals, and insects for food, and perches for raptors. Wildlife research has found that dens and nests are found in every large dead tree in a healthy forest. Decaying logs provide homes and energy to diverse plants and animals, and return nutrients to the soil. To say that the presence of old and dying trees in a forest is unhealthy is like saying that the presence of old and dying people in a human community is unhealthy.

We do not have a wildfire problem here in our mountains. Our hardwood forests of the East do not accumulate fuel. The annual leaf fall completely decomposes each summer, adding organic matter to the soil. Some of our south-facing slopes rarely catch fire from lightning during very dry weather, but these fires burn small areas and cause no serious damage. Arson fires set during drought periods sometimes burn over larger areas, but this is not a forest health problem; this is a human health problem.

Finally, what are some of our forest health problems here in the mountains? I have condensed the most serious into two categories: (1) air pollution and acid rain, with their attendant insect and disease pests, and (2) the loss of habitat by fragmentation.

In the first group, the most critical is the decline of red spruce forests at the highest elevations, caused by a combination of air pollution and acid rain. The devastation of Fraser fir by the balsam woolly adelgid in these same forests has been hastened by these same pollution factors. In fact, all plants and animals in our mountain forest communities are affected to some degree by air pollution and acid rain. White pine, yellow-poplar, black cherry, and a dozen other species, although not obviously in decline, are known to be injured by air pollution. Of animals affected, aquatic invertebrates, amphibians, and fish are all in a population decline caused by the increased acidity of streams. In this category also are the dogwood blight, the balsam woolly aphid, and the butternut canker. Although it is the insect or fungal pest that finally kills the trees, it is well documented that air pollution and acid rain predisposes the host trees to death by the pests.

The international pulp and paper industries, some of the world's worst air polluters, deny that there is a problem with air quality. Could it be that none of the tree species affected are commercially important for timber? If Congressman Taylor seriously cares about the health of our nation's forests, he would work toward better legislation and enforcement of our air quality laws. As one might expect, however, Taylor's response has been to help dismantle our air quality laws.

There are two additional, potentially serious, insect problems headed our way from farther north but not yet arrived in the Chattooga River watershed. One is the

Texas. It is now moving south through Virginia and has caused serious damage to oak forests throughout the northeast. The other is the hemlock adelgid which has killed many thousands of hemlock trees in Virginia and northward. Best estimates are that both of these pests will arrive early in the next century. While all of these pests have serious consequences to the trees affected, they certainly do not justify a general forest health "crisis" that calls for new logging laws. Nevertheless, the very presence of these kinds of pests is used to create the impression that

**Congress needs to enact
only one new law to
improve the nation's
forest health:
Eliminate mandated
timber targets!**

there is a health crisis, and that we must salvage the timber before it is lost.

Congressman Taylor's scientific committee advocates cutting the forest, even clearcutting, as a remedy to cure disease and insect problems. The timber industry feels that any dying tree, and all trees in danger of dying, should be cut and utilized, and further, they say the best solution is to cut the entire forest and start over with a new young forest. But these mature forests are healthy; in fact, they're healthier than forests without dead snags and rotting logs on the ground, and there is no need to clearcut just to salvage a few trees that are dying from natural causes.

But what about oak trees? We hear from Mr. Taylor that "oak wilt" and "oak decline" have reached "crisis" proportions here in the Southern mountains. This is absolutely a fabricated falsehood. The disease known

continued on page 26

The Great Forest

Christina Bolgiano

It once stretched almost unbroken from the shores of the Atlantic to the banks of the Mississippi. Now we battle to save the remnants and sometimes, with a mix of sadness, rage, and hope, we speak restoration.

Rage is not the politically correct emotion to feel in an old growth forest. Awe, veneration, respect, humility, -- these are expected. But I want to pummel the furrowed bark with my fists, stamp my feet on the moldy ground, scream into the dappling canopy. I want to weep. The thought of the forests lost, fragmented, and degraded throughout the East only an eye blink ago, during the logging booms of the nineteenth and early twentieth centuries, is overwhelming. It's not that the trees on this rocky Blue Ridge mountain top in western North Carolina are huge and imperial, the charismatic mega floral equivalents of bears and wolves. On the contrary: they are stunted white oaks, forty feet tall and eighteen inches in diameter, yet they have been documented at 350 to 450 years old. Their limbs ripple sideways like braided hair undone; their trunks are hirsute with mosses. From them emanates a mysterious life of which we know almost nothing. These living sculptures are the most perfect biological expression of which this ridge is capable. Once cut, half a millennium would pass before such trees appeared again, if at all. This, and a scattering of places like it, far more than we have any right to expect, far less than there should be, are all that's left of the original Great Forest, the immense expanse of eastern woodland through the canopies of which it was said a squirrel could travel from the Atlantic to the Mississippi without ever touching ground. Nearly four centuries of cutting for settlement, agriculture, and timber extraction

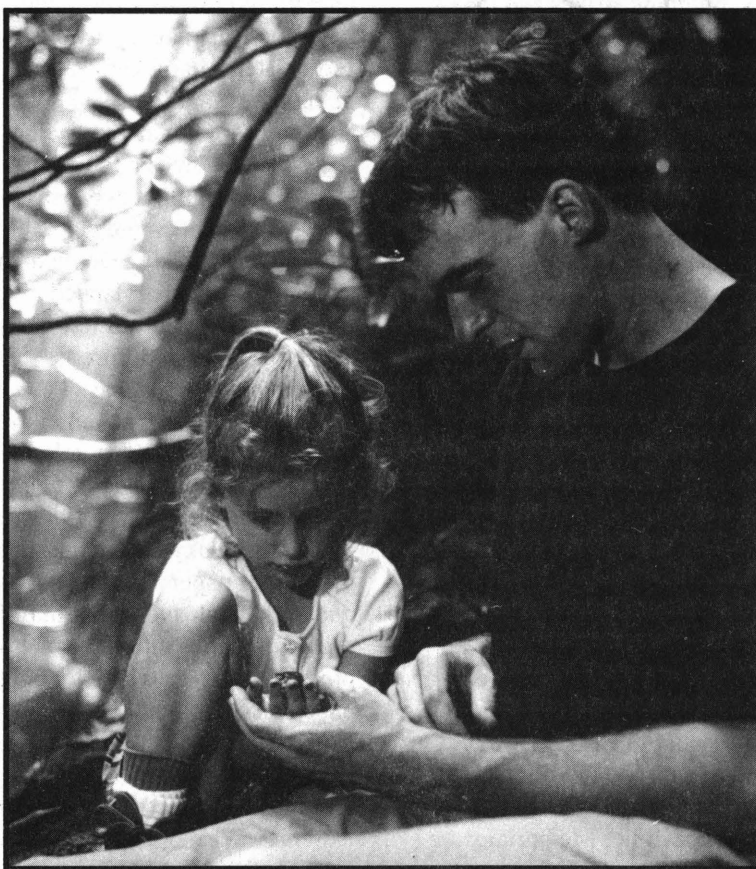
has reduced it to a fraction of its glory, leaving little more than tiny primeval islands in an otherwise manmade landscape.

In ways we don't yet know how to measure, this loss of the forests of yesterday reverberates through the forests of today. The mere fact that large tracts of trees once again billow green across the landscape through much of the East doesn't mean that eastern forests have fully recovered from the assault of earlier decades. Too many species of forest plants and animals are rapidly declining,

and disease, pest, and regeneration problems are too widespread and persistent. As research on the remaining virgin woodlands of the Pacific Northwest continues to reveal the stunning complexity of ecological functions performed by old growth, scientists are beginning to wonder whether managed forests anywhere in the world can sustain long-term productivity without a complement of old growth. New understanding of the role of old growth in a forest ecosystem mandates a new look at the remnants and the potential restoration of the once great Eastern Forest.

"The first thing is to identify what's left," Bob Zahner says as we stand beneath the white oaks. Long and lanky, with white hair swept back from a thin face, Zahner looks the academic he is,

albeit a renegade. Retired now from a career of training Ph.D. candidates in silviculture, he has rejected the manipulative approach of professional forestry and become a leading figure in the burgeoning grassroots movement to preserve eastern old growth. "There are more differences than similarities between western and eastern old growth," he tells me. "Tree species are far more varied and tend to be smaller and shorter lived in the East. Also, there are quantitative differences in such things as the amount of deadwood and canopy layers. In particular, eastern old growth has a greater richness of herbaceous species and their insect pollinators." Zahner and other biologists have



*"Old growth becomes the original hypothesis....
It gives us our only chance of understanding
what we've done to the rest of the landscape."*

Forest *continued*

worked out a general definition of eastern old growth that encompasses about a dozen characteristics. As the dwarfed white oaks proved, huge tree sizes are not a determining factor. Age, however, is, although "old growth" doesn't refer to the age of individual trees but to the long-term undisturbed nature of the forest community. Charles Coghill, a forest ecologist in Vermont, suggests that half the dominant trees in a stand should have reached at least half of the longevity expected for their species (in itself a complex and variable figure). Long periods of time without catastrophic disturbances allow the canopy to be nicked by random windthrows, lightning strikes and insect infestations, which generally kill a small number of trees at a time.

Like the sporadic twinkling of lightning bugs against a summer night, but on a longer time scale, these sudden bursts of light form a changing pattern through the forest. Wildflowers, shrubs, and subdominant trees swiftly fill the sunny spaces, resulting in a population of trees of all ages (called "uneven aged") and a complex understory. Deadwood is abundant. Trees that have blown over often pull their roots from the ground, mixing mineral salts with leaf humus and giving the terrain a texture called "pit and mound topography." Soil is otherwise undisturbed and so buffered from erosion that streams draining from ancient woods are among the purest waters ever tested. These are relatively simple external criteria; nutrient cycling and other ecological processes are so intricate that they are not yet and may never be fully understood, much less defined.

Using these external criteria, old-growth sleuth Bob Leverett has been able to find dozens of previously undocumented stands in nearly a decade of searching. A computer consultant in Massachusetts, Leverett has been enamored of forests since boyhood and claims to hold the national record for falling down in old growth. "I wouldn't be surprised if we end up finding close to a million acres," he says. Once believed virtually extinct except for a few famous showcases like Joyce Kilmer Memorial Forest in North Carolina, the surprising extent of ancient-forest remnants throughout the East was first documented in 1990 by Earth First! activist Mary Davis, who painstakingly contacted dozens of resource agencies to publish a state-by-state compilation. The list ran to 23 pages and totaled more than 300,000 acres -- and in 1993 Davis produced an expanded version. In the introduction, Leverett listed the Great Smoky Mountains National Park, Michigan's Upper Peninsula, Adirondack State Park, northern Minnesota, private timberlands in northern New England, and parts of the Arkansas Ozarks as the locations of the largest remaining acreage of old growth. Davis and Leverett concentrate their efforts on forests that were already established when white settlers arrived and that managed to survive with relatively little change. This is the kind of eastern old growth to which the term "ancient forests" might properly be applied, but "relatively" is the

key word. Even where the timber wasn't valuable enough for commercial cutting, every acre of eastern forest was altered by human influences: piecemeal logging, arson, grazing, and the extermination of native elk, bison, wolves, mountain lions, passenger pigeons, and Carolina parakeets. We'll never know what shade-loving shrubs, what secretive salamanders, were obliterated in the rush, just as unnamed species are being lost everywhere today. Introduced pests and diseases, of which the chestnut blight is merely the best known, caused and are still causing dramatic shifts in forest composition. Fire suppression has favored shade-tolerant red maples over shade-intolerant oaks. Air pollution is damaging many species; Orie Loucks, an ecologist at Miami University in Ohio, believes that the grand hardwood forests of West Virginia and eastern Kentucky are literally -- and quickly -- dying from it.

In short, the term "virgin," which connotes a total lack of human influence, can't be applied to any eastern forest, and some argue that millennia of Native American burning and foraging would obviate the word even if Columbus had never landed. Nonetheless, old-growth remnants remain our truest measure of the productive capacities of eastern forests. "Old growth becomes the original hypothesis," says Peter White. "It gives us our only chance of understanding what we've done to the rest of the landscape." Currently the director of the Botanical Garden at the University of North Carolina in Chapel Hill, White spent most of the 1980s as a research biologist for the Great Smoky Mountains National Park, producing a panoply of papers on forest dynamics. He concluded that due to the high average rainfall in the Smokies the entire region probably suffered soil erosion and loss of productivity even where logging cleared the land only once. "It's impossible to prove it by numbers without data from original soils," he says, "but the fact that there are places in the Park today that are treeless after being logged more than half a century ago provides an example in the extreme. We'd be best off protecting the small amount left for scientific study, because old growth could teach us how to have sustainable logging."

Old growth in national parks is protected, of course, at least from direct human impacts like logging. Similarly protected are old growth bits and pieces on some other public lands; the federally owned Boundary Waters Canoe Area Wilderness in Minnesota and Adirondack State Park in New York are preeminent examples. But in the largest single ownership of old-growth remnants -- the 24 million acres of national forests in two administrative regions that stretch from the Atlantic to Minnesota and Texas -- protection of old growth is anything but automatic. One of the largest remaining clusters of unprotected old growth, for example, lies within 14,000 acres of slopes and coves in the Pisgah National Forest in North Carolina. The area, called Big Ivy (because in local parlance mountain laurel is known as ivy), came to the

Forest *continued*

attention of Karin Heiman during her year in the early 1990s as the botanist for the national forests of North Carolina. Hired to identify areas of high species-diversity, Heiman quickly became mired in timber politics, was fired, and is now embroiled in an appeal founded on the word "whistle blower." Logging had been going on in Big Ivy for two decades and more was planned, but Heiman documented over fifty rare plant and animal species there, some of them with hearteningly healthy populations.

A small, compact blonde with aquamarine eyes, Heiman's face was sunburned from field work as a self-employed consulting biologist when we met for a hike in Big Ivy. The buzzy trills of black-throated blue and green warblers drifted down from the canopy. Fringed orchids and bead lilies bowed over the trail. In the lushest places grew every conceivable form of leaf, every imaginable elegance of blossom. Here we found huge trees -- sugar maples, northern red oaks, hemlocks -- all in a row from the linear womb of a nurse log and now grown as thick and stout as prominent citizens. Heiman stepped almost unconsciously out of her way to touch the largest of them in passing. Since her dismissal from the Forest Service, she has made the preservation of Big Ivy a personal crusade. "This could be a world-class reservoir of biodiversity," she declared.

Big Ivy's special characteristics also attracted the attention of Dan Boone, an ecologist for The Wilderness Society, in the early 1990s. To analyze the Pisgah National Forest Plan, Boone used Big Ivy as a case study and projected fifty years of management actions proposed for the area. "The current management plan would reduce old-growth conditions to small patches," he noted, "so that species that need old growth may be relegated to areas too small to sustain them. Some species would definitely be imperiled." This lack of consideration for old growth, as well as other deficiencies, prompted The Wilderness Society (in conjunction with the Sierra Club and the North Carolina Wildlife Federation) to submit a thorough critique of the plan.

Sensitized to old-growth controversy by bitter experience in the West, the Forest Service recognized an emerging issue. Through a 1991 cooperative agreement with The Nature Conservancy, which has built a large library of plant community classifications, the Forest Service acquired broad descriptions of thirty-five eastern woodland communities, with references to more than 100

subtypes. Here are vignettes from every part of the Great Forest, from the rustling beech maple-basswood woodlands that swept from Minnesota to New England to the assemblages of river birch, sycamore, cottonwood and elm that shadowed the banks of major waterways; from the cypress-tupelo swamps along the southeastern coast and the Mississippi River that harbored bald cypress trees more than a thousand years old to the fragrant pine-oak forests that graced dry, shallow soils almost everywhere. The most widespread communities were the grassy woodlands of longleaf pine, with their handful of trees per acre and low understories of forty species per square meter; they

once covered 92 million acres of coastal plain and piedmont from Virginia to Texas. The group of surviving white oaks that tapped my reservoir of anger at ancestors that afternoon on the Blue Ridge were remnants of one of the dry oak forests that grew on well drained and upland soils south of the Adirondacks. Most diverse were the forests from the central and southern Appalachians westward to the Ozark and Ouachita Mountains. With their dozens of tree species and a thousand kinds of shrubs, herbs and forbs, these were some of the richest temperate forests in the world.

For each of these communities, precise definitions of what constitutes old growth -- such as number of snags per acre,

percentage of the canopy in gaps, and size and spacing of trees -- are being written by Forest Service scientists and academic researchers. This will mostly be an exercise in literature review, because so few functioning old-growth ecosystems are available for field verification. Where no data are detailed in the literature and no examples exist in the field, there will be blank spaces on the tables of old-growth attributes. A project underway at Great Smoky Mountains National Park to describe oak and hemlock old-growth stands, before their inevitable alteration by gypsy moths and hemlock woolly adelgids (two introduced insects), may fill in some of the blanks, but others can be completed only as time makes old growth available for study.

It is this matter of old growth to come -- the potential for a new Great Forest -- that adds a decisive twist to the issue of eastern old-growth. Decades after the worst of the logging, large tracts of eastern forest are aging toward old growth. Many of the maturing trees are held in private woodlots, but these plots are generally too small and distinct to function as full-fledged ecosystems.



Yellow Lady's Slippers grow in the understory of rich woods habitats

Forest *continued*

Besides, unless social priorities are significantly reordered, market incentives will tend to eliminate them just as they have in the West, where precious little old growth remains on private land. It is mainly the national forests that are expansive enough to overcome two great obstacles to the development of an ancient forest ecosystem: the distortion of edge effect (the invasion of light, wind, predators, and parasites along the perimeters of any disturbance larger than about half an acre) and the need for habitat connections (such as wide swaths of forests along streams and across open spaces) to link woodlands for the dispersal of plants and animals necessary to avoid the inbreeding of populations. "We need to be thinking about old-growth landscapes, not old-growth stands," says Dan Boone. "It's a matter of scale." Old-growth on a landscape scale raises the same questions that bedevil forest managers in the West: How much is enough? Where should it be?

"This is a hallucination," Bob Zahner quipped as a family of ruffed grouse exploded from the undergrowth. "Grouse aren't supposed to use old growth." We were on a hillside above a stream, upwind and downslope from the ancient white oaks on the Blue Ridge. Looking into the hollow, the world was an airy, spacious, green and gold place, with sun gleaming on brown trunks. The almost unbearably sweet, melting notes of a wood thrush flowed from some hidden place in the greenery. "For years foresters and hunters have said that grouse can live only in young forests, but grouse eat acorns," Zahner said. "Oak trees don't even start to produce good crops until they're around eighty years old. Grouse love old growth." So do dozens of other forest creatures, from deer to deer mice, who feed on nuts. Mature oaks, hickories, and beeches capable of dropping heavy crops have gained tremendous value since the nutritious chestnuts died.

Aging forests also offer niches unavailable elsewhere. Dams of fallen branches form pools that serve as refugia for various fishes, and catch nutrients for aquatic organisms. Downed logs harbor the small mammals that eat and disperse mycorrhizal fungi, without which young trees can't survive. The deeply fissured bark of very old trees provides the only habitat for dozens of lichen species. Trees big and hollow enough to fulfill a black bear's preference for a den fifty feet high take centuries to form. A soil deeply littered enough for salamanders takes nearly that long. A lithe and exquisite lifeform, salamanders often weigh in as the most abundant group of vertebrates in mature woods, and play a crucial role in the food chain. As for invertebrates, they are so poorly known in old growth that new species are being discovered even in the otherwise overcollected East: a possible new millipede in Virginia, new mites and other arthropods in the Great Smoky Mountains National Park. Any megafauna wholly dependent on old growth is probably extinct -- the last such species was probably the ivory-billed woodpecker, which disappeared in the 1940s with the last of the original oak-

gum forests -- the spotted owl of the East might be a mite, not the most charismatic of creatures.

As in the West, concern for wildlife in old growth has focused on birds. The red-cockaded woodpecker is barely hanging on in the last pine-grass forests of the South. Neotropical migrating songbirds are showing steep, continuing declines that were first blamed on deforestation of their winter habitat in Latin America, but strong evidence is now pointing to forest fragmentation across the East.

Jane Holt is helping to gather that evidence. She began her career as an ornithologist on the Highlands Plateau, a four-thousand-foot high plain at the corner of Georgia, North Carolina, and South Carolina that hosts the greatest diversity of songbirds in the Southeast. In the late 1950s, and again in the 1970s, Holt resurveyed the same forest stands that pioneering ecologist Eugene Odum censused in the 1940s. When I met her at an old-growth conference in Asheville (where she teaches at the University of North Carolina), she was working on getting permission to do her third survey. Shy and soft spoken, with an air of gentle Southern formality, Holt ticked off three species of warblers -- black-and-white, black-throated blue, and blackburnian -- as well as wood thrushes, rosebreasted grosbeaks, and ovenbirds as the species most rapidly disappearing. Each of these fast-vanishing birds gleans insects from a very specific structural element of the forest, like the leaves at a certain canopy level, or tips of branches, or bases of trees. "The multilayered vegetation of old growth supports the most birds, and the most different species," Holt told me. "We love our generalists, but it's the forest interior specialists that are suffering. The strongest thing we could do for biodiversity is promote old growth."

That was the conclusion arrived at by Peter Kirby, The Wilderness Society's regional director in the Southeast, whose office is currently completing a major ecosystem study of the Southern Appalachian region. "Old growth is essentially an irreplaceable unit in maintaining a full complement of native wildlife," he says, thereby implicitly answering the question of "how much is enough" with another question: How much is needed to support healthy populations of all native species over a time span of centuries?

To address that question at least for neotropical migrants, the federal government in 1989 sponsored a cooperative program called Partners In Flight. Regional working groups from all federal land-managing agencies, plus a sprinkling of university researchers, timber-industry managers, and members of conservation groups, intend over the next couple of years to formulate recommendations for the national forests on size and age of wooded tracts needed to halt the decline of summer migrants. The idea is that these advisory recommendations will be folded into the planning process that produces a

Forest *continued*

new land-use plan for every national forest at least once a decade.

It is through this planning process that a new Great Forest -- if there is to be one -- will be achieved. A few national forests whose plans are coming due for revision are bandying about the figure of 5 percent as a sufficient allocation of land for the regeneration of old growth. The figure comes from Larry Harris' influential 1984 book, *The Fragmented Forest*, although he used it merely as an arbitrary starting point for envisioning old growth landscapes (it's now said he rues the day he ever mentioned the figure).

Bob Zahner advocates a minimum of 20 percent and talks of whole national forests managed by "benign neglect." Whatever percentage is mentioned, national forest planners usually consider that it can be found on land classified as unsuitable for timbering, which often comprises 30 to 60 percent of a national forest. But lands too steep, dry, or thin-soiled to grow harvestable trees can hardly be expected to produce highly diverse old growth. And since

the designation "unsuitable" can be revoked whenever a forest plan is revised, whatever richer sites might have been included are vulnerable to market whims and political whimsy. Logically enough, the best growing sites can be expected to produce the most luxuriant old growth as well as the most lucrative timber, a fact noted with concern by Dan Boone, who worries that the drive to eliminate below-cost timber sales will concentrate Forest Service cutting on the most productive sites, endangering the best old growth.

Bill Martin, a Forest Service staffer charged with coordinating the Southern Region's old-growth definitions, also noted the incipient conflict between timber and old growth. "One of the benefits of mature trees is high-quality saw timber and veneer logs," he said during an interview in his office. "Hardwoods get bigger the older they get, up to a certain point when they start to have rot spots." (And it is precisely at this point that old-growth attributes begin to form.) Martin emphasized that he wasn't a policy maker, and cheerfully admitted that he wasn't an expert on old growth. A couple of personal touches in his office testified to his real expertise: A cross-stitched sampler of a man with an ax spelled out "Timber

Bill," and a model of a log skidder hulked on a countertop. To his credit, Martin at least did not refer to old growth as "decadent," the traditional term many foresters use to describe a stand that no longer produces the maximum amount of wood usable by humans (in their view, the primary "purpose" of the forest). Old trees use about as much energy to maintain themselves through respiration as to build new wood, and foresters prefer the economic benefits of younger, faster growing trees. But the rededication of good growing sites from timber to old growth would have far less economic impact in the East

than the preservation of old growth is having in the Pacific Northwest. Far less than 10 percent of the timber supply in the thirty-two states that comprise the two eastern Forest Service regions comes from national forests -- except in Michigan, where it is 35 percent -- and only nine communities are classified as economically dependent on national forest timber extraction.

Martin did downplay the effects of clearcutting and talked about rotation lengths, the time span between



Undisturbed forests provide habitat for Rhododendron vaseyi

one cutting and the next in the same site. "If you go by Hurricane Hugo," he said, referring to a huge, forest-wrecking storm on the South Carolina coast that was labeled a once-in-a-century event, "we could have rotation lengths of 100 years." This assumes a storm of exactly the same intensity slamming into exactly the same place at exactly the same interval to inflict exactly the same level of damage every hundred years -- not much of a likelihood. Besides, even such large natural disturbances as hurricanes and fires are much more variegated in their consequences than clearcutting, the results of which we know all too well. With few exceptions, however, rotation cycles in national forests throughout the East are planned for 40 to 150 years, and there is an underlying idea that one 150-year-old stand can be cut when another reaches the 150-year mark. Given the complexity of old growth and the fact that many trees are just reaching maturity (much less old growth) at 150 years, one stand simply can't substitute for another.

A recent comparison of cut and uncut forests in the Southern Appalachians showed that one of the glories of those mountains, the bountiful herbaceous understory,

Forest *continued*

had not recovered 85 years after cutting, and gave few signs that it ever would. Another recent study estimated that clearcutting in western North Carolina killed nearly 14 million salamanders a year and that fifty to seventy years were required for local populations to rebuild. Woodland salamanders are another of the treasures of the cool, moist forests of the Southeast, occurring in more varied forms there than anywhere else in the world. Scientists worry that genetic diversity is being impoverished by chronic reduction of regional populations to the tune of a quarter of a billion salamanders. Where are the animal rights people when you need them?

Despite the Forest Service's obligation to manage for biodiversity and the knowledge, long held, that the Southern Appalachians

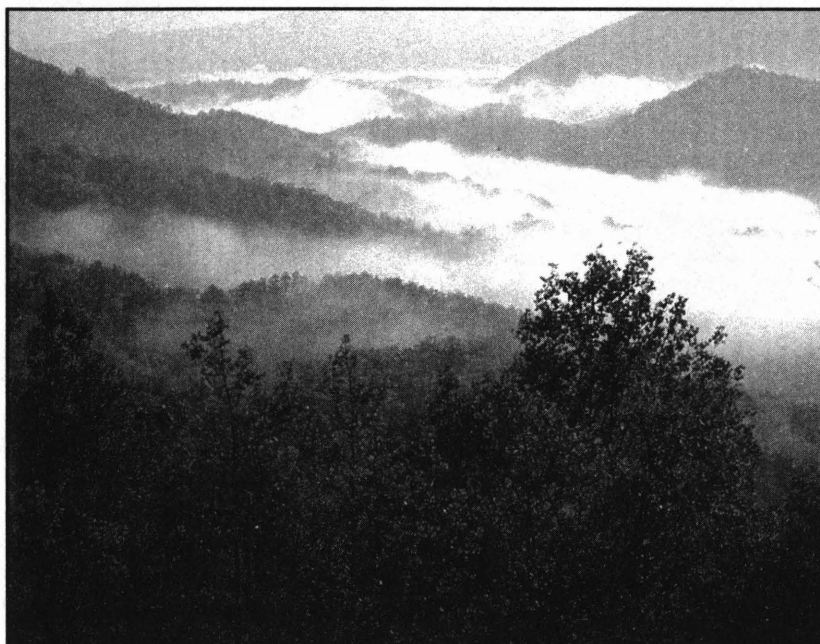
are a globally important site of salamander diversity, no one had previously monitored the impact of timber harvesting on salamanders. "This is all new to us," I was told by Marilyn Robertson, wildlife ecologist for the Forest Service's southern region. "We're just beginning to realize the ecological importance of microhabitats, and the impacts of fragmentation on different species."

Robertson works closely with botanist Susan Hooks and called her to join the interview. They were a jocular pair, but bantering ceased when old growth was mentioned. Neither was much involved with it because the forests in the region hadn't yet asked for their aid, but Robertson anticipated "a major impact on our jobs when they do, because they will be asking for help in selecting Management Indicator Species related to oldgrowth. Our knowledge and experience with such species is limited." These species are supposed to do exactly what their name implies -- indicate the impacts of management on the health of the forest. Salamanders and neotropical songbirds are obvious choices, although habitat changes in Latin America must be factored in for avian migrants. But it doesn't matter what Management Indicator Species are chosen if they aren't monitored and there is no standard methodology for collecting, recording, or utilizing data about them. Hooks agreed that this was an astonishing procedural gap, and hoped, as a member of a

national working group on monitoring, to coordinate things, at least in the southern region.

Far greater challenges of coordination will be required to stitch together an old-growth landscape from today's chaotic quilt. Few management guidelines on size, location, or connections of old-growth sites currently apply from one national forest to the next, much less between the two regions "because," says Ann Bartuska, director of the Forest Service's new office of ecosystem management, "there is a legal requirement resulting from the National Forest Management Act for every forest to develop its own plan." There could be strategic guidance at the regional level, Bartuska admits, but she does not support the idea of declaring that an arbitrary percentage of land be set aside

for the nurturing of old growth across the whole region. "That is unreasonably inflexible," she says. "We don't know what the original amount of old growth in the various forests of the East was. The best we can do is to provide a mix of tree ages and species across the landscape in a way that reflects the natural communities and long-term capability of the land." This sounds alarmingly like the mosaic of "fragments and edges" that the Forest Service has been touting for decades -- to very mixed reviews from



"...we seemed to swim above an ocean of mist, with mountains swelling up one after another like waves frozen in place"

environmentalists. Although in other ways Bartuska seems to look forward rather than back -- mentioning, for example, that "a great deal of thought and some action" is being devoted to harvesting methods that mimic small natural disturbances and discussing the complexities of restoring natural-fire regimes in landscapes dominated by people -- it remains to be seen what ecosystem management will mean for the Great Forest.

At the end of our hike in the Blue Ridge, Bob Zahner took me to an overlook, where we seemed to swim above an ocean of mist, with mountains swelling up one after another like waves frozen in place. For the most part, it was a cutover landscape that would not produce old growth in my lifetime. As I took in the scene, I tried to focus on future possibilities and wished that growth could be accelerated by the sheer force



Salamanders of the Chattooga River Watershed

Bryan Stuart

The Southern Appalachian Mountains are well-known for their rich and diverse salamander fauna. In these mountains the world's largest family of salamanders, the *Plethodontidae*, originated and dispersed, eventually extending into the Pacific Northwest and Central America. However, there remains today more biomass of salamanders in the Southern Appalachians than in any place on Earth, making this region a mecca for salamander biologists worldwide.

While most groups of plants and animals tend to increase in diversity in the tropics, the salamanders are an exception to this rule. Though the neotropics do contain bizarre and fascinating species of plethodontid salamanders, they cannot size up to the diversity of adaptive types and life histories that we have here in the Southern Appalachian Mountains. Four other families of salamanders are represented in the Southern Appalachians as well.

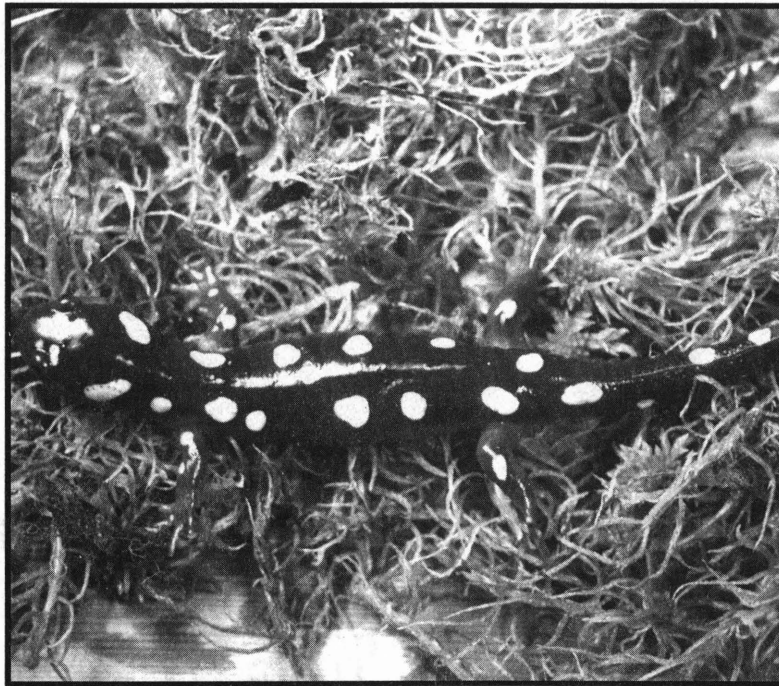
The Chattooga River watershed is no exception to this rule of diversity. Eighteen species of salamanders are confirmed to occur in the watershed, and at least six more may occur but remain unverified. Most of these species are abundant in the watershed, though some have restricted elevational distributions or habitat requirements, as discussed below.

Considering their biomass, salamanders play an integral role in the ecosystem of the Southern Appalachians. Most feed opportunistically on small invertebrates, though many of the larger salamander species will predate on the smaller species. In turn, salamanders are preyed upon by fish, snakes, birds, raccoons, opossums and other generalist carnivores.

The most unifying characteristic for the family *Plethodontidae* is lunglessness: those with aquatic larvae respire with gills, and those with direct-development

(amphibians which skip the larval stage) respire through their moist skin. Relying solely on the skin for respiration is quite a feat, especially when considering the large size of some adult plethodontid salamanders. At least two of our species, *Desmognathus quadramaculatus* and *Gyroneophilus porphyriticus*, reach total lengths of over 200 mm /8 inches (Martof et al., 1980)!

The genus *Desmognathus* is the largest genus of salamanders in the Chattooga River watershed, with five species occurring. These are typically stream or stream-side salamanders. With the exception of *D. aeneus* and some *D. ochrophaeus*, they are drably pigmented in browns, reddish-browns, or black. However, their fascinating biology makes them beautiful in the eyes of any herpetologist.



The Spotted Salamander (Ambystoma maculata) can be found in wetlands and bottom land forests such as Whetstone Bog near Earl's Ford on the Chattooga River

Desmognathus salamanders spatially distribute themselves in the community in an interesting manner; the larger species tend to be more aquatic and found in the streams, while the smaller species tend to be more terrestrial. *Desmognathus marmoratus* and *D. quadramaculatus* are the largest members, and are strictly aquatic (though some *D. quadramaculatus* will venture into seeps or wet rock crevices in waterfall spray zones). *Desmognathus monticola* and *D. ochrophaeus* are medium-sized members, and are found under rocks along the stream edge and in seeps. *Desmognathus*

aeneus is the smallest member of the genus in our watershed, and is terrestrial, being found along seeps under leaf litter or moss in heavily-shaded areas. A community of these five *Desmognathus* species can be found at the Camp Creek tributary to the Chattooga River. Other parts of the watershed have at least three or four of the species.

Predation, competition and respiration restraints all play roles in determining this community structure. The smaller species avoid the niche of the larger species to prevent being eaten, and the niche of similar-sized species to avoid competing for resources. Also, it is easier to extract oxygen from the fast, cold, stream environment

Salamanders *continued*

than from the terrestrial environment. Since larger animals have smaller surface area : body volume ratios, they have less surface area to exchange gases through the skin, making it easier to be large in the aquatic system. Similarly, the smaller animals have larger surface area : body volume ratios, and so have more surface area on their skin to exchange gases, leading to better exploitation of the terrestrial environment. An important side note is that in slow-moving streams, skin-breathing can become difficult because of a poorly-oxygenated boundary layer that forms around the submerged animal. However, it is believed that aquatic plethodontid salamanders have the ability to restrict overall metabolism, or to respire anaerobically for long periods under such conditions (Booth and Feder, 1991).

All *Desmognathus* lay eggs, which are guarded by the female. In most cases, the eggs hatch into aquatic larvae with gills. The eggs of *D. aeneus*, the smallest terrestrial species, hatch directly into miniature adults; the aquatic larval stage is skipped entirely. *Desmognathus aeneus* is thought to be a recently-evolved taxon because of its terrestrial lifestyle and direct-developing larvae.

Species descriptions of

Desmognathus are as follows: *D. marmoratus* is nearly jet black in the Chattooga River watershed (its coloration is variable in nearby watersheds). *D. quadramaculatus* is mottled brown above, with a black belly. *D. ochrophaeus* is highly variable, but in our watershed tends to have a reddish dorsal band that is zigzag or broken into diamond shapes. The belly is lightly peppered with gray. *D. monticola* in our watershed usually has two rows of alternating orangish spots, often hard to see in adults. The belly is plain white. *D. aeneus* has a reddish stripe that extends all the way down the back, with clean, unbroken borders that distinguish it from *D. ochrophaeus*.

The genus *Eurycea* has two members in the Chattooga River watershed, *E. wilderae* and *E. guttolineata*. *Eurycea wilderae* is very abundant and

widely distributed in the watershed. The adults are found along streams under leaf litter or other debris, and the aquatic larvae are found in almost any small, permanent body of water. The adults are a beautiful golden yellow or orange, with two black lines running longitudinally down each side of the back. Even though they are abundant, I never tire of seeing an adult *E. wilderae*. *Eurycea guttolineata* is found in bottomland forests in the floodplains of streams at elevations below 3000 feet in the watershed. Larvae are found in bogs, small ponds, or slow-moving streams (Bruce et al., 1995). Slightly larger than *E. wilderae*, the adults are creamy-yellow with three longitudinal black stripes down the back.

The genus *Plethodon* has four members in the watershed. All four species are completely terrestrial, with direct-developing

young, as seen in *Desmognathus aeneus*. They are found primarily in hardwood forests under and inside fallen logs and in leaf litter.

Plethodon jordani is dark gray or black, sometimes with some white or brassy fleckings on the sides and back. *Plethodon teyahalee* and *P. chlorobryonis* are more heavily marked with white fleckings, and are almost indistinguishable from each other. Genetic analysis (Highton et al., 1989) or detailed examination of the head

shape (Stuart and Bruce, unpublished) is required for distinction. Hybridization between species of *Plethodon* in certain parts of their ranges further complicates the taxonomy of this group. *Plethodon serratus* is gray with a reddish brown dorsal stripe. *Plethodon jordani* is typically found in the watershed above 1800 feet elevation. *Plethodon teyahalee* primarily occurs above 3000 feet, and *P. chlorobryonis*, below 3000 feet. *Plethodon serratus* is known only from an elevation of about 3600 feet near Ellicott Rock Wilderness Area, but it probably occurs elsewhere in the watershed. Unlike the other three species of *Plethodon*, *P. serratus* prefers conifer forests, particularly hemlock, over hardwoods.

The genus *Pseudotriton* has two representatives in the watershed, *P. ruber* and *P. montanus*. The terrestrial *P. ruber* adults are red with black spots and chins, and are



Bryan Stewart and Joellen McDonnell search for the elusive Seepage Salamander

Salamanders *continued*

commonly seen crossing roads on rainy nights. *Pseudotriton ruber* larvae are found in almost all stream sizes and classes, but mainly in slow-moving, shallow streams with collections of leaf litter. The larvae do not metamorphose into adults until they are two and a half years of age. *Pseudotriton ruber* is found at all elevations in the Chattooga watershed, while *Pseudotriton montanus* is much rarer in the watershed. Adults are more drably pigmented than *P. ruber*, and live in mud burrows along slow-moving or standing bodies of water. The larvae also exhibit a long larval stage of probably one and a half years.

Gyrinophilus porphyriticus lives throughout the watershed, but is difficult to find. It lives in springs and in stream headwaters, though adults will venture out of the aquatic habitat, into the forest. A large salamander that can achieve a total length of 220 mm / 8.8 inches (Martof et al., 1980), *Gyrinophilus* are well-known predators on other salamanders. *Gyrinophilus* are yellowish orange with black peppering and two conspicuous black and yellow stripes running between the eyes and nostrils.

Aneides aeneus is the final species of plethodontid salamander confirmed to be in our watershed, and is a species of Special Concern. This species is adapted for living in rock crevices, and is found in rock outcroppings with damp, deep crevices. Populations are small and disjunct (isolated from the organism's main population) from one another, and so are subject to local extinctions. These salamanders are direct-developers. They have green markings that closely match in color and shape the lichens that grow on the rock outcroppings with which these salamanders are associated. Much research has been conducted on the status and distribution of this magnificent salamander, and several localities for this species are known in the gorges of the Chattooga. *Aneides* can be found day or night by peering deep into narrow crevices with a flashlight. Specimens should be disturbed as little as possible, and not collected.

The family *Ambystomatidae* has one representative found throughout the Chattooga River watershed, *Ambystoma maculatum*. The terrestrial adults are black with bold yellow or orange spots. They lay their eggs in the late winter or early spring in small ponds that lack fish. For this reason, golf course ponds are often used as breeding sites by this species. The larvae are distinguished from other salamanders in the watershed by



The Red Salamander (*Pseudotriton ruber*) is a terrestrial salamander found in a variety of forest types in the Chattooga River Basin

their exceptionally large gills.

The family *Salamandridae* also has one representative, *Notophthalmus viridescens*. This family is primarily European, though the single representative here is very widespread and abundant. *Notophthalmus* has a fascinating life-history. Eggs are laid in slow-moving or still bodies of water, and hatch into aquatic larvae. The larvae emerge in a few months as terrestrial "efts." Efts are orange with two rows of red spots down each side of their back. The efters live in hardwood forests for up to five years, at which time they migrate back to the pond and transform into aquatic adults. The aquatic adults are greenish with the same two rows of red spots. All life stages are highly toxic. *Pseudotriton ruber* are also highly toxic, and it is thought the terrestrial *P. ruber* adults mimic the toxic red efters. In this relationship, both members benefit by increasing the chances a predator will learn of the noxiousness by tasting the other species.

Last, but not least -- the hellbender. The hellbender is a member of the family *Cryptobranchidae*, which has one species here in the United States and two in the Orient. This zoogeographic distribution is a result of plate tectonics and geological history, and is seen in other taxa as well, such as the alligator (one species in the Southeastern U.S. and one in China) and many plants. Our hellbender, *Cryptobranchus alleganesis*, is truly a bizarre creature. Up to 740 mm / 30 inches in total length, hellbenders are mottled black and brown with flat heads,

Salamanders *continued*

tiny eyes, and many folds of loose skin extending from the body and appendages (Martof et al., 1980). There is only one record in the Chattooga River watershed, from Tugaloo Lake in 1970. It may occur in the Chattooga itself or some of the larger tributaries, but no specimens have been found for verification.

Salamanders play an important role in the Southern Appalachian ecosystem. Their ecological relationships with other organisms, their bizarre and complex life histories, and their evolutionary relationships to each other have intrigued biologists for many years. Much research has been conducted in this area by biologists, many through nearby institutions such as the Highlands Biological Station and Coweeta Hydrological Laboratory.

I recommend acquiring a copy of Martof et al. (1980) or Conant and Collins (1991) for photographs and distribution maps of the above species. If nothing more, spend some time along a stream or a road on a rainy night to observe our salamanders. Indeed, you might also agree they are the treasures of the Southern Appalachians.

Acknowledgements:

I thank Dr. Richard Bruce, Director of the Highlands Biological Station, for reviewing this article, and for giving me the opportunity to observe and study the salamanders of the Chattooga River watershed during the summers of 1995 and 1996.

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The Green Salamander (Aneides aeneus)

Common names of Chattooga River watershed salamanders:

Desmognathus marmoratus shovel-nosed salamander
D. quadramaculatus black-bellied salamander
D. monticola seal salamander
D. ochrophaeus mountain dusky salamander
D. aeneus seepage salamander
E. wilderae two-lined salamander
E. guttolineata three-lined salamander
Plethodon jordani jordan's salamander
P. teyahalee and *chlorobryonis* slimy salamander
P. serratus red-backed salamander
Pseudotriton ruber red salamander
P. montanus mud salamander
Gyrinophilus porphyriticus spring salamander
Aneides aeneus green salamander
Ambystoma maculatum spotted salamander
Notophthalmus viridescens red-spotted newt
Cryptobranchus alleghaniensis hellbender



The Monarch Butterfly

Fred A. Urquhart, Ph.D.

Excerpts from original articles which appeared in the August 1976 and August 1996 issues of *National Geographic*; reprinted and paraphrased with permission from the National Geographic Society.

"I GAZED IN AMAZEMENT at the sight. Butterflies – millions upon millions of monarch butterflies! They clung in tightly packed masses to every branch and trunk of the tall, gray-green oyamel trees. They swirled through the air like autumn leaves and carpeted the ground in their flaming myriads on this Mexican mountainside."

These were the words of Canadian zoologist Fred A. Urquhart as he and his wife Norah arrived at the long sought after overwintering place of the eastern population of the monarch butterfly. On January 9, 1976, decades of research came to fruition with this discovery, which he had been working toward most all his life.

Until that time, no one knew where these fragile creatures vanished to during North America's winter months. Dr. Urquhart's discovery was preceded by many years of work focussed on the extremely difficult task of tracking the monarch's seasonal migration. In 1952 he wrote an 'appeal for volunteers to assist in a butterfly tagging program and twelve people responded, prompting formation of the Insect Migration Association. By 1971 the Association numbered six hundred, and hundreds of thousands of butterflies were tagged all across the continent. The tiny labels carried identifying letters and numbers and the words: "Send to Zoology University Toronto Canada". They began receiving tagged specimens from all over the US and parts of Canada, along with numerous reports from enthusiastic collectors of all ages and walks of life.

In 1965, Dr. Urquhart joined the staff of Scarborough College of the University of Toronto. The research program expanded and gained momentum, and

the data flowed in. Researchers found that nearly all male monarchs die on the flight north from their wintering grounds, and they also confirmed that the butterflies do not fly at night.



Kathy Brugger amongst the Monarchs
Photograph by Albert Moldvay, (C) National Geographic Society

The monarch butterfly migration is an amazingly complex pattern of behavior, tied to seasonal changes and reproductive cycles. These natural cycles spur them to fly great distances on a southbound migration, in retreat from the killing frosts of winter. Even though the monarch's lives are brief, with most surviving only a year, they fly

Monarchs *continued*

very long distances southward in the fall and return in the summer, as far north as Canada, to their home breeding grounds. After considerable study, Dr. Urquhart and colleagues concluded that most of the migrating monarchs were those that hatch in late summer, as daylight hours wane. Of these, the females do not develop productive ovaries and thus do not mate until after their flight south to the overwintering place. As daylight hours lengthen in the wintering area, the monarchs -- now sexually mature -- feel the urge to mate and fly north, breeding new generations along the way.

The research continued, and it took many years to plot the monarch's migration routes. Finally a pattern emerged which lead Dr. Urquhart and Norah to look toward Mexico as a possible overwintering site. In 1972 Mrs. Urquhart wrote to several newspapers in Mexico City telling about their project and asking for volunteers to report sightings and to help with tagging. One response proved to be the key that finally unlocked the secret. It was a letter from Kenneth Brugger of Mexico City who offered his assistance in locating the elusive colony. He would spend the next two years zigzagging across the Mexican countryside in search of the colony, and reporting any findings to Dr. Urquhart.

One evening in January of 1975 Mr. Brugger telephoned the Urquharts and announced with uncontrollable excitement that he had located the colony!

In January of 1976 Dr. Urquhart and Norah went to Mexico, traveling the steep village roads of Sierra Madre, ascending towards the high mountain summit of the "Mountain of the Butterfly". The following is an account of thier first sighting of the colony:

"From the summit, dotted with junipers and holly glistening with hoarfrost, we had to descend steeply. Down, down we stumbled to a clearing surrounded by stately oyamel trees, a kind of fir. Then we saw them! Masses of butterflies -- everywhere! In the quietness of semidormancy, they festooned the tree branches, they enveloped the oyamel trunks, they carpeted

the ground in their tremulous legions. Other multitudes-- those that now on the verge of spring had begun to feel the immemorial urge to fly north--filled the air with their sun-shot wings, shimmering against the blue mountain sky and drifting across our vision in blizzard flakes of orange and black. While we stared in wonder, a pine branch three inches thick broke under its burden of languid butterflies and crashed to the earth, spilling its living cargo.... There, to my amazement, was one bearing a white tag."



Monarch butterfly

This butterfly, which had been tagged in Chaska, Minnesota, helped to confirm the migration pattern that Dr. Urquhart was documenting. Continued research would discover several other overwintering roosts, all within a restricted range in the same general area of south-central Mexico's Sierra Madre.

Yet today in 1996, there is growing concern that of the nine overwintering spots in Mexico, only five areas -- which altogether total just 62 square miles -- are designated sanctuaries. Here, despite government restrictions, some of the forests have been cleared

by poor farmers and commercial loggers.

The "dean of monarch researchers" Lincoln Brower (University of Florida) says: "We're not going to have a monarch migration in 20 years if those reserves aren't expanded and protected". Last April, representatives from Mexico, the United States, and Canada gathered to discuss ways to preserve the monarch's shrinking winter habitat in Mexico, and reducing the use of herbicides on milkweed -- the sole food of monarch larvae -- while encouraging young students in all three countries to count the migrating monarchs.

With this kind of three-country cooperation, the monarch butterfly can have a chance of continued survival.



Interview with US Forest Service Chief Jack Ward Thomas

The following interview was conducted on September 17, 1996, by Buzz Williams at the University of Colorado's Fleming Law Building in Boulder, Colorado, during a conference sponsored by University's School of Law / Natural Resources Law Center. The conference addressed "The National Forest Management Act in a Changing Society, 1976-1996". Also present at the interview was Glen Olen, editorial staff writer with the National Geographic Society.

Buzz Williams (BW): I want to start with a political question, since this is an election year.

Jack Ward Thomas (JWT): You won't get an answer.

BW: (laughter) I don't know, you might like this one.

JWT: I don't do politics.

BW: You were the first Chief of the Forest Service that was a political appointee....

JWT: Except for Pinchot. Anyway, all Chiefs are political appointees.

BW: Yes, eventually, but they made you a "Schedule C" political appointee, so in reality you are the first Chief that was appointed in that way. How do you think that is going to affect the position of Chief of the Forest Service, when we have a change of Presidents?

JWT: The intent under my appointment was that my appointment would be changed to Senior Executive Service; otherwise, I would not have accepted. I was told that the position would be converted; yet, as it turns out, that has not been possible to do.

BW: You mean that even if Clinton is re-elected, you will not be the Chief of the Forest Service?

JWT: No, I didn't say that.

BW: One of the things that led to the ouster of your predecessor was the revelation that there was massive timber theft in the Pacific Northwest.

JWT: I don't think that had anything to do with it, and in the long run, I don't think there was much proof of

"massive" timber theft.

BW: Concerning the incident of timber theft, or the alleged timber theft in the Pacific Northwest, did your not agreeing that it was actual timber theft prompt you to release the "Timber Task Force"?

JWT: No, the Timber Task Force was scheduled only for a prescribed period of time, and I allowed it to continue one year beyond that. Then the plan was to continue to go after some situations in the Pacific Northwest, and then to replace the Timber Task Force with a full scale operation across the country. With some regional emphasis at the end of that period, I "sunsetted" it -- as was prescribed.

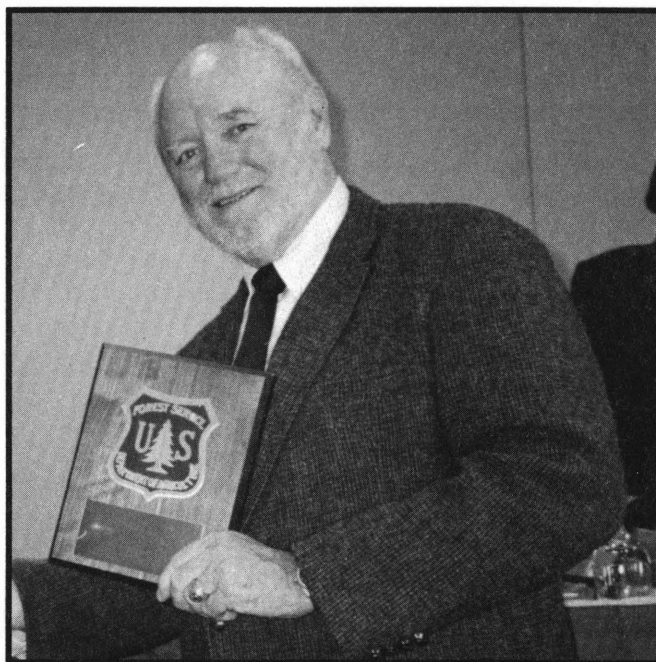
BW: The Timber Salvage Rider which you addressed this morning has been widely acclaimed as one of the worst pieces of anti-environmental legislation of this century. There are those who think that the continuation of the

Salvage Rider will be what Senator Craig is proposing in his Forest Health Bill. Do you have any comment on that?

JWT: No. When I am asked to testify on the bill, then you will hear my comments.

BW: In keeping with not answering political questions, I expected that. Charles Wilkinson of the University of Colorado School of Law said that our first mission should be to understand the land itself, and also it was pointed out that the Forest Service's monitoring program has not been at least perceived to be up to speed. What do you intend to do to address that problem?

JWT: It is a problem. We have not monitored as we should. On the other hand, that topic was a part of my speech this morning. You get funded to do certain things. We have not been funded to do adequate monitoring. It is not a priority in Congress of those in the budget business. When you are reducing your budgets under executive order -- dramatically -- and you are reducing the number of people that you have -- dramatically -- priorities get set. So those priorities in funding get set, but we just have not been funded to do it. We are in the process of establishing



US Forest Service Chief Jack Ward Thomas

Interview *continued*

-- and I have been working on this for about two years -- a monitoring institute that we would share with the Bureau of Land Management and others, which calls for levels of monitoring that we can achieve, to ensure accountability on monitoring. We hope to come forward with this very soon.

BW: That's good to hear. We look forward to that because our organization wants to be a part of cooperative programs in monitoring down where we are on the Chattooga River. Moving on to a couple of more scientific questions: You've stated that the Forest Service should move more to ecosystem management. How do you feel about the necessity of having core areas, with wildlife corridors that connect to allow genetic exchange?

JWT: Those are options. I helped develop those concepts in the Inter-agency Scientific Committee that dealt with the habitat of the Northern Spotted Owl. When we talk about reserves, yes, we need more. Bigger is better than smaller, closer together is better than far apart. The question is, what do these connections mean? Does it mean public lands scattered across the south? Or the public land that runs right down the Cascades?

BW: Along those lines, you spoke this morning about the controversy over entering roadless areas, because the matrix has been so overcut that you are being essentially forced into these roadless areas.

JWT: I didn't say "overcut", I said "forced into the roadless areas". I said that the roadless areas had been allocated under the RARE II process through the Congress, and under the Forest Plans through an approved Environmental Impact Statement (EIS) -- exactly as prescribed by law with all of the appropriate documentation. You know, if we decided to enter none of them it would have a rather immediate and significant impact.

BW: Could you live with a system where you didn't have an annual sales quantity, where you were allowed to make decisions on a project-by-project basis, working with your local managers on the ground?

JWT: I could live with that. But not under the current

law, I can't live with that. We would have to have a heck of a lot more trust than we do now, to operate in such a manner.

BW: As far as I'm concerned, I would have trust in the agency without timber targets.

JWT: So would I, but in general, under current law that is simply not feasible.

JWT: When we talk about reserves, yes, we need more. Bigger is better than smaller, closer together is better than far apart. The question is, what do these connections mean?

BW: Would you agree that one of our missions in conservation should be getting the public up to speed on exactly what is happening on the ground? By moving to a system that would eliminate timber targets, could this help to reinstate the people's trust in the Forest Service?

JWT: I don't know if the purpose of building trust would be accomplished or hindered by moving to a system like

that. But certainly I would be in favor of more public education.

BW: That was my last question. Now I want to tell you about something we are doing down in the Southeast, and invite you down to check it out. We're working with two large power companies, the Forest Service and other managers of large tracts of land to establish a system of cooperation across what we call the Southern Blue Ridge Escarpment. We have a meeting coming up shortly at the Strom Thurmond Institute at Clemson University to figure out how we can work cooperatively to establish consistent ecosystem management principles.

JWT: Will you keep the chiggers from getting me?

BW: Yes sir! *(laughter)*

JWT: Getting back to your question about timber theft. This is one of the really interesting debates going on. If you review our weekly reports and look at how much work we do on drug interdiction, on marijuana gardens, on meth-labs, on timber theft, on illegal immigration, on illegal workers, on public safety in the camp grounds.... With limited officers, and without a continuing increase in our capabilities -- we need more support. But there are still those groups who want to make accusations of collusion.

BW: You know, you may remember that I was with the

The Future of the Endangered Species Act: "Managing for Extinction"?

Chas Zartman

According to the U.S. Fish and Wildlife Service (FWS), the primary objective of the Endangered Species Act is to facilitate the "restor[ation of] listed species to a point where they are viable, self-sustained components of their ecosystem." On December 1, 1996, as the FWS decides whether to formally retain the listing of nearly 4,000 "candidate" species for endangered status, the public will discover how faithful the FWS is to their own words.

In summary, federally listed species are classified, in increasing order of precedence, as candidates of secondary priority (C-2), primary priority (C-1), threatened (T) or endangered (E) status. Presently at stake is the fate of C-2 species status. The potential elimination of the "candidate" species status is a perfect example of a federal agency's attempt at coping with Congressionally-based budget cuts through misdirected downsizing. In theory, the role of "candidate" status lies in its effectiveness as a safety net for species possibly nearing qualification for endangered species status. If utilized to its fullest potential, the C-2 listing, which includes such Chattooga Basin inhabitants as the Green Salamander (*Aneides aeneus*) and the Oconee Bell-flower (*Shortia galacifolia*), provides a means of prioritizing conservation efforts towards potentially imperiled species -- an action which encourages early intervention for habitat preservation, before rare species populations dwindle to unsustainable (i.e., "endangered") levels.

The demonstrably high costs and low success rates of intensive recovery programs for species which have reached endangered status is further evidence of the financial and biological benefits of proactive, preservation-oriented approach to management. The C-2 species status is an effective preventative tool in the conservation of the rarer examples of biodiversity, and formally withdrawing it from the listing process would surely encourage a knowledge gap for potentially endangered species -- a scenario which would inflate the number of species qualifying for endangered status, and also would run counterintuitive to the recently popular sympathies of

streamlining the federal bureaucracy.

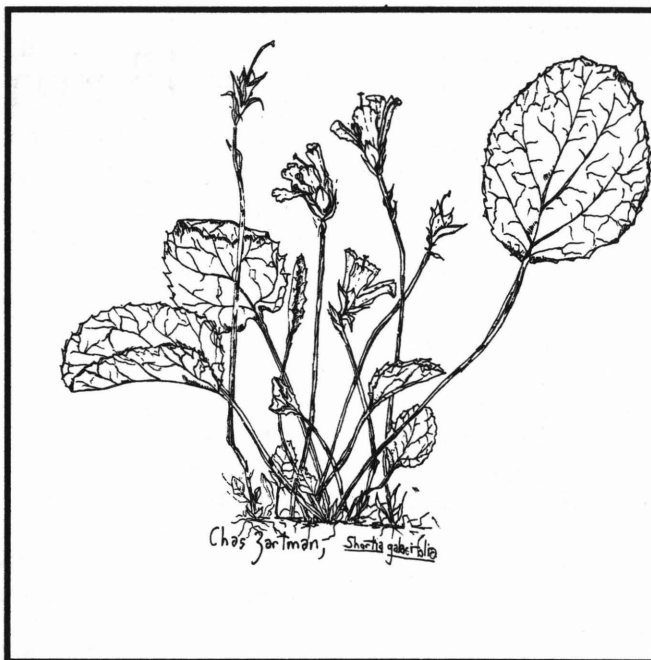
A 1993 inventory of endangered species recovery programs in *Science* magazine indicated that in nearly one-third of the cases, recovery goals were set at or below the number of presently existing populations. This disturbing statistic highlights the necessity to employ the C-2 listing as a means of recognizing notably rare species before they

reach critically low population sizes. Even though "candidate" species do not receive the formal legal protection granted to species on the threatened or endangered lists, C-2 status is a necessary branch in the listing hierarchy which can be used as a framework for biological study, for public land management strategies and for prioritizing those conservation efforts which are predicted to yield the best results with the lowest possible costs.

The Endangered Species Act is no stranger to controversy and criticism from all schools of thought. It has been used by the extractive industry faction to scapegoat the problems of coping with a finite resource base, but it has also been criticized by the conservation-minded as being an ineffectual,

"too-little-too-late" means of securing rare species and habitat. It is a shame that instead of advocating for the advancement of the listing structure to include a global (G) rank as created by the Nature Conservancy, we are only fighting to keep the Act from regressing any further.

In theory, the general premise of the Endangered Species Act incorporates a biologically defensible approach to rare species conservation, but in reality evaluating and implementing a successful recovery process must not only include extensive understanding of the ecosystem associated with the species at risk, but, to its disadvantage, must also take into consideration certain political, social and economic pressures as well. One of the drawbacks of endangered species status is that it tends to deconstruct the issue of conservation to focus on a single entity, and the public, frequently led by misinformed politicians, can become ensnared in this myopic perspective. There is no better example of such a fate than that regarding the recently listed endangered Spruce-Fir moss spider (*Microhexura montivega*). This tiny spider, known from only four spatially isolated populations along the spine of the southern Appalachians, is strictly



The Oconee Bell is one of many species that may lose their Federal rarity status

"Managing for Extinction"? *continued*

associated with the damp, cool environment provided by high elevation Red Spruce and Fraser Fir forests. The endangered status of the Spruce-Fir spider can be directly attributed to a suite of issues revolving around the destruction of the C-2 listed Fraser Firs from the synergistic effects of acid rain-induced soil acidification, introduced insect pests such as the Balsam Woolly Adelgid, and past extensive logging and burning of this forest type. In regard to this scenario, the irony is thick, as the fate of a federally endangered species is primarily dependent on the recovery of a C-2 listed species! Unless we, the citizens, recognize the Endangered Species Act as a means of safeguarding the habitat of potentially imperiled organisms before they reach endangered status, the number of isolated cases which fall into the "Spruce-Fir spider syndrome" will continue to mount.

As Reed Noss states with regard to rare species, "it is only prudent that on some fronts we must concede defeat." Employing the triage policy in an effort to focus attention on conserving rare taxa which have the greatest chance of survival is a necessary evil, only because the importance of early intervention in conservation efforts has never been recognized. Thus, the move to eliminate C-2 status is an action which will only dig us deeper into this "extinction vortex".

To state your opinion regarding the elimination of the C-2 listing, contact: Chief, Division of Endangered Species, U.S. Fish and Wildlife Service, 1849 C Street, N.W., Mailstop ARLQ-452, Washington, D.C., 20240.

Pertinent Literature:

Newman, B. 1996. Endangered National Heritage Act: The Future of the Endangered Species Act. Wild Mountain Times, Late Summer 1996

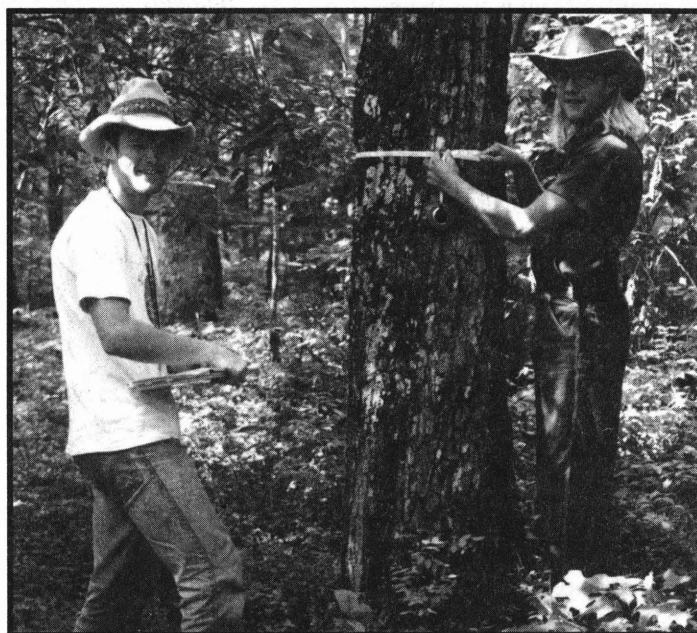
Noss, R. 1996 "Conservation or Convenience?" Conservation Biology 10 (4): 921.

Teat, T.H. et al. 1993. The Status and prospects for Success of the Endangered Species Act: A look at Recovery Plans. Science 262: 976-977.

White, P.S. 1988. Our Eastern Highlands. The Nature Conservancy Magazine 38(2): 5-11.

Tuckaluge Watershed Monitoring Updates: Success Through Volunteerism!

The 1996 summer season was one of discovery in the Tuckaluge Creek area, as Coalition volunteers helped locate and identify many species of birds and salamanders. A total of 27 bird species, which included seven Partners in Flight-listed species of high concern (Wood Thrush, Ovenbird, Yellow-billed Cuckoo, Eastern Wood Pewee, Worm-eating, Hooded and Black-throated blue warblers), were documented with volunteer help from Lisa Zweede, Mark Hopey and Trevor Rundle. Ten species of salamanders including the Seepage Salamander, which is state listed as a PET species (potentially endangered and/or threatened), were also documented at proposed timber harvest sites in this watershed with the help of many volunteers including Neal Bradley, Joellen McDonnell, Travis Berrier, Mike Connaley, Mark Hopey, Gail Livingston, Bill Noel, W.S. Lesan and Bryan Stuart. Permanent vegetation plots currently are being established in the Tuckaluge Creek area with the help of Kenny Duncan and Claire Newell, in an effort to track the effects of different harvesting techniques on the forest regeneration process. The CRWC greatly appreciates the volunteer help! The extent and quality of our field research is directly attributed to the assistance of volunteers. **If you're interested in experiencing the Chattooga's natural history, during any season we are in the field and willing to teach volunteers. Just get in touch.**



Chas Zartman and Kenny Duncan measuring a Black oak growing in a permanent plot located within a patch of Chattooga old growth forest.

Logging Proponents Take Aldo Leopold's Name In Vain

Kelpie Wilson

Article from the Internet, August 1996

Luna, Estella, Aldo Carl and Nina Leopold -- surviving children of the celebrated forester and naturalist Aldo Leopold -- are challenging a logging industry supporter who used their father's name in defense of a so-called "forest health" bill now before Congress.

In recent weeks, the logging industry has pumped up its lobbying for an innocent-sounding bill -- the "Federal Lands Forest Health Protection and Restoration Act," sponsored by Senator Larry Craig (R-Idaho). In an article sent to newspapers around the country, it was argued that Aldo Leopold would have supported the Craig Bill.

But in a letter last week, Leopold's four surviving children -- each of whom holds a doctorate in natural sciences -- expressed outrage that their father's name would be used in support of a measure that would, in reality, cause tremendous harm to the nation's public forests. The Leopolds' letter was sent to editorial writers across the country.

Senator Craig's proposed legislation "runs exactly counter to Aldo Leopold's published ideas about stewardship of the national forests," the Leopold children wrote, "for the bill would promote dubious 'salvage' logging practices in the name of forest health."

In their letter, the Leopolds noted that President Clinton's "Northwest Forest Plan" was signed in 1992 as an attempt at compromise between conservationist demands for protection of public forests and timber corporations which desire to expand logging. The Craig Bill, they wrote, now "threatens to undermine even the weak protection measures in the President's plan. We cannot imagine how Aldo Leopold's name could possibly be employed in defense of this bill!"

"Written by logging industry lobbyists and rammed through committee without adequate input from scientists or the public, Sen. Larry Craig's Bill, S. 391, would permanently undermine important environmental laws and restrict the public's ability to challenge destructive logging practices," the Leopolds wrote.

In his bill, "Senator Craig, one of the largest recipients of timber PAC money in Congress, narrowly focuses the 'forest health' debate on the health of commercially valuable timber-- at the expense of the entire forest ecosystem."

"Decades of unrestricted logging and fire control have created unnatural, unhealthy conditions and increased fire risks in a number of National Forests in the West. One recent scientific study, the Sierra Nevada Ecosystem

Project, prepared for the Congress by more than 100 independent scientists, concluded that "timber harvest, through its effects on forest structure, local microclimate and fuel accumulation has increased fire severity more than any other recent human activity," the Leopolds wrote.

"Congress," they wrote, "should reject Sen.

Craig's poorly conceived bill that pretends to aid 'forest health but in fact serves the interests of short-term timber industry profiteering."

Instead of more salvage logging and new logging road construction, the Leopolds wrote, "what is needed now is ecological restoration. We need a different approach which looks at specific regions and problems including ecological use of fire, and that advocates methods to restore the health of the entire ecosystem, not just trees with commercial value. This idea would fit well with Aldo Leopold's vision and philosophy -- maintaining our remaining national forests as the international treasures that they are."

Considered by many to be America's greatest naturalist, Aldo Leopold was an early leader in the wilderness conservation movement. Among his many achievements he is noted for his classic textbook, Game Management, and for his numerous essays on conservation, published in A Sand County Almanac. He died in 1948.

Aldo Leopold's surviving children include: Dr. Luna B. Leopold, emeritus professor of geology at U.C. Berkeley; Dr. Nina L. Bradley, a restoration ecologist with the Leopold Foundation of Baraboo, Wis.; Dr. Aldo Carl Leopold, emeritus professor of plant sciences at Cornell University; and Dr. Estella Leopold, a professor of botany at the University of Washington.

For additional information, please contact Dr. Luna Leopold at: (307) 367-4762.



Join in Support of the CHATTOOGA CONSERVATION PLAN

Now is the time to write a letter of support for the Chattooga Conservation Plan! The Forest Service is required by law to revise Land and Resource Management Plans for our National Forests every 10 to 15 years to reflect new information on recreation and natural resources, timber harvesting, and public sentiment for their proposed management actions. Citizen input is an integral part of the Forest Plan revision process. The Chattooga River Watershed Coalition and partners have worked for the past two years, carefully designing a land management plan which we have formally submitted to the Forest Service as an alternative in the Forest Plan revision process. We have incorporated the best scientific counsel available for the Chattooga Conservation Plan, and it has received very favorable peer reviews. A key to actual implementation of the Chattooga Conservation Plan is an overwhelming show of public support.

The Chattooga Conservation Plan is a collaborative project of the Chattooga River Watershed Coalition, the Southern Appalachian Forest Coalition, and The Conservation Fund. The Chattooga Conservation Plan presents a common-sense approach to preserving, restoring and maintaining the native forest ecosystem in the Chattooga River Watershed.

The plan proposes three special management areas in the watershed: (1) Core/Wildlife Corridor Protection Areas, (2) Cooperative Ecological Restoration Management Areas; and (3) Sustainable Economic Development Management Areas. **The Plan does not have heavy-handed restrictions on activities in the Core/Wildlife areas, which already support legal**

hunting and fishing and limited trail development. It does encourage the Ecological Restoration Areas to support projects including selective logging, campgrounds and picnic areas as well as legal hunting and fishing. On private land which surrounds towns and along major highways in the watershed, the Plan proposes Sustainable Economic Development Areas to promote local business enterprises. Finally, this Plan

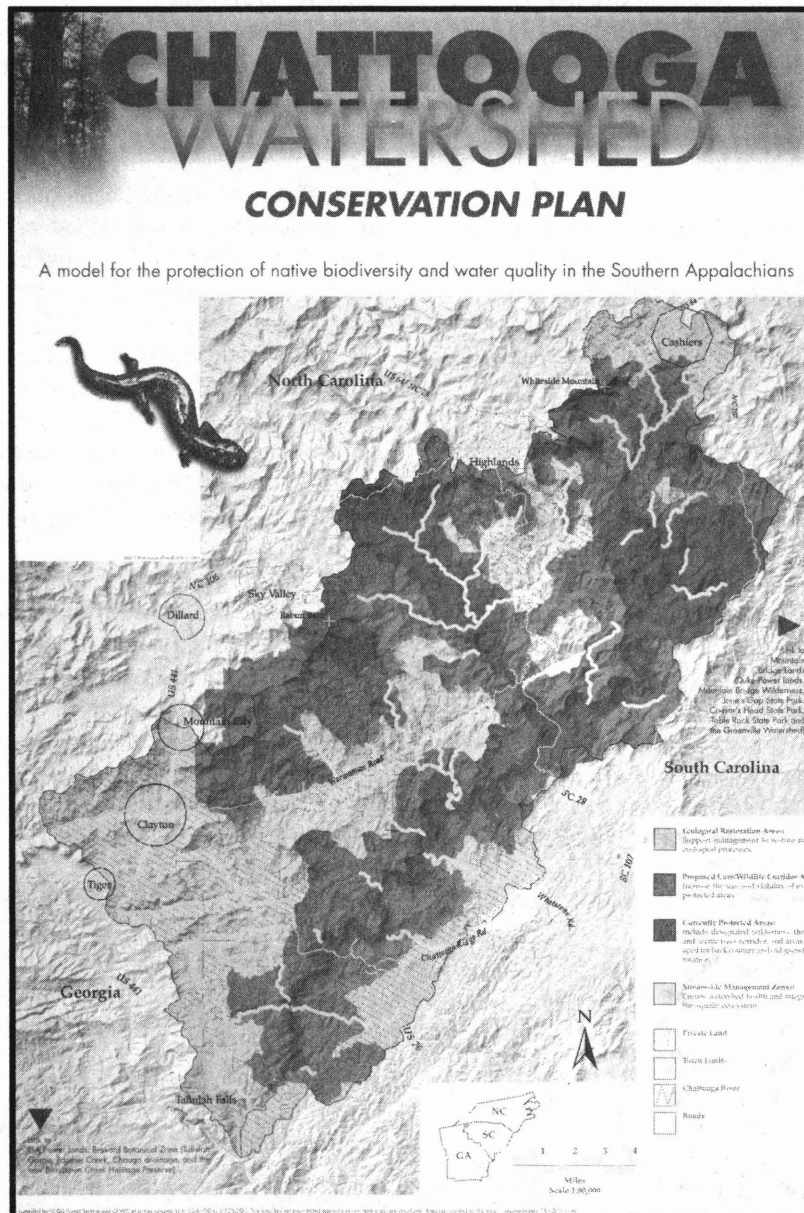
does not endorse restrictive regulations which would affect private landowners; instead, it offers ideas for possible financial incentives and voluntary agreements for conservation. The Chattooga Conservation Plan offers a scientific and common sense solution to the integrated management of the three National Forests in the Chattooga River watershed.

Please take the time to write the Forest Service at the addresses below and express your endorsement of the Chattooga Conservation Plan. The key to implementation of this Plan is an out pouring of public support. Let's make a difference, and write those letters of support! Send your letters to the US Forest Service at:

Georgia
USDA Forest Service
Chattahoochee NF
508 Oak Street
Gainesville, GA

30501

South Carolina
USDA Forest Service
Sumter National Forest
4931 Broad River Road
Columbia, SC 29210



Chattooga Conservation Plan



Chattooga Watershed Action Update

Tribute To Walton Smith

On September 10th, our good friend and renown forester Walton Smith passed away. To those who believe the hand of human kind is best used for making things better, Walton was an exemplary conservationist. We will miss him.

******Calling All Volunteers!******

Help Deliver Petition w/ 20,000 Signatures

At the beginning of this year, the CRWC reaffirmed commitments to a strategy which holds that the best way to bring about the changes necessary for good stewardship of our public land is to assist informed citizens in taking action -- in positive, creative ways. Since then, we have reached our goal of collecting over 20,000 signatures on our PETITION of Guide lines for Managing Our Public Lands. We intend to deliver this Petition, via an over-land and water route of 200 miles, to Regional Forester Bob Joslin in Atlanta on Monday, November 25th at 2 p.m. Beginning on Saturday, November 16th, we will start the journey to Atlanta from the pristine source of the Chattooga River at the "Dividing Springs" atop Whitesides Mountain in North Carolina. The Petition will be carried by climbers, who will "rapple" with the document down the 2,000 foot rock face of Whitesides Mountain to the Chattooga River. From there, hikers will transport the Petition through the Ellicott Rock Wilderness Area to "Chattooga Old Town", the historical site of the Indian Village at the Hwy. 28 bridge. From that point, riders on horse back will transport the Petition to Earl's Ford, where paddlers will take the document and descend down sections II, III and IV of the Chattooga River, across Lake Tugaloo to the dam. From there, hikers will carry the Petition up through the Tallulah River Gorge. Then the document will travel via mountain bike through the national forest and over back roads to Helen, GA, where we'll paddle it for the last 100 miles across Lake Lanier, and down the Chattahoochee River. Regional Forester Joslin has agreed to meet us at the US Forest Service office in Atlanta, and receive the Petition. *If you would like to be a courier, or help with the support logistics, please contact the CRWC office.*

Reminder

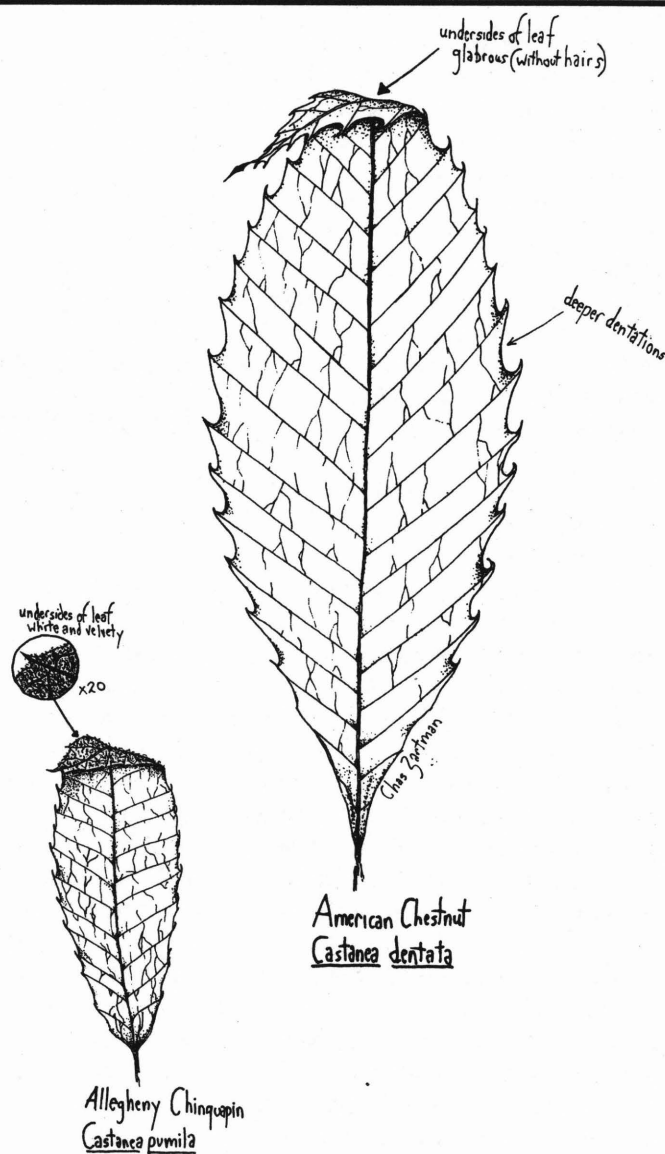
Public comments on the "Notice of Intent" for our National Forest Plan Revisions are due by December 2nd, 1996. Please see page 22.

Earl's Ford Horse Crossing

The CRWC is working with several equestrian groups and the US Forest Service, to explore the feasibility of a "legal" horse-crossing in the vicinity of Earl's Ford on the Chattooga River. The ancient Earl's Ford crossing was closed to horses recently; however, this new proposal will be outlined in an upcoming Forest Service scoping notice. Please contact the CRWC office with questions/comments.

Hints to Identify the American Chestnut Tree

We've had a great response from citizens who want to help us locate surviving American Chestnut trees! One of the most effective ways to discriminate the American Chestnut tree from both the Allegheny Chinquapin and the introduced Chinese Chestnut is to study the abaxial side (under side) of the tree's leaf. If the leaf's underside is clearly absent of soft, matting hairs, then the plant is most likely an American Chestnut. For a bomb-proof test of pubescence (the presence of hairs), rub the leaf across your lips. A positive verification on any combination of the following characteristics should also secure an American Chestnut find: (1) strongly tapering (acuminate) leaf tip; (2) clear indentations between teeth on the leaf margins (edges); (3) a husk that includes more than one nut; and (4) the twigs are glabrous (lacking hairs). *Please feel free to direct any identification questions to the Coalition office.*



The Ecology of Commerce Book Review

Nicole Hayler

"We are seeing increases in population while decreasing the carrying capacity of our ecosystems – two trains speeding toward each other in the night. The tragedy is not that they will collide, but that they will pass each other at great speed, leaving a gap between what we need and what will be available, a gap that will expand rapidly owing to the exponential nature of growth."

-Paul Hawken

The Ecology of Commerce by Paul Hawken was published three years ago, and received widespread recognition and acclaim as a highly credible, even "visionary" analysis of our free market economy's effect on society and the environment. The depth and breadth of Hawken's argument is rooted in historical facts, principles of capitalist economic theory, and sobering ecological reality. As such, *The Ecology of Commerce* is relevant to a wide audience, and has gained the attention of liberals, moderates and conservatives alike. It is my opinion that Hawken's unique dissertation on the symbiotic evolution of our free enterprise economy and American culture, and how this relationship has affected local and global environments, is destined to become a classic in interdisciplinary literature. Whether or not the ideas and mechanisms explained in *The Ecology of Commerce* will be acknowledged and acted upon by the status quo remains in question.

Hawken asserts that while we are living in a "turbulent [and] transformative period", our epoch is unique from previous periods of upheaval due largely to the current exponential growth in population, and the "once-in-a-billion-year blow out sale of hydrocarbons". Indeed, Hawken points out that at the present rate of combustion of fossil fuels, carbon dioxide emissions will "effectively double-glaze the planet within the next fifty years, with unknown climatic results". Meanwhile, we continue to "steal from future generations" by our rapacious consumption of eons worth of capital reserves expressed in the form of ancient forests, soils, fossil fuels and subterranean aquifers, while employing our land, fresh water, air and sea "life support systems" for toxic waste dumps. Hawken shows that this scenario is both due to and being exacerbated by the "power and impact of corporate capitalism" at the global scale, where language that promotes the accumulation of wealth is the common denominator between different cultures, and reigns absolutely supreme over all other values. Here, corporate

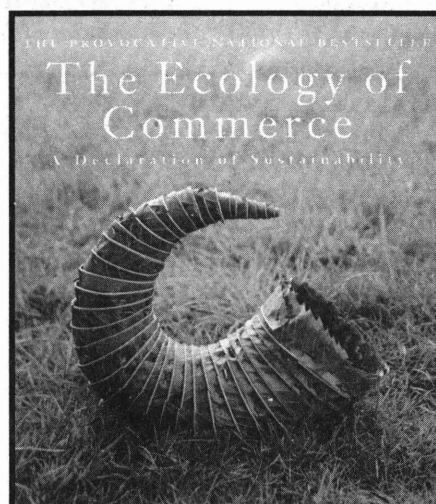
accountability is compromised due to the amorphous nature of multi-national business ventures. Some readers may deny the severity of this situation; however, Hawken's documentation includes a multitude of objective sources which altogether render a convincing global overview. This perspective supports these assertions as well as the statement that "all living systems are in decline" as we continue to extinguish the diversity of life on Earth.

In the midst of these and other disturbing facts, the point Hawken expands on throughout his book is that *there is hope* to reduce and eventually remedy our natural world's decline, via a "willful transformation" of present systems of commerce. After all, our system of responding to consumer demands by producing goods and services works quite well. Thus Hawken states: "If this book has one main purpose, it is to imagine and describe the ways

business can act that are restorative to society and the environment", which he then presents in eloquent detail. *The Ecology of Commerce* proposes that our systems of commerce undergo a dynamic transformation by incorporating specific economic mechanisms (which do not include currently conceived notions of "balanced multiple uses" and "mitigation") to incrementally induce changes. Hawken describes a new design for commercial systems, based in part on the "true cost" of producing goods and services. These "true costs" can be derived by quantifying the substantive environmental impacts and social tolls of producing products and services, as well as their costs and impacts to future generations. *The Ecology of Commerce* also develops the rationale for implementing measures

such as "green taxes" on excessive fossil fuel consumption, and other specific "negative feedback loops" which would promote conscientious adjustments of corporate behavior and consumer demand. Hawken details positive incentives as well, like applying the "green taxes" to reduce or eliminate current payroll and capital gains taxes, which would in turn provide more money for energy conservation and environmental restoration businesses by directing the tax burden away from entrepreneurial and income activities, onto activities which need to be discouraged. Meanwhile, viable common sense strategies such as living off of "current income" (solar and hydrogen systems) and reducing/recycling waste are also promoted.

The Ecology of Commerce shows that we have arrived at an opportune time to redesign our economy, employing innovative free market systems and time-tested models of efficient natural systems. Read it, think and act.



Published in 1993
by HarperBusiness

1996 Congressional Environmental Scorecard

As the 104th Congress comes to an end, it seems timely to publish the cumulative "Environmental Score card" of the Chattooga River watershed's Congressional delegation. In short, the majority of 104th Congress worked to continue the focused assault on our environment which began in earnest with the 103rd Congress.

Below is a list of the issues, bills, amendments and/or riders that were presented to the Senate and the House, followed by the pro-environment voting record of the Chattooga watershed's Members of Congress.

House of Representatives

1. Anti-Environmental Riders I
2. Anti-environmental Riders II
3. Wildlife Refuges
4. Federal Land Acquisitions
5. Redwoods and endangered Species
6. Logging Without Laws
7. Logging Roads
8. Farm Bill -- Sugar
9. Climate Change Research
10. Pork Barrel Water Project
11. Superfund
12. Subsidizing Nuclear Power
13. Renewable Energy Research

Representatives: Pro-Environment Score

Nathan Deal, GA (R)	27%
Charles Taylor, NC (R)	8%
Lindsey Graham, SC (R)	4%

Senate

1. Endangered Species Standstill
2. Logging without Laws
3. Grazing I
4. Grazing II
5. Utah Wilderness
6. Public Lands Sell-off
7. Farm Bill -- Livestock
8. Farm Bill -- Sugar
9. International Family Planning
10. Pork Barrel Water Project
11. Subsidizing Nuclear Power
12. Nuclear Waste Storage
13. Funding Enviro. Programs

Senators: Pro-Environment Score

Paul Coverdell, GA (R)	4%
Sam Nunn, GA (D)	81%
Jesse Helms, NC (R)	4%
Lauch Faircloth, NC (R)	4%
Ernest Hollings, SC (D)	81%
Strom Thurmond, SC (R)	0%

Remember, only you can prevent an anti-environmental Congress!



Contact your Representative



Express your opinion

Forest Health continued from page 4

their habitats throughout our mountains. This phenomenon is fast reaching crisis proportions, and is caused by two things: Excessive road building, both for logging and for public travel, and clearing the forest for resort development.

Perhaps equally serious is the accelerated construction of second homes, golf courses, and retirement communities that is developing in Southern Appalachians. Since this urbanization is on private lands, solving the problem becomes a matter of county and local zoning, but it also makes even more imperative that our National Forest lands are not further fragmented by roading and logging.

In summary, Congress needs to enact only one new law to improve the nation's forest health: Eliminate mandated timber targets!

We already have exceptionally good laws that direct the Forest Service to manage the public forests properly, and the Forest Service has many good men and women who can do just that. True, they do need more conservation biologists, more botanists, and more wildlife biologists, and fewer timber foresters. We all know this is wishful thinking, but Congress must keep timber-oriented politics out of National Forest management.

Timber corporations have made up this bogeyman they call "forest health crisis" and their "scientific experts" tell Congress we must cut down all the forests in order to save them. Is the American public, who owns our National Forests, going to buy this absurd and deceitful interference in good forest management?



Interview continued from page 18

Association of Forest Service Employees for Environmental Ethics (AFSEEE) when this issue surfaced. Do you feel like it was a good decision to "stove pipe" the law enforcement section of the Forest Service?

JWT: I have mixed emotions about that, but Congress insisted on it. The chances of collusion were pretty damn small. Yet it was perceived by Congress that some of this was going on. The investigations cleared every single person in the Forest Service that was so accused. As far as an organization like AFSEEE is concerned, they are very good at accusations and very poor at back-tracking on their accusations when proof is lacking.

BW: I'd like for you to know that I agreed with your speech this morning when you said that the Forest Service is the greatest public land management agency in the history of this country. Thank you very much Chief Thomas.

JWT: You know, it's one of the toughest challenges that we face -- to work our way through the debate about "appropriate use". And in the middle of this debate, we've downsized our staff. We shouldn't complain about that, it's just the price of dealing with management that prizes their politicization and attention. And our constituency has grown, while people in the Forest Service have had to make some adjustments.

On Thursday, October 11th, (after our interview) Chief Thomas announced his resignation as Chief of the Forest Service. At a news conference announcing his departure, Thomas said: "It's time for the American people, through their elected representatives, to set down and make sure that we have a clear mission and a clear mandate for what we are experienced to do."

Jack Ward Thomas was the first scientist to serve as Chief of the United States Forest Service. At the time of his appointment, there were great expectations from the conservation community -- for a shift to more ecological and less extractive management. It didn't happen, and many blamed the Chief. Read again what the resigning Chief said about this perception. We sincerely hope that citizens *will* send a clear message: The American people want the next Chief to have a clear mission to protect and restore our National Forests.



Chattooga River Watershed Coalition

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Buzz Williams*

*Development Director
Nicole Hayler*

*Administration
Cindy Berrier*

*Biologist
Chas Zartman*

*Program
CRWC Staff*

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*Production and Layout,
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Atlanta Whitewater Club
Georgia Canoeing Association
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Georgia Botanical Society
Georgia Ornithological Society*

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Center
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Timber Framers Guild of North
America
Carolina Bird Club
Government Accountability Project
Turpin's Custom Sawmill
Dagger, Inc.*

Renewal

☐

Name _____

Address _____

Phone number _____

Membership

Join the Coalition and help protect the Chattooga Watershed!
Your contribution is greatly appreciated. It will be used to
support the Coalition's work, and guarantee you delivery of our
quarterly newsletter. We're a non-profit organization, and all
contributions are tax-deductible.

Individual: \$7.00

☐

Group: \$14.00

☐

Donation:

☐

Sustaining: \$45.00

☐

Send to:

Chattooga River Watershed Coalition
P.O. Box 2006
Clayton, Georgia 30525

Chattooga River Watershed Coalition

PO Box 2006

Clayton GA 30525

(706) 782-6097

(706) 782-6098 fax crwc@igc.apc.org Email

Our Purpose:

"To protect, promote and restore the natural ecological integrity of the Chattooga River watershed ecosystem; to ensure the viability of native species in harmony with the need for a healthy human environment; and to educate and empower communities to practice good stewardship on public and private lands."

Our Work Made Possible By:

CRWC Members and Volunteers

Turner Foundation, Inc.

The Moriah Fund

Norcross Wildlife Foundation

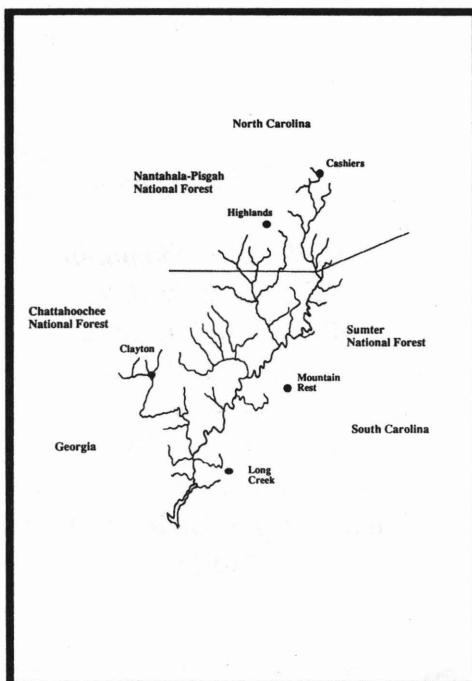
Lyndhurst Foundation

Patagonia, Inc.

Town Creek Foundation

Merck Family Fund

Frances Allison Close



Our Goals:

Monitor the U.S. Forest Service's management of public forest lands in the watershed

Educate the public

Promote public choice based on credible scientific information

Promote public land acquisition by the Forest Service within the watershed

Protect remaining old growth and roadless areas

Work cooperatively with the Forest Service to develop a sound ecosystem initiative for the watershed

Chattooga River Watershed Coalition
PO Box 2006
Clayton, GA 30525

Non-Profit Organization
Bulk Rate Permit # 33
Clayton, GA



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ERRATUM

Chattooga Quarterly, Fall 1996 issue

****PAGE 4, second column, second paragraph, second sentence**
should read:

"One is the gypsy moth which is now moving south through Virginia..

****PAGE 4, second column, very last sentence, continued on PAGE 26**
should read

"The disease known as oak wilt occurs along prairie edges in Wisconsin, Minnesota, and Texas. It is not present within 900 miles of the Chattooga River watershed. And oak decline is a perfectly natural condition, recorded periodically for over a century, recurring after periods of drought. Oak decline affects older trees of only two species, scarlet oak and black oak, and is limited to dry sites with poor soils. Oaks as a group are not in danger from the health standpoint. The industry, "cure" for oak decline is clearcutting. (Although the Western North Carolina Alliance won the battle against "clearcutting" per se in the Nantahala-Pisgah National Forest, other forms of excessive logging and roading are still common on National Forest timber operations. We still have much work to do on this score.)

The second category of serious forest health problems in the Chattooga River watershed is the forest fragmentation issue, which affects entire ecosystems. All forest interior plants and animals, from orchids to yellow birch trees, from bears to warblers, are rapidly losing their habitats throughout our mountains."