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# WildEARTH

Spring 1996

Bill McKibben explains  
MACHO



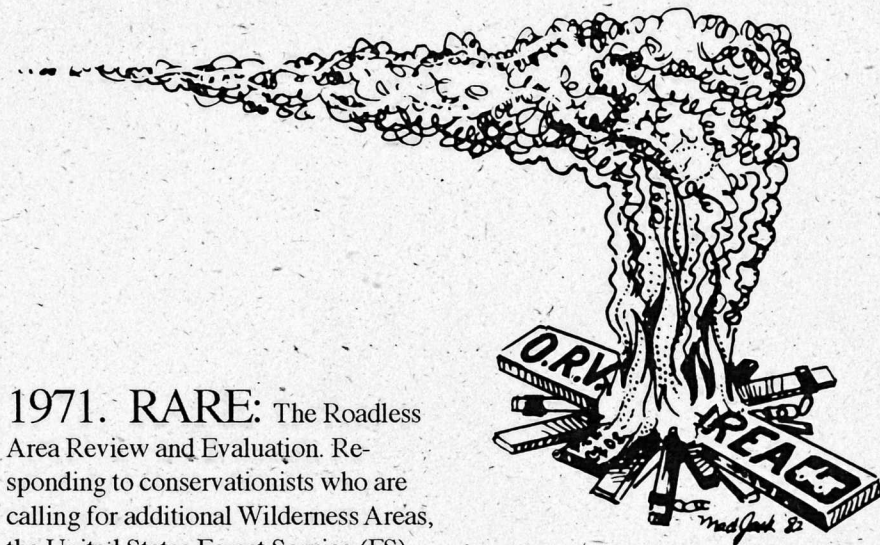
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*Stephanie Mills* visits Leopold's Shack  
*Andy Kerr and Sally Cross* Get Political  
*Michael Soulé* mulls Ecosystem Processes  
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*Lyanda Haupt* bemoans Hawaiian Extinctions  
*Brian Tokar* explores Biotechnology's Impacts on Biodiversity



# Around the Campfire



**1971. RARE:** The Roadless Area Review and Evaluation. Responding to conservationists who are calling for additional Wilderness Areas, the United States Forest Service (FS) graciously agrees to inventory all roadless areas on the National Forests and evaluate them for suitability for Wilderness designation. That was the official line, anyway. In reality, RARE was a preemptive strike by the FS brass against new Wilderness Areas—particularly those with trees. The inventory was inconsistent, capricious, and sloppy; the evaluation was designed to recommend the fewest possible areas. The goal was to prevent Wilderness Area proposals from tying up the Forest Service timber program.

So, at the beginning of my conservation life, I learned that the Forest Service doesn't play by the rules.

During the last 25 years, conservationists have worked hard on National Forest management plans and on reform legislation like the National Forest Management Act. Honest and dedicated FS employees have tried to reform the agency from the inside, even going so far as to form the Association of Forest Service Employees for Environmental Ethics. Despite all this, the Forest Service still doesn't play by the rules. Why do Mark Hatfield and the other senators from Big Timber continually try to exempt Forest Service timber sales from all conservation legislation? Because the Forest Service consistently loses in court when conservationists sue. The Forest Service breaks the law, conservationists sue, federal courts rule against the Forest Service, then sawlog senators slip through riders exempting the Forest Service from obeying the law.

In the last 25 years, the Forest Service has destroyed an average of one million acres of de facto wilderness a year through logging and associated road building. They have hacked away at ancient forests, leaving only scattered bits. They have butchered critical habitat for Endangered and Threatened species. They have left wild rivers bleeding with the silt of devastated watersheds. All to get the cut out. All to continue the professional culture and custom of the Forest Service: build roads, cut trees, turn wild forests into tree farms.

No wonder Howie Wolke calls the Forest Service an outlaw agency.

No wonder many conservationists have decided that the only solution is to prohibit all commercial logging on the National Forests.

I called for an end to National Forest logging 16 years ago after the heartbreak of the *second* Roadless Area Review and Evaluation.

*continued on p. 2*

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# WILD EARTH



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Cover art: Leopard Frog by Robert M. Smith



Since then, more and more conservationists have joined the cry for "zero cut."

This spring, Sierra Club members will vote on a zero cut ballot proposition. Two of my heroes and mentors, David Brower and Brock Evans, are supporting the measure.

When I was elected to the Sierra Club Board of Directors a year ago, I knew the zero cut issue was one that I would be expected to champion by many folks who voted for me. I have not taken this responsibility lightly. I have thought long and hard about the issue. I have talked to a variety of experienced conservation leaders about the strategic implications. At the Society for Conservation Biology Annual Meeting last summer, I asked prominent conservation biologists for their views.

My decision wasn't easy. It was painful. I asked myself the crucial question: Would a zero cut position by the Sierra Club help or hinder efforts to protect and restore the ecological integrity of our National Forests?

Others might draw a different conclusion to my question; others might base their conclusions on different questions about the issue.

The ballot question that Sierrans will vote on this spring is this:

*Shall the Sierra Club support protecting all federal publicly-owned lands in the United States by advocating an end to all commercial logging on these lands?*

(The Sierra Club's policy on forestry already opposes all logging of old-growth and roadless areas, and gives chapters the authority to oppose all logging on National Forests in their regions. If passed, the ballot initiative, even according to proponents, would *require* all Sierra Club representatives and entities, if asked, to say that the Sierra Club opposes all commercial logging on National Forests and other federal lands.)

So. Where do I stand?

I have come to believe that if it were the position of the Sierra Club to oppose all commercial logging on public lands, efforts to protect and restore the ecological integrity of the National Forests would be harmed.

I oppose the ballot question. I oppose the Sierra Club opposing all commercial logging on our National Forests.

I take this position for two reasons: ecological and strategic.

Past overcutting, grazing, fire control, and other abuses have left many areas of the National Forests in an unnatural and unhealthy condition. Conservation biologists tell me that some continued logging is necessary to put our forests back on the track to healthy, natural conditions. Dr. Reed Noss, author of *Saving Nature's Legacy* and science editor of *Wild Earth*, has argued against the no-cut ballot measure by saying "... scientifically, there is abundant evidence and little uncertainty that some forest types, collectively covering many millions of acres, have suffered from de-

cadecades of fire suppression and can benefit from active restoration." He has told the sponsors of the ballot measure, "I think this effort is misguided and needs to be replaced by something more substantial and scientifically credible."

Let me offer three brief examples of forests where active restoration is necessary: 1) Hardwood forests converted to pine plantations, or diverse forests clearcut and replanted with one tree species. 2) Dog-hair thickets of Ponderosa Pine, which have replaced open, park-like stands after logging and under the adverse effects of livestock grazing and fire suppression. 3) Biologically impoverished second-growth stands between old-growth stands (here restoration forestry could jump-start old-growth conditions, in part through the creation of standing snags and downed woody debris so old-growth dependent species like the Spotted Owl will move through regenerating areas).

A graduate student at Colorado State told me that he had written a paper to prove that zero cut was the solution; he changed his mind when his research showed that no cutting would cause the ecological collapse of the Ponderosa Pine ecosystem in Colorado. Again, this is due to decades of past abuse. We need to keep in mind, also, that restoration forestry is a short-term proposition. Once it sets damaged forests on the path to ecological recovery, there will be little need for it. Healthy, natural forests don't need any silviculture to maintain their ecological integrity. But it is needed now. On this, the conservation biologists with whom I have talked all agree.

Sierra Club proponents of zero cut have paid attention to these ecological concerns and argue that their proposed policy would only prohibit *commercial* logging—they say the Forest Service could pay crews to do needed restoration forestry. I wish this were true, but I am not so politically naive as to believe it will ever happen. We're in a real world of slashed federal budgets. Silviculture to heal damaged National Forests will happen only if it's commercial. I wish this wasn't so, but it is.

For the Sierra Club to adopt a zero cut position would also be bad strategy. A year ago, when the economic anarchists of the GOP majority in Congress launched their War on Nature and Human Health, I feared that conservation and environmental groups were going to get stomped. Because of Bill Clinton's tofu backbone and care-less attitude about Nature, the timber senators pushed through their Logging Without Laws rider—the worst single defeat ever suffered by the conservation movement. Aside from the Logging Without Laws loss, however, the Sierra Club and other groups have done a helluva good job in holding the line. We have successfully painted congressional anti-Nature thugs as extremists. If the Sierra Club adopts a no-cut position for our National Forests, I fear our enemies will paint *us* as extremists, thereby hamstringing our efforts to show them as the off-the-wall, out-of-the-mainstream, rape-and-scrape wackos that they are.

There are still natural forests on the public lands: old-growth stands that remember centuries, roadless native forests that one day could be designated as Wilderness Areas, ecologically healthy forests that provide habitat for Endangered and Threatened species, and Eastern forests recovering old-growth characteristics. These are the most valuable parts of our National Forests—the areas we must defend at all costs against the timber beasts and their phony “salvage” sales. It is my carefully considered opinion that if the Sierra Club adopts a position of opposing all commercial logging on the National Forests, the efforts of all conservationists to repeal the venal Logging Without Laws rider and to defend the most ecologically valuable forests will be severely injured. Remember that Sen. Larry Craig of Idaho is pushing legislation to make the Logging Without Laws rider permanent. The priority for conservationists must be to kill Craig's evil bill. I fear that a zero cut position by the Sierra Club would hurt our ability to drive a stake through Craig's bill.

In many areas of the West, National Forests contain the only timber available to local communities. While we may want to run the big logging operations off the National Forests, many of us believe that there should be a place for small, locally-owned outfits for posts, poles, firewood, vigas, and sawtimber. Such operations have no need to build new roads, enter roadless areas, or cut old growth and other natural forests. A draconian zero cut mandate would put these folks out of business, too. After seeing the bad publicity in New Mexico after a successful Mexican Spotted Owl lawsuit, I would hate to see the media coverage and political backlash if the Sierra Club announced it was opposing all commercial logging on the National Forests.

While I don't think a total zero cut position is right for New Mexico and some other Western states, I think zero cut may be the right approach for many National Forests in the East. Current Sierra Club policy allows chapters to advocate no logging for the National Forests in their states, if they so wish. This flexibility is the best approach, I think. (Interestingly, those Sierra Club Chapters who have endorsed the no commercial logging initiative are generally urban, while those opposed are from more rural states in the West.)

In sum, I think that for the Sierra Club at this time to publicly oppose all commercial logging on the National Forests would harm efforts to protect and restore the ecological integrity of our National Forests. I do not deny that you can make reasonably good arguments in favor of zero cut. Some experienced conservationists support it; some experienced conservationists oppose it. You can never prove that your strategy is the best one. It's always a judgment call. Decent, thoughtful, experienced people can disagree. If they are adults, they can disagree and still be allies and friends.

Despite my opposition to the *Sierra Club* taking a zero cut position, I still think that *other groups should advocate zero cut*. The way to do that is to clearly articulate and promote the no-cutting alternative, not to attack and condemn those conservationists who do not support zero cut. We should be able to recognize the value of multiple strategies, of a range of positions within the movement.

Regardless of how Sierra Club members vote, I hope we can quit spending our time fighting among ourselves and get back to the real work of defending and restoring our forests. ■

— Dave Foreman  
Jawbone Mountain

Let *WE* be bombarded by letters and articles from all directions responding to what will likely be Dave's most controversial Campfire yet, I wish to make a preemptive strike. In pondering the foregoing, please consider also these points:

1) *Wild Earth* is not the place for a protracted debate over the zero cut issue. Controversial conservation concerns are best resolved through direct dialog, not through the pages of an infrequent periodical. Vilifying opponents is all too easy when one faces them only in print. I suggested Dave devote his Campfire this time to the zero cut question because many people have been wondering why is *Wild Earth's* publisher opposed to the zero cut position. Now they have their answer.

2) *WE* does not have an official position on the zero cut question. Nor need we take a position on any Sierra Club ballot initiative. Dave is speaking hereinbefore as a Sierra Club director, and many *Wild Earthlings* are Club members; but *Wild Earth* has no formal affiliation with the Club.

3) *WE* represents a diversity of viewpoints and opinions, but virtually all of us agree that *ultimately all public lands should be strictly protected as wildlife habitat*. Some believe the zero cut campaign will best advance us toward such a goal; some believe the zero cut slogan has become counter-productive. I happen to believe conservationists should unite in a campaign to curtail commercial exploitation of public lands, even while calling for restoration thinning or burning or other remedial practices where necessary to restore natural forest. (I also believe conservationists should address directly the implements of destruction: Feller-bunchers, mechanical skidders, trucks, chainsaws, and the like are probably not compatible with sustainable forestry—whether that forestry is practised on private or public lands.)

Though *Wild Earth* has not the space to run a lengthy debate over zero cut, we encourage respectful dialog between and among the different camps. *WE* will strive to help inform this discussion by continuing to run articles on the ecological effects of current forestry practices and strategies to protect and restore native forests. ■

—John Davis





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# THE WILDLANDS PROJECT .....UPDATE

by David Johns

One of the great strengths of The Wildlands Project is its regional focus. In that regional focus lies the adaptability to the unique biological problems and promise of each part of North America. In turn, the ability of regions to draw upon each other's experience is vital to success. We all have much in common.

Like people in many movements, conservationists are prone to interminable discussions involving theory and practice. Those discussions are important; but only when grounded in the work of designing and implementing reserve systems will our questions finally be answered. As work in the Rockies, Mesoamerica, Klamath-Siskiyou, Sky Islands, US Southeast, Eastern Northwoods and elsewhere unfolds, we grapple with questions about emphasizing key species, the degree of ecosystem analysis, appropriate scale, mapping techniques, data gaps, defensibility, building support, and limited resources. As regions find solutions, we will share them through updates in the *Wildlands Newsletter*, *Wild Earth* and the Framework Package. As always, we encourage your participation.

## REGIONAL PROGRESS

Working with scientists, activists are continuing to build the organizational, public education and outreach and other structures needed to design and implement a Yellowstone to Yukon reserve system. People have long worked on the ecosystem level (e.g., Hells Canyon Preservation Council, Friends of the Northern Rockies), on the state or provincial level (e.g., Idaho Conservation League, Alberta Wilderness Coalition), and on larger areas within the US or Canada (e.g., American Wildlands, Canadian Parks and Wilderness Society), but too infrequently on cross-border issues. Work must continue at all levels, but must be better coordinated and integrated, especially across borders. To facilitate such integration of work to design a reserve system and a campaign to implement it, a Y2Y coordinating council has been established.

The Klamath-Siskiyou reserve design project, initiated by the Siskiyou Regional Education Project, will produce preliminary maps soon. The Klamath-Siskiyou province of the Pacific Northwest region is an exceptionally diverse area and vital link in the coastal mountains that run from Alaska to northern California, and that connect with the Cascades, Sierra-Nevada and interior valleys. Preliminary reserve design work for the Oregon Coast Range, adjacent to the north of the K-S, was completed earlier.

In the Sky Islands/Mogollon province (Arizona, Sonora) of the Southern Deserts region, activists and biologists are developing preliminary maps for several key species. These maps, which should be completed by early summer of this year, will then be tested against the goals for key species protection and recovery to determine if they are adequate. Precise mapping of plant assemblages for this province, unlike much of Canada and Mesoamerica, is not available at this time. It will be integrated as it becomes available.



In the Eastern Northwoods, wildlands reserve design has been proceeding sporadically due to limited funding. RESTORE: The North Woods produced a proposal for a Maine Woods National Park that has set the terms of the conservation debate in Maine. World Wildlife Fund's Endangered Spaces campaign has generated maps of ecosystem attributes and enduring features in southern Quebec and New Brunswick. The *Northern Forest Forum* published preliminary maps of proposed wild cores for northern headwaters areas. Now, with a generous grant from the Geraldine R. Dodge Foundation and additional funds, we can integrate work completed thus far and develop preliminary maps for the region, which encompasses much of eastern New York, southeastern Ontario, southern Quebec, Vermont, New Hampshire, Massachusetts, Maine, and the maritime provinces.

The focus on the above regions is not meant to slight other work underway in other parts of the continent. Wildlands work is also proceeding in Alaska, British Columbia, the Arctic, the boreal forest, the prairies, the Great Lakes, the Southern Appalachians, the Southeast Coastal Plain, California, southwestern Mexico, the Yucatan peninsula and Mesoamerica.

### NOSS LEAVES BOARD

It is with regret that I announce Reed Noss's resignation from The Wildlands Project board of directors. His contributions to the project are incalculable. Reed is not heading to a cave in the mountains—however much he deserves a rest from a civilization seemingly bent on destroying the natural world. He remains the science editor of *Wild Earth*, and will continue to be involved in several Wildlands pilot reserve design projects, including Klamath-Siskiyou, the US Southeast (Florida, Alabama, Georgia initially, eventually Mississippi/east Texas to North Carolina), and Y2Y. As most of you know, Reed is editor of *Conservation Biology* as well.

### RESERVE DESIGN HELP

There has been a very positive response to the second special issue of *Wild Earth* devoted to The Wildlands Project (Winter 95/96). Additional copies are available. We ask \$5 for a single issue to cover costs. Contact the Tucson office for bulk rates. Copies of the first special issue featuring the Wildlands Conservation Strategy are also still available.

Additional materials to help in reserve design are available in what we have called the Framework Package. (See Winter 95/96 p. 35 for contents.) The Framework Package is not cheap to produce so we are asking \$25 per copy. The package is intended for those who have attended Wildlands workshops and are working on reserve design projects. If your group is working on reserve design, but no one has attended a workshop, please contact Rod in Tucson to arrange a meeting with Wildlands staff.

### OUTREACH AND FUNDRAISING

From April to June, Patagonia and The Wildlands Project will host events in eastern cities where Patagonia has retail outlets. Events in Atlanta, Washington DC, New York, Boston, and Freeport (Maine) will educate people about the mission of TWP and cooperating groups, and raise funds for reserve design. Contact the Tucson office for details.

### A PERSONAL NOTE

The project will finally consolidate offices this spring, to improve staff efficiency and facilitate contact with all of you. My roots are in the damp soils west of the Cascades in the Pacific Northwest. Without nearly constant rain I would dry up. Not a pretty prospect. And the thought of dealing with endless sunny days, not mention 120 degree summers...well, enough said. I will leave the project as executive director around March 1, or at the time a new one is hired. Many excellent candidates have applied for the position and I am confident that whoever is selected will be able to bring flesh to the vision.

I will not be leaving the project. As a board member I will continue to work in several areas: with Y2Y, Klamath-Siskiyou, and Mesoamerican reserve design and implementation efforts, with the Society for Conservation Biology, and on fund raising. You can reach me after March 1 at POB 725, McMinnville, OR 97128. I will put my new phone and fax number in the next newsletter. You can also get them from the Tucson office later.

Such a transition is always a good time to assess our progress: what we've done, what we haven't done, what we should have done. There is no question The Wildlands Project is ambitious. It was born ambitious. The threat that confronts much of the life on this planet will not be successfully met with timidity. How have we measured up to our ambitions? I must admit that the tasks we have faced in creating a North American Wilderness Recovery Strategy have been greater than I originally expected. Nonetheless, we are setting ourselves to those tasks. Too much is at stake to become discouraged.

In our first four years, with a small staff and limited funding, we have made conservationists throughout North America and many other parts of the Earth aware of our mission; that mission has excited countless people to a new sort of action. TWP's mission has encouraged them to think and work across institutional and political boundaries; it has encouraged them to be bold, to link with others across their regions.

We have increased the cooperation of scientists and activists. Those who work to protect wildness know that the path includes rigorously applied conservation biology but that science alone, speaking truth to power, will not win the day—only the voice of thousands will.



We have successfully encouraged many larger conservation organizations to think more boldly and to integrate biology into conservation planning. Our insistence on the need to focus on grass-roots organizing has also been heard. We have created a network of activists and scientists committed to creating a vision of a biologically healthy North America.

We have started on several reserve design projects, including Y2Y, Klamath-Siskiyou, the US Southeast, and the Eastern Northwoods. We have cooperated with others who have similar efforts underway, seeking to build continental support.

We have also had our shortcomings. We have not been as well organized or productive as we should have been. Starting an organization is difficult. Building a staff is difficult. Finding resources is difficult. We were unrealistic in how long it would take us to find cooperators, locate the resources to do reserve design, and actually undertake it. We got off to some false starts. With your help we have learned. We tried to do too much at once. Moving ahead across all of North America and on too big of a scale resulted in some wheel spinning. Focusing on pilots and allowing the scale of reserve design to select itself have allowed us to move forward. Moreover, we thought funders would be less timid and more receptive to long-term work. Fortunately, we have finally convinced a core of visionary funders that TWP and its cooperators are worthy of investment.

We can produce results that make a difference. We are changing the agenda.

We have at times been too parochial, victims of our own experience in a particular region (especially the West), with preconceived notions about potential constituencies. We have all of you in the regions to thank for correcting our errors. But keep an eye on us. The familiar can be a straitjacket; it takes friends to get out of one.

While I am on the subject of thanks—and before I get to the formal 1995 thank-yous—I want to express my personal gratitude to all of you who have helped to bring us that much closer to making North America safe for the great web of life that emerged on this continent. In the past four years I have traveled from Costa Rica to Alaska, and from Florida to New England. In each and every place I have found people—you—who welcomed me, had the patience to teach me, and to listen to me, and the willingness to join with others to tackle obstacles that often seem insurmountable. Throughout North America there are people—you—of extraordinary vision, enduring compassion for and understanding of the natural world, and commitment to taking the risks necessary to save it. It has been an honor and a pleasure to meet you and work with you; I look forward to our paths crossing soon.

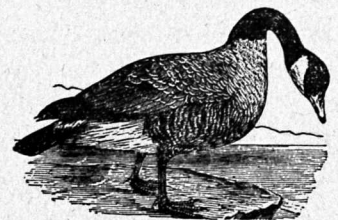
Several foundations and many, many individuals have helped make possible the work of The Wildlands Project and its cooperators. They know what the best reward is for their contributions: the howl of a wolf, the sight of a wild salmon, the thump of a Bison's hoof, the glimpse of a cat disappearing into the bush. We can only offer a "thank-you" and an ongoing commitment to make the most of your help. ■

The board and staff of *Wild Earth* are grateful to the many generous *Wild Earth* readers who responded to our annual end-of-year fundraising appeal.

Though paper and other production costs have risen significantly of late, we have resisted raising subscription prices or expanding paid advertising. Thus, *WE's* dependence upon its readership (through the fundraising letter) is greater than ever. For readers intending to make a contribution (who may be struggling with procrastination issues), it is never too late. Please call us at 802-434-4077 if you've misplaced your appeal response envelope and need another, or to make a tax-deductible donation using your VISA or Mastercard. We will acknowledge contributors by name in the summer issue. (An especial thanks to the many respondents who included kind words with their financial contributions—your encouragements are deeply appreciated.)

We wish also to acknowledge the generosity of the **Foundation for Deep Ecology** and **The Rockwood Fund**, whose recent grants will allow *Wild Earth* to expand our outreach efforts in the coming year.

—Tom Butler



#### Office Consolidation

Project offices will be consolidating in Tucson, Arizona beginning March 1, 1996. Science staff will be in Tucson June 1. This means you will only have one number to call to reach us. The consolidated office address and phone are:

The Wildlands Project  
1955 West Grant Street  
PO Box 5365  
Tucson, AZ 85703

(520) 884-0875 phone (520) 884-0962 FAX  
To reach science staff until June, use the current number and address in Corvallis, OR.

# More Thoughts on Common Ground with Conservatives

by Bill McKibben

Occasionally, I will find myself working on some project and realize that what I need is an ally—an organization or network that unfortunately does not exist. I'll spend a day or two toying with the idea of starting such a group, but then I'll realize that there aren't enough hours in a day. So herein I offer a few ideas, in case someone out there with time on their hands is looking for something to do. Each of the ideas in a way takes account of Dave Foreman's recent appeal to find more common ground with conservatives.

## 1) A campaign to end the deduction for mortgage interest on second homes

I live in the backwoods Adirondacks, with very few near neighbors. But there are lots of homes around, many of them occupied only a few weeks a year. These houses are, among other things, monuments to the provisions in the tax code that allow people to write off their mortgage interest on vacation homes. And that tax law continues to help drive the new development that threatens the Adirondacks and nearly every other rural landscape in the nation.

Under current law, unchanged since 1986, the interest on up to a million dollars of payments on a first and second home can be deducted. This adds up to a large amount of revenue—in a December 1994 interview, Mark Desautels, a spokesperson for the Congressional Budget Office, said ending the deduction for second homes would probably mean about \$700 million more in revenue for the government. And it adds up to a large amount of damage, too. Though the absolute number of second homes built each year may be no more than 50,000, according to David Crowe, staff vice president for housing policy at the National Association of Home Builders, "the interesting thing is that it's concentrated in very specific places." Not just "the Adirondacks," for instance, but lake shore in the Adirondacks. You can usually be sure that critical species habitat and prime development parcels occupy the same place on a map.

Repealing the second home mortgage deduction should be possible to sell politically. Not only does the deduction raise the budget deficit, it does so in order to provide a dubious benefit. Do advocates of "limited government" really think its mandate includes subsidizing vacation homes? Isn't this precisely the kind of out-of-control welfare that we need desperately to reform? And isn't there a real possibility of a coalition with liberal groups concerned about the money that's being siphoned off from public housing? What about a fifty-fifty split—get rid of the mortgage deduction and devote half the proceeds to reducing the deficit, the other half to housing the homeless?

Despite its logical appeal, the battle would be fierce. The National Association of Home Builders claims that tens of thousands of jobs would be lost, and the real estate lobby would be even more vocal. Nonetheless, it's a good fight, one that even a Forest Service report on the Northern Forest in the late 1980s indicated might help conservation efforts. Development threats won't disappear—the very rich will buy their chalets with or without a tax break—but the financing for the very worst projects might be harder to get. And people might rediscover the environmentally efficient act of *renting* the house where they want to spend a few weeks in the summer.





## 2) The League for Cheap, Quiet Sports

Or some such—acronyms are not my forté. We had loons nest on a nearby lake for the first time in living memory last summer, and we had to spend much of the summer patrolling the perimeter of their nesting area to keep jetskis away. One thing we learned in the process is just how few people like the damn things (jetskis, not loons). Another is just how well organized jetskiers (and ATVers and others of their high octane ilk) really are. Any legislative proposal to control their predations is a desperately hard fight, in large part because the manufacturers of these noisy beasts pour serious cash into any battle.

It occurs to me that birdwatchers, sport fishers, hunters, paddlers, hikers, skiers, and so forth need an organization that takes advantage of their vastly superior numbers to at least fight the supercharged set to a standstill. And to do it over the particular issue of *noise*, which drives so many people nuts.

I think this one is also a political winner. Granted, conservatives might stick up for the right of anyone to do anything they want, but the counter-argument is at least as rooted in conservative philosophy, and in the sense of community values so many conservatives claim to support. Picture a lake. Even if it's small, fifty canoes can share it without causing the least bit of trauma to anyone. All it takes, however, is one big engine booming by to wreck the afternoon for all fifty of those people. Is this how we want communities to work?

As for the constant claim that any hindrance to technofun is "elitist," we need someone to stand up—on Nightline, CNN, This Week with David Brinkley—and say the obvious: it's the eight thousand dollar jetski that belongs to the rich elitist, not the three hundred dollar Grumman canoe. Thrift is reputedly a conservative virtue.

I doubt if you'd need to start a membership organization, put out a magazine, send out endless fundraising letters. Probably better to organize in the fashion of the American Automobile Association, which claims everyone with a driver's license as their supporters in the endless campaign for more roads. How about a plan to have "quiet lakes"—paddles and oars only—on bodies of water less than 250 acres in size in a given state? Or to confine ATVs to small restricted areas, just like they do in Japan? At the very least, such quiet initiatives would start an interesting debate.

## 3) Manly And Courageous Hunters Organization (MACHO)

As I said, I'm not very good at acronyms, and this one really needs work. But this could be a powerfully important group, if some hunters with real experience and credibility would organize it.

I've seen time and again—with battles to reintroduce the wolf to the Adirondacks, or establish a national park in the Maine woods, or any of a dozen other cases—that the opposition of the "sportsmen's organizations" has been intense and effective. And I've never understood why, since history would indicate hunters and conservationists should be in some cases

the same people, and in almost every case on the same side. The Adirondacks, for instance, have been protected at several crucial junctures by the strong help of the state's various sporting councils.

In recent years, though, these organizations (with exceptions like Trout Unlimited and Ducks Unlimited which work mostly on habitat issues) have turned strongly anti-environmentalist. In part this is because of the perception that environmentalists are tied in with gun controllers and animal rights campaigners; in part it's because of emerging class differences between the two groups (I can show you lots of yuppies with fly rods, but not many with Remingtons). But mostly, I think, it's because of changes in the sport of hunting. Like so many other human activities, it's become more specialized, lazier, and goal-oriented. "Sportsmen" cruise lumber company roads in northern Maine "shoulder-sniping," or run their radio-collared dog packs from a posse of pickups.

In the face of this slob hunting—widely supported by the advertisers of gear and gadgets that underwrite the hunting magazines—how refreshing it would be to have a strong group of hunters who take a different approach. Who push for the idea that hunting is more of a challenge when the other predators are in the forest hunting too. Who stress that they want roadless areas—not just for habitat but to make the hunt more of a challenge again.

Again, this would hark back to some deep conservative themes: man (or woman) really testing himself in tough conditions, not riding to the kill in a pickup lined with rich crushed velour. Hunting as character-building—as "sportsmanship," a fair fight, not a harvest. It would work if "real hunting" was seen as sexier, tougher, gristlier than its late-20th-century simulacrum. We need a new Teddy Roosevelt. He would provide invaluable assistance, and cover, in any conservation fight.

I close with the thought that rhetoric must in many cases be conservative these days—and that that is not such a bad thing. Turn the rhetoric on its head, noting that "conservation" comes from the same Latin root. The real enemy to environmentalists is constant change, endless expansion, the market-driven consumerism that should be anathema to deep conservatives too. Nothing could be more conservative than making sure that CO<sub>2</sub> levels in the atmosphere don't double, or that the ozone layer doesn't disappear. Nothing could be more radical than doubling the number of people on the planet and seeing what happens; nothing could be more radical than cutting the number of species in half and seeing how the world makes out. ■

*Bill McKibben is the author of numerous conservation articles and books, including The End of Nature, The Age of Missing Information, and most recently Hope: Human and Wild. Wild Earth plans to review Hope (Little Brown & Co, 1271 Avenue of the Americas, NYC 10020) in our summer 1996 issue.*

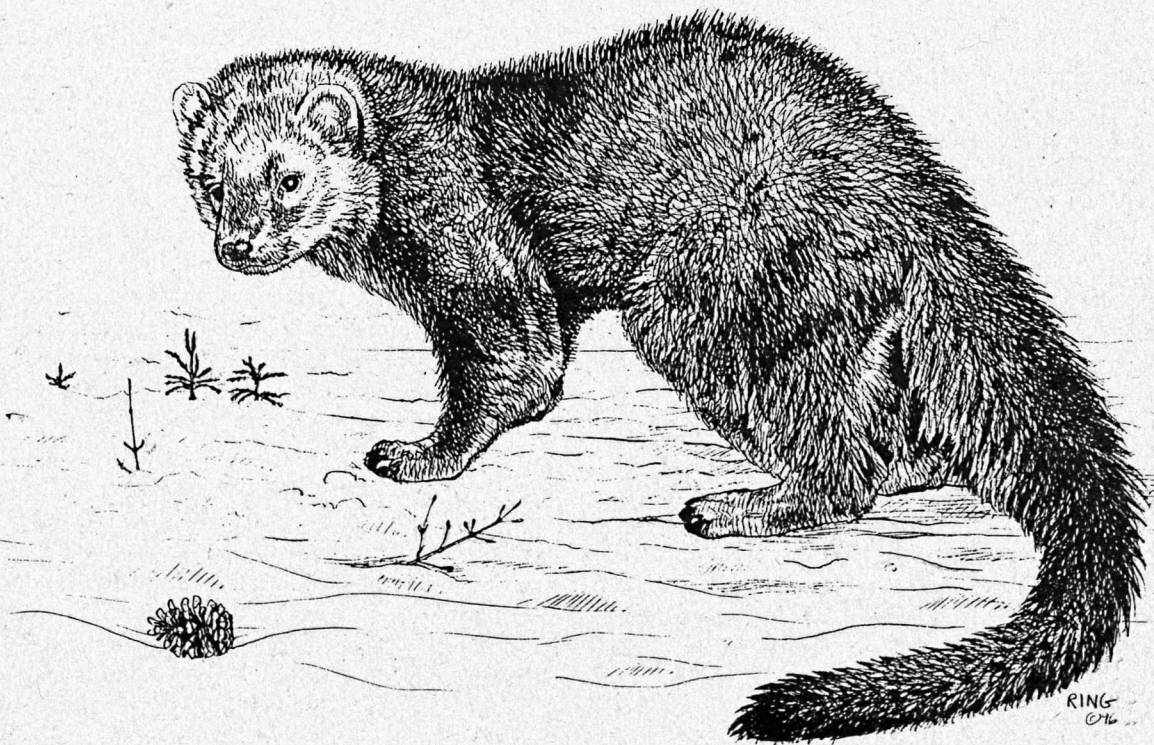
# Where Paths Cross, a Path Begins

by Larry Anderson

**T**HE TRAIL WAS NEARLY LEVEL where it crossed the open glade of hardwoods, spruce, and fir. There, perhaps fifty yards ahead and to the left, the animal entered my field of view. Alert and wary, possibly more surprised than I, it stopped in the middle of the trail. I stopped, too. Leaning back on its tensed haunches, the creature offered me a brief but clear look at its profile: dark, almost black; a long, bushy tail; small ears. It wasn't a dog, a Coyote, a bear cub, or a Bobcat. Plenty of people claim they've seen evidence of Mountain Lions in New England in recent years. But this animal was too small, its form was too stout to be really feline—and anyway, black panthers were entirely out of the question.

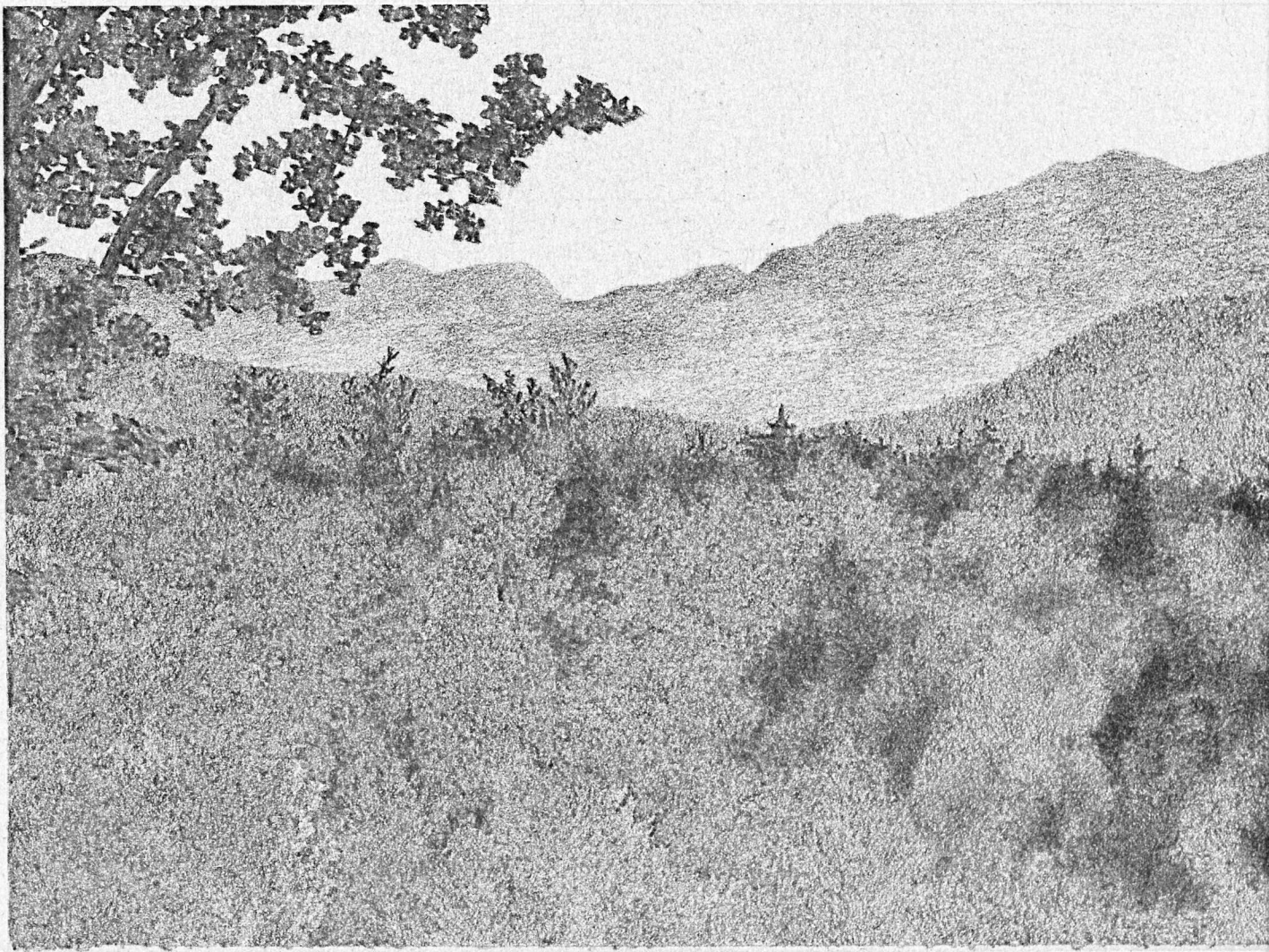
Two curious species, one at home, the other passing through, we froze in place for only a few seconds, our eyes meeting momentarily. Then the animal sprang out of sight, vanishing into the woods. Unsettled, adrenaline flowing, I resumed my pace, only gradually regaining my breath and rhythm.

Poring over guidebooks later, I determined that what I had seen must have been *Martes pennanti*—a Fisher. This larger cousin of the marten and weasel “was common throughout New England during early settlement,” observes Alfred Godin in his definitive *Wild Mammals of New England*, “but soon disappeared in most of New England due to overtrapping, logging, and clearing of the forest for agriculture.” The Fisher has made a comeback in the region, however. “[I]ts speed of dispersal seems to be related to hilly country,” Godin writes, “regardless of the kind of forest cover present in New England.”



Fisher by Martin Ring





I had been walking along the Sleeper Trail, a short, gentle path that connects Mt. Whiteface with Mt. Tripyramid in the Sandwich Range, the southernmost hills in New Hampshire's White Mountain National Forest, between the lake country to the south and the higher peaks, including the Presidential Range, to the north. The trail takes its name from the Sleepers, a pair of barely discernible knobs in the forested gap between Whiteface and Tripyramid. As it traverses the Sleepers, the trail demarcates the watershed of the Mad and Swift Rivers.

Godin's account exactly fit the setting and the situation. Fishers, he continues, "travel greatly in search of food." To describe their cross-country scavenging, Godin cited another naturalist, who "stated that fishers prefer to travel along ridges, usually crossing small streams to get to the next ridge, and added that such a 'crossing may be used by generations of fisher.'"

I had started early that morning, making good time on a trail that ascends steadily from the Kancamagus Highway to the ridge, following Downes Brook. I wanted to get ahead of the crowds on this late fall weekend, which always brings hordes to the White Mountains. I hadn't yet seen another hiker. Somewhere along the way, though, as I knew from the map at the trailhead, I had crossed a surveyor's line marking the boundary of a designated federal Wilderness Area. Established in 1984

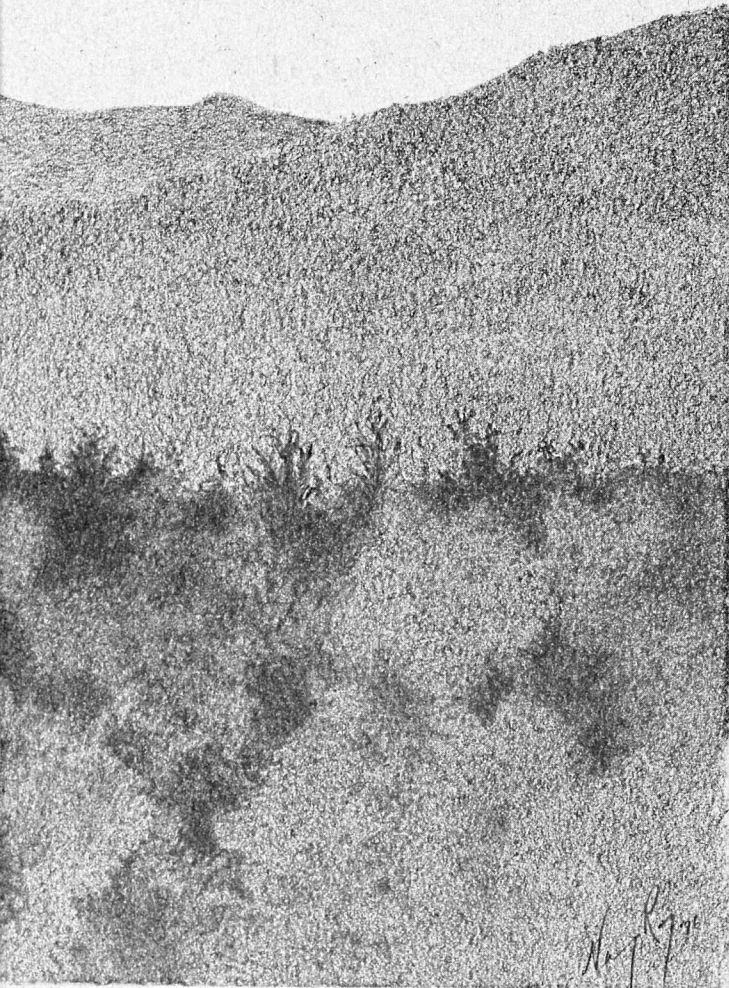
and covering roughly 25,000 acres, the Sandwich Range Wilderness is one of five separate Wilderness Areas which together comprise about 15% of the 772,000-acre White Mountain National Forest.

My hike was an historical pilgrimage, an act of homage to a man who had walked these same woods in the late 1890s and early 1900s. I was following the footsteps of Benton MacKaye, the long-lived (he died in 1975 at the age of 96) forester, regional planner, conservationist, author, and visionary best known for his conception of the Appalachian Trail. I was retracing the first and last legs of a two-week hiking circuit of the White Mountains he completed with several fellow Harvard students in the summer of 1897.

MacKaye's hike through the mountains that summer, he later observed, marked the time "I first saw the true wilderness." The experience changed his life—and changed as well, in subtle but significant ways, the prospects and the uses of America's remaining wild lands. MacKaye's adventures and observations right here, on the slopes and summits of Passaconaway, Whiteface, Tripyramid, and the surrounding hills, contributed directly to the area's protection as Wilderness—indeed, to the protection of Wilderness Areas around the country. MacKaye was one of that hardy tribe—including the

*illustration by Nancy Roy*





*The grandest sight I ever saw was now  
before me...nothing but a sea of  
mountains and clouds.*

likes of Muir, Marshall, Leopold, the Muries, Zahniser, and Brower—who nurtured the organizations, the spirit, the philosophy, and the laws that preserved the possibility for such modest but meaningful encounters as I had experienced on Sleeper Trail. They saved a space where a Fisher and I might cross paths.

In a windowless, climate-controlled archive, I had read MacKaye's original handwritten journal of his 1897 mountain excursion. Though, by his own account, he and his companions endured more than one fierce storm when rain came down like "pitchforks," he had managed to protect his pocket notebook from the elements. Now, years later, the quills he had gathered from a dead porcupine still pierced the journal's pages. His crude sketches yet evoked the stunning mountain vistas that so inspired him.

The hikers completed a loop covering much of the mountain terrain that would later be incorporated into the White Mountain National Forest. From the remote Swift River valley settlement of Albany Intervale, or Passaconaway, near where I had begun my own day hikes, MacKaye and his companions headed north over such mountains as Tremont, Lowell, Anderson, Washington, and other summits of the southern Presidentials. Following roads south along the Franconia

Range, they completed their hike by climbing over Osceola and Tripyramid—the latter mountain my destination as I followed the Sleeper Trail—to return to their starting place.

It had been on the very first days of MacKaye's hike, though, that a mountain experience struck him with the force of revelation. During their rigorous approach to the modest 3384-foot summit of Mt. Tremont, the hikers crossed a blowdown, and ascended the steepest part of the mountain in a torrential downpour; then, in the middle of a fearsome lightning storm, they set up camp during the night on what they thought was the mountain's summit. Awaking cold and wet before sunrise the next morning, MacKaye determined that they were in fact a quarter-mile from the "true summit." Alone, he ascended Tremont. "The grandest sight I ever saw was now before me," he noted in his journal, "nothing but a sea of mountains and clouds." The sunrise view from the mountain was panoramic, taking in much of the White Mountain range as well as "the hills of old Massachusetts" to the south. "I felt then," he wrote a friend, "how much I resembled in size one of the hairs on the eye tooth of a flea, to use a vulgar expression."

A century ago, in many respects and by whatever definition, this New Hampshire terrain was less of a "wilderness" than it is today. These mountains and forests had a different aspect in the 1890s. MacKaye's tramp came at the climax of the region's timber boom, when logging railroads wound up every valley. He walked among the ruins of the logging epoch, camping in abandoned lumber camps and hitching rides on the railroads. A tide was turning, as the century turned, and MacKaye was riding the flow. The timber barons of New England were frantically shaving spruce and fir off the mountain slopes. The ravages of the lumbermen sparked a response, however, from a growing legion of hikers, resort owners, and reformers. In 1876, some of them had created the Appalachian Mountain Club. By the turn of the century, a movement to create an Appalachian national reserve was growing in such southern states as Tennessee, North Carolina, and Virginia. North and south along the Appalachian range, activists joined forces. After passage of the 1911 Weeks Law, which authorized creation of the first National Forests in the East (including the White Mountain National Forest), some of the East's highest, wildest terrain began to be retrieved for common use and enjoyment.



One of MacKaye's trail companions was Sturgis Pray, then on the threshold of a career as an eminent landscape architect. Trained in the Brookline, Massachusetts offices of Frederick Law Olmsted, Sr., Pray would go on to head Harvard's pioneering landscape architecture program. Until failing health and professional obligations overtook him at a relatively young age, he also maintained an intense interest in the mountains. For the Appalachian Mountain Club, he oversaw the maintenance and expansion of the network of hiking trails spreading across the White Mountains.

Pray, MacKaye later observed, held to a simple axiom for the design of a hiking trail: it should be wide enough for "one fat man to barge through." MacKaye often credited his hiking partner's notion of a "path through a pathless wood" as a key inspiration for his own vision of the Appalachian Trail. In October 1921, MacKaye's article, "An Appalachian Trail: A Project in Regional Planning," appeared in the *Journal of the American Institute of Architects*. By 1937, Eastern trail enthusiasts had completed the continuous footpath, which today stretches for almost 2100 miles between Georgia and Maine. The Appalachian Trail became a model for trails and greenways throughout the country. Its success inspired passage of the 1968 National Scenic Trails Act. In combination with that year's Wild and Scenic Rivers Act, the legal framework was in place for what MacKaye, as early as 1916, had envisioned as a "linked-up... national recreation ground which would reach from ocean to ocean."

But the Appalachian Trail was just one of MacKaye's important contributions to the reclamation of the American environment. And recreation was not the only—or even the principal—element of his evolving vision of the American landscape. From the utilitarian conservatism of Gifford Pinchot's Forest Service, which he entered as a fledgling forester in 1905, to the land ethic of his friend Aldo Leopold, whose *Sand County Almanac* he championed, MacKaye's life, work, and thought encompassed the American conservation and environmental movements in this century. In 1935, along with other conservationist luminaries such as Robert Marshall, Robert Sterling Yard, and Leopold, MacKaye co-founded The Wilderness Society.

Indeed, outliving many such friends and colleagues, he witnessed the realization of numerous ideas to which he had devoted his life—ideas at first declared utopian or ignored outright. The 1964 Wilderness Act, for example, established by law the principle (if not always the practice) that untrammelled wilderness is the highest and best use of certain American lands and resources. MacKaye had drafted a federal wilderness law in 1936. A decade later, during his tenure as president of The Wilderness Society, he had another version on Howard Zahniser's desk when the principal author and proponent of the 1964 law took over as the organization's executive secretary. Today, some 100-million acres of federal land are designated under the Wilderness Act.

This legal variety of wilderness, like the Sandwich Range acreage tucked among the ski areas, tourist resorts, and factory-outlet stores in New Hampshire's White Mountains, is still something novel on the American landscape. We're not quite sure what to make of it. Bureaucrats and academics gather for conferences, coolly analyzing the management, philosophy, ethics, and politics of wilderness. Activists of varied persuasions and extremes challenge the premises of the Wilderness Act—either complaining that designated Wilderness represents a paltry gesture at real wilderness protection, or railing against wilderness as an assault on freedom and their own uncompromising notion of the "wise use" of natural resources. Photographers bring back stunning images. Scientists study acid rain, ecosystems, endangered species. Hikers and climbers seek solitude, challenge, beauty, a measure of danger. Some, like myself, stalk other prey—exploring back through history, trying to see a wild place through other eyes, imagining what it might have been like to walk here in another time.

My momentary encounter with the Sleeper Ridge Fisher remains with me. I remind myself that there was nothing mystical about our meeting—that I had not experienced another "epiphany around every corner," as author Terry Tempest Williams sardonically describes one commonplace literary response to the natural world in the late twentieth century. A Fisher, these days, is not that rare an animal.

Nonetheless, this ridge route, the naturalists suggest, could have been favored by "generations of fisher." MacKaye's journal didn't mention any ancestors of my erstwhile trail acquaintance. But he and Sturgis Pray did startle a bear on the summit of Mt. Tremont; then they watched in awe moments later as two eagles soared above the mountain's cliffs.

Now, almost a century later, a Fisher and I cross paths. It is in its element. But where am I? I do not—by law, I cannot—remain. I am a transient here. In America today, the paradoxical landscape I traverse is called "wilderness." For Benton MacKaye, this same terrain inspired the vision of an environment reclaimed, renewed, always evolving. Acting on his vision, he left a legacy that is incalculably significant—whether measured in miles of trail blazed, acres of Wilderness designated by law, species of wildlife protected, or numbers of activists inspired. MacKaye's example endows us with hope and optimism in a gloomy time.

Today, almost a hundred years later, a Fisher's domain still offers the prospect of new visions, new hopes, and new explorations. A century hence, will this modest spot on a quiet trail in the New Hampshire forest provide similar possibilities and prospects? ■

*Larry Anderson (POB 205, Little Compton, RI 02837) is a free-lance writer whose work has appeared in Orion, Sierra, Wilderness and other publications.*

## LEOPOLD'S THOUGHTS ON SPECIES REQUIEM DAY

Species Requiem Day was proposed (Wood 1995) in the Spring 1995 *Wild Earth* as a national day of mourning for the human-induced extinction of many of our fellow travelers. Wood suggested in the same article that such a commemorative observance would assist compassionate humans in moving beyond their grief with a new resolve to protect and restore the land organism.

Readers may not be surprised to learn that Aldo

Leopold and his contemporaries in the Wisconsin Society For Ornithology were the first to observe a Species Requiem Day, although it was not called such. On 6 April 1946, Leopold delivered a presentation on a proposed monument (dedicated on 11 May 1947 and placed in Wisconsin's Wyalusing State Park) to commemorate the extinction of the passenger pigeon, the identical species proffered by Harold Wood as symbolic of species cast into oblivion by humanity. Per-

haps the most moving of all Leopold's poetic prose (Meine 1988), it asked that as we recognize our grief, so too we recognize our responsibility to act.

*There will always be pigeons in books and in museums, but these are effigies and images, dead to all hardships and to all delights. Book pigeons cannot dive out of a cloud to make the deer run for cover, nor clap their wings in thunderous applause of mast-laden woods. Book-pigeons cannot breakfast on new-mown wheat in Minnesota, and dine on blueberries in Canada. They know no urge of seasons; they feel no kiss of sun, no lash of wind and weather. They live forever by not living at all (Leopold 1946).*

Leopold concluded:

*...this monument is not merely a symbol of a dead past, but also a portent of a different future. Perhaps we can learn more from the dead than from the living (Leopold 1946).*

In "The Conservation Ethic," Leopold sketched the evolution of human "ethical yardsticks." The first concerned relationships among individuals, the second prescribed the interaction of the individual with society, and the third, posited by Leopold to be an ecological possibility, dealt with the relationship of the individual and society to the land and its non-human species.

Yet he acknowledged "The ultimate issue, in con-

servations as in other social problems, is whether the mass-mind wants to extend its power of comprehending the world in which it lives, or granted the desire, *has the capacity to do so*" (Leopold 1933, his italics).

Thus, Species Requiem Day could have a creative purpose in addition to the commemoration of species extinction: facilitation of the grieving process and inspiration of renewed commitment (Windle 1992). It could serve to focus consciousness on a unique branchpoint in human ethical evolution, a remarkable event over which we have a measure of control. That is, will our kind turn in the direction of the most base human attributes; namely, those of resignation, consumption, greed, and hate? Or shall we choose to strive for our special niche in Creation made possible by the gifts of that same evolutionary process? ■

—Paul Torrence, 15105 Watergate Road, Silver Spring, MD 20905

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## Statement of Purpose

*Wild Earth* is a non-profit periodical serving ecocentric grassroots groups within the conservation movement. We advocate the restoration and protection of all natural elements of biodiversity. Our effort to strengthen the conservation movement involves the following:

- We provide a voice for the many effective but little-known regional and ad hoc wilderness groups and coalitions in North America.
- We serve as a networking tool for grassroots wilderness activists.
- We help develop and publish wilderness proposals from throughout the continent.
- We are working with The Wildlands Project to complete a comprehensive proposal for a North American Wilderness Recovery Strategy.
- We render accessible the teachings of conservation biology, that activists may employ them in defense of biodiversity.
- We expose threats to habitat and wildlife, and offer activists means of combatting the threats.
- We facilitate discussion on ways to end and reverse the human population explosion.
- We defend wilderness both as *concept* and as *place*.



## USE CAUTION IN USING CONSERVATION EASEMENTS

Brian Dunkiel's article, "Using Conservation Easements," (Fall '95) should be read cautiously. Conservation easements may be a tool in land protection, but only in very specific situations.

Conservation easements have become the politically correct land protection strategy in the 1990s. Easements are touted by government bureaucrats, politicians, the timber and paper industries, and some conservationists. With such a diverse base of support, conservation easements seem too good to be true. Maybe they are.

In practice, many conservation easements fail to protect the ecological integrity of the land. Instead, landowners receive a subsidy for restrictions on activities that they cannot or have no plans to implement anyway. The party acquiring the easement is essentially paying money for something it already is getting free of charge.

A few years ago, the State of New Hampshire purchased conservation easements on over 2000 acres of James River Timber Corporation land near Lake Umbagog (on the New Hampshire and Maine state border). Lake Umbagog certainly deserves protection. It is one of New England's premier lake ecosystems. Indeed, it was identified in The Wildlands Project vision mapping as a critical "core" wildland.

The problem is the James River easement offers little true protection. The easement bans permanent de-

velopment but allows a host of other destructive activities. This includes the construction of "roads, dams, fences, bridges, culverts, barns, maple sugar houses, trailers, and sheds." If a temporary airstrip is needed for forest management, it would be allowed! Furthermore, James River can conduct forestry activities including: "to cut and remove forest products, including but not limited to trees, logs, poles, posts, pulpwood, firewood, chips, biomass... to clearcut; to apply herbicides, pesticides, fungicides, rodenticides, insecticides, and fertilizers..." Should these activities be allowed in a Wildlands core area?

Equally disturbing is the Forest Legacy Program which is managed through the US Forest Service with State input. The program uses federal funds to acquire easements on private or corporate timberlands. Many of the proposals being submitted are from large transnational corporations and—while limiting development—allow clearcutting, road building, and other extractive and ecologically destructive activities. Even the Forest Service is calling for the program to be reformed.

Mr. Dunkiel states that "Wildlands Project supporters should work with their local land trust." I must again wave a flag of caution. One of the largest "land trusts" in New Hampshire is only interested in easements that allow them the right to log the "protected land." A recently completed study in Maine concludes that the wood products industry should start

its own land trust as a repository of easements to protect the industrial "working forest." Funding for this industry "land trust" would come from donations, foundations and other sources. In some states, these lands may be exempt from some property taxes. Easements are being used to maintain the status quo—including ecologically destructive activities—contrary to the vision of The Wildlands Project.

As anyone working in the conservation arena knows, the devil is in the details. Recent experience shows that the details of actually implementing conservation easements cause at least as many problems for wilderness as they solve. ■

—David N. Carle, Associate Executive Director, RESTORE: The North Woods, POB 440, Concord, MA 01742, (508) 287-0320

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[Editor's note: For more cautionary advice on using conservation easements, see Jamie Sayen's article "Limitations of Conservation Easements", beginning on page 76 of this issue.]

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## DUNKIEL RESPONDS TO SAYEN'S ARTICLE AND CARLE'S LETTER

Mr. Sayen and Mr. Carle properly note that conservation easements are not presently being used in ways that would create effective wilderness reserve systems. Their principal concern, one I also share, is that most easements drafted today do not expressly protect functioning ecosystems. This is a critique of the way in which specific

easements were drafted, rather than a disadvantage of conservation easements *per se*. The bottom line is that the language used in a conservation easement document determines how the land at issue will be managed. Therefore, easements can be as protective or permissive as people make them.

It is true that land trusts have not explored all the alternatives, and, as drafted, most easements do not prohibit commodity extraction and damage associated with such activity. But there are instances where willing landowners have already crafted very restrictive conservation easements designed to protect an area's ecological integrity. In Minnesota, for example, The Nature Conservancy has acquired the development rights to property, where the easement clearly articulates the owner's intent to create a natural sanctuary that will be "forever wild" and establishes a "protected environment for native plant and animal life." Notice that the "forever wild" language is quite similar to the first sentence of New York's Article 14.

Conservation easements might not be the appropriate conservation tool for all situations, but I am confident that they will prove useful in implementing wilderness proposals, sooner more likely than later. This is because overlap between a wilderness system's boundaries and private property is unavoidable. Implementation of a network of reserves will therefore require broad grassroots support. Until statutory acquisition on the scale the Headwaters

Wilderness Reserve calls for is imminent, properly crafted conservation easements currently provide the best means for protection of privately held wildlands located within wilderness proposals. Moreover, encouraging land owners to identify their property as part of a living wilderness system should make these wildlands less vulnerable to destructive land uses. ■

—Brian Dunkiel, POB 622, South Royalton, VT 05068; (802) 889-3530; <email,bdunkiel@vermontlaw.edu>

**MORE ON BEING BORN IN THE USA**

Bravo for publishing the article entitled *The Environmental Consequences of Having a Baby in the United States* (summer 1995). Finally somebody has addressed this sacred cow.

The authors conclude that “one especially effective way for individuals to protect the national and global environment, and hence protect the well-being of all existing people, is to stop creating more humans.”

Good parenting is a noble aspiration, but it’s time we stopped congratulating ourselves and uncorking champagne bottles every time someone has a baby. Many countries award generous maternity leave-with-pay policies and monthly baby bonus cheques. But there are no freebies for couples who choose not to have children, even though they contribute significantly to the common good by not creating more mouths to feed. The planet’s carrying capacity has long been exceeded.

It’s beyond me what would possess otherwise intelligent, informed people to bring children (that they presumably love) into this polluted, violent, collapsing “syphilization” (Edward Abbey’s word). Either they are optimists or selfish. ■

—Ann Hansen, POB 433, Stn E, Toronto, Canada M6H 4E3

I read with interest your cover story *The Environmental Consequences of Having a Baby in the USA* (summer 1995). The statistics pertaining to consumption patterns in the US were astounding and the article made a good point of emphasizing how humans in one part of the world (the US) can have an enormously different impact on the earth from humans living in a different part of the world (say India).

I, too, believe that more people should consider the impact their children have on a crowded planet. However, I don’t believe it is realistic to think that this type of information will cause people to forgo the strongest biological drive we possess—that of procreation. On the other

young son. Having a child fulfilled an urge (need?) as natural and as old as the mountains which surround me. For me, parenting and teaching go hand-in-hand. At age 5, my son can distinguish between a Red-tailed Hawk and a Turkey Vulture soaring overhead, he knows why we don’t have wolves in Oregon anymore, and why we have brought them back to Yellowstone, and he knows how the dams of the Rogue River make it difficult for the salmon to make their journey up and downstream. He loves to imitate coyote howling, watch snails drink, and time the crows returning with sticks for the nest they built in our fir tree. And so I believe that my son will have a

*Encouraging environmentally-conscious couples to have a child may actually enhance the well-being of our planet...*

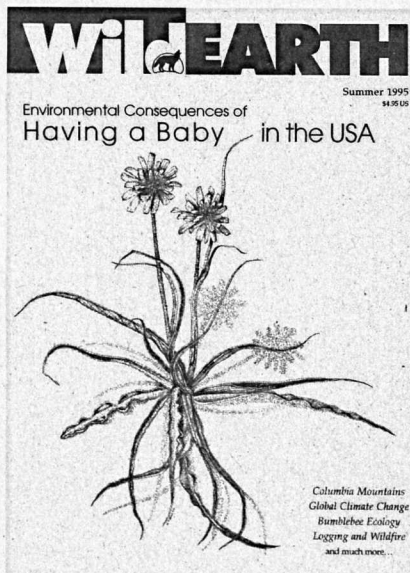
hand, I do believe an article such as this can help control our population by encouraging couples to only have one child, rather than the standard two. Encouraging environmentally-conscious couples to have a child may actually enhance the well-being of our planet in that these couples 1) are likely to raise a child who, as an adult, will possess a strong sense of environmental responsibility and 2) are more likely to become involved in their community since their child would directly benefit from their efforts.

I am the mother of a

positive impact on this human-driven world because of his exposure to the natural world.

Had I “abstained from creating another human being,” my life and many others would have lost much. For me, one is enough because 6 billion is too many. We need to appreciate those couples who choose not to have children of their own. They are doing us all a favor. But we also need to support couples who have just one child—one to love, nurture and teach. ■

—Kari Tuck, 350 Avery Street, Ashland, OR 97520





*The idea of wilderness needs no defense. It only needs more defenders.* —Edward Abbey

This responds, in some measure, to an article by Sandy Irvine entitled "The Cornucopia Scam, Part 3" which appeared in the spring 1995 issue of *Wild Earth*. Hopefully, my remarks have broader implications.

To begin, I got Deep Ecology Blues.

Biocentrism, social ecology, ecofeminism, new conservationism, ad nauseam, are beginning to resemble what I call the Peter Pan Syndrome.

"Are you an eco-warrior?"

"Yeah. See—here's my card."

"Wow, nice green leotards."

"Tinkerbelle is the *real* power behind Pan."

Don't forget evil personified: Captain Hook. Mean Bastard.

As much as eco-defenders enjoy their bioregional conferences, taking the moral high-ground, and communing with kindred earth spirits (especially the ones from Sedona), we remain wed to a neo-reform conservation ethic in avoidance of the true paradigm of ecosystem collapse: too many people.

Human beings are pre-programmed to consume. We didn't invent ourselves (sorry Sartre), but are composites of natural selection. That we, as a species, have rammed the genetic imperative into turbo drive is frightfully obvious. No amount of philosophical wishing, regardless of how deep, can alter the fact that "homo erectus asphaltus" has forcefully stepped apart from nature.

In fact, the entire human epic—from the fossil record to cyberspace—is a story of our attempts to leave wilderness behind. If that is unpleasant to hear, so be it. Here's a little experiment: Ask the good folks in China if they'll be the first to tread lightly, adopt biocentrism, and forego the material benefits of the modern world. Ask the Inuit to relinquish their snowmobiles, South Africans to forego refrigerators.

Not to belittle biocentrism, but the word doesn't show up in Americans' funky lexicon. We are more enthralled with the likes of OJ Simpson than collapsing ecosystems. More people joined the Sons of the Confederate Veterans last year than volunteered to work on The Wildlands Project. Most Americans would rather eat animals than save them from extinction.

I've said it before in these pages: If we don't fess up that human beings have greatly overshoot the Earth's carrying capacity, we're all kidding ourselves. As my friend, Pete Jones, says, "Either we quit consuming, or we quit producing consumers." I don't know about y'all, but down here in Alabama, the subject of reducing consumption is a frightening offense. Growth and progress is the regional religion.

If the goal is to restore the wild, it seems high time we quit bickering over philosophical tangents and stick overpopulation on the front burner. Regardless of socio/cultural considerations, ecological problems are diminished in direct proportion to a decline in the human popu-

lation. This is not to suggest that we ignore social ills. But let's defend the wild first, then help the woo-woos sort through the baggage.

The flaw with Deep Ecology is the notion that human nature can be reformed. Sandy Irvine says in his article that "all human activities must be managed in the light of their environmental impact." Managed by who? I don't suffer dictators well, even when they are deep ecologists.

Instead of quibbling over consumption patterns, we should accept our species for what we are: aggressive, greedy, lustful, selfish primates. Given clothes, cars, and rifles, Jane Goodall's chimps would teach us a thing or two about primate hard-wiring. It's normal to have desires, like driving fast cars, getting drunk, making money and self-aggrandizement. But it's stupid and counterproductive to overpopulate.

I can hear socialists now, gnashing their brittle teeth, despising the nexus between human behavior and biology. But what is, is. Copulate, don't populate.

Let the arm-chair philosophers pontificate about ecorighteousness; defenders of the wild should determine the carrying capacity per ecosystem and make a case for reduction of human numbers below said capacity. Now.

We should be as radical on this issue as those before us have been about spiking old growth trees, sinking illegal whaling vessels, and blocking new roads in public forests. We should put the Pope on trial for being the

key player in the despoliation of nature. The Pope is about as biologically correct as old Tarzan movies.

Replications may be a right, but defending wilderness is a duty. Procreation may be sacred, but not at the expense of other life forms. Let's get over the heebies about having a head-on with socialists, yuppies, and the religious right where babies are concerned.

Deep ecologists are not going to deprogram quirky human behavioral traits, philosophically or otherwise. Social reformers are not going to redistribute the wealth. Rather, humans are growth oriented until natural selection dictates otherwise. In the mean time, no more conciliatory compromising regarding overpopulation.

Having said all that, I imagine Jesuits, Presbytery, ecofems, liberals and mothers everywhere will be mailing snake letters to my post office box. I love snakes — they go well with onions and peppers.

The bottom line is that the cornucopia scam is irrelevant. Whether men are schmucks is beside the point. It doesn't matter if God looks more like Madonna than Charlton Heston. Vegetarianism is shtick. What matters is that while you were reading this, several thousand human beings were added to the planet. And they're hungry and want to rock & roll...

In parting, indulge me in another Abbey quote:

"If there's anyone still present whom I've failed to insult, I apologize."

—Eduoard la Boue, (a.k.a. Ned Mudd), POB 130411, Birmingham, AL 35213

## Road RIPort #4

We live in a society obsessed with access—especially the fast and easy access that roads provide. But roads do more than just provide access; they degrade and destroy ecosystems. An overwhelming body of scientific information explains how roads disrupt ecological systems. Roads deliver massive quantities of sediment to streams, disrupt hydrologic cycles by altering runoff patterns and intercepting subsurface flows, reduce and fragment wildlife habitat, introduce exotic species, and kill animals directly.

To bring these problems to the public's attention, ROAD-RIP is now working on the Terrible Twelve Campaign. Together with our coalition members, we have developed a list of twelve terrible roads throughout the United States. We are using the Terrible Twelve to highlight the ecological destruction caused by roads, and as regional rallying points for education and continued road-fighting efforts. Of course, terrible and destructive roads exist throughout the country, and we are working to close those roads as well as the twelve on our list.

This campaign combines ROAD-RIP's strategies of public education, activist training and coordination into one unified, national effort to raise awareness about the problems associated with roads, and motivate people to work to close, obliterate and revegetate wildland roads. We are preparing printed materials, a slide show, workshops, and regional strategy sessions, which will form the basis of the Terrible Twelve "road" show (spring-fall 1996) to visit the road sites and work with activists and communities affected by the roads. If you want to participate in this campaign, sponsor a stop on the Terrible Twelve tour, or receive the December-January issue of our *Road RIPorter* with a 16-page feature on the campaign, contact us at the address below.

Though the Terrible Twelve Campaign has been driving our work for the past few months, we continue to strengthen our road-fighting coalition. We held a Road-Ripper's workshop in Carbondale, Illinois, focusing on southeastern road issues. Since National Forest plans (management plans required under the National Forest Management Act of 1976) throughout the country are coming up for revision within the next few years, we have been gathering information to help activists participate in the revision process. Many forests have no road density standards at all, and we are working with local groups to insure that revised forest plans have effective standards in place to improve long-term

land management practices. As an interested individual or activist, it is imperative that you become involved in the forest planning process as soon as it begins, and that you bring up roads as an issue as soon as you become involved, so that you can gain legal standing. The more you pressure the Forest Service to create and enforce road standards, the more likely they are to do so. We are now gathering information on road standards. If you need information about the forest planning process, or if you have information to share from your experiences, please contact us.

Last fall, we had a graduate student intern develop an annotated bibliography of current restoration articles. His project confirmed what we already suspected: Very little research has been done on the short and long-term effects of restoring former roadways or on the most effective restoration techniques for different terrains. We are continuing to gather information on road-bed restoration, and to develop an in-house library on this and other topics. If you know of any particularly useful articles, or if you have suggestions for contacts, please call us.

Finally, we want to correct an error from Road RIPort #3 in the fall issue of *Wild Earth*. Our Bureau of Land Management and National Wildlife Refuge guides have not yet been printed. The BLM guide is going through final editing as we write this Road RIPort, and the NWR guide is still in the planning stages, along with a restoration guide. All registered handbook owners will automatically receive the BLM and NWR guides as soon as they are available.

We look forward to hearing from additional road-fighters as we continue to disseminate information and strategies to activists around the country. You can contact ROAD-RIP at POB 7516, Missoula, MT 59807; 406-543-9551.

—Marion Hourdequin and Bethanie Walder,  
ROAD-RIP directors





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# Big Tree Finds

The big tree update in the fall edition of *Wild Earth* began a process intended to serve several purposes. First, we want to keep readers informed on the distribution, physical characteristics, condition, and exceptional features of tree species in eastern old-growth forests. Second is to focus attention on exemplary old-growth sites. Data collected from the "best stands" can be highly useful in understanding natural forest ecosystems. A third objective of the updates is to refine our understanding of the physical characteristics of various tree species. As these articles reveal, much of the quantitative data in popular tree guides is outdated. No criticisms are intended. Authors did the best they could with the information available to them. A fourth purpose is to recruit others to help in the daunting task of documenting our old-growth forests, while they still exist. A fifth reason for the updates is that we want to share our discoveries and the immense enjoyment they give us with readers of *Wild Earth*.

## Southern Appalachians

The big tree team of Blozan and Leverett continue to make discoveries within the old-growth forests of the eastern United States. In truth, Will is making the discoveries and I'm doing the cheering. I have a few champions to my credit, but they fall a mile short of Will's amazing discoveries. To my satisfaction, the most remarkable find was a joint effort on a trip into the Cataloochee District of the Great Smoky Mountains National Park in August 1995. Will had measured a huge White Pine to 172 feet months before, which I reported in the fall edition of *Wild Earth*. Will thought there might be others near that height within the stand. On the way there we measured a lone White Pine that looked as though it could exceed all discoveries. It did. At an astonishing 207 feet, it may be the tallest living thing in the eastern United States. Two White Pines in Michigan appear to be in the 200 foot class. One is the national champion, though the method used to measure it may not have correctly triangulated the crown. At 399 points on the big tree formula, it is out of reach. The 207 footer earns about 352 points. We also confirmed a large Tulip Poplar, near the great pine, at 167 feet in height, 3 feet under our reigning champion for the species. The Tuliptree's girth is a respectable 11.5 feet.

Only a few days before Christmas, Will made a spectacular discovery in the Cullasaja region of the Nantahala National Forest of western North Carolina. A protected stand of old-growth White Pines near the Cullasaja River proved to be a big tree bonanza. Will successfully confirmed 7 pines in the above 150 foot class. The tallest is 195.8 feet with a girth of 10 feet 11 inches. The second tallest is 183.1 feet with a girth of 10 feet 2 inches. The widest of the pines measures 13 feet 10 inches in girth and reaches 159.6 feet in height. Both the tallest and widest yield between 335 and 340 points on the big tree formula.

So far Will Blozan is up to 12 confirmed national champion trees. Eleven are in the Great Smoky Mountains National Park and one, a new champion Catawba Rhododendron, is on the Blue Ridge Parkway. These trees are champions using the big tree formula of American Forests (formerly the American Forestry Association). In addition, Will recently confirmed a magnificent Yellow Buckeye at 152.4 feet in height and 41.3



inches in diameter. As of this writing, the Yellow Buckeye is a world record for height. One of Will's most unusual discoveries is a small stand of second-growth Tulip Poplars. A tree Will judges to be around 70 years old is already up to 167 feet! Heights in the 120 foot class are more typical of fast growing Tulip Poplars at comparable ages. This is an exceptional tree.

Some ages Will has confirmed include a Blackgum at 561 years, the oldest known of its species. The tree has a breast high diameter of 37.8 inches. Recently Will confirmed a Shortleaf Pine 16.5 inches in diameter to be 260 years old. Other notable ages are Tulip Poplar at 434 years, Eastern Hemlock at 503, Red Spruce at 378 years, Chestnut Oak at 396 years, White Oak at 354, and White Pine at 331 years old.

### Tall Timber Natural Area, Pennsylvania

On my return to Massachusetts from the Smoky Mountain trip, I spent time in Pennsylvania's aptly named Tall Timber Natural Area. This little old-growth jewel presented me with an unanticipated surprise, an Eastern Hemlock that I believe to be the current champion of height within Pennsylvania. The hemlock just reaches 8 feet in girth, but soars to 145.1 feet, eclipsing all others I have measured in the Keystone State. The best I had done previously was 132 feet for an isolated hemlock in Ricketts Glen. I have measured hemlocks to 130 feet in Cook Forest State Park and believe there to be taller ones, but as of this writing the Tall Timbers stand has the champion.

I should point out that the tallest Eastern Hemlock ever measured, past or present, is a Will Blozan tree in the Greenbrier region of the Great Smokies. At an astonishing 164.7 feet in height, the tree easily surpasses the previous champion, of 160 feet. A hemlock in Joyce Kilmer had been incorrectly listed by the state of North Carolina as 174 feet. The actual height, as confirmed by Will, is not more than 156 feet, excluding a 2 foot dead top. Will suspects that proper allowances were not made for the tree's lean. I am not surprised. I once measured a pine that had been presented to me as having been confirmed at 175 feet. The tree was in fact 124.7 feet in height. Large errors can be made by not understanding the trigonometry.

Pennsylvania was once fertile ground for trees of exceptional size. Old forestry texts contain remarkable photographs of virgin stands of hardwoods and conifers. Magnificent mixed hardwood stands—including Cucumber Magnolias 4 feet in diameter—get me to salivating. Alas, they are no more. Although Pennsylvania's great forests were cut long ago, I retain faith that the Keystone State still has a secret here or there. I would appreciate anyone with information on potential champions in Pennsylvania to write me.

### Berkshires of Massachusetts

A new champion of height has emerged for the hardwoods of the Baystate—a White Ash on the side of Clark Mountain reaches 135.1 feet, edging past the prior state hardwood champion, a Sugar Maple at 134.6. The ash rises columnar and proud amidst many that exceed 120 feet. Most of the ash are in the 125 foot class. For Sugar Maples, at this point, so far as I know, I have the all time height record for the species, 144 feet for a splendid tree in the Big Ivy drainage of western North Carolina's Craggy Mountains. ■

—Robert Leverett (52 Fairfield Ave., Holyoke, MA 01040)

## BAN CLEARCUTTING IN MAINE REFERENDUM

On Election Day in November 1996, voters in Maine will have an opportunity to ban clearcutting in the industrial forest of northern Maine by voting "yes" on the "Ban Clearcutting in Maine Referendum." While this battle to halt forest liquidation by absentee multinational timber corporations is being fought in Maine, it is a national issue—indeed, a global issue.

The Ban Clearcutting in Maine Referendum would eliminate forest practices that create openings in the canopy greater than one-half acre. It would set standards to reduce soil nutrient depletion and encourage diversity in terms of tree species composition, age and size class.

The Referendum applies only to the northern half of Maine—the 10.5 million acre area owned almost exclusively by absentee multinational corporations and the heirs of 19th century timber barons. Most of this area is uninhabited by humans. In the past 15 years these caring landowners have clearcut more than 2000 square miles, an area greater than Delaware.

On Election Day 1995 over 55,000 registered voters in Maine signed the petition to place the Ban Clearcutting Referendum on the November 1996 ballot. Signers included hunters angered over the destruction of deer winter yards, fishermen angered over the siltation of their favorite fishing holes, snowmobilers tired of running into stumps, and loggers and paper mill workers who realize that current industry practices are dooming the future of their vocation in Maine.

On one level, the Referendum represents a triumph of democracy as angered citizens of all walks of life have taken direct action to change government policies. On a deeper level, however, the necessity of a referendum is testimony to the breakdown of democracy in Maine. Industry and a subservient Maine legislature and a series of industry-friendly governors have sabotaged every effort by citizens and mainstream environmental groups to end the massive clearcuts—some covering entire townships—that have ravaged the Maine woods for the past two decades. Industry is now waging a slick multi-million dollar propaganda and disinformation campaign against the Referendum.

The public strongly supports banning clearcutting. The Referendum will win if we can raise sufficient funds to counter the timber industry's economic threats and lies.

Please send a generous contribution to Ban Clearcutting in Maine, POB 2218, Augusta, ME 04338; 207-623-7140. Thanks. ■

—Jamie Sayen, Northern Appalachian Restoration Project



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# Public Naturalization Projects

## *Growing Concerns for Wild Life and Biodiversity*

### INTRODUCTION

Among the most serious of contemporary environmental concerns is the worldwide loss of biological diversity. Indeed, it is now abundantly clear that, due to the direct and indirect modification of natural environments by humans, we are on the brink of one of the greatest extinction spasms in the history of our planet (Wilson 1992). Far beyond merely depriving humans of many potential useful resources, the magnitude of this biodiversity crisis threatens to seriously disrupt the course of evolution on our planet (Myers 1989).

As individual countries prepare biodiversity strategies in the wake of the Earth Summit's Convention on Biological Diversity, an increasing number of groups are focusing attention on this important issue. However, biodiversity conservation is a complex exercise, and few individuals within the environmental movement hold the necessary expertise to tackle the problems we face. In fact, conservation biology—the discipline concerned specifically with biodiversity protection—is itself a relatively new scientific field within which concepts and approaches to the issue are evolving rapidly.

Public ignorance of issues related to conservation biology is demonstrated by the recent popularity of “naturalization” projects—in particular those purporting to help biodiversity. Where once we planted backyards, schoolyards, and parks to attract wildlife, we now plant “for biodiversity.” On one level these activities raise interesting philosophical questions about what wildlife really is, and the relationship between wildlife and biodiversity. These I shall attempt to deal with in the first part of this essay. My main concern, however, is the assumption that anyone can help solve the biodiversity crisis by undertaking such plantings. Although I do not intend to discourage people from acting with good intentions, wholesale advocacy of this approach suggests some profound misconceptions about the nature of biodiversity on the part of many project promoters. Given that groups across the continent are now proclaiming the benefits of naturalization, it is time to examine the limitations—indeed the potential dangers—inherent in this activity. The second part of this essay will begin such an examination.

### PART 1: BIODIVERSITY AND WILD LIFE

A contraction of ‘biological diversity’, the term ‘biodiversity’ “is commonly used to describe the number, variety and variability of living organisms” (Groombridge 1992). A more specific definition is provided by the Global Biodiversity Strategy. This document states that “Biodiversity is the totality of genes, species and ecosystems in a region” (WRI, IUCN & UNEP 1992). The latter definition emphasizes the three basic levels of diversity. It is important to remember each of these when undertaking any project related to biodiversity conservation. All too often the genetic level is ignored in public actions—with potentially dire consequences.

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*by Ken Towle*

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## Biodiversity

Why does our planet feature so much biological diversity in the first place? Since a thorough review of the current theories is beyond the scope of this essay (see Wilson 1992 for overview), suffice it to say here that biologists generally agree that, while there are many contributing factors, higher diversity is to a large degree the result of long-term evolutionary processes. Environmental conditions are believed to have a profound impact on the processes of natural selection and speciation. For example, the larger a region is, the more species it will contain; the more stable a region is climatically and physically, the better will be the opportunities for speciation to occur. The availability of higher energy input may further contribute to the process of speciation. This energy-stability-area theory has been widely used as an explanation for the exceptionally high biodiversity of tropical rain forests (Wilson 1992).

Since Darwin published his theories, evolution has generally been regarded as a linear process. Thus, life is perceived to be progressing toward ever more advanced forms. Yet it may be as valid to see evolution as continuous adjustment—a delicate balancing act based on individual species' potential to deal with change. An ecosystem may change according to the composition of its component species, their adaptive capabilities, and the degree of environmental change it is facing. The survival of a species in relation to environmental change depends on the genetic make up of individuals. This is why the genetic level is so important. It is fundamental to both the species and ecosystem levels of biodiversity.

It is exactly this potential to adapt to change that makes biodiversity so crucial an issue. Simply put, loss of biodiversity means loss of evolutionary options. At a time when humans are changing the physical and climatic structure of this planet more extensively and more rapidly than at any point in recent evolutionary history, the need for these options is greater than ever before.

With the exception of five known previous mass extinctions, which occurred over the course of thousands of years (as compared to the current extinction spasm, which is happening in a comparative blink of an eye), the process of evolution at the planetary level has proceeded more or less unimpeded. Significantly, the biosphere was largely what we would now consider "wild," that is, not under the manipulation of humans which we refer to as "control" or "management."

*Simply put, loss of biodiversity means loss of evolutionary options.*







Left in a wild state, and given enough time, life in general has a tendency toward diversification and complexity. For example, evolution has taken us from one-celled organisms to the complex systems that make up our bodies. Within a species, genetic traits resulting from random mutation undergo a process of natural selection over time on the basis of local environmental and demographic conditions. This results in an overall increase of genetic diversity over widely dispersed populations of the organism. Eventually, species diversity itself increases as distinct populations become sufficiently isolated to produce such profound genetic or behavioral changes that interbreeding becomes, quite literally, inconceivable.

If we accept this tendency in life toward diversification when left in a wild state, then we can conclude that there is indeed a close relationship between biodiversity and wildlife. Uncontrolled conditions in nature generate diversity, at least at the genetic and species level. In this context the distinction between wildlife and biodiversity breaks down. One might even argue that biodiversity *is*, or at least is the product of, *wild life*. That diversity represents evolutionary options gives added credence to Thoreau's famous dictum that "in wildness is the preservation of the world." In essence, by destroying wild nature we are locking doors we may one day find ourselves banging on.

The process opposite to evolution and diversification is domestication. Domestication represents the forfeiture of wildness, genetic diversity, and ultimately of evolutionary options. Domesticated plants and animals have been pulled away from nature through deliberate genetic manipulation by humans to suit what we perceive to be our own needs. In this way, with few exceptions, true domesticates are disconnected from nature. They have lost their ability to survive in the real world, to be wild. Either genetically or behaviorally, they are no longer capable of adapting to wild conditions.

If not only biodiversity, but evolution itself is the product or result of life in a wild state, then by changing rather than being changed by the natural environment, humans have become the product of our own artificial selection. We have halted our physical evolution in favor of our adopted technologies on which we are now entirely dependent. As John Livingston (1994) has suggested, *Homo sapiens* itself may have been the first domesticated species.

The further we bring the Earth within the realm of what we perceive to be human control, the greater becomes the degree of planetary domestication. It is the age-old process of conquering the wild. Complex, naturally evolving ecosystems are being converted to simplified, managed units, or even monocultures. This represents a phenomenal loss of ecosystem and species diversity. However, it is the decrease in genetic diversity within the species we choose to cultivate that characterizes their domestication and condemns them to dependence on humans. Through this multi-level planetary loss of biodiversity that results from such domestication, we are in essence disrupting evolution, destroying our own options as well as those of other life forms.

The above perspective, while in itself disturbing, has serious implications for a wide range of issues, and with respect to many conservation disciplines. Indeed, it brings into question the long-term success of *ex situ* conservation, habitat management, and restoration efforts. I shall address the significance of the wild/diverse relationship for the latter of these disciplines in Part 2 of this paper.

illustration by Anna Guillemot

## Part 2: Misguided Public Action for Biodiversity Conservation

Given the close relationship between wildness and diversity, the best way to preserve biodiversity is to protect wild nature. It is time for us to admit that we know very little about how ecosystems function. We must recognize that (to paraphrase Frank Egler) "Nature is not only more complex than we think but more complex than we can ever think" (Miller 1993). According to Payne (1992) "untampered nature is priceless. Improving the dynamic processes of natural systems might be impossible. Protection might be a better management goal than manipulation."

Since our understanding of the complexity of natural ecosystems (i.e., wild life) is rudimentary, our efforts to restore such systems are at best learning experiences involving trial and error. This being so, we should question why the current allocation of limited available funding for biodiversity conservation often favors restoration-related work rather than the protection of existing natural habitat.

Much of this government and private funding goes toward "naturalization" programs that involve public plantings of trees or shrubs, wildlife "gardens" etc. in schoolyards and parklands. Dozens of guidebooks for such activities are now appearing, and citizens are increasingly being encouraged to convert their backyards to wildlife habitat. Certainly, we need lawn substitutes and means by which we can better understand and appreciate nature, and on these grounds such activities should be encouraged. However, programs promoting naturalization are increasingly focusing on biodiversity conservation as the goal, and it is clear from much of the current literature that little attention is being granted to the issues in conservation biology relevant to this goal.

I contend that, aside from their potential to raise awareness, public naturalization projects can in most cases contribute little to halting the biodiversity crisis. Indeed, without the involvement of experts in conservation biology some of these plantings could work against biodiversity conservation. The remainder of this essay will consider concerns related to these well-meaning but often misguided activities.

### BIODIVERSITY: THE MORE THE BETTER?

One concern is the common public misconception that as far as biodiversity is concerned, more is necessarily better. Citizen action programs for biodiversity often promote this idea, perhaps in an effort to simplify what is in reality a very complicated issue. To act on this perception can be dangerous. In fact, while encouraging a diversity of species one can simultaneously and unwittingly contribute to the biodiversity crisis. Whether more biodiversity *is* better depends entirely on the situation, and every situation is different.

This is especially true for genetic diversity. To illustrate, if we cross-breed formerly isolated or distant populations of a vertebrate species under artificial conditions, the diversity of

each individual population may increase from the fresh genetic input, but the overall diversity within the species will likely be reduced through increased homogeneity. Furthermore, the fitness of each individual population may be reduced through outbreeding depression—the disruption of coadapted genotypes which is a potential result of such hybridization.

The opposite process, inbreeding depression (resulting from the crossing of closely related genotypes), has also traditionally been thought to cause a reduction in fitness. Yet, there is growing evidence that—at least for some invertebrates and plants—localized populations may actually *require* a certain degree of inbreeding in order to maintain their ability to adapt to local conditions. Genetic input from members of outside populations could result in outbreeding depression (Shields 1993). These considerations hold profound implications for habitat restoration of any kind, and introduce a level of complexity to such projects that few members of the public have the expertise to face. To proceed in planting without addressing such issues may be irresponsible.

For example, commercially available wildflower seeds or trees and shrubs are often the descendants of distant stock that is genetically adapted to foreign climate and soil conditions. Many local indigenous plant populations are already under stress, facing air pollution, increasing doses of UV radiation, and invasions of competing, predatory or parasitic exotic species. By planting such foreign "ecotypes" we may be playing with fire. Few of us foresee the invisible but insidious threats we pose as the bees, butterflies, and hummingbirds we so appreciate perform their natural evolutionary role as pollinators in our habitat gardens, before moving off to nearby natural areas.

The cross-breeding of distant plant genotypes with nearby natural populations is inevitable so long as we rely on imported commercial seeds or plant stock. When this occurs a variety of outcomes are possible, depending on the species and local environmental conditions. The introduction of new genetic qualities—the immediate increase in genetic diversity—may benefit local plant populations by increasing their resilience. Or resulting hybrids may be infertile. While the latter possibility may prevent the newly introduced genetic qualities from spreading further through the local indigenous population, if this population is very small to begin with and all individuals become contaminated with the foreign germplasm, then the entire local population—even if they are perennials—may ultimately face extinction. Finally, the blending of distant and local stock can result in outbreeding depression. As new genetic properties spread through local wild populations, we may be inadvertently weakening their ability to adapt to environmental change, even as we increase our other negative impacts on the environment.



The above considerations make clear that considerable risk is involved when we cross-breed distant populations of the same species. Except in emergency situations such as when the survival of a critically threatened species or ecosystem is at stake, only genetic stock adapted to local conditions should be planted in restoration projects of any kind.

Would-be restorationists and advocates of backyard habitat should also be aware that even if nurseries do supply local genetic stock, that stock may only be available in the form of clones or cuttings. These may have been selected from parents more for features attractive to human value judgments than for their ability to adapt to natural conditions. Cross-breeding of these with on-site individuals of the same species can lead to a fitness reduction in the overall population.

In sum, on the genetic level the true benefits of plantings cannot be gained through an increase in biodiversity *per se*, but in maintaining or restoring the ideal degree and particular qualities of biodiversity that allow for the continued adaptation and evolution of each species under local environmental conditions. Plants and invertebrates are the groups most likely to benefit or suffer from such actions; vertebrates tend to be too wide-ranging to be profoundly affected by small-scale habitat restoration projects. The maintenance of this delicate balance between too much and too little genetic diversity presents a tremendous challenge to conservation biologists, and is certainly beyond the capacity of the average citizen.

Such considerations should cause us to pause for a moment and question whether or not we should be planting at all. In some situations it may well be better in the long run merely to allow nature to take over and selectively remove exotics where they threaten indigenous species. After all, left to themselves, many open spaces can undergo succession so quickly that within a few years they may resemble sites that have been "naturalized." This would result in great savings in energy and financial resources.

Let us now look at the "more is better" perspective in relation to the species and ecosystem levels of biodiversity. When backyards and schoolyards are subjected to plantings for biodiversity, it is invariably the species level that is being considered. Species richness—the number of individual species present—is the focus.

Temperate ecosystems exhibit what might be interpreted as a high degree of species diversity when we look at them from a bioregional perspective. However, local environments may support only a subset of the region's plant and other wildlife species. Certain soil, drainage, or microclimate conditions are more suitable for some species than others. Trees such as Eastern Hemlock (*Tsuga canadensis*) and American Beech (*Fagus grandifolia*) may grow in stands, contributing to a lower species diversity over a small area. Therefore it is foolish to assume that as many tree, shrub, or wildflower species as possible should be planted

for the benefit of biodiversity when conditions of the planting site might better support healthy populations of only a few species. This consideration of species "evenness" is especially relevant when dealing with small backyard habitats. If we wish to "design for nature" rather than for our own interests, then a careful assessment of local conditions should be undertaken, and the species most suited for those conditions should be planted. Rather than planting a haphazard number of species known to occur regionally, a knowledge of species requirements and habitat associations should be incorporated into plans for any given site.

## EDGE EFFECTS

The actual physical structure of a planting is of great importance for biodiversity. Many planting programs promote the creation of "edge" habitat as a means of increasing the number of species attracted to wildlife gardens. This enhancement of species richness is wrongly assumed to benefit the cause of biodiversity conservation. Edge habitats (or ecotones), as opposed to core areas such as forest interior, do tend to support a greater diversity of species. Because they represent an interface between two or more habitats, edges are used by species normally associated with each habitat and by generalist and opportunistic species that include several habitat types in their foraging circuit. Edges also tend to exhibit various stages of succession, each of which is a preferred habitat of certain wildlife species (Hunter 1990). However, artificial edges can have profound negative effects on species conservation.

In eastern North America, the fragmentation of forests resulting from agricultural development, roads, and powerlines has greatly increased the amount of edge habitat. This has become a major concern of conservation biologists, because forest interior species and habitats can be threatened by negative edge effects, such as drier conditions, storm damage, increased predation and parasitism, and invasions by exotic species.

The impacts of habitat fragmentation and the resulting edge effects on forest interior songbirds have been particularly well documented (Terborgh 1989, Askins et al. 1990, Finch 1991). For example, the Brown-headed Cowbird, a common brood parasite, has better access to songbird nests in small forest fragments (Robinson et al. 1993). Opportunistic species that regularly prey upon the eggs and young of songbirds thrive in edge habitats. These include Opossum, Raccoon, skunks, squirrels, foxes, Coyote, crows and Blue Jay—many of which now have artificially high populations as a result of human manipulation of the landscape.

In recognition of these facts, we should think twice before encouraging the establishment of additional edge habitat. Even when the "edge" is isolated in a backyard or schoolyard, the planting can nevertheless encourage predators and parasites that have negative impacts on nearby natural areas. Expert advice is a must.

## WILD LIFE OR WILLED LIFE?

I suggested in Part 1 that there is a close association between biodiversity and wild life. I shall now argue that unless we are willing to commence by emulating the natural processes around us and ultimately to relinquish control over our adopted site, our habitat plantings may work against biodiversity conservation.

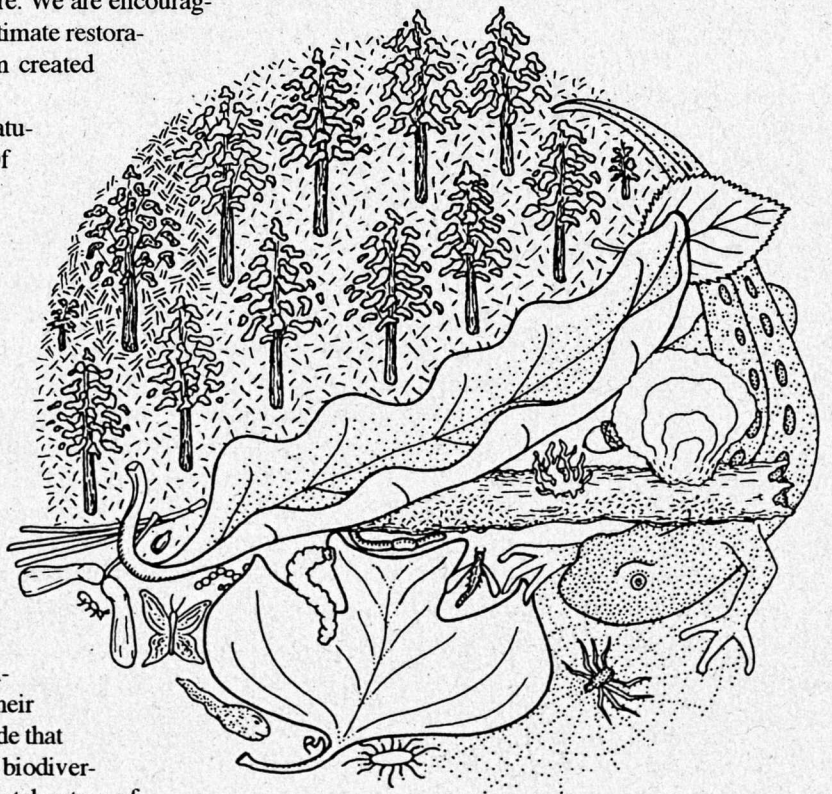
The core issue is management. We tend to forget that the native species we wish to plant are the evolutionary products of millennia. In North America, at least, most have evolved under wild conditions and are thus designed to survive entirely independent of human manipulation. Not merely the individual species, but the ecological relationships—the ecosystems themselves—have evolved this way. Again, we are dealing with *wild* life.

When a decision is made to plant native species—whether or not the intention is biodiversity conservation—we *choose* the species we wish to plant or attract. In a restoration ecology project, such choices may be dictated by knowledge of historical ecosystems. By contrast, for backyard, park, or schoolyard habitats, such choices are more often based on prejudices and preferences. We want to plant attractive species of trees, shrubs, or wildflowers. We may want to encourage chipmunks but not Coyotes, and so on. In urban areas such choices may be practical from a human health perspective. Whatever the case, literally or figuratively, we “weed out” the undesirables. Thus, even with the best of intentions, the species chosen may not be those best suited for the site.

Let's face the facts. When taking this approach to naturalization projects, it is not really nature that we attract to our backyards, and we are not communing with nature—as many of us would like to believe. Not so long as we perceive nature as wild, anyway, i.e., free from human manipulation. In reality, we are still gardening: we are manipulating, attempting to manage nature. We are encouraging not wild life so much as *willed* life. Even legitimate restoration projects fall into this trap when the system created requires extensive long-term management.

This even brings into question the use of naturalization projects for education purposes. Of course, students should learn more about indigenous species and ecology. Natural history should be an integral component of the curriculum. However, to impart an increased understanding of and respect for nature, we must be careful not to imply that nature needs continuous management as does a garden.

The wildlife versus willed life argument is more than a philosophical issue. By encouraging only desirable wildlife species through extensive habitat management, are we not commencing a process of domestication? Could continuous weeding, watering and other maintenance compromise the ability of vegetation to evolve as a wild ecosystem? If the species present are no longer adapting to wild conditions, what is to be the selective pressure on their genotype? From this perspective we must conclude that the idea of managing or manipulating nature for biodiversity may in fact be the antithesis of the fundamental nature of that diversity which is *wild* life.





## CONCLUSION

The objective of this paper is not to criticize or reject legitimate restoration projects being undertaken with input from ecologists or conservation biologists. Ecosystems are incredibly complex. Not even the most experienced ecologist or restorationist would lay claim to intimate understanding of any ecosystem type. We still cannot even agree on what constitute ecosystem boundaries. The ecosystem concept itself is now widely questioned (Worster 1990).

As far as backyard and schoolyard habitats are concerned, the public should be aware that while they may help in environmental education, nature appreciation and aesthetics, act as good lawn substitutes, or control erosion, their value in helping to solve the biodiversity crisis may be limited to providing a little habitat for migrating songbirds and a few locally uncommon species of plants and insects. Naturalization and restoration projects *can* play a more positive role in abating the biodiversity crisis, but for them to do so, we must concentrate on the broader landscape, rather than on backyards and schoolyards. While the details of such an approach are beyond the scope of this paper, in essence we need to protect, expand, and where beneficial connect existing natural areas in order to make them more ecologically viable over the long term.

With all this in mind, one must question continued government and private funding for small-scale urban naturalization projects. The complexities and dangers involved in these efforts continue to go unrecognized by the public and governments alike. Funding sources rarely allocate resources for hiring those with expertise, even when a group does want to involve them in their project.

For governments and private citizen groups that are serious about contributing to biodiversity conservation, several general rules will help: 1) If you only want to undertake a backyard or schoolyard naturalization project, tie it in with a contribution to a local conservation group working to protect remaining natural habitats. 2) Involve an expert in your project. 3) Take a regional landscape perspective. Try to find an existing natural site that is of potential importance for biodiversity. Choose one that can be expanded, connected to other sites, or otherwise improved in such a way that it may contribute to biodiversity conservation.

It is time for government and private funding sources to think more about the future of life on this planet than about good publicity. When dealing with the biodiversity crisis, they should act on the following:

- 1) the complexities of the issues must be recognized and communicated through education projects;
- 2) expertise must be identified and encouraged; and
- 3) priority species and habitat protection as well as restoration needs must be addressed through funding programs.

This does not mean that the public must be left out of the effort. On the contrary, with the necessary information the average person can do much to help.

Now that the Convention on Biological Diversity has been ratified in Canada, we are committed to the goal of biodiversity conservation. Given the shortage of existing funds, let's make certain that what we do have goes where it can accomplish the most. The popular dictum "extinction is forever" reminds us there will be no second chances. Therefore it is imperative that we do the job right, and given the urgency of the situation, do it right now. ■

*Ken Towle (10 Deering Crescent, North York, Ontario, Canada M2M 2A3) is a consultant in conservation biology in Toronto. He has undertaken biological inventory work in temperate and tropical areas, and is involved in local habitat evaluation, restoration, and environmental education projects.*

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# An Arctic Dream— Torngat National Park

by Gary Randorf

*The pattern of our exploitation of the Arctic, our increasing utilization of its natural resources, our very desire to "put it to use," is clear. What is it that is missing, or tentative, in us, I would wonder, to make me so uncomfortable walking out here in a region of chirping birds, distant caribou, and redoubtable lemmings? It is restraint.*

—Barry Lopez

Imagine a place where mountains tower thousands of feet vertically out of the sea, penetrated by deep-cut fjords sprinkled with icebergs. Where Caribou range in the thousands, Polar Bears are frequently seen, and a globally unique population of tundra-dwelling Black Bears resides. Gray Wolves and Arctic Fox live here, and the abundant bird life includes Golden Eagle and Peregrine Falcon. The hundreds of archaeological sites include tent rings, stone Caribou fences, and graves. As you walk easily through the dry tundra, you pass by countless lakes and ponds whose bright blue waters are decorated with pebbles, boulders, and bedrock like works of abstract art. The trails are made by Caribou, not people. Almost 300 miles of breath-taking coastline is uninhabited, and the nearest highway connected to the rest of the world is 350 air miles away!

This is the Torngat Mountain range of northern-most Labrador. Recommended as a national park for over twenty years, its proposed boundaries are shrinking as a result of "mining fever." Just south of the closest human community, Nain, strikes of significant nickel and copper ore bodies have prospectors scrambling. Recent staking has led to the deletion of several areas from the proposed park, jeopardizing its ecological integrity.

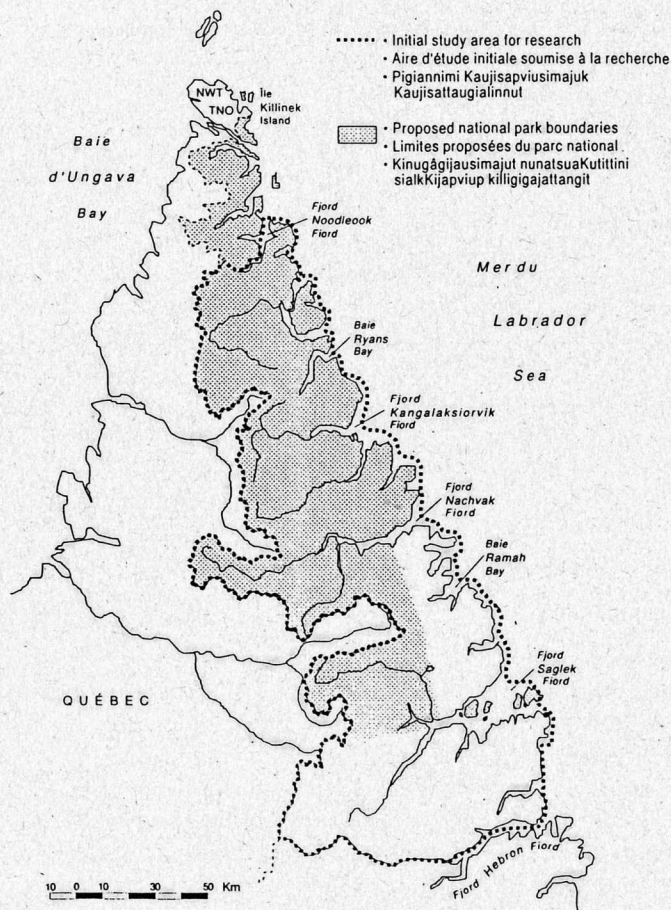
My twenty plus years of experience in helping to preserve New York State's six-million acre Adirondack Park tells me it doesn't have to be this way. The essentially wild and natural Adirondack Park is a mixture of public and private wildlands, alongside working landscapes (forests and farms), human communities, and yes, even mines. So it need not be an "either/or" situation. The proposed Torngat Mountains National Park boundary can and should be ecologically based to include all significant natural areas and to protect the biodiversity and representative landscapes of Newfoundland and Labrador. Should some mining



*Saglek Fjord*

© Gary Randorf Photography





interests be overriding in significance, surely a way can be found to extract the minerals without destroying the habitats. Smelting and refining can be done elsewhere. And "Inuit interests," which have also led to shrinkage of proposed boundaries, can be accommodated. Indeed, I am convinced, after spending several days with three Inuit, that their interests are as those of their predecessors, who "knew beyond a shadow of a doubt, beyond any hesitation, what made them happy, what gave them a sense of satisfaction, of wealth. An abundance of animals."<sup>1</sup>

I am the designated photographer of a small, ad-hoc group of Americans and Canadians who want to help move the Torngat National Park proposal along. I recently made a ten day trip there to begin photographing on the ground. Three of our group are pilots who have previously flown the area. Next May we will base ourselves in Nain for a week or two, and make aerial photographic forays into the Torngats when weather allows. We will use the photographs and our experiences to elevate awareness of this magnificent region and park proposal, and garner advocates.

Northern Labrador is a photographer's paradise, with the spectacular Torngat, Kaumajet, and Kiglapait Mountains standing as stark, mysterious, and silent sentinels to a fascinating history. Though not populated today, artifacts confirm that the North Coast was inhabited by indigenous people some 6000

<sup>1</sup> From *Arctic Dreams* by Barry Lopez (New York: Charles Scribner's Sons; 1986).

years ago. Permanent European settlement began in the 1700s with the arrival of Moravian missionaries from Germany in ships laden with prefabricated building supplies. Their villages are now deserted and the natives live mostly farther south in Labrador.

In 1995, the Newfoundland government allowed mineral staking within the proposed Torngat Mountains National Park. Staked now are the highest peaks in Canada east of the Rocky Mountains and prime hiking country in Nachvak Valley. This staking within the proposed park, coupled with the deletion of several ecologically integral areas from the park study area, has a coalition of Canadian environmental groups alarmed.

Surely it is time to establish a Torngats Park. Having visited parks all over the world, I say without hesitation that this landscape compares with the best of them. When it comes to wilderness, uniqueness, biological integrity, and remoteness, few places can match the Torngats. They deserve support and advocacy from all people who fight for wild places. ■

*Gary Rendorf, former executive director of the Adirondack Council, now serves half-time as senior counselor to the Council (Box D-2, Elizabethtown, NY 12932) and devotes much of the rest of his time to promoting wild places through photography. His book, The Adirondacks, Wild Island of Hope, is due out in 1996.*

For more information on the park proposal and stages of the Torngat Mountains National Park Feasibility Study that lie ahead, contact the project coordinator:

Ian MacNeil  
 Parks Establishment Branch  
 Parks Canada  
 25 Eddy Street  
 Hull, Quebec K1A 0M5

To express opinions or make inquiries about the proposed park, write:

Tom Lee, Assistant Deputy Minister  
 Parks Canada  
 Department of Canadian Heritage  
 25 Eddy Street  
 Hull, Quebec K1A 0M5

Readers can also help by supporting and requesting information from one or more of the following citizen groups:

- World Wildlife Fund Canada, 90 Eglinton Ave., East, Suite 504, Toronto, Ontario, Canada M4P 2Z7; (416) 489-8800
- Canadian Nature Federation, 1 Nicholas Street, Suite 520, Ottawa, Ontario, Canada K1N 7B7; (613) 562-3371
- Canadian Parks and Wilderness Society, 160 Bloor St., East, Suite 1335, Toronto, Ontario, Canada M4W 1B9; (416) 972-0868
- The Protected Areas Association of Newfoundland and Labrador, 220 Lemarchant Rd., St. Johns, Newfoundland, Canada; (709) 726-2603

map courtesy of Canadian Heritage  
 Parks Canada

# Update on the Ecological Condition of Adirondack Lakes

by Curt Stager

**A**fter nearly two decades of research and media coverage of the subject, the Adirondacks have become an international symbol of the destructive effects of airborne pollution. The acidification of Adirondack lakes is one of the best documented environmental problems today. Unlike global climate change or ozone loss, about which we know relatively little, we now know very well what causes lake acidification, when it started, and what its effects are (auto and industrial emissions, since the Industrial Revolution, and death of many species of fish and invertebrates). The Adirondack Park is arguably the most heavily acid-impacted region in the United States. However, few people consider that other environmental problems face Adirondack lakes as well. I'll try to remedy that in this report from the northern Adirondacks.

## ACID DEPOSITION

First, an overview of acid rain. The evidence that finally convinced even the most stubborn skeptics that Adirondack lakes have acidified on a large scale due to recent atmospheric pollution was not just direct measurements of pH changes over this century; those were too rare and unreliable. It was largely the study of sediments under the lakes that clinched the story.

Researchers in the 1980s, largely funded by power companies, collected sediment cores from 38 Adirondack lakes ranging in pH from 7.8 to 4.4 (Cumming et al. 1992). They dated the sediment layers with radioisotopes, and analyzed the fossil algae preserved in them. Certain kinds of single-celled algae, called diatoms, have glassy shells that fall to the lake bottom as the algae grow and die each year, and are preserved there. As the annual layers of mud and dead algae build up, they form an archive of environmental data stacked like pages in a book. Since particular species of diatoms live in waters of specific pH, you can infer a lake's past pH by identifying the kinds of diatoms preserved in its sediment records.



*Avalanche Lake, Adirondack Park  
acrylic painting by Bill Amadon*



Elaborate statistical methods enabled researchers to reconstruct detailed histories of pH changes in the lakes covering the last 200 years or more. They showed conclusively that currently acidic lakes have grown more so since the Industrial Revolution. So convincing was the fossil evidence of falling pHs (lower pH means more acidic) in response to rising pollutant emissions that it took nearly everyone by surprise, not least the power companies, who no longer fund those researchers.

One revelation of acid rain research by the Environmental Protection Agency in the 1980s was that critical acidification has so far claimed about a fifth of the Adirondack region's 3000 lakes and ponds. (Importantly, though, estimates that include lakes smaller than 4 hectares in area raise this to 47%.) Brief ("episodic") acid pulses, primarily due to spring snowmelt, acidify 60-70% of all Adirondack lakes at least once a year, year after year. The majority of chronically acidified lakes lie in the western and southwestern sections of the Park, where precipitation is higher because of the prevailing storm tracks. Another problem area is the high country. Lakes over 2500 feet in elevation are relatively rare but are among the hardest hit, because the soils up there are thin and naturally acidic anyway, and thus unable to neutralize the atmospheric acids coming down on them. Moreover, the high lakes are small, with little acid-neutralizing capacity (ANC), and lie above the average cloud line and are thus exposed to acidic fog and rime ice.

Recently, scientists have become concerned that a sort of "acid rain time bomb" may be ticking away here (some say it's already going off). Although clean air legislation has helped slow sulfate deposition, nitrogen deposition continues to rise. At some point, perhaps in the next 25-50 years, Adirondack watersheds may become saturated with nitrate, overwhelming the natural buffering capacity of the soils. At that point, additional acid inputs will tend to rush straight into lakes that were formerly resistant to acidification. A recent memo from New York's Department of Environmental Conservation (DEC) warns that at least three-quarters of all Adirondack waters may eventually become chronically acidified as a result.

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Acidification is a problem of national scale, and solutions may be slow in coming. Lake liming is costly and has been shown to be largely ineffective in long-term stabilization of lake pH. In a study by Cornell University's Carl Schofield (1986), for instance, stocked trout bred successfully in only

10% of limed lakes studied. Controlling pollution sources seems the most feasible action to take. The DEC suggests that additional reductions of anthropogenic sulfur and nitrogen emissions by at least 40-50% will be necessary to prevent future acidification in the Adirondacks.

#### LIMITED STATE OF KNOWLEDGE

Most studies of Adirondack lake ecology have been designed with acid rain or sport fishing in mind. Although these issues are of great importance, they are not the only ones worthy of concern here. The composition and condition of the aquatic communities of most Adirondack lakes remain virtually unknown. There are very few data bases, as far as I am aware, concerning the condition of aquatic Adirondack amphibians, reptiles, molluscs, bacteria, protozoa, sponges, worms, bryozoans, non-biting insects, or non-game birds other than loons. In fact, roughly half of all Adirondack lakes remain completely unstudied by scientists.

The most comprehensive study of Adirondack lakes to date was conducted by the Adirondack Lake Survey Corporation (ALSC). Between 1984 and 1987, the ALSC sampled 1469 lakes and ponds, roughly half of all Adirondack lakes between 0.2 and 203 hectares in size. The lakes were selected randomly, to minimize sample bias.

The raw data from that study fill several bookshelves, are mostly chemical in nature, and are being computerized for easier public access. To summarize some of their findings: 26% of the lakes had pHs below 5 (very acidic); fish inhabited 76% of the lakes; fishless lakes were generally small and acidic, and were most numerous above 600 meters elevation and in the western and southwestern portions of the Park.

The ALSC estimated that 50 to 70% of today's fishless lakes have always been fishless; later sediment studies have tended to confirm this. The few well documented cases of fish loss available suggest that acidification has played a relatively minor role compared to changes in fish stocking, rotenone treatment (discussed later), and introduction of predators and competitors.

Unfortunately, even the massive ALSC study had its shortcomings. Some of the features most useful in determining the extent of nutrient pollution (such as chlorophyll *a*) were not adequately measured. Due to logistical considerations, the largest lakes were not investigated at all.

Perhaps the most serious problem with these kinds of investigations is that they usually represent only one or two visits to each lake, generally within a single year. Lakes change dramatically from week to week, season to season, and year to year. Most of the studies performed thus far provide only snapshots of very dynamic lakes, again designed primarily to address acidification and sport-fishing issues.

Perhaps the most comprehensive "long-term" study to date was conducted by Syracuse University scientists who monitored 13 Adirondack lakes once-monthly over 11 years (Driscoll and van Dreason 1993). This ongoing program, under new management now, includes 52 waters. They found that sulfate levels have fallen, acid-neutralizing capacity has held steady, and nitrate levels have risen since 1983. Oddly, nitrate levels seem to have decreased from 1992 to 1994; the cause remains unclear. To me, this underscores the need for much longer time perspectives in judging the natural variability of ecosystems.

We still have, then, very few truly long-term records of individual Adirondack lakes to show how variable they are in their temperature, productivity, clarity, and population fluctuations of aquatic organisms other than fish. Thus, when we see a change, it's often difficult to know whether or not it's normal.

Clearly, the effort and expense to conduct complete, long-term ecological monitoring programs on all Adirondack lakes would be prohibitively high. However, there is a relatively cheap and simple way to get at some of the long-term environmental data. Remember those lake sediment studies? Much-needed environmental data are stored in the mud archives under each lake, waiting to be read. I've looked into a few of those volumes recently, and the stories they tell are not reassuring. Many of them don't have much to do with acid rain, though.

### ROAD SALT CONTAMINATION

Road salt is an obvious candidate for trouble in roadside waters, with the heavy loads put out by the Department of Transportation during long Adirondack winters. The ALSC study found high chloride levels in several roadside lakes, but provided little insight into what effects this has on aquatic life other than fish (there seems to be little effect on trout thus far).

I have watched the birch trees lining the lakeside road in the Cascade Notch wither and die over the last several years, from road salt contamination and root compaction under sands washed off the road with the salt. The two Cascade Lakes next to the road have had unusually high chloride concentrations in their stratified waters, and sediment cores collected by one of my students showed a shift in the diatom assemblages in their upper layers. Which is almost all I can say, at this point, about the nature and extent of road salt impacts on Adirondack lakes.

### EUTROPHICATION

A more clearly serious problem is nutrient enrichment, which triggers thick algae blooms that can taint or toxify the water, and can deplete it of oxygen; this process is known as "eutrophication." Sometimes the nutrients come from obvious human sources such as sewage systems or fertilized lawns and fields. Sometimes the sources are more obscure.

For example, the large and beautiful Upper Saranac Lake (Franklin County) has experienced sporadic but massive algae blooms in recent years, to the distress of lakeshore residents and anglers. My colleagues at Paul Smith's Col-

lege and I have shown this to be a classic case of "cultural eutrophication." The mud under the lake is black and smelly at its surface. Below 5-10 centimeters, it's rich and brown, like that of most North Country lakes. There is a dramatic shift in diatom assemblages between the brown and the black, reflecting an increase in nutrient pollution since the early 1950s, when a state-operated fish hatchery went into full-time operation upstream from the lake. Nutrients from fish chow and raw fish sewage now end up in the north basin of the lake, helping trigger algae blooms.

Sometimes algae blooms occur in these lakes without warning or obvious explanation. A year after the worst of the Upper Saranac blooms made local headlines, Rat Pond, less than a mile to the north, turned mud-brown. Flying over the area in September, I was struck by the contrast in colors between Rat and the surrounding dozens of sky-blue ponds. The brown color was due to algae, but unlike Upper Saranac, Rat Pond has no hatchery, nor even a single house in its watershed. Where were the nutrients coming from?

The next fall, Black Pond, near my home in Paul Smiths, turned brownish green with cyanobacteria. Again, algae blooms appeared briefly but dramatically in a lake that supported no human habitation or other obvious nutrient source. Perhaps, I thought, these lakes just bloom spontaneously from time to time, and these are simply natural fluctuations in algae populations.

Paddling through the nearby St. Regis Canoe Area during the year of the Black Pond bloom, I turned to sediments once again for clues. Under each of the half dozen lakes I sampled, I found a thin black layer of mud atop the brown deeper layers. This surprised me, because the usual situation in relatively shallow lakes such as these is to have black muds (indicating low oxygen conditions) lying beneath a thin brown layer that turns pale through contact with the oxygen-rich lake waters above it.

Back at home, I leafed through some information I had recently obtained from the DEC about fish stocking programs in the area. There I found a list of lakes that the state has reclaimed ("reclamation" is a euphemism for "poisoning the resident fish population with rotenone and re-stocking the lake with some other game fish"). Every one of the black-layer lakes, as well as Rat and Black Ponds, had been reclaimed at least once since the mid-1950s. As of 1992, the DEC had reclaimed 25 lakes in Essex County, 46 in Franklin County, 5 in St. Lawrence County, and 28 in Hamilton County. What look to most visitors like pristine wilderness lakes, often accessible only by boat or by foot, are actually DEC fish tanks.

The thickness of the black layers under these lakes suggests that they represent the time since reclamation, although costly radioisotope dates are needed to confirm or refute this. Shifts in the diatoms in the Rat and Black Pond sediments indicate nutrient enrichment following reclamation, presumably because rotenoning a lake is like dumping several truckloads of dead fish into it. According to my preliminary observations, this widespread "reclamation" practice seems to boost the nu-



trient loads in a lake's waters and sediments, and may set a hair trigger for the sudden release of algal nutrients into the lake's food chain for many years to come.

## ROTENONE

Another aspect of the rotenone issue is the question of toxicity to non-target species. Rotenone is said to be harmless to humans and to any other animal that lacks gills. It comes from a tropical vine, and South American natives have long used it to capture fish in their local streams. That ancient tradition involves crushing the plant, dumping it into the water to kill every nearby gilled animal, and eating whatever floats and looks good. Supposedly, the rotenone does the people no harm, but relatively little research has been done on the toxic effects of rotenone on complex aquatic ecosystems or Adirondack lake organisms other than fish.

It is well known that rotenone kills fish by attacking their gills. Less well known is that it also kills aquatic insect larvae, which breathe through gills. Likewise, it kills waterfleas, the tiny crustaceans at the bottom of the animal food chain, upon which larval fish depend for food. More research needs to be done on the effects of rotenone on non-commercial invertebrates such as sponges, bryozoa, worms, and molluscs (recently, one such study was conducted on three reclaimed lakes by Harig and Bain [1995]). To their credit, the DEC tends to "reclaim" lakes in fall rather than spring in part to minimize risk to breeding amphibians.

Humans who eat fish from reclaimed lakes have been reassured that rotenone breaks down quickly in the field. However, a scientist at Queen's University, Ontario, told me recently that he thinks it shows up in fish tissues long after the recla-

mation. If this is true, then the most likely place for the rotenone to persist would be in dark, cool, oxygen-poor lake sediments. Mud-dwelling invertebrates, later eaten by fish, might recycle it into the food chain. This possibility remains to be investigated thoroughly in the Adirondacks.

## NON-NATIVE SPECIES

The topic of reclamation brings up the issue of fishery manipulations in general. Until this century, many of the fish sought by anglers—including bass, Northern Pike, Rainbow and Brown Trout, salmon, splake, and Yellow Perch—were rare or absent from Adirondack waters. The most common natives of the nineteenth century were Brook and Lake Trout, bullheads, pumpkinseeds, and various minnows. As the new species have been brought in over the last hundred years, mainly by state fishery managers responding to public demands for game fish, they may have altered the food chains of the lakes they have invaded. To my knowledge, there have been few scientific studies conducted on this issue in the Adirondacks.

One of the central arguments given in favor of reclamation is that it restores native fish species to their ancestral lakes. This argument, of course, rests on the assumption that natives are somehow "better" than immigrants (in which case, perhaps we humans should all move back to Olduvai Gorge).

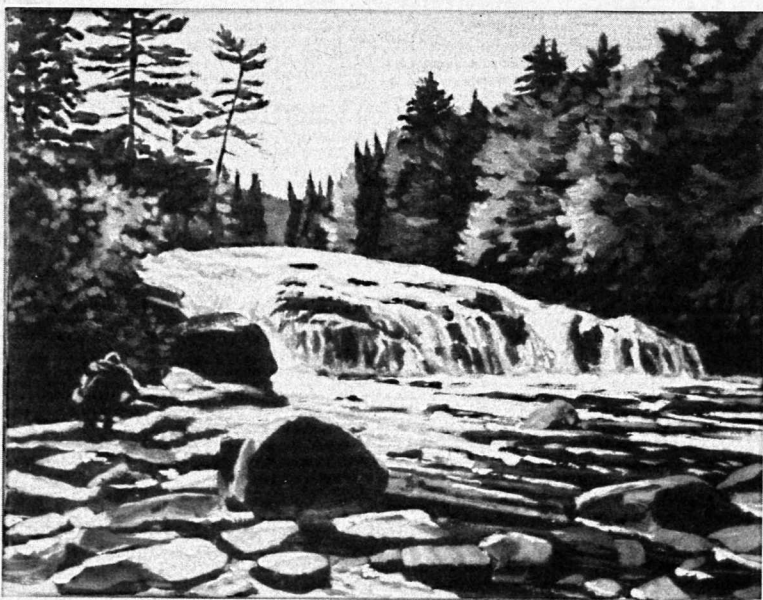
Interestingly, the same bureaucracy that now considers perch to be "trash fish," and names Brook Trout as the game fish of choice, introduced 200,000 Yellow Perch to Adirondack waters between 1919 and 1932, presumably by public request. Environmental management changes with public opinion, as much as with science. The Brookie's relative primacy in the region is now used to justify the elimination of immigrant perch by reclamation.

To leave fish again for a moment, I am happy to note that we have yet to suffer much from other exotic aquatic species invasions in the high country. Purple Loosestrife and Eurasian Milfoil are making some limited inroads, but I have yet to hear of Zebra Mussels in our mountain waters; one of the bright sides of having acid waters in our lakes is that they corrode mollusc shells.

## TOXICS

I gave little thought to toxic contamination of Adirondack waters until this year, when I got my fishing license and read in the regulation manual that Yellow Perch in Meacham Lake (Franklin County) are too full of toxics for human consumption. The only human activity on Meacham lake is at a small public campground on the shore; no industry anywhere nearby. How could it be so polluted?

The problem is mercury. The DEC scientist I spoke with about this said that the mercury may be coming out of the air (our polluted storm



*Raquette River, Adirondack Park*  
acrylic by Bill Amadon

clouds carry heavy metals and other toxics as well as acids); or it may be naturally present in the rocks and soils of the region, which becomes a problem as low pH levels make the mercury more mobile. Whether raining from above or being leached from below or both, mercury enters the food chain and accumulates in fish flesh; you can't trim it away with the body fat like you can the PCBs in Lake Ontario fish. A recent report (Simonin et al. 1994) suggested that as many as 100 Adirondack lakes support perch with unacceptably high (>1 ug/g) levels of mercury in their flesh. Several questions about mercury here deserve immediate attention: (1) why aren't more lakes listed as hazardous, (2) is acidic precipitation increasing the mercury problem, and (3) why are Meacham Lake perch so mercury-contaminated when the lake isn't even acidic? Last I heard, its pH was neutral.

Again, we run up against the problem of too little research funding. The DEC will never have enough money and personnel to check all fish species in all 3000 lakes annually for mercury contamination. And who knows what the situation is for other metals such as cadmium, which is turning up in Adirondack deer livers, or airborne PCBs, which were found in mosses in Paul Smiths several years ago? To what levels are these substances accumulating in the bodies of Adirondack residents?

## SUMMARY

Critical acidification is mainly a problem for small, high elevation lakes and for lakes in the western and south-western portions of the Adirondacks. Nearly three-quarters of Adirondack lakes are impacted by acid pulses at least once a year. Many lakes appear to be relatively unaffected by acid deposition at present, but this may change as their watersheds approach nitrogen saturation. The best that can be done to halt future acidification in the region is to further reduce industrial and auto emissions. Meanwhile, a host of less researched issues face a large number of Adirondack lakes. Unfortunately, their exact nature and extent have yet to be adequately determined.

One of the biggest problems facing Adirondack lakes right now is our lack of information about them. We need more baseline data on water chemistry and non-fish biodiversity, and much more information about the effects of road salt contamination, nutrient enrichment, fish stocking, and rotenone treatment in these lakes. Information on heavy metal and other toxic substance pollution is still very scarce, and this contributes to what may be an ill-founded sense of complacency on the subject of local environmental and public health issues among park residents and administrators. ■

*Curt Stager is a biologist on the faculty of Paul Smith's College (Paul Smith's, NY 12970). Though also a popular Adirondack musician, Curt is best known for his popular North Country Public Radio show "Field Notes."*

Mink by Bob Ellis

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# Acid Rain Still a Scourge in Adirondacks

by John F. Sheehan

*The acid rain problem in the Adirondacks has been building for more than 50 years, since soft-coal-burning electric facilities in the Midwest built huge smokestacks to push pollution into upper air currents and away.*

When the Clean Air Act Amendments of 1990 passed, everyone who had fought to protect the Northeast from acid rain breathed a huge sigh of relief. Finally, the federal government was coming to grips with sulfur dioxide pollution and the damage it had done to the Adirondack Park and other sensitive areas.

Unfortunately, the federal acid rain control program has not worked very well so far. The Adirondacks are not getting any better. Even the US Environmental Protection Agency (EPA), which designed the acid rain control program in 1992, predicts that the forests and waters of the Adirondacks will only get worse under current emission levels.

The Adirondack Council and Natural Resources Defense Council predicted the program's shortcomings in 1992 and filed suit on 11 March 1993 (US District Court, Washington, DC) to compel the EPA to fix the problems. The Adirondack Council and New York State Department of Environmental Conservation (DEC) joined forces on a similar suit the same day. Two years later, the program is still sputtering woefully.

The acid rain problem in the Adirondacks has been building for more than 50 years, since soft-coal-burning electric facilities in the Midwest built huge smokestacks to push pollution into upper air currents and away. Rather than dissipating and disappearing, the acidic pollution is carried in clouds across the Great Lakes and dumped as acidic rain, sleet, snow, fog and dry particles in New York and New England, with the western Adirondacks perhaps the hardest hit area.

At times, the pH of precipitation at Whiteface Mountain, in the heart of the Adirondacks, has been measured at between 2.0 and 3.0—or, somewhere between vinegar and lemon juice.

Acidity may affect every form of life exposed to it. As it is falling, acid rain causes and intensifies respiratory problems in every animal that breathes with lungs. It depletes nutrients from farm fields and erodes public monuments and buildings. When it hits the ground, it seeps into soil and causes plant roots to harden, reducing the capacity of trees and other vegetation to absorb water and nutrients.

As it runs off into water bodies, the acidity leaches metals out of soil, rocks, and plants. Aluminum attaches itself to the gills of fish and other aquatic life, suffocating them. Among the larvae of some amphibians and insects, membranes harden such that individuals are unable to undergo metamorphosis.

The problem is worse in the spring, when an entire winter's precipitation melts in a matter of weeks and runs quickly into water bodies, turning them harshly acidic. In the worst-hit places, most lifeforms die off, leaving crystal blue water that looks pretty but contains almost nothing alive.

## Biodiversity

In 1984, New York's legislature passed the nation's first acid rain law in response to these problems. Although it was successful in stemming much of the acid rain caused by New York's smokestack industries, most of the problem originated in other states.

After six more years of political struggle, an environmental coalition convinced Congress to amend the Clean Air Act and the Bush Administration to approve the amendment. But the program created by the Bush Administration's EPA was not what the environmentalists had in mind—and even fell short of what Congress had mandated.

The federal program had two major goals. The first was to remove 50 percent of the sulfur dioxide pollution produced nationwide. Rather than requiring reductions in the Ohio Valley where they would surely help protect the nation's most sensitive area—the Adirondack Park—the EPA decided to allow market forces to decide where the reductions would be made. Those who found it the most cost-effective would be first. EPA speculated that the Midwest would be the first.

The second goal was to make the program cost as little as possible. This would happen by creating a pollution allowance trading system similar to New York's acid rain program. The 110 dirtiest smokestack utility companies in the nation were given individual pollution limits, expressed in tons of sulfur dioxide. For each ton they were allowed to emit, they received one pollution allowance. Those who cleaned up their emissions beyond what the law required could sell their extra allowances to someone who wanted to delay or avoid clean up.

The Chicago Board of Trade set up a special commodities market for the buying and selling of pollution allowances. They can be bought and sold by anyone, just like pork bellies and wheat futures, without notice to environmental officials.

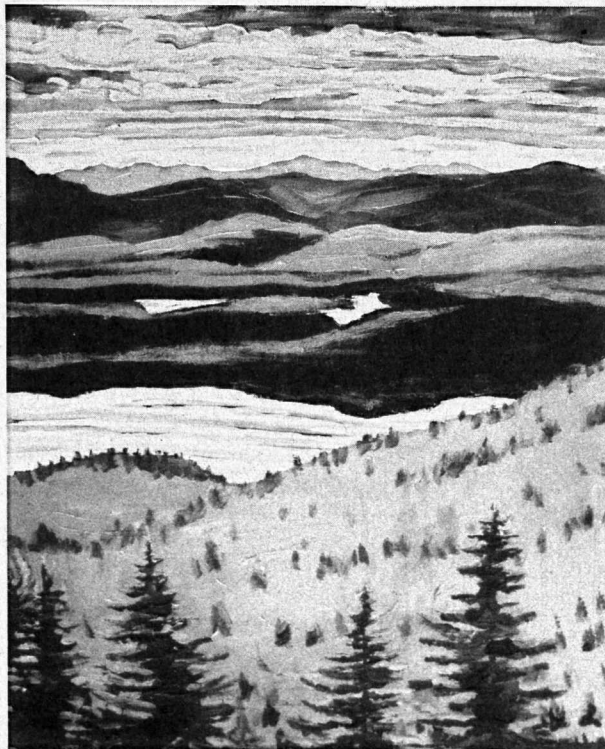
But what would these two goals mean for the environment? Would a 50 percent reduction be enough? Would it happen in the right places? Could market forces actually work to protect the environment?

Sadly, those who thought the pollution allowance market would save the environment are learning what experienced stock and bond traders learned long ago: Free-market forces are fickle and unpredictable.

EPA had predicted that sulfur dioxide allowances would cost an average of \$700 to \$1200 each (for the right to emit one ton). With the cost of installing scrubbers or other pollution control devices averaging only \$400 per ton in the Ohio Valley, the Midwest would surely clean up right away.

However, EPA forgot to take a few things into account.

David Hawkins, attorney for the Natural Resources Defense Council (NRDC) and the Adirondack Council in their suit against EPA, argued successfully that EPA had miscalculated the number of extra allowances it should hand out to utilities. As a partial settlement of the lawsuit, EPA eliminated 800,000 allowances slated for distribution to utilities in each of the program's first five years. In all, four million tons of pollution were taken off the market; but even this reduced the availability of allowances by only 12 percent.



*From Panther Mountain, Adirondack Park  
acrylic by Bill Amadon*



Another factor EPA seemed to miscalculate was the effect of natural gas availability on the market. When the Iroquois Gas Transmission System pipeline went on-line, it brought huge western Canadian reserves to gas-starved Long Island, where the Long Island Lighting Co. (Lilco) had been burning high-sulfur oil to make electricity for nearly three million people. Suddenly, Lilco's emissions were much cleaner. Lilco only needed roughly half of the 90,000 allowances EPA was giving it each year. Lilco quickly made a deal with AMAX, Inc., a Midwestern soft coal company that intended to sell the allowances with the coal. Buyers would automatically be in compliance with the program, even if they had already used all of their allowances for the year.

The other two New York utilities, Niagara Mohawk Power Corp. and NYS Electric & Gas, benefitted as well from a provision in the EPA program that required the 50 percent nationwide pollution reduction to be based on what was emitted in 1980. That was four years before New York passed the nation's first acid rain law. The 1980 baseline allowed utility companies in New York and other states with acid rain programs to benefit from the reductions they had already made. The utilities would get allowances for the reductions to put them on equal economic footing with states that had done nothing to prevent pollution so far.

At the end of March 1993, EPA held its first auction of allowances at the Chicago Board of Trade to help establish a market price. The average price paid for an allowance was less than \$170. At the 1994 auction, the price dropped to \$159. At the 1995 auction, the price fell to around \$140.

In each case, Ohio Valley and other Midwestern utilities and coal producers were the dominant buyers of allowances. After the 1993 auction, one Ohio-based utility said it was scrapping its \$400 million plans to install scrubbers. At the 1994 auction, another Midwestern utility announced plans to build a stockpile of a million allowances.

EPA had again miscalculated. EPA had announced that it was setting up a completely free market for allowances, saying it wanted no additional state regulations to hamper trading. But it did not take into consideration the roles of state-level utility regulating boards, sometimes called public service commissions. Such boards were set up to protect ratepayers from the whims of electric companies with monopolies on service. As a result, they require utilities to produce power at the least possible cost to consumers. While that protects the ratepayer, it also requires a utility to continue polluting if the price of an allowance is lower than the price of clean-up. With allowances trading at \$140 per ton and scrubbers costing \$400 per ton, the utilities had little choice.

Finally, EPA realized something was wrong when it agreed to another partial settlement of the lawsuits brought by DEC, NRDC and the Adirondack Council. EPA had failed to report back to Congress, as required by the Clean Air Act Amendments, on whether the Adirondack Park needed special protection from continued acid rain damage. The report was due in November 1993.

All three plaintiffs felt the report was needed to show that a 50 percent nationwide reduction in sulfur dioxide would help some places, but not the Adirondacks. They predicted that without special protection, the Adirondacks would continue to lose lakes and forests to acidification.

They were correct. In its long overdue report to Congress in February 1995, EPA noted that the Adirondacks stand to lose 42 percent of all 2800 lakes and ponds in the six-million acre park within 40 years under the current program. EPA now estimates it would take an additional 30 to 40 percent reduction in emissions by Midwestern utilities to halt the damage to the Adirondacks. It would take more to allow the Park to recover.

Ironically, EPA believes it has the authority to require the additional reductions right now, but is waiting for Congress to tell it how much of the Adirondack Park and other sensitive locations should be saved, the report states. In July, the entire New York Congressional delegation (except US Representative Bill Paxon, R-Williamsville) sent a letter to EPA demanding that it produce a plan to protect the Adirondack Park and assuring EPA that the 33-member delegation would support additional legislation to accomplish the goal.

The next step is up to Congress and the EPA. Will they set a limit on the total amount of pollution coming from the Midwest and protect the vast, sensitive Adirondack ecosystem? Or will the Park's environment and economy continue to suffer? ■

#### **What You Can Do**

The Adirondack Council, NRDC and DEC, as well as the New York Congressional delegation (which has introduced new acid rain legislation to protect the Park), need help to convince the entire Congress and the EPA to further reduce emissions. Please write your Congresspersons (representatives, US House, Washington, DC 20515; senators, US Senate, Washington, DC 20510) and EPA (401 M St., SW, Washington, DC 20460). Those who would like more guidance can call the Adirondack Council's Albany office at 518-432-1770.

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# Central Appalachian Plant Distributions and Forest Types

*or What a Walk in the Woods Can Tell You*

*by Robert F. Mueller*

## ABSTRACT

Occurrences of plant species and forest types in the Central Appalachians are related to elevation, soil acidity, and moisture content. Simple observations and survey methods are featured. Time rate of change (kinetic) and equilibrium criteria for forest succession are discussed.

## PATTERNS IN THE WOODS

If knowledge is power, ignorance is fatal when it comes to our threatened native ecosystems and their beleaguered defenders. The enthusiastic nature lover may be awestruck and inspired by nature's grandeur, but in the absence of real knowledge of detail, the experience may be little more than a green emotional blur or an inchoate impression of sights and sounds not likely to arm one effectively.

We don't need to be card-carrying professionals to know the forest. Professional foresters are demonstrating every day that their training may actually be counter-productive. Rather, we can begin in our own way with identification of common trees and animals, and progress gradually to less eye-filling and more difficult species. Virginians For Wilderness have for some years been humbly packing their field guides and manuals into the woods, trying to get on familiar terms with the bewildering Appalachian diversity. We are using this hard-won familiarity to understand the processes at work in forming both natural and technologically influenced biologic communities. To this end, we've made traverses up as many ranges, peaks, and "knobs" as possible, collecting data on the way up and down. Such climbing traverses have the advantage of taking us over most of the representative terrain types, ranging from low elevation coves and major riparian zones through mid-slope topographic convexities and concavities to the most exposed summits. We also try to extend our studies to as many as possible of the unusual biologic communities such as isolated mountain bogs, glades, and barrens which are frequently home to rare species and highly disjunct populations. These unusual habitats are important because they may contain species at the limits of their ranges, so that the conditions rendering their occurrence possible are most starkly displayed. We have noted that many northern species (e.g., Balsam Fir and Buckbean), which are here at their southernmost stations or nearly so and are of very restricted occurrence, nevertheless flourish and reproduce prolifically at these stations as long as conditions remain favorable and there are no human-induced disturbances. At issue here is the concept of equilibrium as distinguished from change with time or plant succession.



*illustration by Jackie Taylor*



The effect of elevation on species ranges and forest types was discussed extensively by Braun (1950). For example, she mentions elevational limits for Tuliptree and other species and notes the occurrence of index species such as *Maianthemum canadense*, *Clintonia borealis*, and *Trillium undulatum* for northern/high elevation habitat conditions. Here an attempt is made to extend this approach by graphical approximations.

Figures 1, 2 and 3 summarize the results of field studies and literature surveys on certain habitat indicator species, forest type distributions, and environment-sensitive plant communities in the vicinity of 38° N latitude. In these figures, elevation above sea level is straightforward since it is easily determined. However, pH is much less well defined not only because of instrumental problems but because there is seldom a single pH reading for a column of soil at any given location. In many cases, pH may vary by almost 3 units in a 50 centimeter column of soil (Armson 1977). In the eastern US, soils generally show lower pH (more acidic) values in leached surface horizons because precipitation is acid even in the absence of anthropogenic pollutants. This is true even in soils developed on limestone bedrock: horizons may be quite acidic near

the surface but near neutral (pH=7) or alkaline in contact with limestone at depth. Some tree species (e.g., Black and Red Spruces and Arborvitae), though, have very shallow root systems, particularly in bogs, so the surface pH may for such trees be a reliable indicator of the effective pH under which these trees developed. Also, a number of species (e.g., Chinquapin Oak, various ferns, mosses and lichens) frequently are in direct contact with rock surfaces that contain pH-determining minerals such as calcium carbonate. Although not precise, then, pH values can be used to help explain floral and faunal occurrences. Soil moisture, too, is a difficult parameter but relative magnitudes may be estimated by comparison with the end points of standing water and the observed driest sites.

Figure 1 shows the most prevalent ranges in elevation and pH in the Central Appalachians with plotted occurrences of some common trees, shrubs, and herbaceous species. Some major forest trees—including Tuliptree, Black Gum, Chestnut Oak and Sassafras—appear to be relatively insensitive to pH but are limited by elevation, hence their limits are indicated by horizontal lines. Thus Auten (1945) found no correlation of site quality with calcium, magnesium, phosphorus, potassium or soil reaction pH for Tuliptree. Such species are commonly observed growing over a wide range of conditions, though Tuliptree and some others are very moisture dependent. Red Spruce (*Picea rubens*), the common high elevation conifer on the Allegheny Plateau, appears to be limited by pH and generally grows in podzolic soils with pH from 4 to 5.5 (Fowells 1965). Although the lower limit of this tree is shown as a horizontal line, this limit may vary in elevation with pH and certainly does with moisture conditions. The same applies to species such as Mountain Holly (*Ilex montana*) and Canada Yew (*Taxus canadensis*), which have less well-known pH ranges but are placed in the figure based on field observation of general habitat. Quite generally in this figure upper and lower elevation limits of species are indicated by downward and upward pointing arrows respectively.

Some species, such as *Ilex montana*, represent ambiguous cases. Although this species is characteristically encountered at high elevations in the Central Appalachians, it forms part of a complex that extends into the Piedmont and Coastal Plain and has been referred to as *Ilex ambigua* (Radford et al. 1964).

In this scheme, Partridge Berry (*Mitchella repens*) is a special case. This little evergreen creeper on the forest floor, with its shiny leaves and red berries, is a conspicu-

Figure 1: Central Appalachian Habitat Indicator Species as a Function of Elevation and pH at 38° N Latitude

Down-pointing arrows indicate upper limits, up-pointing arrows lower limits

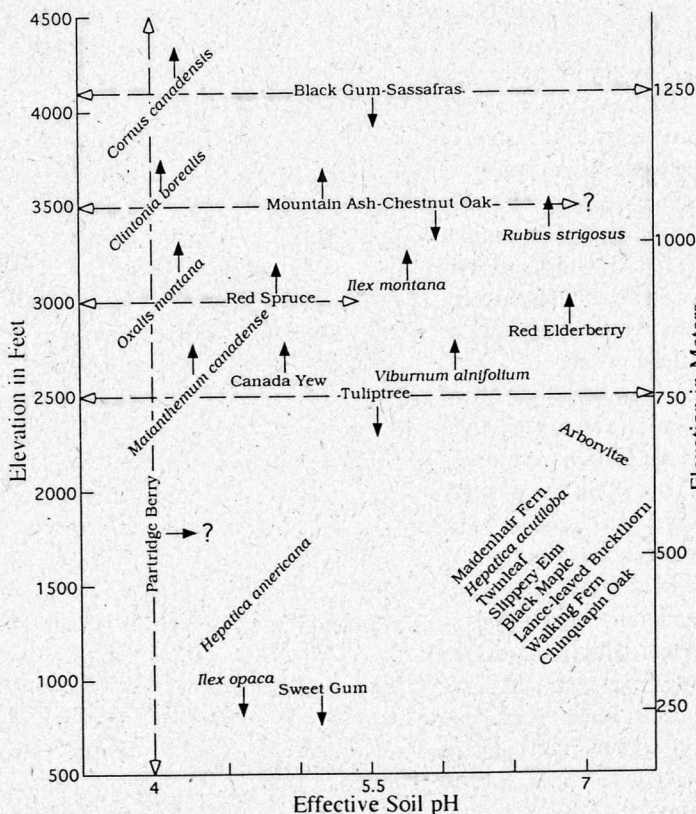
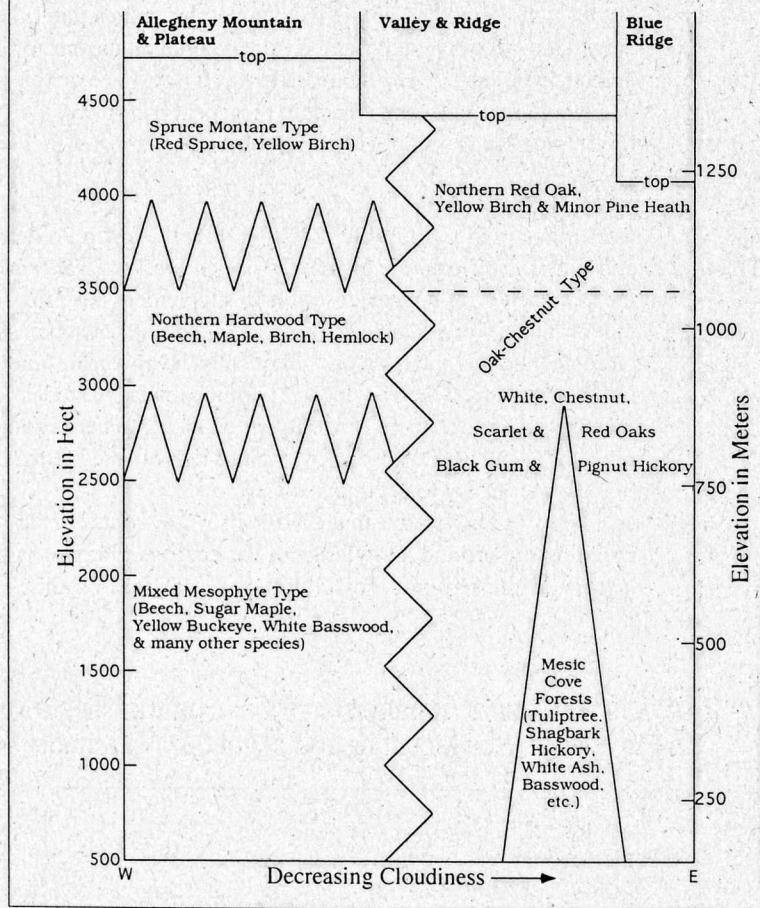


Figure 2: Major Central Appalachian Forest Types at 38° N Latitude



ous member of acid soil communities from sea level to the highest Allegheny spruce forests (as indicated by the vertical line). However its precise and full pH range is uncertain (as shown by the horizontal arrow with a question mark).

Occurring in much the same environment as Partridge Berry, but usually confined to high elevations, are the four northern herbaceous species, Canada Mayflower (*Maianthemum canadense*), White Wood Sorrel (*Oxalis montana*), Yellow Clintonia (*Clintonia borealis*), and Bunchberry (*Cornus canadensis*). In Figure 1, these species are shown with upward pointing arrows indicating the approximate lowest common elevation of occurrence. *Cornus canadensis* is very rare in the Central Appalachians. *Maianthemum canadense* is, in contrast, quite common at intermediate to high elevations; while *Oxalis montana* and *Clintonia borealis* appear to be of intermediate frequency at higher elevations. These four spe-

cies are written slanting upward to the right to reflect an inferred interaction of elevation and pH. By Le Châtelier's Theorem a stressed system will react in such a way as to relieve the stress. Thus an acid-loving northern or high elevation plant might be expected to relieve the stress of warmer temperatures at lower elevations by seeking a more acid environment. Although this theorem is usually applied in chemistry, plants are of course complex chemical systems and if other factors remain constant it should enter here also.<sup>1</sup>

A similar approach is applicable to the assemblage of plants at the lower right in Figure 1. These plants range from the common Maidenhair Fern (*Adiantum pedatum*) to the Chinquapin Oak (*Quercus muehlenbergii*) in lime-rich environments at pH values near neutral. Lance-leaved Buckthorn (*Rhamnus lanceolata*), Walking Fern (*Camptosorus rhizophyllus*), and Chinquapin Oak characteristically occur very near or on limestone or lime-rich outcrops and the latter tree is seldom found in environments with pH lower than 7 (Reynolds and Potzger 1953). The species written slanting up to the right are all southern or temperate species so that the stress of cooler (high elevation) environments would be expected to be relieved by higher soil pH values.

Arborvitae (*Thuja occidentalis*) is a special case because it is a distinctly boreal species that in the north is found in swamps, some of which are quite acid. In fact, its leaf litter has a pH ranging from 4 to 4.9 (Fowells 1965). Furthermore, Arborvitae seedlings usually develop in rotten wood, decayed litter, peat and moss which are characteristically acidic substrates. In the north and in intermediate latitudes, Arborvitae also occurs in alkaline environments such as limestone outcrops and calcareous wetlands. However, in the Central Appalachians it is with rare exception<sup>2</sup> found only on or near limestone or carbonate-bearing rocks, usually at moderate elevations. It appears that the Central Appalachians contain few high elevation bogs suitable for Arborvitae. Apparently, then, the stability field of Arborvitae is constrained to alkaline environments at low latitude/low elevation locations but is expanded to include both alkaline and more acidic environments at cool high latitude as well as hypothetical high elevation locations.

It must be remembered that the species shown in Figure 1 are only a small fraction of those that respond to differences in elevation and pH. Conversely, many species of very wide occurrence show little obvious response to these parameters. Red Maple is a striking example which, though it shows some aver-

<sup>1</sup> A case of a complex biological system that can be understood through chemical principles is the walking rate of ants which is characterized by a heat of activation of the rate of hydrolysis of ATP (Langridge 1963).

<sup>2</sup> Ogle (1989) describes an Arborvitae occurrence in an alkaline seep with a pH of 7.5 in southwestern Virginia.



sion to high pH values, is present in habitats ranging from southern swamps to the fringes of the boreal forest including all elevations in the Central Appalachians. Other common trees of wide distribution in many habitats are White Oak, White Ash, and Black Cherry, although these are generally excluded from swamps and areas of low soil fertility.

Well recognized forest types of the Central Appalachians as related to geographic distribution and elevation are shown in Figure 2. Nomenclature generally follows that of Braun (1950) but has been modified to distinguish well segregated Red Spruce Montane Forest which she included in her "Hemlock-White Pine-Northern Hardwoods" type. Major segregates of the Oak-Chestnut type are also shown. As indicated previously (Mueller 1994) these variations in forest type appear to reflect not only temperature and rainfall differences but also a systematic variation in degree of cloudiness from east to west. In Figure 2 the full zig-zag lines indicate interfingering or blending of different forest types in both horizontal and vertical ranges. The horizontal dashed line that divides the Oak-Chestnut region distinguishes the dominantly Northern Red Oak "orchard" subtype of high elevations from the more extensive forests at lower elevations dominated by combinations of Chestnut, White, Scarlet, Red and Black Oaks. The dividing line between the two subtypes is the upper limit of Chestnut Oak as shown in Figure 1. Similarly the triangular area indicates the cove type forests within the regional Oak-Chestnut type. These cove forests are similar to the mixed mesophyte forests farther west but seldom contain Yellow Buckeye and certain other species present in the latter. In the highest versions of these cove forests, usually above 2500 feet elevation, Tuliptree and some other southern species drop out. While both the Valley and Ridge and Blue Ridge Provinces are characterized by Oak-Chestnut upland forests and similar cove forest vegetation, there are differences in detail (Mueller 1994). Neither Figure 1 nor 2 take account of aspect or differential exposure to sunlight as related to slope. This is generally difficult to detect in the Central Appalachians given all the contributing factors, and needs more observation.

To illustrate the response of vegetation to soil moisture and pH, it helps to include some specialized communities. Figure 3 shows the most acidic water-saturated plant community, the peat bog. These bogs, as typified by those on the Allegheny Plateau, are dominated by a variety of mosses, particularly *Sphagnum*, and lichens such as *Cladonia* (so-called "Reindeer Moss") and may contain acid-loving flowering plants such as sundews and cranberries. Associated trees are usually spruce, Balsam Fir or Eastern Larch. Quite different is the flora of calcareous fens and marshes, which are far richer in available nutrients, and have a greater diversity of flowering plants—including some, such as Swamp Lousewort (*Pedicularis lanceolata*), Prai-

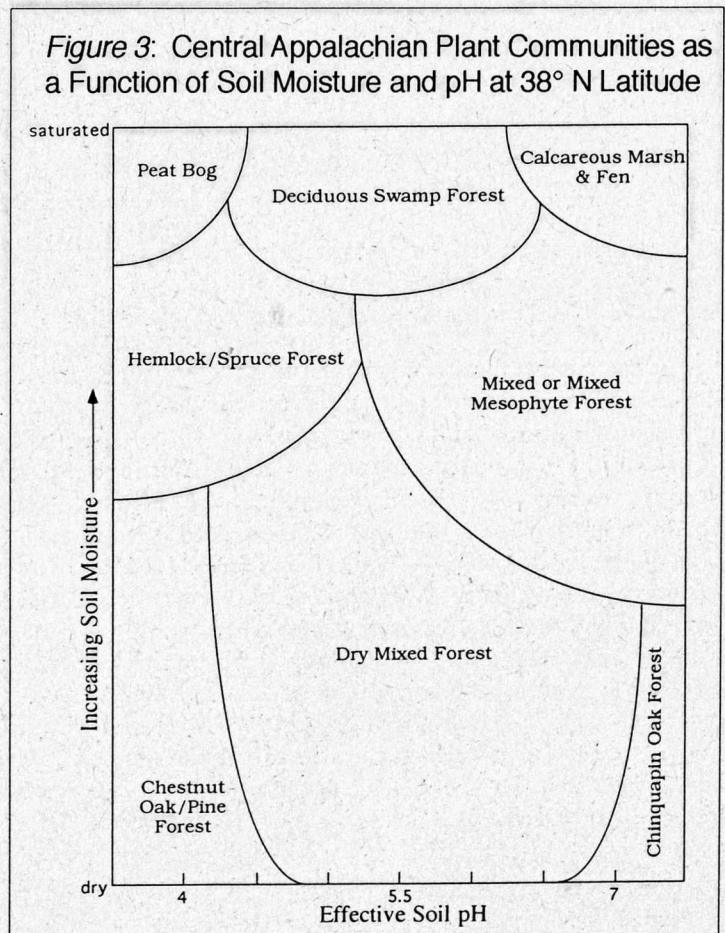
rie Loosestrife (*Lysimachia quadriflora*), and Large-leaved Grass of Parnassus (*Parnassia grandifolia*), that are virtually confined to a calcareous environment and are thus highly diagnostic of it. While conditions on the dry end of Figure 3 are not as well defined as on the wet end, communities that occupy it are quite distinctive and certain combinations may immediately be excluded by reference to this figure. For example, one would rarely, if ever, expect to see a peat bog surrounded by Chinquapin Oaks or in contact with a calcareous fen.

### USING THE KNOWLEDGE

I have tried to illustrate how it is possible to find order and consistency in nature by making use primarily of walks in the woods. It is, of course, desirable to supplement this information whenever possible by more detailed studies such as biologic transects and lab work. Frequently, however, the time frame of the forest activist doesn't permit exhaustive studies, for which facilities in any case may be lacking. There is an urgency to our work, forced by a multitude of threats, that makes it necessary to get things done "now."

Noss (1992) stated that "No substitute exists for detailed on the ground knowledge of the ecology and natural history of the region." This study, based as it is on thou-

Figure 3: Central Appalachian Plant Communities as a Function of Soil Moisture and pH at 38° N Latitude



sands of observations of plants in relation to their environments, represents an effort to gain such knowledge. Let's now consider a few ways in which such knowledge can advance attempts to protect forests. Since many of the plants discussed are indicator species, they provide evidence of such features as karst topography, including caves and mineral "licks," which may otherwise be concealed. We ought not let the mining industry, which regularly uses plants as prospecting tools, get ahead of us on this. Karst topography harbors some of the rarest species known. The same reasoning applies to acidic or other unusual or extreme environmental parameters. Reserves designed without this type of information might miss critical and even keystone species or communities and so preclude long-term viability. Information of the type presented here is also necessary to evaluate frequently misleading data presented by the US Forest Service and other land management agencies. Often these agencies make use of highly artificial forest type designations, which may list species incompatible with the environment of stands thus designated. In the Monongahela National Forest, for example, "Black Cherry-White Ash-Yellow Poplar (Tuliptree)" forest type is occasionally attributed to areas in which Tuliptree is excluded by elevation. Similarly, some high elevation forests in the George Washington NF have been erroneously classified as Scarlet Oak type. Other applications of field correlation of selected species or communities with the physical environment will no doubt occur to discerning readers as they explore areas they have adopted for protection.

Although the results of this study are strictly applicable only to the vicinity of 38° N latitude, they may be extrapolated using the approximation that each 1000 feet change in elevation corresponds to a 300 mile change in latitude. Thus the upper limit of a tree such as Chestnut Oak would be raised a little more than 300 feet a hundred miles south of latitude 38° N. However, such extrapolation should also take into account east-west climatic variation such as cloud cover, changes in aspect due to changes in ridge orientation, and other factors that may enhance or counter lapse rate.

A result that may follow from floral—and faunal—distributions such as those illustrated in Figures 1-3 is an improved picture of dynamic equilibria in these forests. The concept of dynamic equilibrium may be defined as the tendency of a perturbed system to return to a pre-existing state. In natural systems such perturbations are generally natural disturbances. In the mineral systems of rocks and soils, equilibrium is sometimes difficult to prove and may be present to varying degrees and confined to restricted volumes (Mueller and Saxena 1977), pointing to the importance of scale. In chemical systems of all kinds it is common to find states of metastable equilibrium in which a system is in a relatively stable but not the most stable state. In addition most natural systems are "open" and equilibrium is superimposed on a steady state in which energy and materials exchange with the surroundings. In such systems

equilibrium can prevail only if the rate of the equilibrating process is greater than that of the exchange. Quite generally, deviation from equilibrium is the province of the science of kinetics or the time rate of change of systems.

Braun (1950) discussed some criteria for forest equilibrium (climax): (1) accordance of canopy and understory, (2) tendency of the same climax to develop as the result of unlike succession, (3) occupation of topographically mature sites, (4) equilibrium between soil and occupying vegetation and, (5) climax similarity over a large area. Biologists now reject point 3 as a criterion since they've observed that a climax may be developed on topography as new as glacial moraines. Also, point 1 needs qualification. Reproduction in areas in which the canopy has been opened may temporarily be quite different from the overstory. Also, in some cases concordance is not necessary (Chestnut Oak seedlings under Chestnut Oak canopy), in other cases it is not sufficient (aspen sprouts under aspen), to establish equilibrium. Nonetheless, in the case of tolerant seedlings and saplings under mature trees of the same species, evidence may be compelling. In general, Braun's ideas are in agreement with the definition of dynamic equilibrium.

To the above criteria must be added the recovery of climax forests from large-scale disturbances such as disease and in particular the historic episode of logging and agricultural abuse. One of the best examples is the ongoing return of high elevation Red Spruce in the Allegheny Plateau's northern hardwoods which replaced them after logging and subsequent fires. Of course, where soils have been too badly degraded, changes in forest type occur on a more permanent basis (Braun 1950). In some places, as at West Virginia's Cranberry Glades, the establishment of the regional climax is well documented by the pollen record (Core 1955).

The largest disturbances to which the Appalachian forests were subjected are the ice-age and post-ice-age migrations. The data of Delcourt and Delcourt (1993) suggest that biotic responses approached dynamic equilibrium in the Central Appalachians beginning about 8000 years before present for cool temperate deciduous forests, but that the mixed conifer-northern hardwoods north of 44° N latitude have not attained this state even today. Naturally, this conclusion addresses a more or less crude equilibrium that ignores minor forest migrations associated with temperature fluctuations, particularly around 7000 years ago. If this conclusion of equilibrium on a broad geographic scale is adopted, it follows that elevational zoning as indicated by Figures 1 and 2 is also evidence of equilibrium since it recapitulates, with modifications, the latitudinal zonation. Again, where disturbances (primarily anthropogenic) have intruded, as in the Allegheny spruce forests, the tendency is for the forest to return to the equilibrium type. These conclusions are in general agreement with Braun's criteria 2, 4, and 5, as well as the general concept of equilibrium.

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*illustration by Rob Leverett Jr.*

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Although data on forest distribution and zonation suggest equilibrium, "proof" of it may be out of the question since disturbances both natural and human-induced are so prevalent and the response/recovery times often so long as to preclude all but crude correspondence. This is illustrated by certain secular deviations from prevalent climaxes in the Central Appalachians. For example, in some places Red Spruce forms an understory under old-growth or mature oak-rich upland forest, as in the Fanny Bennett Hemlock Reserve in the Monongahela National Forest where it cannot be easily attributed to recovery from the human induced episode of deforestation and fires. Here, though, the change may result from recent fire control measures and so represent a shift of equilibrium under a modified disturbance regime. An alternative explanation is that such expansion of the spruce forest represents a recent change to cooler or moister conditions.

To reiterate, the results of this study are tentative and approximate. The limits on species distributions by elevation, pH and soil moisture are not absolute. Fairly common types of variation are where microhabitats or microclimate imposed by the geology or topography make it possible for high elevation/northern species to flourish at low elevations or low elevation species to extend to higher elevations. An extreme case is Ice Mountain in Hampshire County, West Virginia, where a boreal plant community exists at only 700 feet above sea level as a result of persistent ice accumulation in a talus slope. Quite generally, disjunct species are more frequent in seeps, bogs or other wetlands where water seems to have a buffering effect (Mueller 1994). The reader is encouraged to refine and expand these data not only in the Central Appalachians but in other areas where the same species occur. Only through such painstaking efforts can we create the scientific basis for the reserve system we need so urgently (Noss 1992). **WVRF**

## Acknowledgments

The writer appreciates the assistance in the field as well as the continuous intellectual stimulation of Mike Jones, Steve Krichbaum, and Gus Mueller. Gus Mueller's assistance with the figures was also invaluable. Particular gratitude is due Dr. Robert Hunsucker who has advanced our efforts greatly through his knowledge of the Appalachian flora and fauna. The partial funding of this work by Human-i-Tees is gratefully acknowledged.

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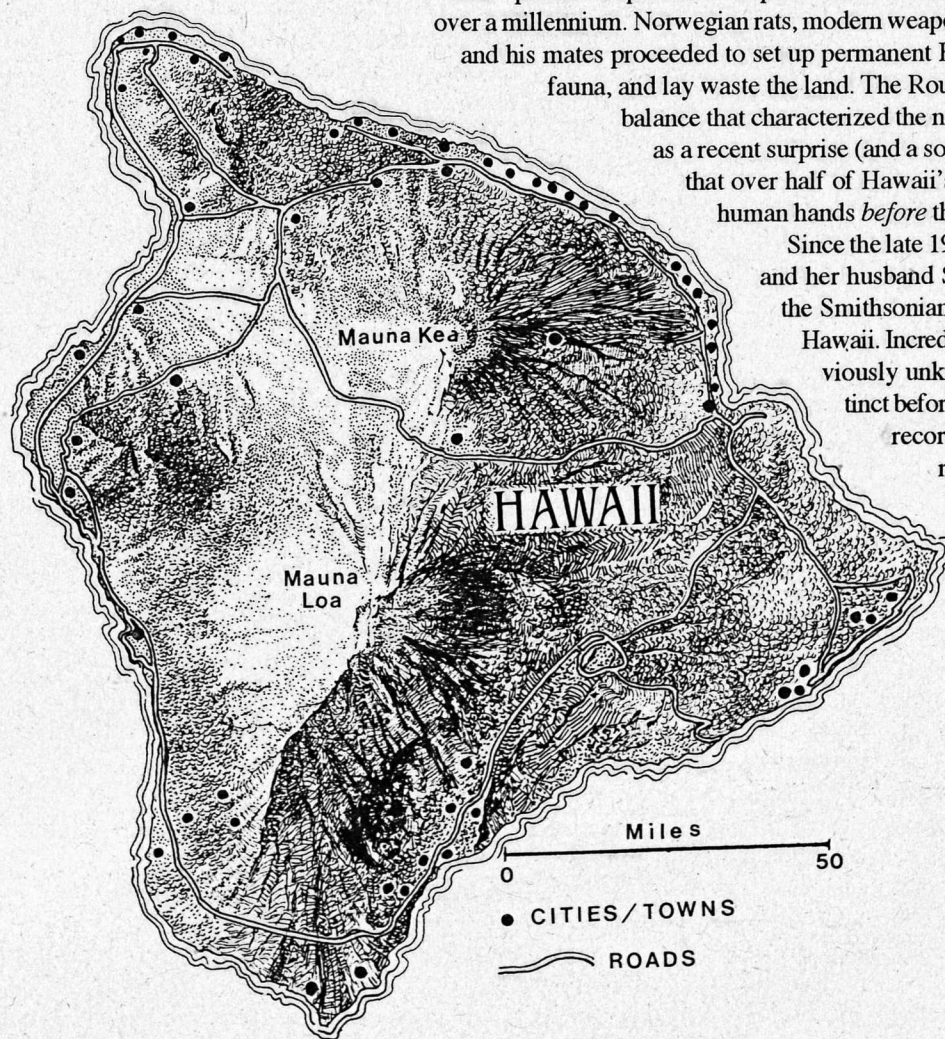
# Feathers and Fossils

*Hawaiian Extinctions and Modern Conservation*

by Lyanda Haupt

The textbooks render a terrific indictment of the Europeans' Hawaiian settlement. Captain Cook arrived with his entourage in 1778, we are told, surveying a pristine tropical landscape in which the native people had lived harmoniously for over a millennium. Norwegian rats, modern weaponry, and foreign diseases in tow, Cook and his mates proceeded to set up permanent European residence, destroy the native fauna, and lay waste the land. The Rousseauian bliss and spiritual/ecological balance that characterized the native culture was lost forever. It comes as a recent surprise (and a sore source of denial in much of Hawaii) that over half of Hawaii's endemic bird species went extinct at human hands *before* the arrival of a single European.

Since the late 1970s, avian paleontologist Helen James and her husband Storrs Olson (ornithological curator at the Smithsonian) have been excavating fossil birds in Hawaii. Incredibly, they have unearthed at least 50 previously unknown species of birds which went extinct before the advent of "modern" ornithological record-keeping instituted upon Cook's arrival. Stratigraphy, radiocarbon dating, and archaeological associations place the majority of the extinctions within the last 1500 years of the Recent geological epoch. Bones found in archaeological sites link the extinctions categorically to the time period of human presence. Despite the temptation to delve into the theoretical implications of their findings, Olson and James doggedly bent their effort toward the painstaking taxonomical tasks their work demanded. If any meaningful discussion was to emerge from their research, the fossils had to be described, categorized, numbered, and named.



This is not just more meaningless scientific data to litter the dusty annals of academe. On some level we *owe* these birds a name. We will never know the small behaviors, the flashes of brilliantly colored plumage, the songs and habits that meaningfully defined these animals. Having robbed them of their life histories, their continuation as both individuals and lineages, justice requires we give these species some attention. At this point, taxonomic recognition may be the best we can do.

Olson and James established excavation sites on the islands of Oahu, Molokai, Kauai, Maui, and Hawaii. The locales were varied, including lava tubes, sinkholes, caverns, kitchen middens, and other archaeological sites. They uncovered an astonishing variety of extinct birds: a small petrel, nine flightless rails, three species of a new genus of long-legged owl, an accipiter hawk, a *Haliaeetus* eagle (same genus as the Bald Eagle), two large crows, and 15 drepanidines (endemic Hawaiian "honeycreepers"—a subfamily of the finches). Among the more unusual finds were four strange species of flightless geese with oversized mandibles and thick, powerful hindlimbs. Olson named them *moa-nolas*. They were evidently suited to the ecological role played by large tortoises on some other oceanic islands. Three flightless ibises were a surprise, as no endemic ibises were previously known from the islands.

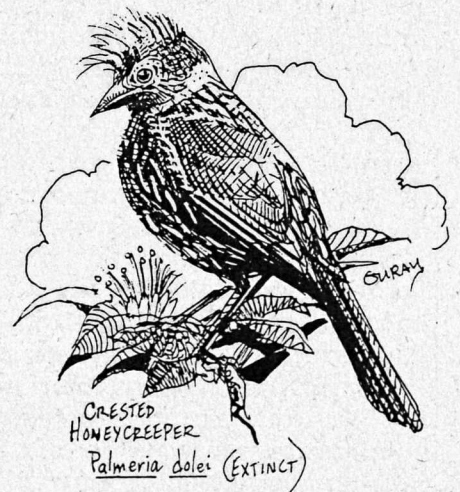
In 1992 Olson and James published their slim ornithological monograph which catalogued the names and taxonomic details of the "new" species. I imagine other readers were overcome with the mixed emotions I experienced while poring over the technical descriptions that accompany the photographs of neatly arranged bones. Each thrill (an endemic *ibis* !!!) is tempered, and shaken. Knowledge of a bird's existence and its extinction hit simultaneously.

Propos of the academic monograph as a literary form, the work gained a singular kind of popularity. It was certainly read by the country's small cadre of avian paleontologists. Other academic fossil-finders and interested ornithologists found their way to the monograph, as well. E.O. Wilson mentioned the work in his bestseller *The Diversity of Life*. But as knowledge of conservation issues in Hawaii continues to grow among biologists interested in the region, this amazing work on the Hawaiian fossils remains popularly unknown.

Conservation biologists and paleontologists live in different buildings. It is unsettling that academic compartmentalization can keep cloistered such keen lessons regarding animals that went extinct recently, under human impact, in *extant ecosystems*. As conservation biologists undertake a frenzied eleventh hour census of the world's biota in order to apprehend what must be accomplished to preserve biodiversity, this work offers a broader perspective on ecological systems that long surpass present data-input techniques. Ecosystems are older than computer models. We can plug numbers into our mathematical models with great practical results; but nothing in the modern repertoire can rival the epochal field of ecological vision which these Hawaiian fossils give us. Their relevance for modern conservation cannot be overstated.

The Polynesians arrived in Hawaii somewhere around 400 AD. They swiftly went to work setting up an island economy and culture based on agriculture and hunting. Notwithstanding its romanticized image, native Hawaiian society was based on a rigid caste system, replete with slavery and ritual human sacrifice. The flora and fauna were quickly transformed, as the Polynesians planted their introduced crops, including coconut, sugarcane, sweet potatoes, bamboo, and gourds. Enormous tracts of land, mostly lowland scrub forest, were burned for conversion to agricultural purposes. Despite the pride with which most Hawaiians regard the ecological harmony achieved by their ancestors, the activities of the early Hawaiians led directly to the extinction of more than half of the endemic avifauna.

*A sudden convulsion of human activity—overhunting, habitat conversion, and alien predator introduction—rapidly decimated Hawaii's native avian fauna. At least 50 species of birds disappeared in just 1000 years...many thousands of times the natural extinction rate.*





## Avian Endemics May Face Fate Confined to Fossils

On the Hakalau Forest National Wildlife Refuge, federal biologists check their traplines daily, removing the corpses of rats and mongoose. The traps are species-specific. Other than the Hoary Bat and the Monk Seal, Hawaii has no native mammals, and the traps won't attract birds. In fact, they are designed to save birds. Introduced animals are high on the chain of factors that have brought an enormous number of native Hawaiian birds to the brink of extinction. Less than half of the incredible array of endemic avian species survive in ecologically viable numbers. We are familiar with a few last-ditch efforts to save endangered species on the mainland, such as the captive propagation of the California Condor. Hawaii faces a startling concentration of such cases:

- The Hawaiian Crow, or *'alala*, is a large and secretive bird with a sooty brown wash over its feathers. The crow numbers less than 15 in the wild, and even fewer in a captive breeding program.
- The Maui *Akepa*, a small, orange, finch-like herbivore of the leafy canopy, is nearly extinct.
- The *Puaiohi*, or Small Kauai Thrush, is a plain, pink-legged, insect-eating denizen of the forest's fern-lined stream banks. As few as twenty remain.

For about a dozen native Hawaiian birds it may already be too late. The sobering list of "probably extinct" species—those that haven't been observed for several years—includes miracles of tropical evolution such as the *Nukupuu*, a tiny and brilliant yellow-headed bird with a curved upper mandible twice the length of the lower.

The convolution of factors that brought about such ecological calamity is complex. A variety of human-wrought changes stand out:

**Introduced species.** The Hawaiian islands have had more exotic species established than any other similar size place on the planet, including aggressive vines, virulent pathogens, competing birds, and even predatory mollusks. Many of the introductions are deliberate and thoughtless parodies of the management system. The mongoose was loosed in 1883 to eat the rats (also introduced) that were wreaking havoc in sugarcane fields. Most mongoose will never even see a rat, but they are happy to feed on ground-nesting birds, including the Endangered *nene*, or Hawaiian Goose. Rats, which arrived with the Polynesians and Europeans, prey voraciously on eggs and nestlings of forest species and burrow-nesting seabirds. The lovely Banana Poka, a flowering vine checked in its native South America by insects which feed upon it, has taken over 70,000 acres of native Hawaiian forest, smothering the flora that avian species require.

Many conservation biologists believe that feral goats and pigs, which roam nearly every mountain and forest of the islands in terrific numbers, represent the most severe threat to Hawaiian natural diversity. On the mainland we have seen the destruction wrought by cattle grazing on public lands. Imagine the compounded nature of the problem in an environment like Hawaii, which evolved its sensitive habitat in the complete absence of mammals like the Bison of North America. Pigs were introduced by the Polynesians; and a rift has grown between conservationists who would eradicate the pig, and Hawaiian hunters who wish to kill the pigs for food and sport, and see them as part of their historical culture.

**Habitat Destruction.** The rampant development interests in Hawaii threaten to undermine conservation efforts. As more habitat is converted to pesticide-ridden coffee and pineapple crops, as more wetlands are drained and beaches developed for tourism, we are forced to wonder where species, even if saved in the short run, will exist in the future.

**Disease.** An influx of introduced birds in the last century has brought avian malaria to the islands. Another 19th century introduction—the mosquito—serves as the perfect vector for the disease. Recent research suggests that avian malaria is spreading in several swamps critical for endangered species. As the US Fish and Wildlife Service joins with the Peregrine Fund to provide captive breeding of endangered forest species, conservation efforts run up against another catch-22: are such efforts worth the cost if the habitat is unsafe? Limited funds continually force such wrenching choices.

As conservationists scramble to save endangered birds, much of the remnant habitat cries out for active management, rather than the "benign neglect" favored in more ideal situations. The thrilling 1981 re-discovery of Bishop's *'o'o* on Maui (last seen in 1904!) invites a sense of hope which must be maintained if conservation is to succeed.

### What you can do:

The Nature Conservancy and the Fish and Wildlife Service have joined forces to acquire 5300 acres on the western slope of Mauna Loa on the Big Island. It is a mixed rainforest, home to at least four Endangered forest birds, several Endangered plants, and the Hawaiian Hoary Bat; it is the primary release site for captive-bred *'alala*. Though the money for the acquisition has been allocated by Congress, Secretary Babbitt has the authority to reappropriate funds, and may attempt to block the project. The parcel of land is privately owned by an individual who is in great debt to the IRS and must sell. If the acquisition effort fails, the land will probably go to a coffee monoculture. It is no overstatement to say that this purchase could well be *the deciding factor in the fate of four species of endemic birds*. Write to Secretary Babbitt right away and insist that funds be allocated for the Kona Forest Unit of Hakalau Forest National Wildlife Refuge.

The Honorable Bruce Babbitt  
Secretary of the Interior  
Sixth Floor, Main Interior Building  
1848 "C" Street, NW  
Washington, DC 20240

For more information on the Kona forest acquisition project, write to:

The US Fish and Wildlife Service  
Pacific Islands Office  
300 Ala Moana Blvd., Suite 6307  
Honolulu, HI 96813

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Outright overhunting is the most obvious explanation for the disappearance of many species. The flightless moa-nolas, ponderous of gait and unaccustomed to predators, were likely easy meals. With them, the flightless ibises, rails, and burrow-nesting petrel were probably just too slow and too naive to escape the formidable and versatile predator, *Homo sapiens*.

We can reasonably conjecture that the avian predators and scavengers in the Hawaiian islands were hit by ecological domino effects after the arrival of humans. Their food base was wiped out. Though none of the avian meat-eaters were large enough to carry off adult geese, the eagle and owls probably fed on the young of these species. The crows and the eagle scavenged their sizable adult corpses. Unlike continents, the tropical islands did not support a mammalian fauna, so big birds were what a large predator/scavenger had to eat. As the geese and rails disappeared, they took their ecological codependents with them.

Conversely, the rampant extinctions among the passerines (so-called “song-birds”) cannot be explained by overhunting. Lacking BB guns, it is unlikely that the Polynesians stalked the forests in search of small birds, especially when they were obviously so well fed on goose. In the passeriform order, the specialized drepanidines suffered most severely. The beaks of the Hawaiian drepanidines demonstrate a diversity, a monument to adaptive radiation, that would make Darwin’s Galapagos finches look like evolutionary child’s play. The array of slim, curved bills, perfectly coevolved to suit the native Hawaiian flora, has led ornithologists to believe this subfamily is mainly nectarivorous, and to dub them the “honey-creepers.” Surprisingly, the recent work shows many finch-like beaks—clearly suited to seeds and insects.

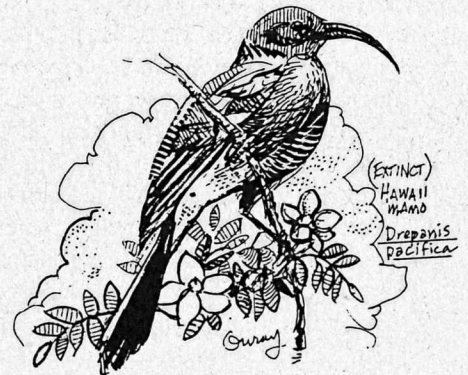
The cause of the pre-European extinctions in this group was probably outright habitat destruction, as the lowland forests were destroyed by burning for agricultural use. These birds had coevolved with specific plants and insects over the lengthy course of geological time. They were highly and specifically adapted. Most species could not simply “move” to the higher elevation wet montane forests. Diaries from the Cook expedition lead us to believe that most of the scrub forest was wiped out before European arrival. This unique ecosystem survives only in remnants today.

Passerines of other species were decimated for the creation of ceremonial robes—sometimes as many as 80,000 individuals for a single garment—a practice that continued into the early 1900s, when the chiefs ran out of birds. The extent and ecological impact of this practice is unknown, but several species that went extinct during European settlement, such as the lusciously-plumed o’os, had been used for these purposes. It is possible that their populations had dropped to barely viable numbers, and the further human impacts dealt the death knell.

The Norwegian rat, introduced by the Europeans, has fallen into rightful infamy. Its ubiquitous presence on most Pacific islands is blamed for the extinction of several vulnerable species, and its rampage continues today. But the destructiveness of *Rattus norvegicus* to Hawaii’s native fauna is directly rivaled by that of *Rattus exulans*, the Polynesian rat, which arrived 1500 years earlier, on the boats of the first Hawaiians. Proliferating wildly in tropical conditions, the rat devoured the eggs and nestlings of the native birds. The endemic species were at particularly high risk, having evolved in a habitat that boasted no rats or species with similar niches, like the land-crabs that inhabit some Pacific islands. The passerines and all ground-nesting birds (which probably included the *Haliaeetus* eagle) were at tremendous risk from rat predation.

In short, a sudden convulsion of human activity—overhunting, habitat conversion, and alien predator introduction—rapidly decimated Hawaii’s native avian fauna. At least 50 species of birds disappeared in just 1000 years. This is many thousands of times the natural extinction rate.

*The human impacts that killed over half the endemic Hawaiian birds are the same ones that imperil the modern avifauna here and on the North American continent.*





The discovery of the fossils and their unique context offers strong support for Paul Martin's "Overkill Hypothesis" on Quaternary period extinctions (see Martin's "Last Entire Earth," *Wild Earth*, winter 1992/93). Martin's research pertains largely to the North American megafauna, which was overhunted into extinction during recent geological history. Martin favors a "blitzkrieg" model, in which human hunters wiped out the lumbering behemoths that populated this continent in a brief, several-thousand-year period. The model continues to be hotly debated, rivaled by climatic models for the mass Quaternary extinctions.

It is easy to imagine a first-order "blitzkrieg" in Hawaii, as the early settlers stumbled over the literal sitting ducks which meant easy dinners. By itself, a "blitzkrieg" cannot accommodate the complex factors that contributed to the Hawaiian extinctions, but Martin's model is more subtle than the military metaphor suggests. *Overkill* has come to be an umbrella term, encompassing the variety of human activities that together lead to the decimation of non-human species.

Recent epoch extinctions in Hawaii undermine the climatic model. At odds with that model is the preponderance of flightless bird fossils. Clearly, the number of flightless species that evolved in insular habitats demonstrates the advantage of this adaptation in environments lacking predators of large birds. This character evolved over geological time, during which climatic oscillations were often tremendous. Yet half the extinctions are of flightless birds. Scientists know of nothing in the minor climatic upheavals of the Recent epoch that could have selected specifically against flightlessness. The same argument applies to the proportionately high number of endemic extinctions. Add that all of these birds survived the relatively tumultuous climatic conditions of the preceding Pleistocene epoch, and the climatic model loses almost all credibility. A broad version of *Overkill*, on the other hand, explains all of these factors.

Recent overkill extinctions offer commentary on present models for conservation. To begin, we need to expand the temporal framework in which we consider the ecology of species. Our view of the Hawaiian avifauna was skewed by differential extinction. The loss of all but one raptor (an endemic buteo, the Hawaiian Hawk) led us to imagine an avifauna that evolved without any predation at all. Now we know there were several large predacious birds. We imagined a simple lower elevation ecosystem, with most radiation of the avifauna occurring in wet montane forests. We have learned from recent studies of remnants that the lowland scrub forest contained more species of trees than the complex montane systems, and supported its own avifauna, now lost forever. We have learned that the drepanidines, an important group in Hawaiian ecology, had habits and diets surpassing the imagination of modern ornithology. Changes in our understanding of native flora have grown around these discoveries. When we consider modern species in the freeze-frame of the present, we may miss an evolutionary foundation that has tremendous relevance for conservation efforts. Species and populations do not exist in a static present.

E.O. Wilson, Murray Gell-Mann, and other prominent scientists are advocating a global biotic census. While this might be timely and important, it is also politically naive and *late*. Obviously, conservation of biodiversity cannot wait for twenty years of data collection. In this light, it is amazing that we are overlooking a veritable blueprint for conservation at our fingertips. The Hawaiian work does not stand alone. Similar paleontological projects in New Zealand, the Chathams, New Caledonia, Madagascar, Fiji, St. Helena, the West Indies, and other Pacific islands yield similar results. Though the contexts differ somewhat, the impacts of overhunting, introduced predators, and habitat conversion have led to incredible avian extinction levels in the last 2000 years.

Most ecological experiments are short-term. They involve small areas and few species. They are bound to fall short of the needs of applied ecology, which addresses systems over years—systems that have evolved over *epochs*. A conservationist's eye on the Hawaiian fossils will reveal descriptive correlations that span geological time, and may be even more useful than the complex analysis of modern models. The parallel understanding of conservation biologists and paleontologists can be twined for a deeper approach to modern conservation.

The fossil record teaches that the same kinds of species consistently show special vulnerability to rapid extinction. Large flightless species are the most easily hunted. Often they fill the role filled by high-order mammals on mainland, and their K-selected strategies (involving slow reproductive rates) make them all the more susceptible to extinction.

Endemic species of insular systems are always at high risk. They are likely to have co-evolved within a specific balanced ecosystem, and any alteration can have extreme repercussions. When land-based predators are absent from an island, the endemic birds have not evolved protection from them, so their sudden introduction is especially deadly. Introduced diseases, particularly when accompanied by a vector such as mosquitoes or domestic chickens (as is the case in post-European Hawaii), can wipe out endemic populations, utterly unprepared for such impacts. Flightlessness, endemism, insular habitats, forest-type dependence, and lack of land-based predators are flagship characters of vulnerable bird species, revealed clearly in the recent fossil record—knowledge that can be put to immediate use in conservation strategies.

The relevance of this record is stressed by the modern list of endangered, blue-listed, or extinct species. The human impacts that killed over half the endemic Hawaiian birds are *the same ones* that imperil the modern avifauna here and on the North American continent.

Of the 1000 bird species known to be at risk of global extinction, 90% are primarily threatened by forest destruction and introduced predators. At least 9% are endangered from overhunting, and 2% from the wild bird trade. Kirtland's Warbler is threatened by conversion of its specific habitat. The Clapper Rail is endangered by earlier hunting and introduced

predators. Masked Bobwhite: depletion of habitat by nonnative agricultural species. Least Bell's Vireo: destruction of riparian woodlands. Nihoa Millerbird: introduction of rats, disease, and exotic plants. Sharp-tailed Grouse: conversion of grasslands to agriculture, overhunting. Trumpeter Swan: agricultural conversion. And the extinct birds once numbering in the millions or billions—the Passenger Pigeon, Heath Hen, Great Auk? Overhunting of these multitudes in combination with habitat destruction spelled their doom. Other methods of imperilment, such as pesticide use and lead-shot poisoning, are modern incarnations of the same ills.

The fossil record offers further commentary on cornerstone theories, such as island biogeography. In their seminal paper of 1963, MacArthur and Wilson present a model of insular zoogeography in which species equilibrium is based on the area and isolation of an island. The bigger and less isolated the island, the more species it can support. When the Hawaiian islands are examined in light of the newly understood extinctions, this theory, at least in the classic MacArthur and Wilsonian sense, doesn't seem to hold up. The island of Hawaii, with an area of 10,464 square kilometers, supported 26 species of endemic land birds—23 known from the fossil record and 3 known historically. Molokai is only 676 km<sup>2</sup> yet supported 30 species (21 fossil, 9 historical). The other islands show a similar disinterest in species-area correlations. Of course, not all the evidence is in. No one is near ready to claim that all fossil species endemic to these islands have been discovered. The work on the island of Hawaii thus far has been relatively meager, and a more complete future census may support a species-area curve. These numbers do not call us to make a final declaration regarding island biogeography. Rather, they remind us to assess *all factors* that contribute to species' vulnerability—insularity and area being just two of many.

Several scientists are overcome with caution. They argue that it is reckless to extrapolate from certain situations (like prehistoric Hawaii and fossil birds) to others (like modern Hawaii, North America, the continental tropics, and living birds). But when the forces at work line up so perfectly, it is much more reckless *not* to extrapolate. Why take precious time to re-learn, to re-document what we already know?

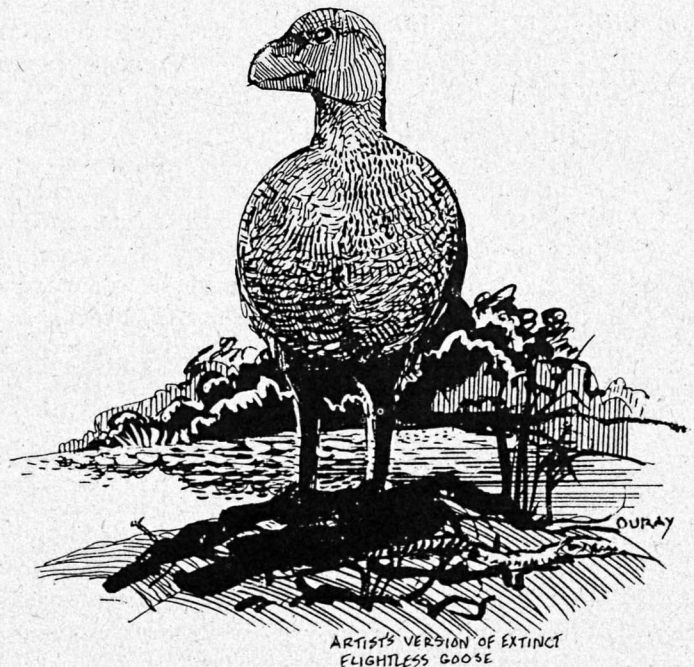
The tropics are being burned, the cattle loosed, the ducks shot, as environmental policy-makers scratch their heads, seek more data, and wonder whether the creatures will be able to take it. The fossil record answers with a resounding NO. We don't have to wait and see what the impacts will be; we've been shown. The experiments were performed before us. The data are there for the taking. Yes, we must proceed with the census, reveal what may be lost, and accomplish everything possible to conserve it. But at the same time, let's look to the fossil record, and use the teaching on biodiversity we already have. Overlay the future upon a *deep* comprehension of the past, and the creatures that have gone before, and we may finally practise the restraint necessary to accommodate other species. **I**

illustration by Chuck Ouray

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# Biotechnology vs. Biodiversity

by Brian Tokar

*The pace of current developments in biotechnology poses an unprecedented dilemma. Never before has the course of basic scientific research been so thoroughly and single-mindedly driven by commercial considerations.*

Recent campaigns by food safety activists have raised a new level of public awareness about the risks of biotechnology. Products like genetically engineered Bovine Growth Hormone for dairy cows, tomatoes engineered for longer shelf life, and virus-resistant squash have inspired widespread debate. One issue that underlies many discussions of biotechnology, but is often underplayed in mainstream accounts, is the profound threat to living ecosystems posed by environmental releases of genetically engineered plants, bacteria, and other organisms.

The ecological consequences of genetic engineering have not always been viewed as a secondary issue. The earliest controversies around biotechnology revolved specifically around the threat posed by releases of genetically altered organisms into the environment. From early scientific debates in the mid-1970s to the controversy over tests of anti-frost bacteria in California in the 1980s, environmental concerns joined public health considerations as a primary focus of discussion. Now, recent findings on the ecological consequences of current developments in biotechnology are not only reawakening earlier concerns but also lending new scientific credence to arguments the biotechnology industry thought it had dismissed a decade or more ago.

The pace of current developments in biotechnology poses an unprecedented dilemma. Never before have the results of new scientific discoveries been so heavily promoted and so rapidly rushed to market. Never before has the course of basic scientific research been so thoroughly and single-mindedly driven by commercial considerations. With hundreds of agricultural products and scores of new drugs being developed and tested in the US alone, it is becoming difficult for activists to respond individually to every new product and every new discovery. People concerned about health, safety and economic issues are once again turning to the wider ecological and ethical implications of the new genetic technologies.

## EARLY DEBATES

In the early years of the so-called "genetic revolution," scientists themselves raised the alarm. In 1975, shortly after researchers at Stanford University succeeded in transferring a gene for antibiotic resistance from one species of bacteria to another, molecular biologists called for federal guidelines to contain potentially hazardous experiments. Contrary to these researchers' expectations, vocal opposition emerged in cities such as Cambridge and Palo Alto where containment laboratories for genetic experimentation were to be built. Guidelines were established by the National Institutes of Health (NIH) but were progressively weakened in subsequent years, despite a record of abuses, accidental releases and other "minor" scandals. For example, one researcher at Montana State University intro-

duced the Dutch elm disease fungus into a new area while testing bacteria genetically engineered to be toxic to the fungus, and a number of other researchers were known to have carried out experiments in violation of the guidelines. In the 1980s, gene-splicing became the technology of choice in an ever-widening range of research specialties, as molecular biologists discovered ways to transplant genes across the species barrier, even between plants and animals, and to use gene splicing to isolate macroscopic quantities of formerly obscure proteins with high levels of biological activity.

Controversies over genetically engineered organisms were pretty much limited to university communities until 1983, when University of California researchers gained NIH approval for an experimental release of frost-inhibiting bacteria on potato fields in northern California. Jeremy Rifkin's Foundation on Economic Trends filed a lawsuit, charging that the government neglected to consider the possible effects of the altered bacteria upon natural ecological balances, other species of plants and bacteria, and the formation of ice crystals in the upper atmosphere necessary for the development of clouds. In a surprising ruling in May of 1984, a federal judge halted the experiment.

When Advanced Genetic Sciences (AGS), a company with close ties to the California university system but not subject to NIH rules, announced plans to test the frost-inhibiting bacteria in agriculturally rich Monterey County, local residents organized to oppose the tests, and successfully amended the county land use plan to effectively prohibit releases of engineered organisms. The test was moved to a strawberry field in an agricultural town east of Berkeley, and Green activists from that city joined people living near the site in opposing the experiment. Concerns were expressed over long-term effects on the wintering cycles of native plants, evidence associating AGS's bacterial strains with a variety of known plant diseases, reports that AGS workers had been suffering from allergic reactions and sinus troubles probably associated with the bacteria, and conflicts of interest between the company, the university and various federal and state agencies.

The so-called "ice-minus" experiments were short lived, due to a number of factors, each of which played a role in AGS's eventual capitulation.

Local opposition was sustained for two years, and the experiments continued to provoke controversy in the local press. Once legal avenues were exhausted, activists continually sabotaged the company's experimental plots, pulling up thousands of strawberry plants late at night. Opponents were helped by two scientific flaws that AGS nearly succeeded in covering up: "ice-minus" bacteria did not protect plants from frost damage as well as advertised, and the company was unable to prevent genetically altered bacteria from escaping their test plots. Soon it became clear that the company simply would not be able to convince enough communities to accept their experiments to ever produce a commercially viable product.

Unfortunately, though, ice-minus was just the beginning. Companies soon began field-testing hundreds of different plants and bacteria with exotic mixtures of genetic traits. The initiative soon passed from specialized companies like AGS to transnational chemical giants such as Monsanto, DuPont, Upjohn and Rhone Poulenc. Their aim was and is to use the technologies of gene splicing to make common food crops easier to grow in large monocultures, cheaper to process, and more adaptable to changing environmental conditions, including drought, lower soil quality and high levels of salt from over-irrigation. By far, the largest category of engineered organisms developed to date are plants genetically altered to tolerate large doses of toxic chemicals. Monsanto has spent millions developing crops resistant to its broad-spectrum herbicide glyphosate (Roundup), and the French chemical company Rhone Poulenc has developed and tested crops resistant to the teratogenic herbicide bromoxynil, which is known to be especially toxic to fish.





## GENETIC ROULETTE

In 1991, the National Wildlife Federation began monitoring USDA and EPA approvals of open field tests of genetically engineered organisms. By that time, 149 such tests had been reported, mostly of plants altered to be resistant to herbicides, viruses, and particular varieties of insects. Today, the number of pending and approved applications for tests of engineered organisms has grown to over 2200. Even if only a few of these crops are approved for human consumption (implying widespread commercial-scale production) an immediate result will be a significant increase in the volume of herbicides used in agriculture. But the longer term consequences raise the most serious concerns.

A 1993 study commissioned by the Union of Concerned Scientists, which has continued the work begun by NWF, outlines many scenarios whereby genetically altered varieties of

common food crops can either become invasive weeds or pass their unique combinations of genes on to native plants, with unpredictable consequences. Inserted genes can spread into the wild through pollen and through various bacterial and viral carriers. The most likely scenario in the US involves crops such as rape seed (canola) and sunflowers that have numerous common wild relatives here. As genetic experimentation spreads into tropical regions, from which the majority of common food crops originate, the risk of genetic contamination of native species multiplies many fold. And while the development and field testing of genetically altered crops race ahead, studies of the ecological and human health risks of experiments in genetic engineering are still in their infancy.

One popular area of research has been the genetic alteration of plants to secrete biological pesticides. Most common among these has been the biological toxin produced by the bacterium *Bacillus thuringiensis* (Bt). Bt bacteria are commonly sprayed on crops by organic growers, aware that the toxin is normally only released and activated in the gut linings of certain caterpillars with unusually alkaline digestive systems. Unfortunately, as Bt has become widely used in sprays against gypsy moths and spruce budworm, many agricultural "pest" species have become resistant and concerns have been raised about pathogenic effects on other moth and butterfly larvae, as well as on the many species of birds and small mammals that eat these larvae. As plants engineered to produce their own Bt toxin — such as a variety of potato developed by Monsanto and approved last year by the US Food and Drug Administration — are grown on a wide scale, we will face difficult to predict but likely dire effects on nearby ecosystems from sustained doses of the activated form of the Bt toxin. At the very least, selection pressure will favor strains of insects resistant to Bt. Declines in populations of butterflies that aid pollination also appear likely.

Along with common food crops, fish have been a frequent target of experiments in genetic engineering. Since the late 1980s, scientists in the US and China have been seeking to genetically alter commercially important species of fish to grow larger and more resistant to environmental changes. Human growth hormone genes implanted into goldfish reportedly led to fish two to four times their normal size. Similar, though less dramatic, results were obtained by inserting regulatory genes from Rainbow Trout into carp. Scientists at a salmon hatchery in Nova Scotia have been working to incorporate cold-resistance genes from flounder into Atlantic Salmon. For people already concerned about the effects of hatchery-raised fish on the genetic integrity of wild populations, these experiments add a staggering new set of potentially adverse consequences.

Less alarming ecologically, but of serious concern to people interested in animal welfare, are experiments in which cows, goats and sheep have been genetically altered to produce pharmacologically active proteins in their milk. For the drug companies, the animals have become nothing more than a highly efficient form of "bioreactor" for drug production. As

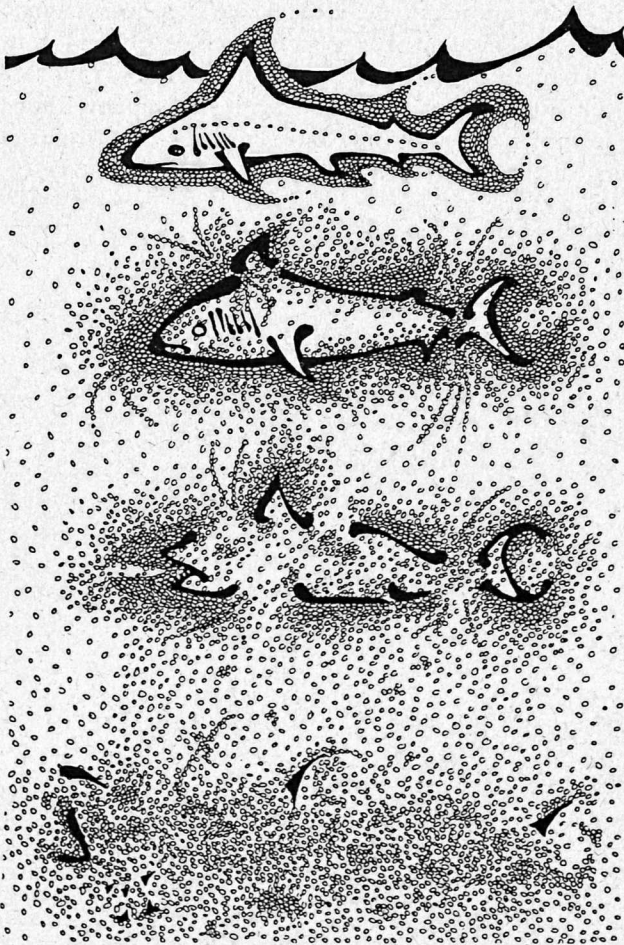


illustration by Jim Nollman

most of these experiments are being carried out in privately funded laboratories, it may never be known how such alterations affect these animals.

Biotechnology is also having an impact on commercial forestry. Companies like Weyerhaeuser advertise that the tree seedlings they raise from tissue culture in their laboratories are an "improvement" on nature. Plantations of genetically identical trees displace native forest ecosystems and may serve as incubators for new, more virulent blights that could spread into surrounding natural forests. A company called Zeneca Plant Science recently announced a technology for genetically modifying such rapidly growing trees as poplar and eucalyptus so the lignin is easier to remove from cellulose for making paper. Zeneca did not announce how they would assure that such artificial traits would not spread through pollen into the wild.

In Europe, officials concerned about the spread of rabies have been loading bait for wild foxes with a virus genetically altered to contain a rabies glycoprotein that stimulates immunity against the disease. While environmentalists have been assured that this will help save the large number of foxes killed annually to prevent the spread of rabies, the virus of choice is closely related to smallpox and several animal poxes, and is known to be transmitted uncontrollably between unrelated species of mammals. These experiments, which continue despite an extremely low incidence of rabies in Europe, demonstrate the profound recklessness that new discoveries in biotechnology seem to encourage.

### NOVEL ORGANISMS

Industry efforts to assuage widespread public concerns about biotechnology are usually based on three commonly held mistruths: that genetic manipulation is "natural," that it is not much different from conventional cross breeding, and that transgenic organisms are inherently incapable of escaping from carefully controlled environments, whether they be laboratories or agricultural plots. Such claims have been utterly discredited in scientific circles. Whereas conventional breeding—and most gene transfers in nature—result in substitutions of alternate forms (alleles) of a particular gene in their appropriate (chromosomal or extrachromosomal) location, the splicing of genes in the laboratory can result in entirely new combinations of genetic traits in a single organism.

This adds tremendous new uncertainties. According to ecologist Philip Regal of the University of Minnesota, even those who support deregulation of biotechnology now generally agree that "there can be no generic arguments for the safety of genetically engineered organisms." By creating "populations of organisms with novel combinations of adaptive traits," Regal has written (i.e., traits such as disease and pest resistance that improve the chances of survival), "genetic engineering does have the potential to create types of organisms that can interact with particular ecosystems and biological communities in novel competitive or functional ways..."

This view is supported by studies of the effects of exotic non-engineered organisms that people have introduced into environments to which they are not adapted. In light of nearly forty years of ecological studies of the impacts of plants and animals introduced into new environments, the likelihood of significant ecological damage from releases of "engineered" organisms is a matter of very serious concern.

From the blight that virtually destroyed the American Chestnut to gypsy moths, from California's garden snails and "medflies" to kudzu vines in the Southeast and roughly forty percent of all the major insect pests in the US, organisms introduced from faraway places have had dramatic and harmful effects on native ecosystems. Eucalyptus trees imported from Australia have suffocated wetlands in North America and southeast Asia, and have become a significant threat to the surface water supply of the Florida Everglades and many other endangered ecosystems around the world. A study commissioned by the United Nations Environment Program documented scores of such cases, from disease-causing microbes that survive heavy quarantine to imported varieties of horses, goats and reindeer. "The results of this wholesale scrambling of the earth's fauna and flora have been unexpected and unfortunate ecological effects," the study concluded.

It is not just a North American problem. A recent Greenpeace study documented unregulated field tests and other development activities using genetically engineered organisms in at least thirteen African, Asian and Latin American countries, and eighty illegal releases of patented, genetically engineered microbes in India alone. With virtually no scientific resources to monitor the effects of these experiments, these countries depend on the inadequate scientific information from countries like the US and Japan where the technologies are being developed.

### THE EVIDENCE MOUNTS

Despite the plethora of ways that ecological and genetic disruption might occur from releases of engineered life forms, these scenarios often have a speculative quality that has made it easy for industry spokespeople to attack opponents for spreading unsubstantiated fears. Until recently, that is. Studies of the environmental consequences of genetically altered organisms are quite rudimentary compared to the increasing sophistication of gene splicing technologies themselves, for obvious reasons having to do with the sources of funding for such research. However, scientific evidence for the viability and disruptive potential of engineered organisms is now beginning to accumulate rapidly.

Last year, virologists at Michigan State University published a study demonstrating that virus genes implanted into plant cells could be transferred into the DNA of other viruses with which the plants come into contact. Dr. Richard Allison told the *New York Times* that this could lead to the unintentional creation of new, and perhaps more virulent, plant viruses. Various studies have suggested that viruses can also transfer



genes among plants and perhaps animals as well. Studies at the University of Arizona suggest that parasitic mites may be involved in transferring jumping genes known as "P elements" among common varieties of fruit flies. When "foreign" genes begin to spread among wild populations of plants and animals, they become virtually impossible to trace, much less control.

One of the most striking recent experiments was performed by Dr. Elaine Ingham, a plant pathologist at Oregon State University. Ingham became concerned about the environmental consequences of her colleagues' efforts to alter the genetics of a common variety of bacteria found in the root systems of most plants. The bacteria would become able to digest crop residues, now considered waste products and often burned in large quantities, and produce ethyl alcohol that farmers could readily use as a fuel. To some, this seemed like the perfect technological solution for turning "waste" products into something useful. Ingham set out to discover how the genetically altered bacteria would affect the growth of common grasses in a variety of soil types.

Ingham discovered that the altered bacteria survived easily and often outcompeted their parent strains, something biotech advocates used to say could never happen. The effects on the grasses were even more unexpected. In sandy soil, most of the grasses died from alcohol poisoning. In clay soils, too, the grasses died, but from an entirely different cause. The altered bacteria apparently increased the numbers of root-feeding nematodes and decreased populations of beneficial soil fungi that help grasses resist common diseases.

"We must understand the effects on the whole system, not just isolated portions," Ingham has written, "because biotechnology products will have a range of impacts much greater than just the engineered organism." In forest soils, for example, native tree species depend on root-dwelling mycorrhizal fungi for efficient absorption of nutrients and water from the soil. What would happen if genetically engineered bacteria spread from a farm into nearby forests? Other studies described by Ingham have demonstrated effects such as altered carbon dioxide levels in the soil, increased plant disease, and changes in the distribution of essential soil microbes from the introduction of genetically altered organisms and their byproducts.

For years, arguments for the safety of engineered organisms depended on

claims that they simply could not survive outside the controlled environment of laboratories and experimental farm plots. Manuela Jager and Beatrix Tappeser of the Institute of Applied Ecology in Frankfurt, Germany have undertaken a comprehensive survey of experiments designed to test this claim, and have found numerous cases of genetically altered life forms surviving in surface water, drinking water, wastewater, soil, and even clothing at rates comparable to their natural relatives. Isolated fragments of DNA may survive and be protected from natural degradation in soil, sewage sludge, animal feces and in particles suspended in water. Such fragments can be assimilated by bacteria and passed on to other organisms. These findings compound the range of plausible scenarios for the uncontrolled spread of traits such as resistance to antibiotics and herbicides, production of substances toxic to various insects, ability to grow better in salty and otherwise degraded soils, and many more subtle biochemical changes.

### A NEW SCIENTIFIC OPPOSITION

While people in the US are fighting important but often piecemeal battles against the hazards of specific products of biotechnology, international activists have joined with progressive scientists to articulate a wider critique of biotechnology, especially genetic engineering. Their focus is on the ecological, social and ethical consequences of genetic experimentation for commercial purposes. They view the scientific paradigm underlying genetic engineering as a fundamental misreading of the nature of life processes, and have demonstrated how the false public optimism of the biotechnology industry reflects a willful ignorance of recent discoveries in molecular genetics and ecological science. This informed opposition has brought some tangible victories, such as the European Parliament's five

year moratorium on engineered Bovine Growth Hormone, and its recent rejection of the patenting of engineered life forms.

The widest philosophical and historical critique of biotechnology has been offered by Indian physicist and ecofeminist activist and author Vandana Shiva, who has pointed out that the mechanistic assumptions inherent in the very concept of "genetic engineering" reduce the complexity and self-organizing ability of living ecosystems to a belief that life can be "[re]designed

*Genetic engineering and other biotechnologies are powerful tools of manipulation that serve the agenda of dominating nature which underlies our economic system and our entire civilization.*

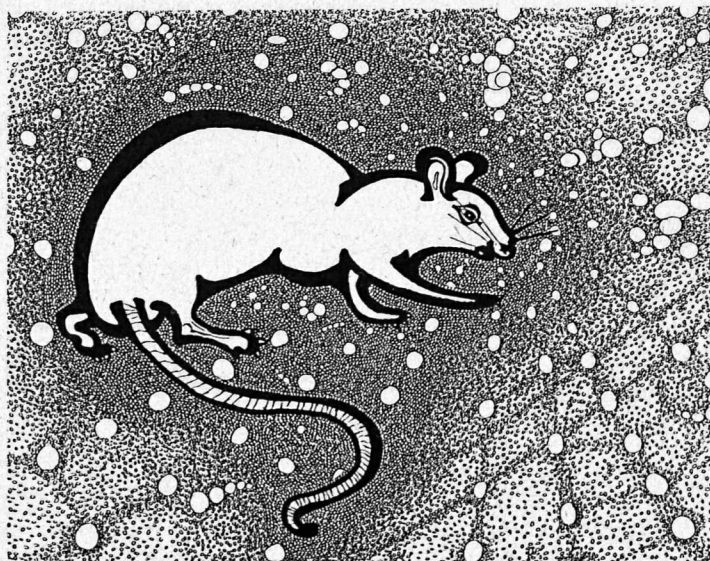


illustration by Jim Nollman



from the outside." "The reductionist paradigm emerged in an era in which species were treated merely as objects of 'Man's empire' to be manipulated at will for serving the interests of the dominant members of the human species," Shiva has written. In addition to ignoring the uncertainties inherent in genetic experimentation and the overwhelming proportion of instances in which genetically altered organisms *do not* behave as predicted, the dominant view systematically denigrates more traditional forms of knowledge, upon which genetic engineers increasingly depend for clues about where to look in nature for promising genes to study. "A post-reductionist paradigm is needed to create respect for indigenous systems and to protect them," Shiva argues.

The world view that has promoted confidence in genetic engineering is also inconsistent with discoveries in molecular genetics over the past 20 years. Popular discussions of biotechnology, according to Mae-Wan Ho of the Open University of the UK, simply ignore the reality that "no gene ever functions in isolation." The "central dogmas" of 1960s genetics—that genes determine visible characteristics in a straightforward manner (DNA → RNA → proteins), that genes are stable and passed on unchanged to future generations except for exceptionally rare mutations, and that inheritance of traits is not influenced by environmental factors—have all been called into question by recent findings. The myth of a straightforward "genetic program" has been challenged by discoveries of "jumping genes," transposons, complex processing and "editing" of messenger RNA before it is "translated," the phenomenon of "cosuppression" (in which additional, artificially inserted copies of a gene suppress, rather than heighten, the original gene's expression), and new evidence that changes in environment can indeed affect the genes that bacteria and plants pass on to their progeny. "Genes are defined by context; if you don't understand the context, you don't understand the function of a gene," added Ho's colleague Brian Goodwin, author of *How the Leopard Changed its Spots*.

Specialists in areas ranging from molecular genetics to plant ecology, biophysics and medicine gathered in Malaysia in 1994, under the auspices of the Third World Network. These scientists drafted a new statement, "The Need for Greater Regulation and Control of Genetic Engineering," which should help to widen the debate around biotechnology. Since the race to commercialize products of biotechnology has made it difficult for researchers of the effects of genetically engineered organisms to keep up, an international moratorium on open-air releases of engineered life forms needs to be enforced until meaningful safety measures can be put in place. This is the view of growing numbers of people around the world who see through the biotechnology industry's exaggerated promises.

However, despite the high risk of unpredictable ecological consequences, genetic engineering continues to be accepted as the means of addressing an ever-widening range of problems. It has attracted billions of dollars in investment capital that has, in numerous fields, crowded other, less invasive ap-

proaches out of the agenda of mainstream research. "The growth of biotechnology depends on its ability to exclude other technologies from being played out fully," Vandana Shiva has said. Despite their inherent limitations, genetic engineering and other biotechnologies are powerful tools of manipulation that serve the agenda of dominating nature which underlies our economic system and our entire civilization. Where the patterns of nature are not well suited to further exploitation, biotechnology offers the possibility of redesigning life forms to satisfy the demands of the system, and that possibility ensures widespread support for these technologies.

Despite the immense financial and ideological weight behind biotechnology, progress continues to be stalled. Just a decade ago, the experts were predicting that products like Bovine Growth Hormone, genetically engineered plants, anti-frost bacteria, and various exotic medicines would be widely accepted by the early 1990s. That this has not, for the most part, come to pass—and that new developments in biotechnology are as uncertain and controversial as ever—offers hope that an increasingly educated public will be able to prevent some of the worst consequences of an imperialistic and fundamentally life-denying technology. **WERF**

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# The Leopolds' Shack\*

by Stephanie Mills

During the Depression, Aldo Leopold, a University of Wisconsin professor of game management, obtained a blown-out "Sand County" farm about an hour by car distant from Madison, where he taught. What might have seemed to the disinterested observer to be just a hunting camp in the country for a professor and his family proved to be the alchemist's retort, the place where an encounter with degraded land crystallized Leopold's thinking on the relationship of people to land and eventually led to his creation of an American classic—*A Sand County Almanac*. The book's spirited proposal of an ethic and "science of land health" has, since its posthumous publication in 1949, been a touchstone of ecological awareness in the United States.

The vessel for the thinking-through of *A Sand County Almanac*, and the setting for many of its essays, is the Shack, a remodeled chicken coop set amidst acres of ill-used farmland bordered by the Wisconsin River. At once celebratory and elegiac, the essays and sketches in *A Sand County Almanac* assessed the state of the land community in mid-twentieth-century America and found it diminished but never lacking in engrossing details. Leopold reflected on the failings thus far of the morality of the human relationship to land, and proposed a simple, if radical, corrective in the land ethic: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." From 1935 until his death in 1948, Aldo Leopold spent weekends at the Shack with his family, happily experimenting in ecological restoration. Each spring the Leopolds planted thousands of pines and carried on a variety of other projects—prairie restoration, tamarack transplantation; they even propagated sumac, which in many waste places volunteers as a woody colonizer. From being a dustbowl-era ruin, so barren that you could "see a mile in any direction" (in the words of Leopold's daughter, Nina Leopold Bradley), to becoming again a verdant tapestry of riparian woodlands, sloughs, oak and pine woods, prairies, savannas, and sedge marshes, the Leopold lands have enjoyed a second chance. The renaissance of this place—as significant to the American heritage as Thoreau's Walden Pond, but mercifully far better protected—is a tale of applied hope and intelligence, and of the land's forgiveness. The ongoing lesson of the Sand County farm is that anyone having any plot of land to care for—back yard, back forty, community park—can initiate a similar process.

*A Sand County Almanac* is suffused with affection for distinct beings—a chickadee, an oak struck by lightning, a wolf killed forty years earlier by a much callower Leopold, a tiny plant called *Draba*, a woodcock peenting at dusk, a relict silphium sending up flower after flower until it must at last give up its lonely ghost of a prairie life. Leopold turned his observations of the happenings on his lands into timeless literature. The study of the periodic phenomena of nature—arrivals, departures, blossomings, matings, hatchings, ripenings, fallings, the identity of the first singer of morning and the last at night—is called phenology, and Aldo Leopold's rigorous field notation of such goings-on was a lifelong pursuit. Yet the scientist Leopold's well-schooled observations are passionate. *A Sand County Almanac* is deeply thought and deeply felt. One reads it and is persuaded in heart and mind that love and honor must find a way back into our relationship with the land and its life....

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\*Excerpts from Chapter 5 of *In Service of the Wild: Restoring and Reinhabiting Damaged Land*, Beacon Press, 1995. Reprinted with permission.

Unlike many environmentalists of my generation, I came late to *A Sand County Almanac*, not reading it until fifteen years after the first Earth Day. Now my yellowing paperback copy is as thoroughly used as a fundamentalist's Good Book. Because Leopold's great work is so germinal a text for land-healing, I obtained permission to visit the Leopold Memorial Reserve, which comprises the Sand County farm. My ostensible purpose was to write about the restoration there, but really it was a pilgrimage. After an introduction to the place, I was given permission to wander on my own for a couple of days. Those days felt like great blessings. The Reserve is a powerful literary-ecological shrine, but it is also simply a beautiful, interesting, kindly extent of land....

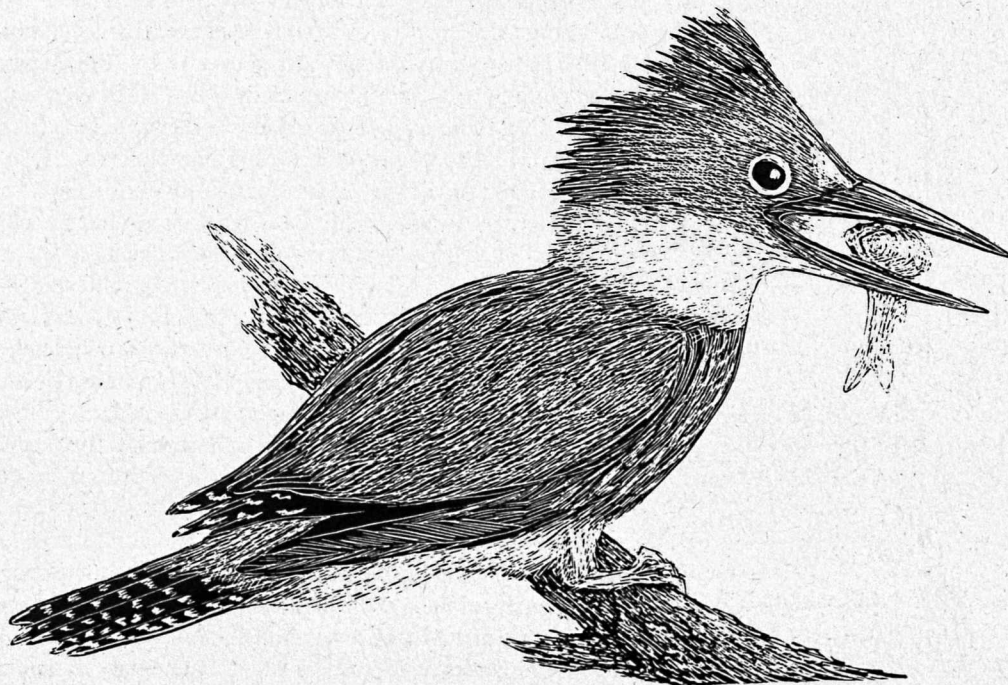
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The original extent of the Leopolds' Sand County farm was eighty acres. Eventually the family was able to purchase more land. Today the Leopold Memorial Reserve consists of 1500 acres that are owned severally. Access is, of necessity, strictly limited. The private landowners—Leopold's descendants and others—whose holdings together make up the Reserve are managing it as open space. They are attempting, by restoring natural processes, to favor indigenous vegetation in all the different ecosystems comprised in the Reserve. Such are the official purposes. From my standpoint of June-hedonism, what they were really doing was graciously maintaining a setting for a perfect summer day. I sat by the broad, shallow, but nonetheless formidable river secure that I would be able to remain comfortably out-of-doors, undisturbed, in a pleasant open pri-

vacy, knowing that this homey woodland is extensive, and pledged to be unspoiled. For restoration to take hold, protection must be ensured. The sense that this place would persist in its simple beauty, that one wouldn't have to dread the day that the Sand County Condominiums went on sale, lent an extraordinary peace and ease to the visit.

I sat in the shade of a basswood tree. The midday sun flooding the mowed opening nearby was almost too bright. Cottonwood fluff floated everywhere on the zephyrs, and olfactorily impaired mosquitoes braved the reek of the insect repellent I'd drenched myself in. Across the river on an island, a doe and her tiny fawn came out on the bank for a drink. Twenty yards in front of me on a snag just offshore, a couple of belted kingfishers perched, and made occasional chirring forays out across the satin surface of the water. The glossy stout oak leaves, stirred by the breeze, made a crisp, effervescent sound. The splendors of my day were small ones, and I found it poignant to think that a day of ease and rapt wandering in a lovely surround should be so exceedingly rare. Shouldn't every human being be able to have days like this, perfect summer days in a green world chiming with bird song, and bespeaking care for the land?

The Shack is the most unprepossessing little cabin imaginable, just weathered board and batten, a shake roof, a couple of Leopold benches flanking the door. Although the Shack itself, where the family bunked and cooked and stored their tools for weekend work, is now on the National Register of Historic Places, it is no sacrosanct museum, but a place still used for family weekends in the country....



*Belted Kingfisher (Megaceryle alcyon) by Suzanne DeJohn*





One of the realizations during this idyll was that this picturesque landscape, although not a howling wilderness, and not a grand range of light à la John Muir, but a quietly regenerating oak woodland, was nevertheless the setting in which the profound ecological truths of *A Sand County Almanac* were resolved into a comely form. Many of Leopold's ideas about beauty and land health were founded in wilderness, to be sure, but it was in this place that Leopold was able to see the land ethic whole. It was here, and not in virgin terrain, that Leopold articulated an ecological morality that addresses a range of relationships between humans and land, from exploration and discovery to healing.

During the first day of my visit to the Reserve I spent several hours with the manager, Matt Bremer, an articulate and amusing ex-Marine and veteran of the Wisconsin Conservation Corps. The Reserve includes an array of plant communities: from floodplain forest to oak barrens to mesic forest to dry prairie to morainal prairie/savanna to old fields once cultivated for pasturage, now recovering. A nice assortment of "ecosystems small, distinct, identifiable," Bremer termed them. He explained that grazing had been the chief agricultural impact on the Reserve lands; only small plots had been tilled, and there was some clearing for wood. Therefore the tree component of the Reserve's landscape was considerably less affected than the herbs and grasses. The exotic Kentucky bluegrass withstood the intense grazing pressure, whereas the more delicate and diverse mixes of endemic plants were all but eaten away.

As Bremer and I approached the Shack on a two-track, we passed a little grassland. This is known as the Shack Prairie, and was started by Aldo Leopold, a personal version of the prairie restoration work going on at the university's Arboretum in Madison. He transplanted mature prairie plants into some areas, scalped off the weedy sod and planted prairie seed in the bared earth in others, and also propagated prairie species in a nursery to plant in his plots. After twelve years of work, at the time of Leopold's death the prairie was flourishing. For twenty years afterward the Shack Prairie was neglected and lost much of its botanical richness. In 1971 Leopold's daughter Nina and her husband, Charles Bradley, began to give the prairie some skilled attention and it began making a comeback.

In 1992 as we surveyed it, Bremer pointed out that the lupine growing among the prairie plants was threatened by deer (which is to say it's being nibbled to death, a common problem in landscapes that have been fragmented and have lost their big predators). This led to an explanation of the Reserve's "Earn Your Buck" program, invitation-only "antlerless" deer hunts. ("Antlerless" must be a coinage arrived at to defuse sentimental objections to killing does.) Managing for "quality deer in quality habitat," as Bremer phrases it, culling the herd to sustainable levels, is directly in keeping with Aldo Leopold's reality-tested science of game management. Indeed, advocacy of doe hunting to trim deer populations to sustainable levels once landed Leopold in a peck of trouble with both the rod-and-gun crowd and urban bleeding-hearts.

The recovery of the lands around the Shack is under way, but far from complete. Because the southern Wisconsin landscape was fire-adapted (meaning that the plants were either tolerant of periodic burns, as many oak species are, or dependent on burns for access to light and release of nutrients), during the periods when fires were prevented a dense underbrush was able to take hold, starving the ground-layer plants of light. This overgrowth hence reduced the overall diversity of the woodland floor. The present management philosophy at the Reserve includes the restoration of natural ecological processes by means of burning across ecotones, or areas where one plant community grades into another. They're trying to recreate the effect of lightning-set fires.

*Prairie Bush Clover (Lezpedeza leptostachya) by Gary Eldred*

Man's second discovery of fire has apparently taken place in the minds of restorationists, and has provoked as much glee and wonder as it must have the first time, maybe even the same sense of mastery. Bremer is very keen on "throwing" fires across ecotones. The resulting burns are ugly, but don't remain so. The plants that evolved here under conditions of occasional fire should thrive with this regime. Thus the fire-tolerant species, like white, black, and bur oaks, can be given room to breathe; and the invaders of the understory, like prickly ash and another prevalent weed called wood nettle, can be subdued. With periodic burning, the richer mix of wildflowers that would characterize the savanna community might have a chance to return and flourish in partial shade on their fair share of the soil's nutrients, and the little grassy patches—all called prairies—will get what they need also.

When I asked whether they are propagating and planting native species that might have characterized this kind of landscape, Bremer said, "I want to put the process back, not the community." The idea is that what should be there will survive. This led to a discussion of the restorationist's triage: "Should I be trying to recreate something that can't survive under present conditions or should I give Mother the process back and let her decide what will survive?" In Bremer's opinion, it might not be worth his spending a whole lot of time on restoring a population of an endangered plant. Organizations like The Nature Conservancy are likely to do the work of keeping such species from extinction by preserving their habitat. Work at the Leopold Memorial Reserve has a different emphasis. There's no collection of biological rarities here. The Reserve's unique status—"It's private ground, it belongs to no program"—means that experimentation in restoration and management technique is, as in Aldo Leopold's day, what goes on here.

Some of the Leopoldian ethos is about taste—as in "a taste for country." Most of the plants reappearing in this place—the prairie and woodland wildflowers, known in the trade as forbs—are small and inconspicuous, unprepossessing, like the dainty penstemon and harebell I saw while walking along Pasque Flower Ridge with Bremer. This suggests that our tastes have been not refined, but vulgarized by most horticulture—garish huge flowers on our bedding plants are to these native blossoms what Jimmy Swaggart is to, say, Black Elk. It takes a highly educated—either in vernacular or botanical terms—eye to see, much less identify, these delicate herbs belonging so well in their regenerating places.... ■

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# Are Ecosystem Processes Enough?

*(Further Thoughts on Leopold's Land)*

by Michael E. Soule

**W**arning! An idea lurking in a statement by Matt Bremer could be dangerous to your biodiversity. When Ms. Mills asks Mr. Bremer, then manager of the Leopold Memorial Reserve, if they are propagating and planting native species that might have characterized this kind of landscape (which the reserve does, to a certain extent), Bremer replies, "I want to put the process back, not the community."

What is the problem with this? What is wrong with simply maintaining or restoring ecological processes? It is this; the processes of ecosystems are universal, but the species are not. The processes—including photosynthesis, nutrient transport, fixation of nitrogen, the water cycle, the decomposition of organic matter by invertebrates and microorganisms, the sequence of seasonal events (like budding, flowering, and seed dispersal), and disturbances such as fire and floods—occur in nearly every terrestrial or aquatic ecosystem on Earth. They are generic. They can be performed by weedy species. Of course, giving attention to universal ecological processes is appropriate, but should not be used to justify the replacement or elimination of some or all the native species that inhabited the landscape before the plow, the saw, and the drain tiles.

To use an analogy, the processes that characterize modern human society include food and fiber production, manufacturing, trade, pizza delivery, life insurance, entertainment, legal systems, health care systems, security systems, communications (media), personal interactions and relationships (play, courtship, physical conflict, marriage, reproduction), religion, waste disposal, body disposal, and so on. Now, imagine that an agency of the United Nations, such as the UN Development Program, was responsible for "social restoration and sustainable development," and that it used the foregoing list to guide the implementation of this prime directive. The list may be fine as far as it goes, but it leaves out something crucial—diversity.

One of the things we enjoy most about humanity is its diversity: its linguistic and cultural variation. We are fascinated by the music of Ireland, the dances of the Middle East, the history of Egypt and Yucatan, the opera of Italy, the pride of the Maasai, the affairs of the British royals, the weapons and warfare of medieval Europe and Asia, the cave dwellings of the Anasazi, the religious practices of India and the Vatican, the initiation ceremonies of aborigines, and so on, ad infinitum.



If our objective is only the maintenance of processes, then we might forego all this diversity of language, history, and culture. We would say, "we don't really need local color; all we need are the processes: language is language, bread is bread, music is music, religion is religion." In fact, there is an argument that diversity is often the source of conflict, as in the Balkans, and that it makes sense to suppress or discourage "redundant" cultural variation. By this logic, the world might even be better off with just English, supermarket white bread, Mantovani, and only one of its many religions and sects.

Or consider an example closer to the heart of conservation. Assume that our job is to preserve a forest in Canada or the northern United States. There are two extreme approaches. We could try to maintain all of the native species—including Gray Wolves, Grizzly Bears, American (Pine) Martens, all the native fish, amphibians, molluscs, insects, meadow perennials, the entire range of tree species, and habitat for all the Neotropical migrant songbirds. Alternatively, we could follow the "process" directive. The latter is much easier. We could replace the native plants with an insect-resistant strain of Scots Pine; we could substitute alien annual grasses and thistles for the native meadow perennials. Instead of native fish, we could have Brown Trout and carp. Molluscs would not be essential. Feral dogs and ravens would do the job of native carnivores and raptors. In other words, with a short list of species, the forest would still produce wood and oxygen, the streams would still produce entertainment for fisherfolks, carrion would still be recycled, and nutrients would still circulate from the trees to the soil and back again, as they do in most of the plantation forests of Germany and Scandinavia.

In summary, it is technically possible to maintain ecological processes, including a high level of economically beneficial productivity, by replacing the hundreds of native plants, invertebrates and vertebrates with about 15 or 20 introduced, weedy species. Now, I'm sure this is not what most ecosystem ecologists want, but this is what many appear to be saying. The message of ecological simplification by substitution is music to the ears of strip miners, strip loggers, strip grazers and others who see native species, particularly endangered ones, as impediments to profit.

WARNING! Be suspicious of "ecologists" who are pitching ecological services (for people) and who speak of "redundant" species or "hyperdiversity." Their idea of ecological integrity may be a lot different from yours. A more ecocentric approach to scientific prairie restoration exists: see Howe, Henry, F., 1994, Managing species diversity in tallgrass prairie: assumptions and implications, *Conservation Biology* 8 (3):691-704. ■

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## Boat of a Million Years

The boat of a million years,  
boat of morning,  
sails between the sycamores of turquoise,

Dawn white Dutch freighter  
in the Red Sea—with a red stack—  
heads past our tanker, out toward Ras Tanura,  
sun already fries my shoulder blades, I  
kneel on ragged steel decks chipping paint.  
gray old T-2 tanker and a  
white Dutch freighter,

boat of the sun,  
the abt-fish, the yut-fish,  
play in the waves before it,

salty Red Sea  
dolphins rip sunlight  
streak in, swirl and tangle  
under the forward-arching wave-roll  
of the cleaving bow

Teilhard said "seize the tiller of the planet" he was  
joking.

We are led by dolphins toward morning.

—Gary Snyder  
*the Sappa Creek, Red Sea, 1958.*

# Befriending a Central Hardwood Forest

Part 4 of 4

by Sidney Collins

## INTRODUCTION

Patched into the unglaciated hills of Indiana, a legacy of Northwest Ordinance grid mapping, the blocky sections of the Hoosier National Forest go tumbling through nine counties down the south-central part of the state to the Buzzards Roost bluffs looming over the Ohio River. Though oversight now is shaped by the rubric "ecosystem management," Hoosier citizen/scientists are, once again, legally challenging Forest Service decisions: to clearcut erosion-control pine plantations, and to "restore" the dry forest communities through prescribed burns.

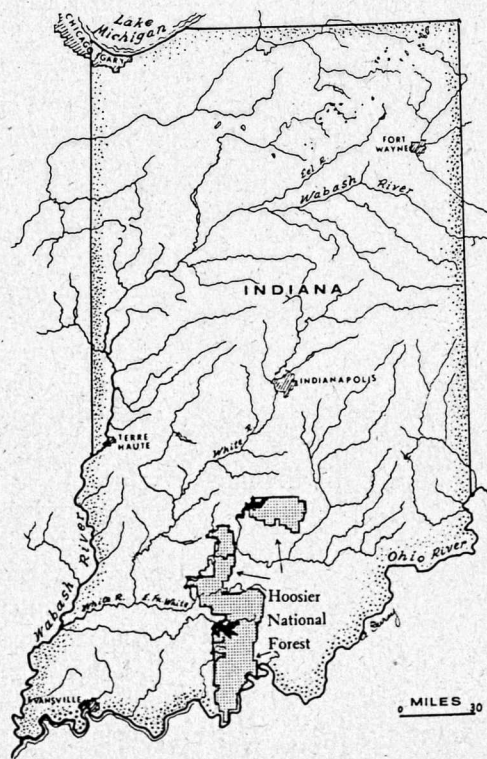
Seeking intimate knowledge of the historical forest, the writer, in Part One of the story, sought out an Indiana University archaeologist and went time-tripping through the centuries—from the tree-felling pioneers who broke treaties with the Shawnee, Potawatomi, and Miami tribes back to the post-glacial paleo-Indians who retooled their spearpoints at outcrops along the Ohio River. Over three hundred and thirty known historic and archaeological sites and structures exist on Hoosier National Forest lands.

In Part Two, using a centuries-old white oak ("wide as a Volkswagon") in Pioneer Mothers Memorial Forest as an emblematic anchor, the writer and her friend, an amateur mycologist, engaged their Forest Service guide in an exchange about the Swiss cheese configuration of the forest. They were left leery of just how much of the Hoosier will be allowed to grow into big trees.

In Part Three, the writer sought the chirp-and-whistle of returning songbirds in the frost of early spring, and followed them into the humid ravines of the summer forest where Indiana University students sample the flying phantasmagoria of bug space to determine the birds' diet.

Conservation biologist Michael Soulé, in an article about biological invasions, has written: "When outdoor enthusiasts perceive that they can't drink the water because of parasites, they can't risk exposure to the sun because of ozone depletion, and they can't wear shorts for fear of disease-bearing ticks, not to mention fire ants and killer bees, they will run gibbering to their indoor exercise machines." Intrepid Hoosiers do not run gibbering. They saturate their wrists, ankles and midriffs with powerful insect repellents and set forth in roasting heat and drought to reconnoiter the tick-infested southern reaches of the state.

I'm talking about a recent hot and droughty summer. A group of environmental activists, two Forest Service botanists, and one forest ecologist drive on a gravel road several hundred feet above the Ohio River. This is the first of four expeditions I'll make to the barrens and dry forest communities in the Hoosier National Forest where prescribed burning is still experimental; not conflagrations, mind you, but skippy little flames that skitter through leaf litter and woody shrubbery. It's hot. Ellen Jacquart peers out at the droopy-looking trees. "The leaves have lost turgor." Spoken like a botanist. We are on our way to Boone Creek Barrens, a Post Oak/Blackjack Oak community rare on the Hoosier. The plan identifies 1131 acres of barrens on the whole forest.





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Ecological restoration techniques may be as faddish as practices in the national schoolhouses. Some activists say that the Forest Service has a new toy, that it has swapped chainsaws for torches. Make no mistake about it; prescribed burning is alluring. In the upper Midwest, especially in the Chicago area, hundreds of people are involved in what they rather fondly call ritual pyromania, to restore tallgrass prairies and oak savannas. The aura of history and romance surrounding the practice can become wildly incandescent. Here is George Catlin, the famous painter of native Americans, writing in 1842:

*The prairies burning form some of the most beautiful scenes that are to be witnessed in this country...Over the elevated lands and prairie bluffs, where the grass is thin and short, the fire slowly creeps with a feeble flame, which one can easily step over; where the wild animals often rest in their lairs until the flames almost burn their noses, when they will reluctantly rise, and leap over it, and trot off amongst the cinders...These scenes at night become indescribably beautiful, when their flames are seen at many miles distance, creeping over the sides and tops of the bluffs, appearing to be sparkling and brilliant chains of liquid fire...hanging suspended in graceful festoons from the skies.*

In Indiana, early travelers' anecdotes have the Indians every year, or every few years, setting fires which went licking over the ridgetops. The degree of native American "management" of the continental landscape has provided much fodder for historical research and argument. Clearly, in Indiana, the pioneering vanguard found a territory predominantly forested. Deforestation was the result of European settlement, not Indian agriculture or burning. The travelers' accounts provide some rationale for burning on the Hoosier; as does recognition that Smokey Bear has suppressed naturally occurring fires on the forest for the past fifty or sixty years. Forest ecologists say that plants found on the barrens and dry forest communities no longer flourish, and in some cases are endangered, because trees have grown in and shaded them out.

We're at the Boone Creek site, every one of us reeking with chemical defense against parasites. Ellen pulled seventy turkey ticks off one of her ankles last time out. Latin polysyllabics begin to fly as the botanists reel off names of the carpet of plants under our boots. We request the vernacular: Indian Grass, Farkleberry, Big Bluestem, Little Bluestem, woodland sunflowers, Prairie Dock, Yellow Cornbeard, Blazing Star, White Wild Indigo—dozens of wild original names. My favorite? Rattlesnakemaster!

The oaks, both Post and Blackjack, are gnarly and crabbed, perhaps as much as two hundred years old. Like Pioneer Mothers (see Part 2), Boone Creek is an old-growth community, but the trees have not grown massy on this dry site. To see them in silhouette against a full moon or wintry sundown would be to conjure graveyards, spooks and witches on brooms. The trees are starkly etched, almost arthritic, standing in a sea of forbs, herbs and native warm-season grasses dotted with sharp color. Lichens and mosses—textured on rock slabs, flecked on trees—display marine coloring: blues and greens endlessly subtle and blending. Char on the forest floor and on the tree trunks bespeaks the burn. To give the ground more sunshine, work crews have either cut down or girdled some of the small Black Oak, White Ash and Black Gum trees. Fallen trees feed numerous decomposers. Large, open-grown Post and Blackjack Oaks have been left standing. About twenty acres is involved in this initial burn, with canopy closure ranging from twenty-five percent to sixty percent on four small sites.

Boone Creek and the surrounding dry forest, 384 acres all told, is the bailiwick of unabashed native plant defenders. Ellen has told me: "It all comes down to plants because plants are the matrix. Animals come and animals go..." She and Steve Olson, also a botanist, and Tom Krieger, the "fire chief," had become intimate by 1991 with this place. They were pleased with the botanical happenings here but wondered whether the drought had cramped the plants' "expression."

The following spring, they got their wish for bountiful weather. Hoosier and Shawnee National Forest staffers from southern Illinois trooped out to a vista at Boone Creek called "out-the-ridge."

"Steve Olson and I started down a slope," Ellen recalls. "There were about twenty-five people behind us. We both just stopped. There was this plant, *Politinia*, Prairie Parsley. Five known sites in the state and it popped up out of nowhere in Boone Creek Barrens. Of course it didn't pop up out of nowhere. These things have been underground for years... This was the first

year there was enough light and maybe enough fertilizer from the fire for it to express itself. It had four or five flowering heads on it, which is really unusual. Think of bright yellow Queen Anne's Lace. The leaves are very artistic, deeply dissected, lots of little lobes but each one is scalloped... And it was so robust! It was happy!" Whenever the botanists behold a plant in the full throes of efflorescence they say: "It's happy!"

A treehugger can get all edgy and bestirred thinking about fire searing the greenwood. I know I did. But searing is not what happens to these marvelous plants. No photosynthesizing plants are burned. The ritual pyromania takes place when most above-ground vegetation is dead. When the plant is dormant, all the energy, the carbohydrates and nutrients, has been pulled down into the roots. (Burning differs markedly from deer browsing in that the deer nip the green photosynthetic parts of the plants.) What does get scorched are the cool-season grasses greening up fast in the spring—Kentucky Bluegrass for instance, which is an exotic. The botanists don't want it out in the woods, crowding and creeping. April is a bit early for the native plants to be up in the barrens. If the fire is timed right, it knocks back the alien grasses.

In addition, the burn is, Ellen told me, "extremely prescribed." The burn window dictates the exact conditions under which the fire chief can light up: temperature, wind speed, wind direction and humidity among them. If at any point the window closes, if the temperature goes above 75 degrees, or the wind speed goes over ten miles per hour, the fire chief orders all fires extinguished immediately.

How did the Forest Service arrive at a position of certitude about management by fire? The early travelers' accounts of burning in old county records, kept in the bowels of Indiana University's main library in Bloomington, helped reconstruct the presettlement fire regime. The operative word is "presettlement." Sleuthing in the state's historic archives yields clues to land conditions prior to extensive clearing of the forest for farming. This is not paleoecology. The target time is just a bit before heavy settlement. Boone Creek, for instance, was described as open, barren woods, having poor, shallow soil and brushy hillsides.

Steve Olson dug into the General Land Office Survey (taken from 1804 to 1811) of the nine hundred plus square miles inside the forest boundary. The surveyors, with frequent difficulty it must be supposed, walked along the lines of the squares and made notes of the trees growing there. They also identified the trees at the corners, called bearing trees. If the corner was in a river, a pond, or off the edge of a cliff, the tree nearest that corner was identified. These go by the poetic name "witness trees" because they stood in for the nonexistent corner. For each of the three thousand corners, Steve knows the species, diameter and distance from the corner for two bearing trees. Forty different kinds of trees formed the forest canopy. Steve collected additional information from modern regional geologic maps, county soil surveys and topographic maps, enabling him to identify the corners by geologic age, bedrock and soil parent material. The attempt to discern the composition of the presettlement forest has been meticulous.

To home in on the barrens communities, the Forest Service, along with the Indiana Department of Natural Resources (IDNR), Division of Nature Preserves, checked historic and recent aerial photographs to find areas with big-crowned trees. Color infrared photos spotted the dry site hardwoods, those gnarled old Post and Blackjack Oaks. Botanists then field-checked the sites for the presence of key indicator plants. The old oaks and small, persistent versions of the indicator plants told them they were on the barrens.

Most Hoosier environmentalists have not objected to burning on the barrens, though some suspected when the plan was released that the "opening up" was an excuse to start timber sales. Well, no one would want those old oaks for timber, but the burning of dry forest sites sparked an editorial broadside in the Protect Our Woods newsletter charging that the burn program is a fad and provides pork for bureaucrats. Has ritual pyromania flared up on the Hoosier? Protect Our Woods points to over a thousand acres of scattered burn sites and a big burn on Mogan Ridge. Four thousand acres were burned in 1993-1994. Habitat for the neotropical migrant songbirds is of primary concern to Protect Our Woods, Heartwood, and the rest of the environmental community. At 10,500 acres Mogan Ridge provides sizeable forest interior. Obviously, habitat for ground-nesting birds is unavailable the spring of the burn, but the "flush of vegetation" the botanists expect may provide improved habitat the following year.



The Forest Service has not prepared an environmental impact statement on dry forest burning. Don Whitehead's opinion of the big burn is unreserved, "In terms of the neotropical migrants, it's insane. We need a research design to study the before-and-after for several years. There are a number of species that are dependent on the middle layers." He is talking about those layers in the forest canopy we noted in Pioneer Mothers, the low-midstory and midstory.

Though the dormant plants on the forest floor do not get sizzled, the "undesirable" tree species do. The mycologist and I made an expedition to Boone Creek last fall to receive a lesson in fire ecology from Tom Krieger, the fit-looking fire chief who appears to be thriving on ritual pyromania, and Steve Olson, he of the 3000 corners, who proudly showed off a whole hillside of Pink Fireweed grown lushly impenetrable after the fire.

"Our intention," explained Tom, "is to regenerate the oak/hickory component of the forest and maintain it. We're repeatedly killing back the nonfire species: maple, ash and Tulip Poplar. The invading shrubs are dogwoods, redbuds and a lot of sassafras. It won't happen overnight. We've had no fire for close to sixty years. Fire suppression is great for keeping houses from burning up but it's probably the worst thing we could do for continuing the central states' forest component."

In a backhanded way Tom is talking about the insidious beech/maple creep problem. Because oak is commercially valuable, a preoccupation with maintaining its formidable presence dominated the forest debate during the timbering era. But now, the botanists want to keep it because of its associates on the forest floor. Ellen Jacquart speaks in alarmed tones of "the Red Maple steamroller." It is not just bruited about but demonstrable that "the state is going to beech/maple."

We've ambled down the slope, past sandstone bedrock to limestone. The rock outcrops are lichen-covered benches set into the hillside. The fire chief strides over to a visible boundary line where the fire stopped, whips out a light meter and thrusts a tanned arm into the thickly-growing maples. There's a kind of gloaming, or twilight, underneath the trees that throttles the Rattlesnakemaster plant and all those other wildy-named low growers. "I definitely want you to see the difference. You can't see in there very far at all, can you?," he asks.

Where we stand ritual pyromania has thinned the bunched-up trees. The plants on the forest floor may escape the scourge of the third element (in ancient and medieval philosophy, you'll recall, earth, air, fire and water were the four elements from which all other substances were composed), but the trees do not. Tom decides when to burn by noting the size of the growing leaves in the spring. When



*illustration by Eva-Lena Rehmarm*

the moisture is "pumping up" in the cambium, the living part of the trunk, fire raises it to the boiling point. The cells rupture and the tree sloughs off its bark and dies.

Steve, the other half of the "vegetative management team," gladly answers my question about plants suddenly springing forth—poof!—after a burn. I recollect Ellen's testimony that things can endure underground for "years and years and years," a kind of patient hibernation. Some plants use seed banking, he says, but others are arrested as "rosettes." The rosette is a scanty swirl of leaves around a bit of stem atop a complete root system. Steve points to the rosette of a suppressed grass. "Some don't even bother putting out a leaf," says the botanist. "They're just hanging on until conditions improve; more sun and a dose of fertilizer follow the fire. Then comes the flush of new growth."

This past summer I met Steve and Bob Klawitter, the indefatigable executive director of Protect Our Woods and author of the definitive appeal of the current plan (denied by the Forest Service), on Mogan Ridge. I came away from the forest with four nymph ticks attached to my torso, and one cautionary Indian tale related by Bob to the slight bespectacled botanist. The big fire had burned out the middle two stories of the canopy. We walked among the singed trees and more of those wild plants: Pussy Toes, Agave, Horsetail Milkweed, Narrow-leaved Mountain Mint, Spiked Lobelia, Whirled Rosin Weed. This part of the forest is dry, akin to the Boone Creek site where the mycologist and I took a lesson from the fire chief.

Bob told Steve that setting fires initiates a process that has no end. We had paused at the edge of the forest to watch a five-inch brown walking stick, a big knobby insect, crawl up Steve's arm. "There's a story in Indian mythology," Bob intoned, "about this centipede that was walking down the road. Somebody stopped and said, 'That's really amazing how you do that.' The centipede said, 'What?' 'Getting all those legs going together in the right rhythm. How do you do that?' The centipede said, 'Oh, I don't know. I just do it.' He walked down the road and he got to thinking, 'How do I do that?' And the next thing he knew he was lying on his back in the ditch."

Concluding the fable about intuition versus conscious calculation, Bob warned, "It seems to me there's a danger that humans are going to take over ecosystem management from nature. We're going to decide how ecosystems should operate. It will be a kind of gardened and cultivated world. Aren't natural processes what we should be trying to preserve?"

The heart of Bob Klawitter's appeal of the Hoosier management plan raises objections to forest fragmentation (excepting restoration of the barrens by burning), regardless of whether it is perpetuated by fire, mowing or bushhogging. He says the Forest Service is now using fire as a tool for biodiversity management rather than remanding the forest to old growth, a decision that essentially would mean—Let it be.

"Why reach back to retrieve any age as the golden time of the forest?" Bob asks. "That's an act of speculation. What the forest once was and what it may become may be different."

Old-growth research has shown that about ten percent of the canopy on average is open, from the fall of a single sick or ancient tree for instance, to larger openings made by tornadoes carving snaky lines in the trees or blowing down whole hill-sides. Wind may be a larger component of the natural disturbance regime for the Hoosier than fire, except in cycles of drought. Insofar as fires are part of natural ecosystem flux, Smokey Bear would suppress wildfire on the Hoosier, because of the neighbors. So if prescribed burning is supposed to mimic the occasional lightning fire, why not cease the manipulation right there and allow a gracefully aging forest to maintain its own openings program? In these jumbled forest blocks it is apparent that a decision to do nothing at all is now a management decision. To let it be is to manage. Environmentalists are in some sense recoiling from the concept and practice of human manipulation, especially as it has been practiced by the Forest Service. They want nature out there wailing, blooming, nesting and glinting away.

✱

In the spring of 1991 rumors were flying that the regional forester in Milwaukee, Floyd "Butch" Marita, was primed to cashier Hoosier NF Supervisor Frank Voytas on account of the ecosystem management coloration of the forest. The plan had been shaped partly by pressure from a particularly vociferous and informed Indiana environmental community. Activists insisted that the Forest Service harken to the cascade of ecological research produced by its own scientists and abandon commodity extraction as the overriding criterion for managing the forest. When Voytas was yanked away from Bedford to participate in a "recreation initiative" for four months, Marita called a summer meeting to quiet down the simmering activists. There was even a big Washington muckety-muck on hand, the Chief's representative, "Bear" Brown.

HNF staffers from Bedford and the planning battle paladins from the environmental community met that summer in Bloomington. A deracinated lot, they gathered far from the forest under fluorescent lights in a motel conference room, ice cubes clinking, air conditioner blowing, and the ozone deficit swirling atmospherically. From all outward appearances, it might have been a group discussing sales and promotion strategies.

Activists were not there to preach wintry doctrines of ecosystem collapse but there was a subtext to their pleas and accusations for which the word desperation is not too strong. The perennial thorny issue is the reach and character of management, harnessed to technological multipliers—like chainsaws—that concentrate its effects. While the regional forester nattered on about "amenities," lumping wilderness in with recreation, the activists talked biology. When one Protect Our Woods member, biting off each word, said to the regional forester, "You just can't keep your hands off it," he had in mind a vision of a once-flourishing forest now hammered into lack-luster blocks by decades of resource extraction. Had the activ-



ist chosen a devotional to enlarge his terse accusation to "Butch" Marita, he might have spoken the words of E.O. Wilson, the Ant Man from Harvard who goes stumping for biodiversity in every forum that will entertain him:

*At the heart of the environmentalist world view is the conviction that human physical and spiritual health depends on sustaining the planet in a relatively unaltered state. Earth is our home in the full, genetic sense, where humanity and its ancestors existed for all the millions of years of their evolution. Natural ecosystems—forests, coral reefs, marine blue waters—maintain the world exactly as we would wish it to be maintained. When we debase the global environment and extinguish the variety of life, we are dismantling a support system that is too complex to understand, let alone replace, in the foreseeable future.*

Most Forest Service folk would sign on to Wilson's earthkeeping manifesto; nevertheless, the agency operates according to its own bureaucratic imperatives. "Forest Service people have to do something or there would be no jobs for them," editorialized the Protect Our Woods newsletter, "so they find something to do in the forest." This may be a diminution of the well-intentioned efforts of the professional staff at Bedford, but there is real concern that ecosystem projects are speeding up when a period of stocktaking might be the wiser decision for the forest. The natives had what we do not: a spare, unmediated vision of the elemental. With land wisdom gone in their wake, we have to scale the edifice of western science to get a good look at the woods. We know more about molecules than we do about the biosphere; more about subcellular organelles than we do about ecosystems; more about cells than we do about natural communities; more about tissues than we do about populations; more about organs than we do about organ systems or organisms. Scientific understanding decreases in direct proportion to the complexity of a system.

At this meeting in a motel, the regional forester may not have understood the message about biology—that forests are repositories of a burbling genetic broth that may reduce to stone soup if we mine and abuse them—but Frank Voytas does. I've seen Frank rattle his big satellite maps showing whatever is wooded in southern Indiana red-orange. "I love this stuff," he said, tracing the opportunities for closed canopy forest with an index finger. "I never liked the industrial side of forestry." Appellants to the plan, which is a blueprint amenable to interpretation, would like to see Frank trace around the perimeter of the entire Hoosier. These controversies about the holes in the forest would damp down if National Forest ownership were consolidated within the purchase boundaries and the Black Bear and

the River Otter were brought home to Indiana. If that vision comes true, now contentious parties will appear less parochial to each other. It is unlikely that anyone in the conversation has secured the fundament of all knowledge about forest ecosystems; hence, the case for caution and humility.

That was essentially the thrust of Alternative E, the no-cut alternative proposed by Protect Our Woods, as an option for managing the forest for the next ten-year planning cycle. The gospel of fervent cutting had been preached and practiced so long that nearly the whole environmental community signed off on a plan permitting at least a curtailed management regimen; it seemed impossible that someone would not be sawing somewhere in the woods. Alternative E—hands off for the next ten years while we breathe deeply and look around—was therefore politically inexpedient and probably moot with regard to the chance it stood of being selected by the Forest Service.

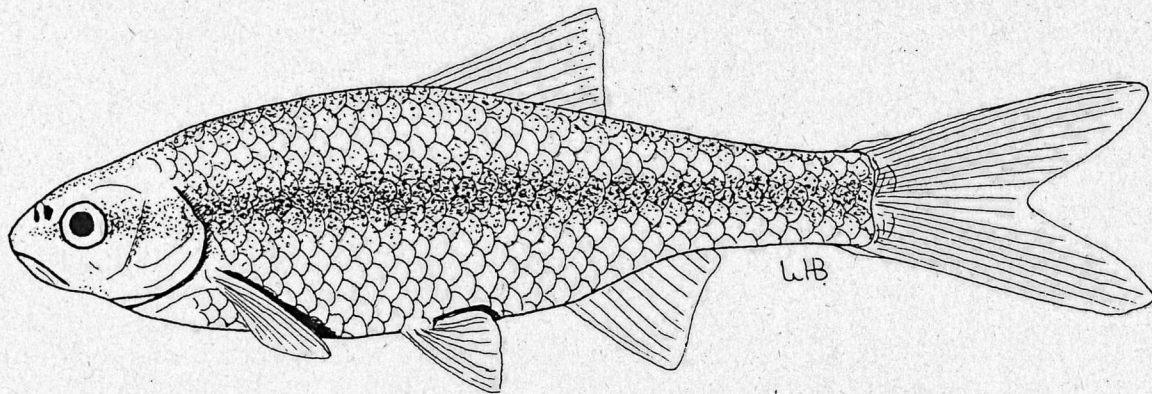
Meanwhile the staff at Bedford is palpably pleased to be otherwise engaged than in cutting down the forest, but they can expect to be challenged by their "interested publics" on administrative and possibly legal grounds: about burning the dry forest, about cutting non-native pine stands (environmentalists want them to die naturally), about holes in the forest. Even litigation need not be rancorously adversarial; it could be part of a conversation among parties who have the same thing in mind for the Hoosier—health and abundance. How about an oxymoron to set the tone of the conversation? Cooperative conflict.

I have heard a remote patch of old growth in Michigan's Upper Peninsula, the Michigamme, called the Once and Future Forest. Now, that is the legend with which Malory graved Arthur's epitaph in *La Morte D'Arthur*: "Here lies Arthur, the Once and Future King," surely the most felicitous phrase in English for burnishing the bittersweet glories of the past, and flinging them, renewed and hopeful, into the future. As it goes with the mythical Arthur, trailing his tattered grandiosity, and bearing the promise that he will always come to help the English, so may it go with the Hoosier National Forest, a small but important tumble of squared-off green geometry in the temperate forests that girdle the globe. **WERF**

*Sidney Collins (323 N. Hillsdale Dr., Bloomington, IN 47408) recently earned a masters degree at Indiana University to celebrate turning 50. She was present at the creation of Heartwood and serves on the Protect Our Woods board. She has two grown kids, and credits her treehugging to her own mother.*

## The Rio Grande Bluntnose Shiner (*Notropis simus simus*) and Phantom Shiner (*Notropis orca*), Cyprinid fishes from New Mexico

by F. Bryant Furlow



### ECOLOGY AND FATE

The Bluntnose Shiner and the Phantom Shiner, closely related minnows in the New Mexico reaches of the Rio Grande, were small omnivores inhabiting main channels of the river. They preferred sandy substrates. Their diets consisted mostly of algae, terrestrial invertebrates, and detritus (Bestgen and Plantania 1990). Mature males developed very small breeding tubercles across their faces during spawning season, but what function these ornaments performed is unknown. Eggs were free-floating (C. Altenbach, personal communication).

Dam building this century isolated populations and reduced water flow in the Rio Grande. Water diversions for agriculture may have destroyed free floating eggs by miring them in low-oxygen ditches. Agricultural biocides and mass fish-poisoning programs initiated in the 1960s by the government probably contributed to the two fishes' extinctions. The primary cause of these extinctions appears to have been habitat dewatering for crop irrigation. During the 1950s, severe dewatering was exacerbated by drought, completely drying extensive reaches of the river (Bestgen and Plantania 1990).

Both taxa were listed as State Endangered in New Mexico: the Rio Grande Bluntnose Shiner was listed in January 1975; the Phantom Shiner, in January 1988. In 1985, the Bluntnose Shiner was made a "notice of review" subspecies under consideration for listing as Threatened or Endangered under the federal Endangered Species Act. These legal designations were, unfortunately, post-mortum. After sharp declines in abundance and distribution beginning in the 1920s, the Rio Grande Bluntnose Shiner went extinct in the 1960s, with the last specimen collected in 1964. A sister subspecies remains in the Pecos River (*Notropis simus pecosensis*), but is endangered and declining (Furlow 1996). The last Phantom Shiner was collected in 1975 (Chernoff et al. 1982).

### LESSONS

Intact flow regimes are vitally important to minnows inhabiting main river channels. Stricter regulation or termination of seasonal irrigation withdrawals from the river would have been necessary to prevent these extinctions.

Conservation plans must explicitly protect spawning habitats and dispersing eggs or young. Limiting the level of dewatering allowed during the summer breeding and egg dispersal season for these shiners might have allowed their recovery. Many minnow species are especially sensitive to anthropogenic stresses; their declines are an early warning system for declining health in river ecosystems (Karr 1991). Endemic minnows can often serve as indicator species. By maintaining populations of the most vulnerable resident fish species, we can protect the biological integrity of whole aquatic systems, and assure true sustainability for human uses of river resources. ■

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# Poems for the Wild Earth

*Someday, if we are very, very lucky, we will know the oral epics of the barren ground caribou, the humpback whale, the monarch butterfly. We will learn the languages of a world to which most of us have turned a deaf ear. Until then, we rely upon the intuitive translations of the hunter-gatherers, the dreamers, the singers, the dancers, the poets. This collection tries, in its way, to speak for the wild earth. For this gift to fully work its magic, it must be carried, it must move. These are poems for walking, for quiet, for rallies and public hearings, and for prayer. These are poems to carry in the heart.*

*Follow these poems into the wild world, listen to them, carry them, and find your own way to speak for the wild earth.*  
—Garry Lawless

Dreamt of  
Moby Dick the Great White Whale  
cruising about  
with a flag flying  
with an inscription on it  
"I Am what is left of Wild Nature"  
And Ahab pursuing in a jet boat with a ray gun  
and jet harpoons and super depth charges  
and napalm flamethrowers and electric  
underwater vibrators and the whole gory  
glorious efficient military-political-  
industrial-scientific tech-  
nology of the great-  
est civilization the  
earth has ever  
known  
devoted to  
the absolute extinction and  
death of the natural world as we know it  
And Captain Ahab Captain Death Captain Anti-Poetry  
Captain Dingbat No Face Captain Apocalypse  
at the helm  
of the killer ship of Death  
And the blue-eyed whales  
exhausted and running  
but still  
singing to each other...

—Lawrence Ferlinghetti

## At the Planning Commission

That it should come to this—that we  
movers of the earth, cutters of trees,  
polluters of springs and streams  
should sit in a heated public room  
deciding where fences shall be run  
over the unresisting land,  
decreeing where power lines shall go  
and houses of the rich be planted!  
In the beam of the overhead projector  
a French-curve map stains the wall,  
lots laid out like steaks and chops  
on a butcher's cutting chart.  
I've seen this mountain in another light,  
toothed with the quiet symmetry of firs,  
after a night when deer and fox and owl  
fed and went to sleep, coyote's song  
brought the dark alive and skunk  
left a subtle warning on the wind.

Restlessly I cross my legs, uncross them.  
I have had my say. Now it is up to the five  
behind microphones at the front of the room,  
visibly tired, thinking of dinner,  
craving a cigarette, a coffee break.  
I forgot to tell them about the salamanders,  
dark as chocolate, torpid with cold,  
that move up the mountain about this time  
every year, how easy it is to drive  
right over them if you are unaware.  
I forgot to tell them about the golden eagle  
that clings to the top of the transmission tower,  
feathers in blue air, talons clutching metal,  
half in his world, half in one we made.

—Barbara Meyn

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*These poems appear in the new collection, Poems for the Wild Earth, edited by Gary Lawless (Blackberry Books); available from Gulf of Maine Books, 134 Maine St., Brunswick, ME 04011; (207) 729-5083.*

## Abomination

(The Christians) swept aside ancient gods  
who inhabited woods and pools of water.  
*from a guidebook to Mont Saint-Michel*

It was my pool. I had lain there underwater  
on my back for ages, my brown bony knees  
propped up, knobs just barely breaking  
the surface. My arms were like skinny  
branches covered with fountain-moss, furry  
with silt, with collected smut  
of decayed carcasses.

I was the one who made shelter  
for the kingbirds and the plumatella.  
It was my hair that tangled and nested  
for the seed shrimp. My mouth  
was the rock cave in which redfins  
and sirens took their refuge.

Staring up from the bottom, my eyes  
caught the moon, brought light and sky  
in the only way possible to the tube worms  
and crayfish.

I opened my arms and made the girth  
of the bank. I let naked human beings  
dive as deeply as they wanted. I held  
the firmament in my lap of clear water.

And no one feared me. I asked for nothing  
from my congregation—those swimming lilies,  
floating bullfrogs, my pea buds  
and copepods and duck potatoes—except  
that they flourish.

So what right, what reason, did those others  
have to come thundering down with their rakes  
and holy brooms, to disgorge me, to drag me out  
by the hair, to strip me bare? Newts,  
peepers, cooters, catfish, all were slipping,  
thrashing, spilling from my body.

They left me there, useless and withering  
on the rocky bank. But I could have lived with them.  
I never mocked, I never denied, I never  
proselytized. And when did they ever bless  
or cherish or sing hymns to minnows and limpets?

Just fins and awns, mollusks, and scuds,  
springtails, teals, fruited rushes, silly  
children—I never wanted to be a god  
to any saints.

—Pattiann Rogers



## the good news

Roads disappear, and the caribou wander through.  
The beaver gets tired of it, reaches  
through the ice, grabs  
the trapper's feet,  
pulls him down.  
Wolves come back on their own,  
circle the state house, howl at the sportswriters,  
piss on the ATVs.  
Trees grow everywhere.  
The machines stop,  
and the air is full of birdsong.

—Gary Lawless



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# Lake Champlain Committee

## *A Voice for the Lake*

**F**or thirty-three years, the Lake Champlain Committee (LCC) has worked to clean up and protect "the littlest Great Lake." Speaking on behalf of the entire watershed of the sixth largest lake in the US, covering 439 square miles and holding 6.8 trillion gallons of water, LCC members' dedication to the 8234 square mile basin extending into the Adirondack and Green Mountains runs as deep as the waters they strive to protect.

This non-profit organization formed in 1963 to halt the development of Lake Champlain as an international seaway. In 1968, the committee blocked construction of a nuclear power plant on the Charlotte shore. The campaign against phosphate pollution began in 1978 when the group led a lake-wide effort to ban the use of phosphate detergents. The LCC summoned the first major regional conference on phosphorous pollution, and in 1979 began a citizen monitoring program, the only ongoing data collection effort in Lake Champlain today.

Internationally, the LCC in 1988 helped set up a cooperative management forum between New York, Vermont, and Quebec. One year later the UN recognized Lake Champlain as a unique natural resource after persistent urging by the LCC. This led to the establishment of the Adirondack-Lake Champlain Biosphere Reserve in 1990.

Also in 1990, the LCC became a federal entity under the Lake Champlain Special Designation Act, receiving federal funds to protect and improve Lake Champlain's health by researching threats to ecosystem integrity and devising expedient solutions. In 1991, Vermont accepted the LCC's water quality standards, which mandate specific lake clean-up goals for the first time.

As the voice for the Lake, the LCC sponsors educational programs, publishes articles and reports on key basin issues, and testifies at hearings and before legislative committees. LCC members also influence policy decisions through their work with local, state, and federal agencies, businesses, and citizens. The LCC's 2500 individual and organizational members include community activists, chamber members, ecologists, biologists, environmental advocates, anglers, boaters, lawyers, doctors, store owners, farm agents, Rotarians, and property-owning summer and year-round inhabitants. The LCC's New York chair, Claire Barnett, warns that despite the group's past successes, Lake Champlain remains threatened:

*Closed beaches; slimy lake bottoms; choking weed growth; invaders like zebra mussels; inadequate access points for swimmers, hikers, bikers, paddlers, and sailors; scores of leaking hazardous waste sites; PCB problems; fish so contaminated by toxics that children shouldn't eat what they catch; sewer overflows; parasites; pesticide and heavy metal contaminants. Although cleaner than it was ten years ago, Lake Champlain has recorded phosphorous levels approaching those in Lake Erie in the 1970s. After years of receiving pollutants, this is indeed a Lake at risk.*

To minimize these threats, the LCC has been striving to strengthen the Lake Champlain Basin Program, described in the document "Opportunities for Action—An evolving plan for the future of the Lake Champlain Basin." The Committee believes that the plan should have four main priorities: 1) no further degradation of natural resources; 2) care of the Lake from an "ecosystem approach"; 3) comparison of the full benefits of environmental improvements over the long term with estimated costs; and 4) creating primary roles in protecting and interpreting the ecosystem for community-based organizations.

The LCC supports a non-degradation policy whose goals include lower algae levels, better fish survival and growth, cleaner water for swimming, and safer drinking water. Currently, pollution from sediments, toxic compounds, pathogens, and invasive, non-native species such as zebra mussels and water chestnuts contaminate the lake and parts of the vast network of rivers, brooks, lakes and ponds that comprise the Lake Champlain Basin.

More than 81 species of fish, 21 species of amphibians, and 318 species of birds live or breed in the Basin. State and federal agencies currently list approximately 5% of these organisms as endangered or threatened. Management has generally focused on individual species, although LCC's executive director, Lori Fisher, happily reported that the latest draft of the Basin plan takes an ecosystem approach. The LCC advocates integrated management which would examine the interactions between wildlife, humans and changes in the Basin ecosystem. Methods of such an ecosystem approach would include monitoring biological indicators to assess water quality, incorporating aquatic food web models into fisheries management decisions, identifying and restoring vulnerable habitats and habitat corridors, and supporting conservation organizations, such as land trusts and The Nature Conservancy, to acquire land and easements from willing landowners.

The LCC supports the creation of an independent body with a high degree of authority to achieve the goals of the Basin Program. Since 1990, the Lake Champlain Steering Committee has been responsible for coordinating the conservation efforts of more than 225 federal, state, county, and town governments in two states, one province, and two nations. The LCC has called for the addition of the Environmen-

tal Protection Agency (EPA) to the environmental agency heads from New York, Vermont, and Quebec who presently form the Steering Committee. The Steering Committee would then be able to respond effectively to management concerns requiring inter-jurisdictional coordination, such as lake-wide water quality standards, and would have the authority to set policies to be adhered to by all involved jurisdictions. Presently, drafts of the Basin plan have been suspended by federal furloughs handicapping the EPA. Also, in the fall of 1995, under the new governor, George Pataki, New York pulled out of the agreement on proposed joint standards of phosphorous levels.

Despite these setbacks, public hearings on the draft plan have been set for April 1996. LCC's Lori Fisher feels that the gravest threats to Lake Champlain today are phosphorous and toxic pollution, which are less tangible than some threats and therefore arouse less public emotion. She urges the 188,000 people who depend upon the Lake Champlain drainage basin for drinking water to support the LCC's efforts to clean up and preserve Lake Champlain. The larger and louder the Committee is, the healthier the lake will be. ■

Contact the Lake Champlain Committee at 14 South Williams St., Burlington, VT 05401-3400; (802) 658-1414.

*This article was prepared by Wild Earth intern Amy Flanders, drawing from an address by Claire Barnett to a Lake Champlain Management Conference, as well as from the Spring 95 LCC Issue Bulletin.*



illustration by Nancy Roy



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# Let's Get Political

*(Environmental Groups Must Organize or Die)*

With their current organizational structure, most environmental groups buy into a bargain that deprives them of the two most potent tools to stop the onslaught on environmental protections—mobilizing the public to lobby elected officials, and opposing or supporting candidates for office. Environmental groups' old paradigm of insider lobbying and public education barely held even in the 1980s, and is failing to stop the rollback of environmental laws in the 1990s. As we look toward a new century, the environmental movement must face the need for a fundamental reorganization of both its organizational structure and its tactics.

In 1970, the year of the first Earth Day, environmentalists developed their political muscle. During the following decade, Congress and a series of Presidents responded by enacting—with bi-partisan support—sweeping environmental laws including the Clean Air Act, Clean Water Act, Endangered Species Act and the National Forest Management Act. As a result, environmentalists could participate in National Forest planning, comment on environmental impact statements, and engage in other non-political public policy activities to implement these new laws.

Environmentalists gained government access in both the legislative and executive branches, and increased the use of the judicial branch. The environmental movement had become an institution. Our ranks, both professional and volunteer, swelled with public policy-types comfortable arguing over issues such as how many parts per billion of some toxic compound was safe; and we took for granted the environmental laws.

In 1980, President Ronald Reagan made the environment a partisan issue. The environmental movement responded by abandoning its bipartisan tradition and embracing the Democratic party. In the process, national environmental groups and the Democratic Congressional leadership struck an unconscious bargain: The Democrats would make sure that no horrible environmental legislation passed, but no great environmental legislation would pass either. Once this deal was sealed, the Democrats took environmentalists for granted, as they did African Americans and organized labor, and the muscle we once had turned into flab.

In 1992, the Democrats won the White House, and environmentalists were optimistic. For the first time in more than ten years, we thought we had both a Congress and a President who supported the environment. Unfortunately, after a decade of embracing Democratic candidates, environmentalists nonetheless had lost an environmental majority in Congress. The Democratically-controlled 103rd Congress turned out to be the worst for the environment in modern history (although it has since been outdone by the present 104th).

*As we look toward a new century, the environmental movement must face the need for a fundamental reorganization of both its organizational structure and its tactics.*

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*by Andy Kerr and Sally J. Cross*

Upon the January assumption of top Congressional positions by Newt Gingrich and Bob Dole, the national environmental movement found itself without access. Gone was the national environmental groups' best defense: killing bad bills.

Today, politicians don't pay a price for voting against the environment. Until they do, the Earth doesn't have a chance. Our opponents have made sure that politicians do pay for voting to protect the environment.

As a movement, we're in a bind of our own making—politicians feel comfortable voting against environmental protections that have widespread public support. We have failed to translate the environment's strong public support into effective political action; that's why we're now fighting a massive effort to roll back environmental laws. To regain our bi-partisan environmental majority, we environmentalists must dramatically change the way we operate.

A systemic problem with most environmental organizations is their designation under the Internal Revenue Code. Most have chosen a tax status that severely limits their use of the most effective tools to protect the environment.

Why do they do that? Most environmental groups have section 501(c)(3) tax status, which provides significant benefits, including federal and state government tax subsidies; but these benefits come at a price. All 501(c)(3) organizations are:

1. Limited in the amount of lobbying they can do to 20% or less of their budget, with a maximum of \$1 million per year. By way of comparison, the National Wildlife Federation's budget is nearly \$100 million per year.
2. Further limited to 5% or less of their budget, with a maximum of \$250,000, for grassroots lobbying efforts. A group with a multi-million dollar budget can only spend a tiny fraction of its budget reaching out to the public, saying: "call Congressman X at Y number and tell him to vote no on this bill."
3. Prohibited from supporting or opposing the election of candidates to office. In Oregon, according to the Western States Center, extractive industries contributed nearly \$2 million dollars to candidates for the state legislature in the 1994 election. In contrast, environmentalists contributed just over \$46,000.





Is anyone surprised that we're losing ground?

Many groups have felt that the advantages of being a 501(c)(3) outweigh the disadvantages. Even since the last election, few have made plans to change. Although many now talk about grassroots organizing, until they change, their tax structure prohibits them from mobilizing that concerned public as an effective political force—organizing them to flood Congress and state legislatures with calls opposing anti-environmental bills. Our opponents know better, and have out-organized us in the public arena, at the ballot box, and in Congress. But a solution exists.

With little extra work, environmental groups can keep their current 501(c)(3) operations, and “affiliate” themselves with another non-profit organization sharing a mission. This affiliated group gives up the tax subsidies and benefits in return for losing restrictions on activities. This other type of organization is known as a section 501(c)(4). Such close affiliation has been affirmed by the US Supreme Court.<sup>1</sup>

This is not an unusual structure. Many groups, including the League of Conservation Voters and the Sierra Club, and social action groups ranging from the pro-choice NARAL to the religious right Oregon Citizens Alliance, are organized as affiliated organizations.

Groups like The Wilderness Society and National Audubon Society have always been operated as (c)(3) organizations. The National Wildlife Federation and Friends of the Earth have affiliated (c)(4)s, but they have not been active. We hope this will change.

On 1 October 1995, Oregon Natural Resources Council, a (c)(3) since its inception, changed its name to ONRC Fund, and affiliated itself with a new non-profit organization named ONRC Action. This requires that we ensure that the “subsidized” money (the Supreme Court’s term) we receive from tax-deductible contributions and foundations is used only for the exempt purposes of education, research, litigation (yes, litigation is okay since it is seeking to enforce existing law, not change it), and agency monitoring and appeals.

ONRC Action is funded by members’ non-deductible contributions to support lobbying and mobilizing the public to speak out against bad bills. The (c)(4) ONRC Action has established Political Action Committees (separate federal and state PACs because of differing limits on contributions and expenditures).

Financially, we expect the “new” ONRC to do as well or better. Most of our supporters are motivated by the actions we take, and we can take a wider variety of actions as affiliated groups. ONRC’s administrative costs have increased during the start-up phase, but should return to normal after we get used to accounting for the affiliated organizations.

In Oregon, at least, politicians in both parties are going to start paying a price for voting against the environment. Working with the other Oregon environmental PACs, ONRC Action PAC will be a player in the 1996 elections.

An affiliated structure makes sense for many, if not most, environmental groups. The environmental movement as we have known it is finally dead. We should all thank Newt Gingrich for putting us out of our misery.

Many environmental organizations have not recognized this death, but soon will. Some will resurrect themselves to effectively respond to this new world order; others will not. Those who survive will make the environment a bi-partisan issue again, just as the crime issue is now. Each party will compete to do the most for the environment. Never again will we environmentalists allow ourselves to become dependent on one political party.

We must stop being just policy wonks and get to work mobilizing the vast public support for environmental protections as a grassroots political force in Congress, in state and local governments, and at the ballot box. Labor organizer Joe Hill’s reputed last words to his supporters were, before going to his state-sponsored end, “Don’t mourn my death. Organize!”

To do so, we must have the right tax status. ■

*Andy Kerr is executive director of ONRC Action. He works in Portland and lives in Joseph, Oregon. After 19 years, he can finally tell you—on company time—not to vote for that salmon-hating, clearcutting “pimp for the timber industry” Senator Mark Hatfield (the senator’s self-describing quote); but he need not, for the pimp is retiring.*

*Sally Cross is political director of ONRC Action. A long-time campaign organizer, she has worked on numerous statewide and local candidate and initiative campaigns, and now organizes ONRC’s advocacy and legislation work. She’s looking forward to her first election season with ONRC PACs.*

<sup>1</sup>Regan v. Taxation With Representation, 461 U.S. 540, 76 L.Ed.2d 129, 103 S.Ct 1997 (1983)

# Coalition Concocts Winning Recipe for Utah

by Mike Matz

With troglodytes like Representative Don Young and Senator Frank Murkowski chairing key public lands Congressional committees, saving wilderness in today's political climate is no easy task. The struggle really centers on stopping spurious development schemes and blocking assaults on the 1964 Wilderness Act. Both threats are embodied in legislation sponsored by Republicans in Utah's delegation.

"This is the first Wilderness bill to be considered by this administration," said Rep. Jim Hansen of H.R. 1745 and S. 884, the Utah Public Land Management Act. Politicians who have made a career of bashing wilderness drool at the prospects. Ooooh, what pieces of legislation these two are!

The companion bills would allow construction of new dams, roads, and transmission lines in four areas (six in the House version) that would be designated "wilderness." Jeep routes and cattle paths that Utah's counties claim are "public highways" would remain open to off-road vehicles in all designations. The BLM would be required to allow the military to affix communication towers to peaks in the mountain ranges, and would have to ensure that livestock grazing is not rendered economically infeasible—opening the door for chaining, herbicide spraying, new stock ponds, and access roads inside "wilderness."

Why stop there? H.R. 1745 and S. 884 reserve no water for "wilderness," permit jet skis on "wilderness" waters, and authorize roads to be built in "wilderness" for access to communication facilities and water projects. The "wilderness" established by these bills would receive less protection than currently afforded other public lands managed under existing laws by the Bureau of Land Management, already the most permissive land managing agency.

In the Utah delegation's mindset, even that is not enough. They threw in hard release language. Forget about future Wilderness designation of any of the remaining 22 million acres of public land managed by BLM in Utah. After the 1.8 million acres of "wilderness" are designated by these bills (or maybe 2.1 million acres because we're thinking of tossing you a bone), that's it. No such language has been included in any previous Wilderness legislation that has passed Congress.

"Efforts to create additional Wilderness are almost over," opined Senator Larry Craig as the Senate Energy and Natural Resources Committee approved S. 884.

Senator Craig, we beg to differ. This is a wilder-less bill, and we're doing our damndest to stop it. When we do, we'll be there at the door with the citizens' proposal for 5.7 million acres of true Wilderness on BLM lands in Utah.

Last December, Reps. Hansen and Waldholtz went to bring H.R. 1745 up for consideration on the House floor, but pulled it down when they found they likely lacked the votes. This legislation was once expected to roll through the House. Now eyes turn toward the Senate. The measure of success achieved by the Utah Wilderness Coalition offers hope for other environmental battles. What is our recipe for success?

**THE UTAH WILDERNESS COALITION**



### **Organize, organize, organize.**

Grassroots recruiting, education, and organizing are key ingredients. Without an activist base, you have little on which to build, less credibility to advocate a position, and difficulty in swaying the debate on terms favorable to your goal. Any campaign has to have committed people behind it. That's what we have that the dark side generally doesn't.

During early sessions held in Utah, we smoked them good. Seventy-three percent of those who testified or wrote letters, during the circus of four rural town hearings and one Salt Lake City hearing, indicated support for the citizens' proposal. This didn't happen by accident; it took a whole lot of phone banking, action alerts, door-to-door canvassing, slideshow tours, home video showings—right on down to printing yellow "5.7 Wild" buttons and arranging car pools.

When Utah's politicians didn't listen, we organized a citizens' hearing. Over five hundred crowded into a rented hall and people stayed until one in the morning to make their comments, which were officially transcribed by a court reporter, then sent to supplement a Congressional hearing record.

With stalwart local support behind the citizens' proposal, we had an easier time broadening the campaign. The kinds of activities that the Utah Wilderness Coalition undertook in-state are the same that needed to be done on the national level. Especially when expanding a campaign, the next ingredient is critical:

### **Add media.**

Grassroots activists can be a fount of letters-to-the-editor and opinion pieces. These and other earned media exposure help to educate citizens on the issues and recruit more people to write letters to elected officials. We keep a steady stream of campaign materials flowing to media contacts, meet with editorial boards across the country, and take visiting reporters from newspapers, magazines, and television on tours of America's Redrock Wilderness. Visibility breeds interest and enthusiasm in activists and media, fear and loathing on the part of decision-makers.

### **Top with lobbying.**

The most effective lobbyists are volunteers—the regular citizens who take time away from their jobs and families to visit their members of Congress in Washington. We've held a series of training sessions and offer an internship program. After anywhere from a week to a month in Washington, with a weekend of workshops and some hands-on experience, these people return to their states as activists, brimming with new ideas, greater knowledge, and more confidence about how they can effect change. We now have a whole network of Wilderness Warriors deployed across the country.

### **Yup, it takes money.**

You can't save wilderness, protect endangered species, or safeguard clean drinking water without money. Production and printing of materials, postage for mailings, long distance calling, grassroots organizers even at poverty-level salaries, all take money, though considerably less than our adversaries spend. Fund-raising need not be daunting. As with any other aspect of a campaign, start small. The Utah Wilderness Coalition scrapped together enough from small donors for the first mailing, wrote foundation proposals for the organizer's salary, put out a collection box at the citizens' hearing. Hard work generated successes that made lobbying for money—yes, it takes some arm twisting—easier and more enjoyable. We gave people confidence that we can win this campaign.

### **Continue to stir the pot.**

But we can't win it without additional efforts of people like you. We need your help in any of the ways mentioned above, and specifically now by asking your senators, through letters or visits when they're back in the state, to filibuster S. 884. ■

*Mike Matz is executive director of the Southern Utah Wilderness Alliance (1471 South 1100 East, Salt Lake City, Utah, 84105-2423), one of 92 organizations locally and nationally that form the Utah Wilderness Coalition. The UWC has adopted a proposal initiated by residents of Utah to designate as Wilderness 5.7 of the 22 million acres of BLM public land. If your organization would like to join them, call Liz McCoy at 202-675-7910 or 801-486-2872.*



*Yucca woodcut by Patrick Dengate*

# Limitations of Conservation Easements

by Jamie Sayen

In the Fall 1995 issue of *Wild Earth* Brian Dunkiel described the uses and advantages of conservation easements in implementing The Wildlands Project vision. While I feel he has made a very helpful contribution to the work of TWP, I am afraid he has an overly optimistic view of the value of easements. I would like to briefly describe some of the limitations and potential disadvantages of conservation easements.

The first question to ask about easements is: what is the situation? If you are trying to establish large core wilderness reserves in a state such as Maine with scant public land (less than four percent of the state) and even less designated Wilderness, easements are of very limited value. Most needed is public acquisition of large tracts of undeveloped lands (and some of these tracts are available in Maine today, courtesy of the large paper companies). Outright public acquisition combined with the adoption of a state constitutional amendment modeled after New York's "Forever Wild" Article 14 is the proper response.

Once the public has acquired large core wilderness areas, easements may play important roles: in protecting buffer zones and wild corridors to help bridge two (or more) large core areas. Easements generally are not, however, the best way to protect habitat of sensitive, rare, threatened, and endangered species and natural communities, unless stringent limits are placed on permitted uses by the landowner, and adjoining areas are equally well protected. To safeguard sensitive species and habitats, there is often no substitute for full fee acquisition.

The second question to ask about an easement is: how much does it cost? Often, the answer is *too much*. The most common form of a conservation easement in the Northern Appalachians is one that restricts development of condos, second homes, and malls. Lands threatened by such development are expensive, and an easement to acquire the development rights usually will cost more than 50% of the full fee price of the land; in some cases the cost rises as high as 90-95%. When you have to pay that much, why not buy it outright, so the public really enjoys control over the future uses of the land?

Dunkiel writes that an easement "could be crafted to permit only low impact activities such as hiking or to prohibit human activity altogether." I submit this is highly unlikely and will be very expensive. Better to buy it outright.

Dunkiel also suggests that easements can be acquired by land trusts, thereby avoiding the whims of legislatures. This is true, but misleading. While I am a big fan of private conservation organizations and land trusts, I am also aware of their financial limitations. Even The Nature Conservancy, the wealthiest conservation institution, is usually not able to afford the largest acquisitions, such as the seven million acres of absentee corporate lands in northern Vermont, New Hampshire, and Maine that are the basis of my proposed Headwaters Wilderness Reserve System. (See *The Northern Forest Forum*, vol. 3 #5.) We'll need public acquisitions to transcend the current site-specific, small-reserve systems that are the most private conservation groups can afford. (Note: I support their efforts, and I recognize the importance of protecting habitats of rare species and natural communities; but we must view these smaller, isolated reserves as components of a larger wildlands system that also contains reserves encompassing millions of acres.)

*To safeguard sensitive species and habitats, there is often no substitute for full fee acquisition.*



In the Adirondacks, the legislature cannot remove protection from state lands without amending the state constitution, because of Article 14. Other states should adopt versions of Article 14.

A third question is: what uses will be permitted? In the Northern Appalachians, almost all easements are designed to thwart development and maintain the "working forest." In some places, such partial protection may be appropriate, but if this strategy is followed as a substitute for establishing large, publicly-owned core reserves, it will be a disaster. Since few conservation easements in our region prohibit such activities as clearcutting, plantation forestry, herbicides, road building, and the stocking of exotic fish, easements have often become an expensive subsidy to clearcutters. This happens because the seller doesn't wish to surrender these "rights" and because the buyer is more worried about development than bad forestry

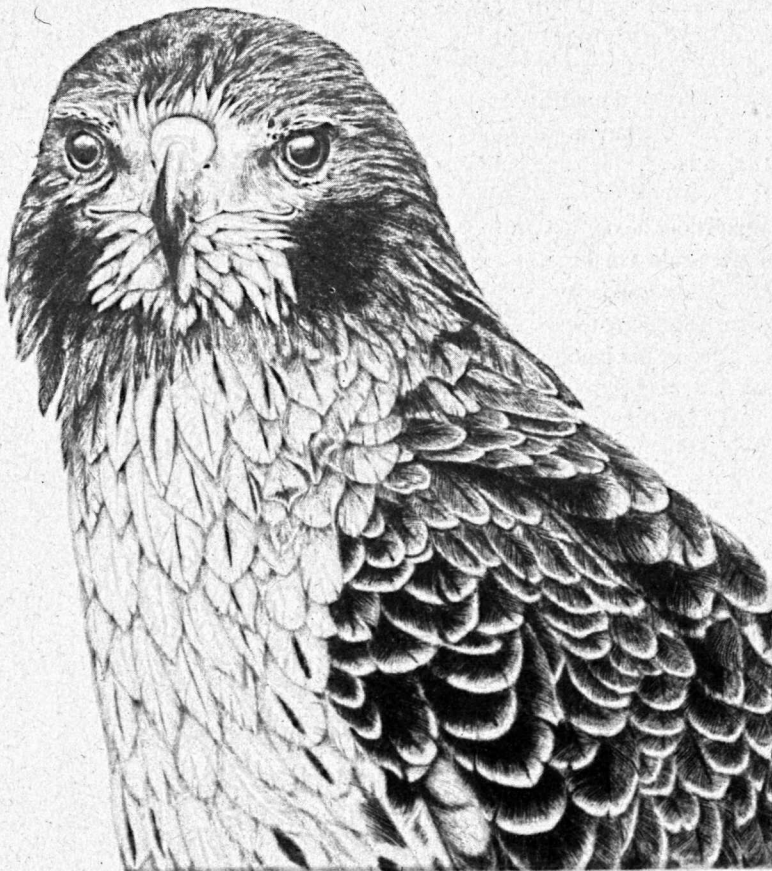
and inappropriate wildlife management. Unless specifically precluded, easement lands may suffer from agricultural runoff of pesticides and fertilizers and excessive recreation pressures.

An example from New Hampshire illustrates the problem of relying on easements to protect ecological integrity. In 1992 the State of New Hampshire acquired development rights to 2250 acres near the Lake Umbagog National Wildlife Refuge from James River Corporation. The conservation easement prevented James River from building a "dwelling, tennis court, swimming pool, dock, permanent aircraft landing strip, tower, [or] mobile home." However, "roads, dams, fences, bridges, culverts, barns, maple sugar houses, trailers, and sheds" are permitted. The easement allows James River to "cut and remove forest products, including but not limited to trees, logs, poles, pulpwood, firewood, chips, stumps, biomass; and to clearcut." The easement states that if "disagreements arise as a result of placement of such structures or improvements, the dispute will be resolved in favor of continued forest management."

Dunkiel has made some very helpful suggestions regarding easements. We should map all protected areas, including conservation easement lands, as a first step in designing Wildland reserves. In areas with large state lands, such as the Adirondacks, or federal lands, such as in the western United States, easements can be a very good tool for connecting and buffering these public lands.

In conclusion, conservation easements can be a very useful tool for supplementing designated Wilderness Areas in buffer zones and connecting corridors. They are useful in protecting the "working forest" from development. But they are an expensive, ineffective method for landscape-level protection of ecological and evolutionary processes. Full-fee acquisition is the only method that can adequately protect habitat for threatened and endangered species and ecosystems. To this end, we need to work for allotment of county, state, and federal funds for purchase of available undeveloped lands; and work to secure constitutional protection for publicly owned wildlands so that legislatures cannot weaken or repeal their statutory safeguards. The federal government should revitalize and enlarge the Land and Water Conservation Fund, and states should adopt New York's Article 14 "Forever Wild" Constitutional amendment. ■

*Jamie Sayen works with The Wildlands Project in the Eastern Northwoods and publishes The Northern Forest Forum (\$15 for 6 issues per year), POB 6, Lancaster, NH 03584 (checks payable to Earth Island Institute). He is author of a proposal to establish an 8-million acre HEADWATERS Wilderness Reserve System in northern Vermont, New Hampshire, and Maine.*



*Red-tailed Hawk (Buteo jamaicensis) by Gerry Biron*



# Unwise Use

by PJ Ryan

**N**ow buckaroos, the corporations and other highbinders behind the so-called "Wise Use" Movement are very good at managing images, symbols and myths.

The American West is a powerful symbol of freedom to the middle class American. If you were to ask the average middle American to list the first five things he/she would do if they won the Publishers Sweepstakes, chances are that one of the things would be to buy a ranch "Out West." Now our lottery winner may never have sat on a horse or seen a cow in its pre "Big Mac" incarnation, but they have a feeling that if they had a ranch Out West, things would be different, better. No boss tellin' you what to do (why, you'd be the boss, an' everybody better damn well know it). The kids would grow up in a rugged, interesting environment, no drugs or worry about their runnin' with the wrong crowd. No problem with those pesky minority groups; no noise, or traffic, or commutes, or the rest of the bad stuff from the end of the century. When you came into town, you'd BE somebody! You'd have your own chair at the Stockman's Cafe where you would drink coffee with important people; cattlemen like yourself, and talk about how America was going to hell in a handbasket with all the welfare, crime, liberals, bureaucrats, vegetarians, and other perverts.

Well, Yes! It sounds great! I'll do it! Let me win the 10 million dollars and I'll go to Montana! I'll buy the ranch next to Ted Turner and Jane Fonda! I ain't proud!

Now, buckaroos, as you and I have been bit players in the continuing saga of the West, we know that the mechanics aren't all that easy. Running a cattle operation is not all that simple; the devil is in the details, as the saying goes. It's odd that people who, given their druthers, would never opt to be rocket scientists or neurosurgeons, cheerfully would like to "have a ranch 'Out West'" as if the required knowledge would be acquired by osmosis.

Strangely enough, it does happen! That's why it's part of the American Dream. The dude goes West; somehow gets himself a ranch and survives assorted tribulations and hazing from veteran cowboys, acquires a masters degree in the manly art of handling cattle, horses and men, becomes a better person for it and wins the girl in the last reel. Like I say, it does happen and was pretty much what happened to Teddy Roosevelt on his way to the White House. Teddy always said that he could not have become president if he had not first become a cattleman in Dakota territory ('Cause it just sort of made him better than everybody else; though he was too shrewd a politician to say so out loud).

*The "Wise Use" people have cleverly exploited the dream of the American West by setting up a sort of David and Goliath match between the folksy, lovable "Mom & Pop" ranchers and a huge, oppressive mysterious Federal government staffed by "outsiders" from another planet (the effete East).*



Even today, it happens; like winning the lottery. In 1960, Bud Griffin, a kid in Vermont, of all places, dropped out of high school and hitchhiked to Montana with the improbable goal of becoming a cowboy, equipped with only the knowledge gleaned from watching television Westerns. Improbably, he was hired and is now the foreman of the 150,000 acre "Flying D" ranch in Montana.

Even Edward Abbey, the arch foe of the welfare cowboy and author of the short essay "The Cowboy and His Cow," the most hilarious put-down of the Western cattle industry ever written, was once a starry-eyed cowboy wannabe. It was the original reason he came out West, so he could be like John Wayne, Gary Cooper, or Teddy Roosevelt. Perhaps he didn't meet the right ranchers, or maybe he did; at any rate, it took a long time for the scales to fall from his eyes. The heroes of some of his novels are cowboys or cattlemen, and some of his novels and essays search for a sort of nomadic cattle culture that would replace "evil" modern industrial society. It took him quite a while to get to writing the "Cowboy and His Cow," by which time the chances of an ordinary American getting an opportunity to buy a cattle ranch were about as remote as, say, winning the Publishers Sweepstakes or the Florida Lottery.

Still, the romance of the cowboy lives on due in part to the fact that a whole television generation was raised on programs like "Bonanza" and everyone wanted to be like the Cartwrights and live on the Ponderosa, as generations before read Zane Gray and wanted to do likewise.

The "Wise Use" people have cleverly exploited the dream of the American West by setting up a sort of David and Goliath match between the folksy, lovable "Mom & Pop" ranchers and a huge, oppressive mysterious Federal government staffed by "outsiders" from another planet (the effete East).

There are about 27,000 federal land ranchers in the US, with an additional one or two million vociferous supporters, mostly in the rural West. Like most minorities, its members are peaceable, law-abiding, neighborly, somewhat opinionated folks, who wish to be left alone to earn their living.

But not all of them. Some of them are quite hazardous to the health of federal land managers.

"When the hour strikes, there will be public officials dead in the streets" according to "Wise Use" activist Jess Quinn.

Another "Wise Use" activist stated at a public hearing in Everett, Washington, "We have a militia of 10,000 and if we can't beat you at the ballot box, we'll beat you with bullets" (ah, well, so much for representative democracy!).

Meanwhile, out in Colorado, state representative Ken Chlouber wants to "hang an EPA employee at each end of town" (presumably for protecting the environment rather than for civic beautification).

Over in Nevada, a Bunkersville rancher refused to pay grazing fees for 80,000 acres of federal land as required by law, explaining, "I don't want bloodshed, but I won't back down."

New Mexico is particularly blessed with "Wise Users." Dick Manning, who runs a mine on public land in Gila National Forest, says he'll meet any federal official who tries to check his mine for water pollution with "100 men with rifles." Over in Catron County, a Fish & Wildlife biologist was told, "If you ever come down to Catron County again, we'll blow your head off."

According to Jeff DeBonis of PEER, "Some Wise Use activists have produced and distributed a list of public employees with their home numbers, and in some areas, have been given instructions on how to harass public officials, including finding out where they live, picketing outside of their homes, using 'lurid' and 'outrageous' signs."

This pseudo-populist hysteria has even seeped into the East. Anonymous fliers were found tacked to telephone poles in Pennsylvania offering a \$10,000 bounty for every dead federal agent.

Now buckaroos, all this rhetoric inflames those who were not too tightly wrapped to begin with, country road beer hall losers with no discernible future, and thus no concern for the future of anyone else. Those folks are, to put it mildly, "easily influenced." Without firm opposition, these folks see themselves as the flaming spear point of a mass movement and perpetuate irrelevant but bloody acts of violence such as the Oklahoma bombings and the AMTRAK train sabotage.

How was this handled in the past? Around the turn of the century, ranchers in the Northern Rockies told President Theodore Roosevelt that Forest Service boundaries meant nothing to them, that they would graze cattle without fee and would kill any forest rangers who tried to stop them. The "Cowboy President" averred that they probably could kill some of the rangers, but would then face the US calvary who would kill all of THEM. The ranchers got the point and there was no trouble.

More recently, when a fanatical Oregon rancher and his friends threatened to slit the throat of Forest Ranger Don Oman for enforcing environmental grazing regulations, an angry President Bush threatened to "Do whatever it takes" to ensure the safety of Ranger Oman and see that the regulations were enforced on federal land.

The president incumbent, who seems to be perpetually running for "Most Popular Boy in the Senior Class," has not provided the sense of firm resolve in backing up federal land managers as exhibited by his predecessors Roosevelt and Bush. This is a pity, as concern for protection of the environment seems to cut across party lines and might well be the winning card in the 1996 campaign. ■

*PJ Ryan works for the National Park Service and publishes "the oldest alternative newsletter in the federal government" (Thunderbear, POB 2341, Silverspring, MD 20915, \$13.50 per year). The article above is from the October 1995 issue (#181).*

# Over-Glossied and Imaged-Out

*Toward a Deep Photography Ethic*

Kodachrome,  
give us your nice bright colors  
give us your greens of summers  
makes you think all the world's a sunny day  
*Oh yeah...*

—Paul Simon

Once upon a time we could be educated and stimulated to protect Nature by viewing its beautiful imagery. The playing field has changed, however, since the days of Ansel Adams activism and Sierra Club exhibit format books. The production and consumption of Nature imagery has become big business, and as depictions of her multiply in print and film, in our homes and even on our bodies, real Nature is disappearing, fast.

It is a curious aspect of humanity that we love to display what we have conquered, or are conquering. Images of wild Nature and indigenous art have become the *motif de rigueur* in American decor. Native artifacts and imagery adorn lavish lodges built on grounds once sacred to peoples shoved aside by industrial society. Earth wrecking corporations like General Electric, DuPont, Weyerhaeuser, Standard Oil and others trim themselves with romantic, picture postcard imagery of Nature to increase their acceptability among a public connected more to color-glossied and electronic representations of Nature than to the real thing. We have become content, it seems, with fakery.

From a narrow perspective, photography is easily justified. It provides a means of recording everything from one's family history to studying Nature to the enjoyment of fine art to a sense of the hunt. It can be truly wonderful. However, the cost of this wonder is enormous and in the larger view, photography's impact upon our lives may be overwhelmingly negative. The ideas brought forth in this essay will not be popular. Nonetheless, as all technologies need to undergo careful scrutiny these days, photography must take its turn at the table.

Eighteen years ago, social critic Susan Sontag took photography to task in her seminal book *On Photography* (a book with no photographs). In it she suggested that a society becomes "modern" when images are themselves coveted substitutes for firsthand experience. And now, we post-moderns may be so well equipped with fine photographs of our environment—a duplicate and more accessible world of images, enduring and always beautiful—that acting to preserve it seems of minor importance. What has the massive proliferation of imagery done to our consciousness?

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*by Daniel Dancer*

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## Environmental Impacts

The ecological impacts of the chemical-intensive process we use to make and store our imagery—from film making, developing, and printing to camera manufacture and publishing—are enormous. According to *Sludge Newsletter*, a respected industry report, the chemicals and heavy metals used in the photographic process, when totalled up across industry lines, may account for roughly half of US toxic waste.

The source of this statistic was the EPA; so while in DC last year with a coalition delivering copies of *CLEARCUT: The Tragedy of Industrial Forestry* to members of congress, I spent an afternoon at the EPA headquarters trying to track down this figure. Several officials noted the difficulty of determining an exact percentage but suggested that, almost certainly, photography taken as a whole would account for a good portion of US toxic waste. The EPA calculates that approximately 500,000 establishments perform photofinishing (only one step in the image-making process). Typical mini-labs produce about 5 gallons of photo-chemical effluent per day and roughly half of them simply dump it down the drain. Silver, arsenic, cadmium, lead, mercury, cyanide and a long list of other hazardous chemicals are routinely added to our environment. I left the EPA thinking that regardless of whether the photographic industry contributes 10% or 25% of total toxic chemical pollution, picture making is a very toxic process.

Ironies abound in these toxic times, yet few are more profound than that the poisons required to produce the beautiful images of the places and animals we love—*of our children themselves*—may return to shorten their lives. Adopting a *deep photography ethic*, then, must include lobbying companies like Kodak and Fuji to employ sound ecological practices. We must demand action to eliminate waste, not rhetoric like that included in the pamphlets they send out in response to concerned inquiries.

Eastman Kodak is sixth in the nation in toxic releases to air, water, and land, releasing over 49 million pounds in 1993. We must press them to adopt the Valdez Principles. Specifically, we should ask that they: 1) reduce packaging and institute recycling programs; 2) continue research into the replacement and elimination of environmentally unsafe chemicals and products; 3) discard toxic waste appropriately and attempt to reduce it; and 4) initiate education programs for customers, employees, and subsidiaries regarding photography-related impacts on the environment and how they may be alleviated. To their credit, Kodak has initiated a pilot recycling program for film containers, which has expanded to other types of solid waste generated in photo-finishing operations.

The big two camera manufacturers, Canon and Nikon, are owned by Marubeni and Mitsubishi, respectively—two of the corporations most responsible for forest destruction worldwide. If you or your favorite pro wields one of these, send the manufacturer a letter. If shopping for a camera, seek a less destructive brand. (If you know of one, please respond.) Better yet, resist the “do everything” models “improved” every year and keep the one you have.

Write to Kodak, Fuji, Nikon or Cannon if you use their products. Praise the quality of their film and cameras and then let them have it with regard to pollution and deforestation. Tell them that you intend to switch to another brand (or better still, give up photography altogether!) unless they make real strides to correct their environmental irresponsibility. Address your letters to the public relations departments.

Nikon Corp. 8-2-3 Marunouchi, Chiyoda-ku, Tokyo, Japan  
Canon, 2-7-1 nishi Shinjuku, Shinjuku-ku, Tokyo 163, Japan  
Kodak Inc, Rochester NY, 14650-0811  
Fuji Photo, 26-30, Nishiazabu 2-chrome, Mubato-kum Tokyo 106, Japan

Write as well, to the North American Nature Photography Association and urge them to consider adopting a *deep photography ethic*. NANPA, 10200 West 44th Ave., Suite 304, Wheat Ridge, CO 80033-2837.

I believe indigenous people's suspicion of cameras was justified, for these marvelous tools of technology *do indeed* steal an essence from life. And judging by the cumulative impact of the false familiarities we have "gained" through imagery, we are paying a terrible price for what we have stolen. We have crossed an image threshold and are now so inundated by depictions of the wonder and majesties of Nature that our ability to appreciate her everyday facets, the very facets that sustain us, has been severely damaged. Under an assault of imagery that has turned Nature into commodity and entertainment, our ability to enjoy the ordinary yet miraculous realities of Nature atrophies daily.

Of course, I'm speaking in generalities. Many of us have been stimulated through photography to seek the joy and beauty of "backyard Nature" and to revel in the wonders of local valleys, stream-sides, and plains. I am one who has, and sometimes, making a wondrous image of Nature's beauty *seems* like the deepest expression of my love for the Earth. Unfortunately, the number who have been stimulated by photography to delight in the commonplace "wilds" is small. Most are caught in a deluge of imagery which has deepened the complacency and denial already ingrained in our society by fostering an "if-it-looks-that-beautiful-then-everything-must-be-ok-out-there" kind of attitude.

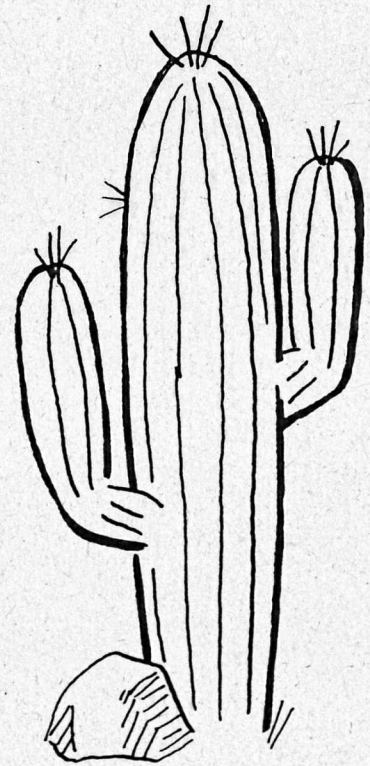
Certainly there are exceptions. Early photographs of a still-wild America played a key role in stimulating Congress to establish our first National Parks. Shows like *Flipper* and *Free Willie* have led to "dolphin-safe" tuna and an appreciation of whales. Again, though, in larger terms such appeals have failed. On the jacket notes for *CLEARCUT*, David Brower admits that whatever love of Nature the many Sierra Club exhibit-format books stimulated, it was not enough. "The beauty and prose and image may have been too tranquilizing," he writes. "Look how much there is! Surely it is inexhaustible." In *The Age Of Missing Information*, Bill McKibben notes that, "while virtually everyone in the industrialized world has a television and has presumably, if only by accident, seen many hours of gorgeous nature films... we're still not willing to do anything very drastic to save that world." The notion that we gain an understanding of Nature by viewing imagery of it is an illusion. What we really acquire, asserts Susan Sontag, is "an acquisitive relation to the world that nourishes aesthetic awareness and promotes emotional detachment."

Over-exposure to Nature's beauty on film and in printed image have made something wonderfully precious, too familiar, and we know, as the old saw goes, what familiarity breeds—if not outright contempt, then passivity and boredom. While surveys show a clear majority of the populace in favor of protecting endangered species and the environment in general, such sentiment fails to materialize when it comes time to vote. Over-imagery may be a major contributing factor to this distressing situation. "Seeing" the bears, the forests, the salmon on TV or the printed page may somehow circumvent the need to act on their behalf. Herein, I believe, is a big reason why the environmental movement fails to achieve a critical mass. "What's to worry. The bears are fine. I know, I 'saw' them last night on Channel 4." For too many, "viewing" is believing. Virtual reality is virtually here.

### THE INDUSTRIAL WEANING PROCESS

Step by step we are being weaned from Nature. We have become "image-junkies" addicted to speed-viewing a world so shaped by "photographic-seeing" that when we do experience a forest, a desert, or an ocean, we are often disappointed. It simply moves too slow. We *expect* nature to perform for us as it does so on TV and on pages of fabulous

*Under an assault of imagery  
that has turned Nature into  
commodity and entertainment,  
our ability to enjoy the ordinary  
yet miraculous realities of  
Nature atrophies daily.*





kodachrome. For most industrial peoples, the sofa has replaced the vantage from the forest trail, the mountain top and the meadow. When we do go outdoors we often find it necessary to mediate our experience by collecting images of it, thereby becoming a tourist in our own reality. "I feel it whenever I stop at a scenic overlook, and I see it in other watchers" observes John Daniels in a recent *Audubon* story. "I rarely see enthusiasm or even animation, but mostly bored children and impassive parents showing the scenery to their cameras and video recorders."

Photographs quickly set our modern standards for beauty and thereby for what should be cherished and protected. Perhaps our National Parks would harbor more biological richness and less "rocks and ice" if our notions of landscape beauty had not been so shaped by the photographer's love of spectacle. While the "intimate landscapes" characterized by Elliot Porter and a few others are a refreshing departure from the spectacular, by and large we have been taught to crave the grandiose—a craving that is counter-productive to self-realization and life quality. "When do I see again the spectacular?" chides Arne Naess. "In the long run such a person mostly will develop an urge and need for the spectacular and a decrease of sensitivity."

We prize photography because it offers a distraction and refuge from what we fear most—our impermanence. Surrounded by "frozen-in-time" imagery we sink ever deeper in "the cult of delusion," sustaining the pretense that by grasping onto things, by collecting and consuming images, by purchasing whatever is new, we can somehow refuse death. Ironically, photography is helping hasten on a grand scale the very process we try so desperately to deny. *Over-imagery is a handmaiden in the industrial rush toward the abyss.*

Like many powerful technologies, photography is a double edged sword, a sword honed to a razor's edge by the corporate technocracy which daily spreads its industrial world view through media and advertising—homogenizing cultural uniqueness, leveling biodiversity, and severing our natural connections to the Earth. Sontag's explanation of how photography serves industrial society is even truer now than when she wrote it, 18 years ago.

*A capitalist society requires a culture based on images. It needs to furnish vast amounts of entertainment in order to stimulate buying and anesthetize the injuries of class, race and sex. And it needs to gather unlimited amounts of information, the better to exploit natural resources, increase productivity, keep order, make war, give jobs to bureaucrats. The camera's*

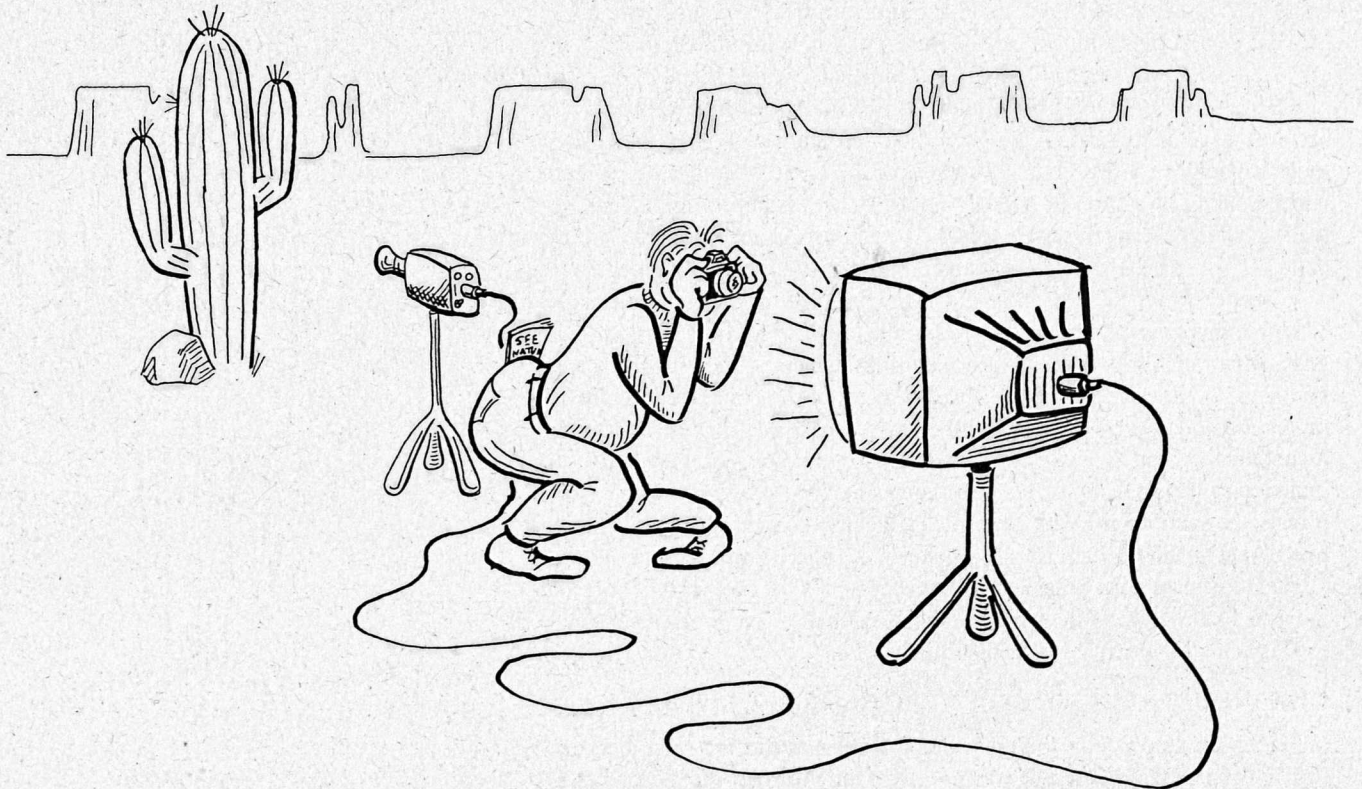


illustration by Andrew Paschetto

*twin capacities, to subjectivize reality and to objectify it, ideally serve these needs and strengthen them. Cameras define reality in the two ways essential to the workings of an advanced industrial society: as a spectacle (for masses) and as an object of surveillance (for rulers). The production of images also furnishes a ruling ideology. Social change is replaced by change in images. The freedom to consume a plurality of images and goods is equated with freedom itself. The narrowing of free political choice to free economic consumption requires the unlimited production and consumption of images.*

### SHOCK TACTICS

Following the lead of war photographers, a league of cameramen and women began to document industrial society's impact upon Nature in an effort to awaken a deluded and over-imaged society. So disturbing and powerful were their images of savage clearcuts, belching smoke stacks, and pathetic trapped animals that such "shock-tactics" became the favored weapon and fundraising tool of nearly every environmental group. For awhile they seemed to work; but alas, these visual cannons are gradually being disarmed by the camera's neutralizing tendencies.

We all remember the images that may have helped end the Vietnam War: the young, terrified, naked girl running from the bombed village and the gun-to-head Viet Cong execution. We remember them because they were the first of their kind to be splashed across the world media. But effects so strong at first wear thin after repeated viewings, becoming less and less real. Whether war footage or environmental devastation, the wretched becomes ordinary, inescapable—"just a photograph." To a public over-glossied and imaged-out—a public that has seen it all, over and over and over again—our counterfeit familiarity with a planet everywhere in danger has made us jaded and less able to respond in meaningful ways. We would be wise to re-examine the relationship between our imagery and Nature while there is still a natural world to photograph—as "Nature" is quickly becoming something we "put on and go to" in cyberspace.

### A DEEP PHOTOGRAPHY ETHIC

It is time for Nature photographers and film makers—whether professional, amateur, or casual—to embrace a new and deeper relationship between the camera and the natural world. For too long, the ethics of Nature photography—among the minority of photographers who even consider such ethics—have centered around issues relating to the "sporting" aspects of documenting the wild. Certainly baiting Coyotes with "kibbles & bits," spray painting pet ferrets black to make them look like their endangered cousins, and getting too close to bears are all unethical and need to be condemned as such. But the profession's ethics need to extend beyond these obvious sins.

The Nature Photographers' Code of Practices, a British publication, lists one hard and fast rule that must at all times be observed by the Nature photographer: "The welfare of the subject is more important than the photograph." While this is an apt credo that would prohibit the abuses listed above, it fails to address the deeper impact of the images we make—the impact on society and our relationship to Nature as a *whole*. If over-imaging the world furthers our separation from Nature, then there is something inherently wrong in our covenant with the camera.

Hunting for images with our cameras is the modern equivalent of primitive hunters stalking their food. When indigenous peoples killed their prey, they honored the animal as a gift. They prayed, gave thanks, or left offerings, believing that if they did not, future animal "gifts" might be withdrawn by the creator.

*A deep photography ethic  
entails a reciprocal relationship  
where the subject one  
photographs is honored by  
some manner of advocacy on  
its behalf—our taking  
balanced by our giving.*



The pictures from the wild that we take home—our “camera-kill,” so to speak—are gifts *as well* and we compromise Nature when we fail to honor the source of our images in some manner. It is time to develop a frame of reference much greater than the borders of our view finder.

Casual, disconnected picture *taking* from the natural world is a form of consumption that by itself does neither us nor Nature any good. However, there are many ways to return the imagery that has been gifted to us. We can write a letter to the District Ranger expressing our alarm about the clearcutting or overgrazing we witnessed in a sensitive watershed, or to our congressional representatives in support of proposed wilderness legislation that would benefit the land we photographed. We can make a donation to a local grassroots environmental group. We can give a slide show about the problems of the region and encourage others to help. At the very least, we can pick up trash in the area we photograph. By reciprocating in such a manner, we *properly* honor our prey, the beautiful image. Our “hunt” will have been successful in the fullest sense, for both our spirit *and* Nature’s will have been fed.

Simply put, a *deep photography ethic* entails a *reciprocal relationship* where the subject one photographs is honored by some manner of advocacy on its behalf—our taking balanced by our giving. We can extend this ethic to the Nature programs we watch on television (is “deep TV” too outrageous a concept?\*) to the photographs we purchase for display in our homes, and to Nature art of all kinds. If it’s Nature and we watch it, hang it, wear it, or put it on a shelf, *let us in some way act on behalf of the subject!* My heart fairly bursts as I ponder the impact of a good portion of society adopting this ethic! It’s not so farfetched, for after all, it approximates the holistic interrelationship native peoples usually had between art and Nature. One did not casually display a bear on his shield or a buffalo on his tipi without first, and many times after, paying tribute to that being. To do otherwise, to treat Nature as *simply* ornament or decoration or entertainment was unthinkable.

## HONOR THE ORIGINAL

Years ago a favorite prairie shot of mine showed up in an herbicide advertisement. I was so horrified to see a place I dearly loved—perhaps the Earth’s most devastated ecosystem (only 1% of the tallgrass prairie remains)—being paired with the agri-business mindset that had helped destroy it, that I quickly pulled all my images from the stock agency that had them. It was then that I learned the importance of “honoring the Original.” It was then that I decided to become strictly an “environmental photographer.”

To professional photographers the “original slide” is sacred. If we capture a really unique and special moment, we make numerous duplicates, store it electronically, lock it in a safe in a temperature and humidity controlled room,

and never, ever send it out if we can avoid doing so (and if we must, oh the forms we make them sign!). The original slide can be a very valuable *thing*, but let’s not forget *the true Original*.

We honor the Original by refusing to make our images available to corporations wishing to “greenwash” their environmental impacts, by not allowing them to be used in advertisements that promote destructive products. Nor do we make them available to “image merchants” who pimp our photographs to whomever comes knocking. Rather, we find agencies that allow one to apply a screen in determining where and to whom one’s images are sold.

We practice the *deep photography ethic* by telling the *whole* story. Shooting a few images of the clearcut beside the forest, the cows across the road from the Elk, or the air pollution in Yosemite, and sharing the *entire* truth with our viewers, will go a long way in suppressing the idyllic illusion that “everything-must-be-ok-because-it-looks-so-beautiful.” Professionals must press editors to quit displaying Nature out of context; for stock agencies, photo magazines, and television networks are all—sometimes unwittingly, sometimes intentionally—engendering a great distortion among “ordinary folk” by the selective control of the imagery in their hands. Some photographers *have* told the whole story well: Gary Braasch with the ancient forests of the Pacific Northwest, Galen Rowell with Tibet, Robert Glenn Ketchum with the Tongass National Forest in Alaska, Peter Beard with African Elephants, and Godfrey Reggio with Western Civilization itself. All of them helped galvanize deep thinking and activism by balancing the beauty with the “beast.”

The camera-toting readers of Nature and photography magazines represent a large number of badly needed advocates for the diminishing natural world—as do all occasionally sofa-bound souls who love *Nature*, *Nova*, and *National Geographic* specials. I’d guess that’s most of us and if we each begin to honor the ancient relationship between predator and prey by connecting the imagery we make, watch or buy (i.e., consume) with some form of activism on behalf of the represented wildlife or place, we can powerfully affect the decision makers who control the destiny of our wild lands.

## YAY OR NAY

While photography *does* help win occasional environmental battles and will continue to be an important component in the activist’s tool chest—like computers, automobiles, and other industrial means of communication we have to use to spread our message—the inherent cost of our unwitting acceptance is staggering. At this point, the best we can do is to mitigate photography’s negative aspects by using the camera as strategically as we can.

Effective purists are rare and I am certainly not one of them. Yet, we must constantly battle to draw the line in our

\*Editor’s note: Yes.

own lives. With regard to photography, we can begin by questioning ourselves before we grab our camera (questions that can easily be extended to the depictions of Nature we view and buy):

- 1) Considering the poison required to make this image, do I really need it or am I just collecting another pretty place, family moment, etc.
- 2) Will this image help somehow in protecting this place, this species, my/our connection to Nature?
- 3) What is the opportunity here for my giving back to Nature? Will I follow through?
- 4) Can I tell the whole story here, and if so, will I share it with others?
- 5) Can I photograph without impacting the health of this place or species?

When we cannot answer "yes" to these questions, we might choose to leave our camera behind. I have discovered great joy in this which has helped in making images I want when I *can* answer "yes." I am only a part-time professional photographer, however, and realize that it might be difficult to make a living while fully engaging the ethic in discussion. In this respect, the business of photography, like the business of living, necessitates individual decisions about balance, ethics, and ecological impact.

### PRIVATE SOLUTIONS

We are not likely to have much success with these issues unless we can take the *deep photography ethic* into the mainstream. Galen Rowell recently wrote in *Outdoor Photographer*, in response to my letter on the environmental impacts of photography, that "even if outdoor photographers take a billion less nature photos next year, we'd still have 49 billion pictures of families and other personal ego gratifications, plus another 150 boxcar loads of unrecycled throwaway cameras." Yes, changing reality is a daunting task, but rationalizations are not the answer. The resistance of Nature photographers (and all others) to begin looking deeply at the camera's *overall* impacts is understandably strong; yet the embracing of a new photography ethic by big-name photographers like Rowell could make a tremendous difference. Sontag signaled the need for such an ethic at the end of her book: "If there can be a better way for the real world to include the one of images, it will require an ecology not only of real things but of images as well."

It's the same demanding question everywhere we look in our bloated, end-of-the-road society. In a world of fantasists lost in denial, how do we relate the impacts of individuals to the health of the whole, and in turn, to the health of themselves and their children? It's *the* question of our time. Wendell Berry offers the best advice I have found: "The only real, practical, hope-giving way to remedy the fragmentation that is the disease of the modern spirit is a small and humble way: one must begin in one's own life the private solutions that can only *in turn* become public solutions."

AS A PHOTOGRAPHER, I've struggled with the dissonance raised by the issues in this essay. There was once a time when I dreamed of the image that would somehow cure the industrial disease. What naiveté! Such a remedy would certainly fail, for it would *only* be a photograph. Even the uniquely precious satellite image of our "Blue Planet" could not turn things around. While initially this startling photograph generated a wave of Earth Day hoopla, it too has been neutralized in over-imagery and now may serve more to distance us from the Earth than to deepen our connection to it. Wolfgang Sachs comments on the ambiguity of this image in *The Ecologist*: "In our position as observed, we are humbled; in our position as observers, we exalt ourselves." Photography has created "the planet as object" and the exaltation of this view has ushered in a new age of "technocratic ecology" in which humanity's leading role is that of observer, planner, and manager (i.e., consumer) of Planet Earth.

It would have been impossible for Louis Daguerre (inventor of photography, in 1838) to anticipate how images would one day consume Nature. In an advertisement soliciting investors, he wrote of his daguerreotype "it gives her [Nature] the power to reproduce herself." He was right far beyond what he could have dreamed at the time, for he could have little imagined the jeopardy in which it would place The Original.

No, photography cannot save Nature. While image proliferation will surely continue, we can look deeply at *what photography truly serves* and begin to resist its allure. Doing so will strengthen our sacred bond to the Earth, and for those of us who photograph, will help us to use our cameras more strategically. We can defend ourselves against the effects of over-imagery by finding ways to purge the excess. Purchase fewer magazines and photo-books. Eliminate television. Look again at the depictions of Nature hanging on your walls. Are you an advocate for that place, that animal, that tree? Use your camera sparingly. Go outdoors as much as possible. Get to know your hillsides, valleys, forests, rivers, and backyards. Find the exotic in the commonplace. Resist the imaged wild. *Accept no substitute for Nature!* **WERT**

*Daniel Dancer is an environmental artist and photographer living in the Columbia Gorge. He was the lead photographer on two coffee-table books released in 1994: CLEARCUT: The Trajedy of Industrial Forestry and Crop Art and Other Earth Works. He is currently completing a book about the eco-mandalas he builds in degraded landscapes from materials found on site. His exhibit, Sacred Ground—Sacred Sky: An Eco-Experience, has been touring the nation for the last three years. He thanks Gary Braasch for his input on photography's ecological impacts.*



# The Adventurer's Guide to the Apocalypse

by Ray Vaughan

illustrations by John Jonik

ARE YOU TIRED OF CROWDED NATIONAL PARKS? Fed up with endless streams of people in your favorite Wilderness Area? Exhausted by those long drives just to get to a place to camp or hike? It's no wonder. Ninety-five percent of the wilderness in the United States has already been lost, converted to urban, suburban, agricultural and industrial areas. With more and more people getting involved in outdoor activities like backpacking and canoeing, the remaining five percent of wild lands are becoming heavily overused.

Would you like true solitude? Would you like to camp on a Saturday and not see another person at all? You can; just follow this guide to those places where most outdoor enthusiasts never go, where adventure is waiting for those who can adjust to it. If five percent of America is congested with outdoor enthusiasts, then the other 95 percent is not. Here is a guide to adventure and outdoor excitement where people least expect it.

## Clearcut Camping

If you are tired of crowded campgrounds and the noise of hundreds of other people, then the clearcut areas of our National Forests are for you. The benefits of camping in clearcuts are many. The most obvious is that *no* other people are around; no noise, no exhaust fumes, no rounds of "Kumbaya" drifting into your space.

There are literally millions of acres of clearcuts on our National Forests, conveniently provided in every unit of every forest nationwide. All of that is free from crowding. Solitude is guaranteed.

We have all read about the virtues of solitude from Thoreau to Muir to Abbey, but how many of us have actually experienced real solitude in a National Park or in a designated Wilderness Area? Find that true sound of silence in a clearcut. Moreover, the night-time view of those stars is fantastic.

Another benefit is that clearcut camping is absolutely free of charge; there is no fee for camping in a clearcut like there is for a developed campground. Also, there is no limit on how long you can stay. Because of all the slash and wasted wood left lying around most clearcuts, firewood is readily available, and you need not disassemble your fire ring the next morning.

One note of caution: never camp in an active clearcut. Such a mistake can lead to a rude awakening. There are so many completed clearcuts, your selection of choice camping sites is virtually limitless.

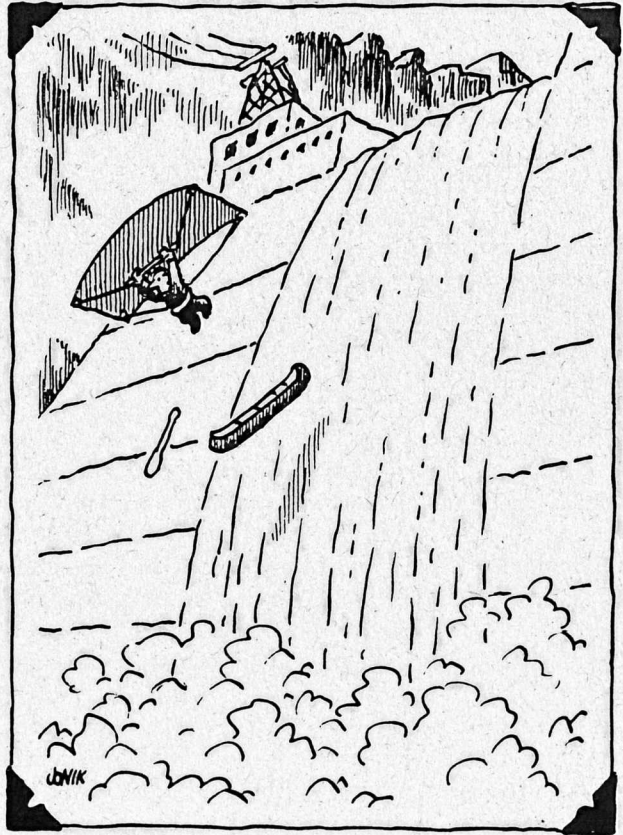


### Best Canoeing by a Dam Site

It amazes me how many people will travel hundreds of miles to stand in line to canoe or raft a short stretch of whitewater or kayak in the sea. Your sea kayaking trip may never produce a whale; your rafting trip is mostly time in the car. There is a better alternative.

Canoe historic and scenic dam sites. No need for long travel times; everyone in the country is near a major dam. And, unlike sea kayaking where you may never see those whales, when you go dam canoeing, you *will* see the dam. Behold dams that were historic environmental battles (all of which the environmentalists lost) like Glen Canyon, Hetch Hetchy and Tellico. They are all on the road map, and being immobile, they are easy to find. The variety in dam canoeing can be awesome. Canoe below the dam and have it loom above you—most impressive. Canoe above the dam and have a great big, smooth lake to enjoy. Truly something for everyone. Dams are also great for bird watching; sea gulls and crows seem to love them.

As with all adventures, dam canoeing also deserves a word of caution. When above the dam, do not venture too close to the gates and intake valves; when below the dam, don't get too close to the outfalls below the gates. Part of the adventure and allure of dams is that they can turn serene waters into violent torrents without warning; so be prepared.

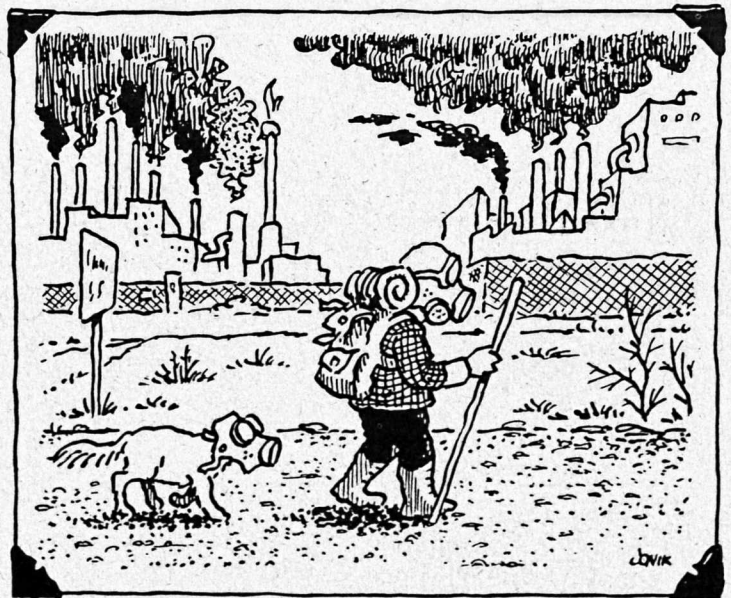


### Industrial Wastelands

Why stand shoulder to shoulder with 20,000 German and Japanese tourists gawking at the view of the Grand Canyon when you can see the impressive might of modern industry all by yourself. Vast acreages of industrial parks and districts are conveniently located in every urban area (and many rural areas) throughout the country.

Foremost among the industrial adventures is backpacking the Cancer Alley National Recreational Trail; it is much less crowded than the Appalachian and Pacific Crest Trails. Running for over 500 miles from Galveston, Texas to Mobile, Alabama, the CAT (as it is known to those who have hiked it) is unique in the world. Passing by more than 120 petroleum facilities, 95 chemical plants, 225 Superfund sites, and 15 paper mills discharging the toxic chemical dioxin, the CAT gives one an unforgettable industrial adventure.

My good friend Chet Kiter (a congressman from Florida) and I were the first people ever to backpack the entire CAT at one time. Although most CAT lovers recommend hiking it in winter, we opted for true adventure and backpacked the entire length during July and August 1989; rigorous adventure at its best, given the humidity and mosquitoes of the Gulf Coast. The next year, Chet introduced the legislation that made the CAT a national recreation trail (Law 90-120).





*There are two kinds of sewers for your adventuring pleasure: storm sewers and sanitary sewers. I recommend that the novice begin with storm sewers, as sanitary sewers do not live up to their name.*



As the CAT runs entirely alongside highways and roads connecting Galveston with New Orleans, Pascagoula, and Mobile, it is accepted custom to hitchhike portions of the trail. Don't worry about your buddies calling you a wimp if you hitchhike parts of the CAT; the types who pick up hitchhikers in that section of the country can give you as much excitement and adventure as any encounter with a Grizzly sow and cubs. Hopefully, as more of you get out into the great industrial outdoors, more trails like the CAT will be developed and given their just designation by Congress.

### **Landfill Rat Shooting**

For those hunters and rifle enthusiasts who are tired of being skunked out of a deer or Elk because of the huge numbers of hunters in the last remaining public hunting areas, better game is waiting for you. Our beautiful country is festooned with garbage landfills, and every one of them is teeming with elusive and cunning game animals, mostly rats.

Don't laugh; rats are wily critters, not to mention small targets. Shooting rats at landfills can become quite an obsession, especially since the rats get smarter and more difficult to shoot once a landfill has been hunted for a while. Must be evolution.

Due to new EPA regulations requiring that landfills have liners and leachate collection systems, most of the municipal and county landfills in America have closed. This is great news for the rat hunter. Most landfills have enough garbage in them to support healthy rat populations for decades, maybe even centuries, and if you go to one of the many now-closed dumps, you won't have all those pesky trucks with the beepers rolling in to spoil your hunt. Nothing sends the rats running for cover like a garbage truck—or those bulldozers they use to compact the trash; with those out of the way, the hunter is free to pursue his elusive prey at his leisure. Best of all, there are no bag limits or closed seasons on rats.

### **Sewer Spelunking**

Like all other outdoor activities, spelunking, or caving, has grown popular—so popular that many caves are being gated off, and one must get permission through a rationing system to get in the best caves. Don't fool with all that bureaucratic nonsense; do your caving in the sewers provided by every municipality in the country.

Convenient to everyone in our urban and suburban areas (and isn't that everyone who really matters?), sewers can provide endless adventure. You thought that Mammoth Cave (with its entrance fee and many regulations) has a vast system; no way. Compared to the sewer system of *any* major city, no cave system on earth can compete.

There are two kinds of sewers for your adventuring pleasure: storm sewers and sanitary sewers. I recommend that the novice begin with storm sewers, as sanitary sewers do not live up to their name. Storm sewers collect the runoff water from rain, and they are often quite large, big enough even to walk through without stooping. Some of the stuff that washes into storm sewers can be fascinating. I have a whole set of lawn furniture that I recovered from the Atlanta system.

Bring lots of batteries for your lights, and make sure to map your progress through the sewers; getting lost and having city employees rescue you can be very embarrassing. However, many sewers have convenient manholes, so if you get lost, you can exit through one of those, and then you will know where you are. For obvious reasons, don't go sewer spelunking during rain storms.

Sanitary sewer spelunking is not for the faint of heart. Buy an Army surplus gas mask with extra cartridges for when the odor becomes, well, robust. If you think the things you find in storm sewers are fascinating, the stuff flushed down toilets can sometimes be outright amazing, particularly when the local police are on another big drug sweep.

An added bonus of sewer spelunking is that hunters tired of landfill rat shooting (though that is hard to imagine) can take their guns into the sewers and hunt rats there, too. The darkness and confining dampness bring a whole new dimension to rat hunting. Just be sure of your backdrop; ricochets in sewers can be precarious.

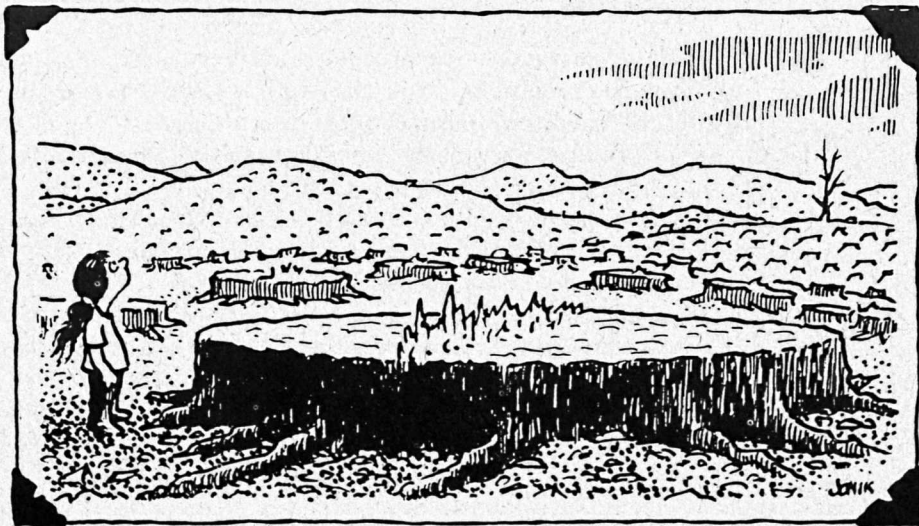
### Urban Birding

Bird watching, or "birding" to the savvy ornithologist, has become an immensely popular outdoor recreation activity. Indeed most choice birding sites around the country, and even in remote countries such as Peru, become like shopping malls in season or when a rare species is sighted. Avoid the crowds of wealthy retirees with spotting scopes and khaki shirts sporting patches; go urban birding. For urban birding, you don't need a field guide, or even binoculars. The only birds you will see in this country's urban areas are Rock Doves (pigeons), House Sparrows, and European Starlings, none of which are native to this continent. Thus, you can get a feeling of going European as you spy the same masses of birds that drunk Parisians see every day.

The object of urban birding is not to see a wide variety of species or to see rarities; it is to see as many birds as possible. Biodiversity is boring, *passé*; bioquantity is what's happening. Sure, your pal who went birding at Point Reyes may see a Brown Shrike, but if he does, he will probably see only one of them. Meanwhile, you will have had a good lunch at your favorite cafe and will have sighted 25,000 pigeons, all without spending a dime on expensive ocular equipment or gasoline. There is no thrill like it.

So, get out there and have a unique exploit. Be like Thoreau; part company with the teeming masses and seek solitude and adventure. In this day and time, one must change with the circumstances; if the crowds hit the wilderness, then go another way, and action and excitement can be yours. As Sting advised, "When the world is running down, you make the best of what's still around." So, don't frustrate yourself competing with the multitude. See what others pass by, and find adventure. It's a new world. ■

*Ray Vaughan is an environmental attorney and author. He works with the Alabama Wilderness Alliance (POB 223, Moulton, AL 35650) when not out shooting rats.*





# Book Reviews

In this issue:

*Deep Ecology For The 21st Century*

*Forcing the Spring*

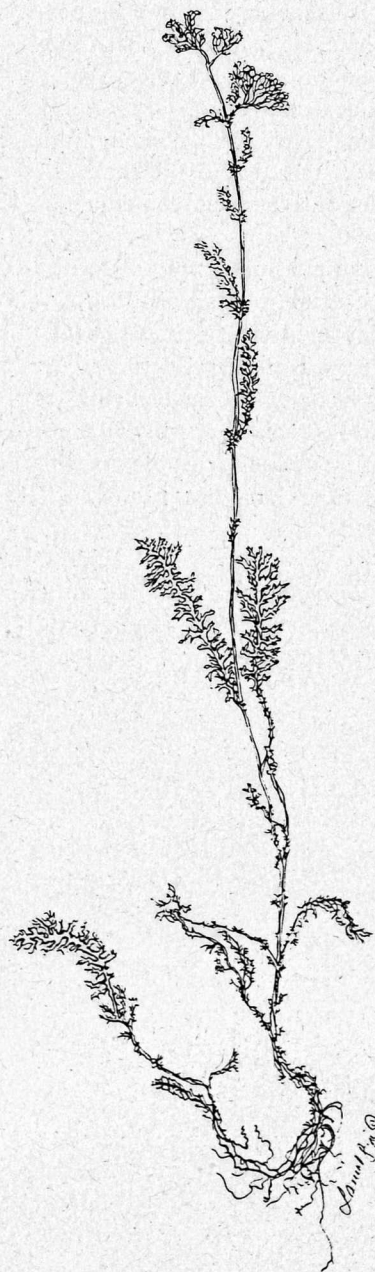
*A Conspiracy of Optimism*

*Environmental Policy and Biodiversity*

*Endangered Species Recovery*

*Ecopsychology*

*The Nature of Nature*



## DEEP ECOLOGY FOR THE 21ST CENTURY

Edited by George Sessions; Shambhala Publications (POB 308, Boston, MA 02117); 1994; \$30; 488p.

Most anthologies of ideas aspire to be little more than college research tools with muscle-bound bibliographies that wag the dog of heavily edited "essential readings." A few, however, do more. These anthologies promote a pause in the battle of ideas, giving readers familiar with a subject a chance to reflect on where their thinking has been and where it is going. The appropriately entitled *Deep Ecology For The 21st Century* belongs to this latter camp.

The book puts Deep Ecology in historical perspective as well as suggests its potential for changing modern society in the coming decades (or the century after the next, to use Arne Naess's time scale in the work's concluding piece). The chapters explore the social, political, and philosophical context of Deep Ecology; and with the preface and chapter introductions provided by the editor, George Sessions, the book probably represents the best primer you can now get on the subject.

As the title suggests, the anthology explores where Deep Ecology is headed. The wide variety of interests explored in the essays selected by Sessions suggests the answer: Deep Ecology is going everywhere. Beginning with Thomas Berry's essay on biocentrism and religion, the book moves through the psychological, literary, philosophical and political aspects of Deep Ecology. Perhaps the only essay the anthology lacks is one on the very topic of Deep Ecology's remarkable dispersal across fields of thought, though Fritjof Capra's piece on Deep Ecology as a new paradigm comes close.

This is an important development, and Sessions deserves credit for emphasizing the intellectual and pragmatic diffusion of Deep Ecology, rather than its "pure philosophy" (whatever that is). Critics of Deep Ecology—especially those in academia—often look down their noses at the eclecticism of biocentric thinkers. With vindication in mind, *Deep Ecology For The 21st Century* could have easily spiraled into the black hole of Green philosophy. Instead, the selections show how Deep Ecology flows across the boundaries of knowledge, which is a much better indication of its merit than is its acceptance in philosophical circles. While Greek scholars were laughing St. Paul out of the Areopagus, his words were undoing the world as they knew it. This new anthology confidently suggests Deep Ecology may do something similar.

Which brings us to another virtue of the book: it highlights just how radical Deep Ecology is. With the impending death of liberalism, our culture's intellectual discourse has become increasingly narrow and timid. In contrast, the essays in *Deep Ecology For The 21st Century* show a passion for fundamental change in our society. As Jack Turner says in one of his essays in the work: "This vision [of our growing recognition that humans are part of the earth] could inform everything from the most private spiritual matters to the gross facts of nourishment and death." You rarely find this kind of intellectual confidence in other schools of modern thought.

Of course, every anthology must leave something out. By including a dozen pieces by Arne Naess, the book omits other interesting voices. I would have liked to see something by those working in the intertidal zones between Deep Ecology, deconstruction and phenomenology. Max Oelschlaeger and David Abram come to mind. But then, these choices reflect my own editorial biases.

All in all, *Deep Ecology For The 21st Century* fairly represents biocentrism's many cross-currents. At the same time, it is perhaps the first book on the subject with a real sense that Deep Ecology, despite its pastiche of sources (or rather *because* of them), represents a coherent and powerful alternative to modernism. ●

—Reviewed by Christopher Manes (Cathedral City, CA), lawyer and author of *Green Rage: Radical Environmentalism and the Unmaking of Civilization*.

illustration by Laura Luzzi

### FORCING THE SPRING: THE TRANSFORMATION OF THE AMERICAN ENVIRONMENTAL MOVEMENT

by Robert Gottlieb; Island Press (1718 Connecticut Ave., NW, Suite 300, Washington, DC 20009); 1993; \$17.95; 415p.

This book will not appeal to most *Wild Earth* readers, yet it contains important ideas and arguments that they need to face. Gottlieb argues that the environmental movement needs to be fundamentally transformed to become a progressive social movement focusing on the gender, ethnicity, and class components of environmental issues. This transformation, he further argues, is already under way, led by the grassroots antitoxics and environmental justice movements that arose in the 1980s. He begins and ends the book by suggesting that the transformed environmental movement can be based on a merging of the new antitoxics environmentalism and the more traditional conservation-oriented environmentalism, but in between he does virtually nothing to suggest how such bridges could be built. Indeed, Gottlieb goes out of his way to attack conservationism and offers practically no discussion of the new grassroots conservation movement. In this review, I discuss the strengths and weaknesses of the book, and close with a question raised by this and other books like it—should environmentalism become the core of a new progressive politics?

#### Strengths

Gottlieb has performed a real service by extending the history of environmentalism to the late 1800s. His discussion of the public health and pollution control movements serves both as a balance to the focus on conservation at this time and as a corrective to those who suggest society's concern with pollution issues really began in the 1960s. This historical discussion also demonstrates the connection of urban environmental concerns with rural and wild land concerns over the last 100 years. In sum, his historical treatment illuminates a neglected part of the story of human-environment interaction in the United States.

The story is told from a leftist-radical perspective, including an entire chapter on the sixties rebellion in which Gottlieb attempts to make connections between the New Left and environmentalism.

Gottlieb's discussion and critique of the Group of 10 and other mainstream environmental groups from the late 1960s through the early 1990s is excellent. He makes many of the same criticisms of these groups that members of the New Conservation Movement make: these groups have become coopted by being inside players, overemphasized professionalization, forgotten the grassroots, and forged ties with corporations that are often part of the problem.

The discussion on the importance of the perspectives of gender, ethnicity, and class on environmental problems is also excellent, helping to illuminate problems that have long been in the shadows and describing approaches that might ameliorate some of the current difficulties of environmentalism, such as the need to overcome the jobs versus environment dilemma (though he might have touched upon some of the labor movement's antienvironmentalism described in Helvar's *The War Against the Greens*). This part of the book is especially good on the grassroots antitoxics movement, which was born and grew in the 1980s.

#### Weaknesses

The fundamental weakness of this book—and it is very fundamental—is that rather than describing how a new, broadened environmentalism can be created, Gottlieb creates a new environmentalism based on his views; one that focuses only on toxics and humans. He does not attempt to build bridges between environmentalism and social justice movements so much as he attempts to dismiss the concerns of past environmentalism—especially conservationism.

There is *no* discussion of new grassroots conservation groups, despite the emphasis of the book on the rise of grassroots groups in the 1970s and 80s. There are three-and-a-half pages on Earth First! and deep ecology (less than on the Clamshell and Abalone Alliances), but nothing on *Wild Earth*, Alliance for the Wild Rockies, Greater Ecosystem Alliance, Preserve Appalachian Wilderness, etc. He has a faulty understanding of the nonleftist alternative environmental movement. For instance, he thinks that animal liberation and bioregionalism are offshoots of deep ecology. This misunderstanding is especially glaring in the case of bioregionalism, which seems to represent a perfect example of the kind of movement he supports (local people working for sustainable communities).

There is virtually no discussion of ecocentrism in this book. Again, this is shocking since one of Gottlieb's main purposes is to construct a broad social movement to take on mainstream society. What is more radical—in today's dominant worldview—than arguing that humans are not the center of all value? Gottlieb's environmentalism seems to be only for humans; it is about human quality of life. A look at the index reveals no entries for biocentrism, biodiversity, conservation biology, ecocentrism, or endangered species. Throughout the book he writes about an environmentalism concerned with "daily life," but this only refers to daily *human* life.

Additionally, Gottlieb leaves unbuilt, unexplored even, numerous bridges that could connect environmentalism and social justice. Four examples underscore this failure. Gary Snyder is mentioned in the chapter on the '60s, but never again. Snyder serves as a fine example of a counterculture figure committed to social justice and wild nature. A discussion of Terry Tempest Williams would have been particularly illuminating on the connections of gender, place, antinuclear activism, and the importance of nonhuman nature. Another bridge left unexplored is the existing connection between the Congressional Black Caucus and mainstream environmental



groups. The Black Caucus already has the best environmental voting record of any group in Congress. And finally, FBI surveillance and infiltration of Earth First! suggests a connection to New Left and social justice groups that have also come under government intimidation.

A final problem is Gottlieb's discussion of population control and immigration. He correctly points to tensions between ethnic groups and environmentalists over these issues—real issues to which environmentalists have not been sensitive. Yet his is a one-sided story. He assumes that being against immigration is bad, but he does not explain why. Similarly, he offers no discussion of why population is not a problem. If a new, broader environmental movement is to be created, it must be based on finding common ground, not dismissing out-of-hand one of the traditional environmental movement's most pressing issues. This is perhaps the biggest obstacle for a broader environmental movement—the failure of the social justice wing to discuss, even consider, population as a problem. Gottlieb offers us no help here.

#### The Future

The difficult question posed by this book (and others like it) concerns the future of environmentalism: should it become part of, indeed the center of, a progressive social movement or should it retain its focus on a set of closely connected, more limited issues: human public health, conserving natural resources, and protecting and restoring wild lands and biological diversity? As a progressive movement, environmentalism could take the place of organized labor, which has been in a

steep decline over the last few decades. Unions were the core of liberal, and to some degree progressive, politics in this country, and their weakening has increased the power of business in the political arena. In examining the immediate practical options for such a progressive movement, opportunities in the United States don't look promising. Third parties have never fared well in the US. The progressives could take over the Demo-

cratic Party, but this is a party in ill-health. Even if environmentalism became the core of a viable political party, environmentalism would certainly be in trouble when that party was not in power.

On the other hand, the environment—and conservation—has become a partisan issue since the early 1980s. Dave Foreman's pleas in this magazine for conservationists to be bipartisan, to move away from the appearance of conservation being tied to liberalism and the Democratic party, are denying current reality. The new conservative Republicans are opposed to environmental and conservation initiatives on three core grounds: curtailment of regulation, protection of property rights, and reduction of government spending. Each of these runs directly counter to the initiatives that might further The Wildlands Project (e.g., the Endangered Species Act, restrictions on privately owned lands, purchasing more public lands). A quick scan of the conservation record of the current Congress does not suggest much hope for the new Republicans. Indeed, urban members of Congress often have the best environmental records (e.g., the Congressional Black Caucus). To be sure, these new Republicans are different from the Republicans who could be counted on as key supporters of environmental legislation, people like former senator John Saylor (R-PA) and current senator Jim Jeffords (R-VT).

If conservationists decide to go it alone, to not become part of a larger progressive coalition, the question becomes can a Wildlands Project work without fundamental changes in society? Can we have half of North America set aside primarily for the wild functioning of nature without a fundamental shift in our economy, society, and worldview?

A progressive coalition might be the way to go for environmentalists, *but* it must be one that recognizes the need for wildlands and the inherent values of nonhuman nature. Human population and consumption must not be dismissed as nonissues. Antitoxics groups must be willing to broaden their views as well. If such groups continue to argue that "we are about protecting people, not birds and bees," as Citizen's Clearinghouse for Hazardous Wastes leader Lois Gibbs states in this book, then there isn't much chance for a broadened environmental movement. In concluding this book, Gottlieb asks: "Can mainstream and alternative groups find a common language, a shared history, a common conceptual and organizational home?" (319) Unfortunately, we won't know from reading his book, because Gottlieb never tries to answer this question. ●

—Reviewed by Chris McGrory Klyza, Associate Professor of Political Science, and Director, Program in Environmental Studies, Middlebury College, Middlebury, Vermont; co-editor (with Steve Trombulak) of *The Future of the Northern Forest*.



Traces of a Lifetime, stone lithograph by Davis Te Selle

## A CONSPIRACY OF OPTIMISM: MANAGEMENT OF THE NATIONAL FORESTS SINCE WORLD WAR TWO

by Paul W. Hirt; University of Nebraska Press (POB 880484, Lincoln, NE 8588-0484); 1994; \$40; *liv* & 297p., appendix, notes.

A decade ago, I was trying to describe the Sierra Club's response to the United States Forest Service in the 1960s. I wrote that the Forest Service, from the Club's perspective, seemed to act with an "*inscrutable malice*" toward trees. Such language, which comes from Herman Melville, outraged one of the academic referees for the manuscript, and my sentence never appeared in print.

What Paul Hirt means by his title, *A Conspiracy of Optimism*, comes very close to dealing with the same problem, and he is very careful to define the meaning of his title. Thus, his thesis is clearly stated—for this is not one of those neutral histories—and is contained in his title. The perspective he takes is, to a great extent, from inside the agency. This is a wise decision for a scholar, and gives his analysis of Forest Service policies great power.

"Most foresters," Hirt points out early, "were well-meaning, public-spirited individuals, doing what they were trained to do" (xxxvi). So how could they have done so much mischief? Through a conspiracy of optimism.

By *optimism*, Hirt means, as all of us indebted to Donald Worster mean, the rather strange but pervasive American faith in technological control over nature based on three cardinal principles: 1) "nature is capital"; 2) "humans ought to use this capital for constant material self-advancement"; and 3) "the social order should encourage this exploitation of nature for the accumulation of wealth" (xvii). Hirt shows that Worster's principles apply so directly and completely to the Forest Service that his thesis becomes almost self-evident.

By using the term *conspiracy*, Hirt is locating something more complex in the culture of the agency, which is at the same time the source and consequence of an agency's confidence and insecurity, its attempt to retain and protect its management discretion, and its inability to change or critique itself. Early on, as Samuel Hays has shown, the Forest Service closed itself off from public purview, developed a technically trained "elite," and instituted a kind of monomaniac culture, stating its policies in terms of unrealizable slogans, promising unrealistic harvests of natural resources, being unresponsive to the larger public.

Hirt's book fulfills the promise of its title. It is a rigorous cultural critique of the agency, of the causes and consequences of the Forest Service's closed and self-limited thinking. His thesis seems so accurate, because it is. The Forest Service, as a result of overstating the possibilities of controlling nature and of closing itself from public purview, could not attain autonomy or fulfill its

empty promises of multiple use and sustained yield. Instead, under the pressure of "the businessman's administration" of the early 1950s, it became a road-building agency, failed to protect the resources in its charge, and over-cut timber. It created the situation that made it a victim of institutional, economic, and political forces, a situation damaging to the resources it was supposed to conserve.

Hirt thoroughly and accurately locates this disaster in the post World War Two politics of the 1950s. He documents in great detail the ways in which the agency made itself vulnerable to manipulation by Congress, the ways in which it allowed itself to subvert its own theories of sustained yield in the name of political expediency, the ways in which it ignored the hard facts of its own economic situation, and the decaying state of the resources it was created to conserve. It is a horror story, told in a measured and orderly way, carefully researched, supported well by hard economic and ecological data—supplemented by Trygve Steen's excellent photographic documentation—so that one must say environmentalists of the 1960s were correct. Hirt shows why the agency's disastrous course did not alter in successive decades.

Yet Hirt tells more than the horror story, as he also explores the roots for constructive change within the agency. He demonstrates that the terms of the debate over forest practices have not changed over the last fifty years. It is a philosophical debate in which philosophers from Aldo Leopold to Chris Maser have shown the flaws in the Forest Service's optimism. But Hirt shows that this is a political and institutional debate, as well. If a new Forest Service emerges, it will be a result of opening its processes to reason and good sense, through pressure from within the agency by groups like the Association of Forest Service Employees for Environmental Ethics, and through continued scrutiny by the American public, which has insisted on, and sometimes received, disclosure of information and access to the decision-making process.

The real virtue of this book is in the way it is written from the ground up, always with attention to the natural world at stake. Hirt clarifies the complex interaction between ecological, philosophical, institutional, political, and economic issues, without offering easy solutions, but also without succumbing to doom and gloom. It is also notable that Hirt's book is one of a series called "Our Sustainable Future," published by a university press. ●

—Reviewed by Michael P. Cohen, author of *The Pathless Way and A History of the Sierra Club*.



## ENVIRONMENTAL POLICY AND BIODIVERSITY

edited by Ed Grumbine; Island Press (1718 Connecticut Ave. NW, Suite 300, Washington, DC 20009); 1994; \$45 hardcover; \$20 paperback; 416p.

Conservation biology, as SCB founder Michael Soulé points out, is a crisis discipline, forced by accelerating species extinction to make decisions and recommendations from imperfect data. In contrast to many scientists, conservation biologists don't assume their work ends with a lab experiment or an article in a peer-reviewed journal. Enumerating extinctions—"counting the deck chairs on the Titanic" as Soulé puts it—is not sufficient. Conservation biologists have an obligation to inform and attempt to influence ecological activists, land managers, and politicians: a monumental task for this young science. What effect has conservation biology had since its founding fifteen years ago?

Ed Grumbine, himself a respected conservation biologist, has sought to answer that. The resulting anthology, *Environmental Policy and Biodiversity*, is a compilation of interviews, articles, and reflections from respected scientists, lawyers, and activists. It is an assessment of work in progress, work to avert global extinctions and the crash of ecosystems.

The anthology is divided into four parts. "Conservation Biology" delineates ethical and scientific concepts on which the science is based. Island biogeography (have we at last settled the SLOSS debate?), landscape ecology, natural disturbances, and viable populations are discussed in the context of a world with expanding, demanding human numbers.

Section two, "Environmental Policy and Biodiversity," is an analysis of current laws pertaining to species and, increasingly, to ecosystems. Robert Keiter examines law and ecology in the Greater Yellowstone Ecosystem. Daniel Rohlf and Michael O'Connell explain problems with the Endangered Species Act (ESA) and offer remedies. Rohlf believes we lack adequate scientific information to properly enforce the ESA; O'Connell believes the lack is in implementation. David

Wilcove insists "...we should stop depending on the ESA as a final safety net for species and start acting earlier by enforcing other environmental legislation" (223).

Section three deals with applied conservation biology. Case studies of ecosystem management in such diverse areas as northern Florida, the Great Lakes, southern California, and Appalachia show how the broad principles of conservation biology are modified in accordance with a specific landscape and social reality. Deborah Jensen writes of California's experimental bioregional councils. Reed Noss presents the vision of The Wildlands Project, which is critiqued by Lynn Maguire.

The final section, "Politics and Policy Making," identifies impediments in science, politics, and contemporary society which prevent implementation of sound conservation strategies—and how to effectively challenge them. Throughout the book, Grumbine's prefaces to each chapter place the essays in the context of both an evolving science and an evolving social paradigm.

No one, after reading this anthology, could doubt conservation biology's influence. In only fifteen years it has altered accepted ideas of conservation, from scenic postcards for human pleasure to long-term protection of species and habitat. A holistic discipline, it encourages cooperation between traditionally competitive management agencies and provides a scientific basis for ecological law and landscape management. Most important, as Grumbine notes, "science forces us to make choices with more explicit knowledge of their consequences."

Understanding those consequences is a vital factor in the shift from controlling and dominating nature to living within it; accepting limits to human activity. *Environmental Policy and Biodiversity* is an important reference for anyone working toward that end. ●

—Reviewed by Trudy Frisk, BC conservation leader, member of Mike Gilpin's original team establishing 1989 baseline data for a five year study of island biogeography and species extinction in the Gallatin Mountains of Montana.



Tiger Salamander (*Ambystoma tigrinum*) by Gary Bentrup

### ENDANGERED SPECIES RECOVERY: FINDING THE LESSONS, IMPROVING THE PROCESS

edited by Tim W. Clark, Richard P. Reading, and Alice L. Clarke; Island Press (1718 Connecticut Ave., NW, Suite 300, Washington, DC 20009); \$25 (paperback); 512p.

*Endangered Species Recovery* is the best book written on the Endangered Species Act (ESA) since Steven Yaffee's *Prohibitive Policy* (1982). It should be read by all activists who want to have the best information available on how to make the act work better. Yaffee provided a more theoretical policy overview of implementing the ESA. Here, Tim Clark, Richard Reading, and Alice Clark have edited a volume that leavens theory with case studies detailing barriers and bridges encountered in attempts to make the law work on the ground. The book also provides an excellent overview of the ESA itself.

The nine case studies make for frustrating reading. The barriers that activists have encountered are described in chapters on the California Condor, Grizzly Bear, Red-cockaded Woodpecker, Florida Panther, Australian Barred Bandicoot, and others. Roadblocks to successful implementation of the law include interagency squabbling, political intervention against species' interests, lack of funding, promotion of the status quo by production-oriented managers, less than rigorous use of science, and bureaucratic delaying tactics. The purpose of *Endangered Species Recovery*, however, is not to chronicle the down side of attempts to protect plants and animals but to "find lessons" and "improve the process." This is where the real strength of the volume lies.

The authors of the case studies analyze what went wrong (and in a few instances, what went right) as the ESA was applied in specific situations. Each chapter offers new learning to avoid problems for these and other species recovery efforts in the future.

This book is a bible for those who believe the ESA should be strengthened instead of weakened. Yet the solutions espoused by the authors are based on clear analyses, not faith. Eight guidelines for improving ESA implementation are discussed. These include better recovery teams, better professional training, bureaucratic organizational change, conservation biology-based amendments to the ESA, and monitoring recovery programs.

The book would make an excellent text for an undergraduate or graduate course dealing with protecting biodiversity. Most *Wild Earth* readers also will benefit from the book because reading it will sharpen political skills. Several contributions are outstanding: the case studies on the Black-footed Ferret, the Yellowstone Grizzly, and the Red-cockaded Woodpecker, and the candidate and sensitive species chapter. Three of the superb chapters are more theoretical: Minta and Kareiva on conservation science, Westra on organizations, and Clark and Reading on professional effectiveness.

The ESA has been law for over 20 years. Yet in terms of protecting biodiversity, we are in no position to claim success. If we are ever to turn the tide of biological impoverishment, we will have to learn from our past mistakes. *Endangered Species Recovery* is a giant step in this direction. ●

—Reviewed by Ed Grumbine, author of *Ghost Bears*.





## ECOPSYCHOLOGY: RESTORING THE EARTH, HEALING THE MIND

edited by Theodore Roszak, Mary E. Gomes, and Allen D. Kanner;  
Sierra Club Books (730 Polk St., San Francisco, CA 94109); 1995; \$15 (paperback); 338p.

Shortly after a tornado had gone on a tear ride through a nearby (western Massachusetts) town, *Ecopsychology: Restoring the Earth, Healing the Mind* arrived in my mailbox. In addition to taking three human lives and taking out a number of dwellings (including some fine trees), the tornado reminded us we are not boss. I wondered if *Ecopsychology* would address the soul of tornadoes.

"Ecopsychology" denotes "an emerging synthesis of the psychological... and the ecological," says Theodore Roszak in his introductory chapter. This volume is a collection of articles by psychologists and ecologists concerned with the sparse attention given the relationship between humans and the rest of the natural world and to that world itself in mainstream psychology.

*Ecopsychology* is to be recommended on the strength of some of its articles. Phyllis Windle's moving piece on "The Ecology of Grief" is one of the best. Beginning with her own grief over the threatened extinction of dogwoods (due to the dogwood anthracnose), it moves in an enlarging spiral toward the recognition that full expression of our grief over planet-wide loss is a crucial element in the work—the ritual structure, really—of ecological restoration.

Laura Sewall probes with precision "The Skill of Ecological Perception," linking research in perceptual psychology and the effects of experience upon the neuronal structure of the brain, as she describes the cultivation of a more nuanced, more flexible ecological way of seeing. The Earth calls continually, observes Sewall.

This call is also voiced fluently in the avowedly ecological (individual) psychotherapy proposed and practiced by William C a h a l a n ("Ecological Groundedness in Gestalt Therapy") and Stephen

Aizenstat ("Jungian Psychology and the World Unconscious"); in Elan Shapiro's practice of the communal form of psychotherapy that is environmental restoration ("Restoring Habitats, Communities, and Souls"); and in Joanna Macy's recognition (in "Working Through Environmental Despair") of the health of our pain for the world. Macy, Aizenstat, and Windle speak to a "positive disintegration" (Macy's phrase) that can quicken the death of outmoded habits of (un)consciousness that have resulted in the present "radical disjunction"—to use Father Thomas Berry's words—between us two-leggeds and the rest of nature. And Carl Anthony ("Ecopsychology and the Deconstruction of Whiteness") astutely discusses one form of radical disjunction among humans: environmental racism and disregard of the ecological needs of the poor and minorities.

Despite such articles, however, this volume as a whole suffers from a mortal design flaw: a privileging of *wholeness* over *wildness*. There is too much talk of harmony, of rhythm, of synthesis, of the "relational" or "holonic" self here; there is insufficient messiness. Though *Ecopsychology* aims at a new form of inclusiveness, it excludes much: storms and fires, for instance (and, alas, an index). It neglects the more shadowy depths, intricacies and ambiguities laid bare by intimacy with the natural world. Excluded from the text and from the list of recommended readings are attempts to give voice to the more haunting personalities of nature. Explorations of nature's comedy and violence, such as are found in the writings of Annie Dillard, and of the more unsettling reaches of nature's imagination, as in Peter Bishop's explicitly psychological *The Greening of Psychology: The Vegetable World in Myth, Dream, and Healing*, are distinguished by their absence from *Ecopsychology*.

A more thorough exploration of the soul in nature would include tornadoes and many other discomfiting forces and discomfiting beings, would recognize that love of nature must transcend our Garden-variety idealizations of it, that such idealizations may actually express, rather than overcome, the radical disjunction between humans and others. It would be mindful of Emily Dickinson's cautionary verse: "But nature is a stranger yet;/The ones that cite her most/Have never passed her haunted house,/Nor simplified her ghost." ●

—Reviewed by Michael Perlman (POB 725, Williamsburg, MA 01096), author of *Hiroshima Forever: The Ecology of Mourning* (Barrytown, Ltd., 1995) and the forthcoming *Powers of Trees: The Reforesting Imagination*.

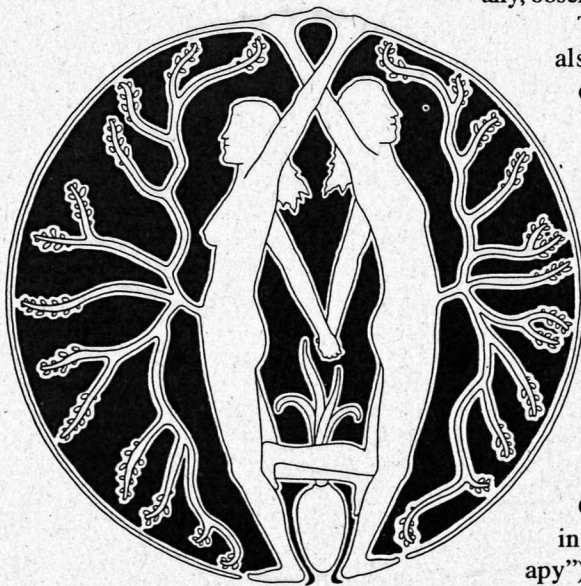


illustration by Rob Messick

## THE NATURE OF NATURE: NEW ESSAYS FROM AMERICA'S FINEST WRITERS ON NATURE

edited by William H. Shore; Harcourt Brace & Company (525 B St., Suite 1900, San Diego, CA 92101); 1994; \$24.95; 356p.

With this anthology of essays and images on the subject of nature, editor William Shore introduces the reader to a diverse and gifted group of contemporary writers and photographers. In addition to expanding and enlightening our perspectives on nature, this collection gives the contributors who donated their work, and those who purchase the book, an opportunity to help solve the problem of hunger in America.

Shore is founder and executive director of Share Our Strength, a nonprofit hunger-relief organization based in Washington, DC. *The Nature of Nature* is one of four titles published in the fall of 1994 to benefit the 25 to 30 million Americans who depend upon public or private food assistance in order to survive.

The most striking aspect of this collection is the inclusive definition of nature that it represents. This is evident throughout the book—from an introduction that announces a commitment to alleviating human distress, through a table of contents that includes the natural history of the plastic pink flamingo, to a confession by a Pulitzer Prize-winning science writer that nature scares her. The value of this anthology lies in the number of surprises it holds in store for those of who may think they know what to expect from a nature book.

Conservationists are sometimes accused of seeing nature as something separate from, and more important than, humanity. In the ongoing controversy surrounding the old-growth forests of the Pacific Northwest, for example, environmentalists are often portrayed as caring more about owls than people. In "The Human Chauvinist Within," Lawrence Joseph writes a bitter obituary for a young logger, Keith Milsap, whom he had met while covering the Spotted Owl story. When two magazines declined to publish Joseph's story on the logger's passing, even after he offered it to them for free, Joseph observed that "there is a vanguard among us so highly evolved as to manage indifference, or even a touch of spite, at the story of Keith's demise." In this essay, Joseph examines the contradictions he confronted in grieving for one human being, "whose work was especially inimical to the magnificent and endangered original-growth forests of the Olympic Peninsula."

In "The Color of a Bird's Egg," Bernd Heinrich effectively conveys the passion for, and purpose of, collecting—a method of inquiry that some environmentalists oppose. Since the age of eight, the author had been obsessed with finding the nests and eggs of more and more species of birds. "Each species has its own intricate and individual behavior that must be learned before you can find its nest," he explains.

Heinrich's description of discovery and delight at his growing collection is reminiscent of the naturalist Miriam Rothschild's account of her mind "taking off," when as a child she viewed drawer after drawer of her uncle's collection of over two million butterflies, which was eventually housed in the Brit-

ish Museum. "First you see the diversity," Heinrich writes. "The eggs of the scarlet tanager, in a cup of loose twigs lined with dark rootlets... The different colors, or lack of them, are all products of evolution. How did they come to be? What were the selective pressures that generated them?"

Birds' eggs are uncolored before being laid; color and pattern are acquired as the egg traverses the uterus, and squeezes pigment out of the uterine gland onto the eggshell. Heinrich compares this process to painting. "It is as if innumerable brushes hold still while the canvas moves. If the egg remains still, there are spots, and if it moves while the glands continue secreting, then lines, scrawls, and squiggles result."

Heinrich's hypotheses about the purpose of egg-shell color (sunscreen, visibility in darkness, general tendency of birds toward diversity, camouflage, identification for parent incubators) and tales of how he tested them (including painting eggs himself and placing them in nests) reveal the mystery and adventure that attract inquisitive and creative minds to science.

In "Electron-microscopy: A Closer Look at Nature," Gregory Paulson and Christine Davitt present a compelling collection of pictures which will amaze and delight those who want to see more than nature's "shamelessly blatant spectacles," such as pretty butterflies on flowers. The authors assert that "magnified several hundred times, even the grossest maggot or the slimiest slug reveals a hidden world of

unimagined beauty." As evidence, they illustrate their brief text with five electron micrographs, which were taken with a scanning electron microscope (SEM). In preparation for this process, specimens are soaked in alcohol, dried, fixed to a specimen holder, and coated with an extremely thin

layer of gold. The resulting graphic images—black and white, exquisitely detailed, portrayed in-depth—include a honeybee's pollen comb (1110X), the facets of a robber fly's eye (1110X), a true bug's eggs (50X), and the unforgettable water bear (3500X), a "fearsome creature" who lives in mosses and lichens, and has what looks like the end of a garden hose where a human would expect a head to be.



Water Bear photo by Christine Davitt

*continued on p. 100*



# Announcements

## Teaming with Wildlife: A Natural Investment

The International Association of Fish and Wildlife Agencies is leading a funding initiative that involves a nationwide proposal to expand user fees with sales taxes on a wider array of outdoor equipment. More than 100 groups, including hunters and anglers, have sponsored the proposal. The money would be dedicated to wildlife conservation, recreation, and education, and would be distributed to state fish and wildlife agencies based on a formula of land base and population. Products with a surtax would include binoculars, film, bird seed, bird feeders, tents, backpacks, hiking boots, recreational vehicles, and field guides. A green logo displayed on such objects would signify their manufacturers' participation in the Teaming with Wildlife effort. Broad support of this initiative is needed when it goes to Congress. To become involved in your state's Teaming with Wildlife coalition, contact your state fish and wildlife agency headquarters. For information contact the International Association of Fish and Wildlife Agencies, 444 N. Capitol St. NW, Suite 544, Washington, DC 20001; 202-624-7890.

## Russian Conservation News

A quarterly bulletin with articles by leading conservation biologists, policy makers, and environmentalists from the former Soviet Union is now available through the Biodiversity Conservation Center of the Socio-Ecological Union. Each 16-20 page issue contains news about protected areas, conservation legislation, urgent issues, general problems and organizations working to solve them. To subscribe contact Mikhail Blinnikov, 2126 West 16th Ave., Eugene, OR 97402; 503-686-2288 or Margaret D. Williams, POB 449, Moscow, 119270, Russia; phone/fax 095-482-18-88.

## Grassroots Grants

Fundraiser and activist Andy Robinson has completed a new book, *Grassroots Grants, an Activist's Guide to Proposal Writing*, to be available in April 1996. It includes sample grant proposals and suggestions from more than forty foundation staff members who fund groups working for social, economic, and environmental justice. Robinson, author of more than 100 successful grant proposals, explains the pros and cons of chasing grants, how grants fit into fundraising programs, how to design fundable projects, how to do grants research, and much more. To order, send \$25 to Chardon Press, POB 11607, Berkeley, CA 94712.

## Society for Ecological Restoration Conference

This year's Society for Ecological Restoration conference, "Paved to Protected: Restoration in the Urban/Rural Context," will be held 17-23 June at Rutgers University in New Brunswick, New Jersey. On-campus sessions will be held 20-22 June and off-campus field activities will take place 17-19 and 22-23 June. For registration materials contact Society for Ecological Restoration conference, 1207 Seminole Highway, Suite B, Madison, WI 53711.

## Round River Conservation Grizzly Project Studies Available

Reports from the 1994 and 95 field seasons of the San Juan Grizzly Project of southwestern Colorado are now complete. The 1994 report (27 pages) covers the general watershed reconnaissance work of the field season; the 1995 report (78 pages) includes the history and context of the Grizzly Bear in Colorado, the season's biological research, and an in-depth view of Round River's working methodology. The reports are available through Bruce Baizel, Round River Conservation Studies, 2032 Delwood Ave., Durango, Colorado, 81301. To cover copying and mailing costs, please enclose \$15.

## Heron Dance

A new journal, *Heron Dance*, has been created to celebrate the power of individuals to make a difference. The publication contains profiles of people whose lives revolve around wilderness; who work with youth in the inner city; who work in prisons and refuge camps; who work for the protection of wild places. An annual subscription is \$27 for eight issues. Contact *Heron Dance*, POB 318, Westport, New York, 12993.

## Ecopscychology Conference

A National Conference titled *Sacred Earth/Sacred Self* will explore the relationship between ecology, psychology, and spirituality. The conference will be held 9-12 May 1996 at Prescott College in Prescott, Arizona. For information contact Rob Israel at 520-445-5660.

## A Vision For All

Web of Life Audio Productions recently produced *A Vision for All*, an exploration of the philosophical and ecological foundations of the ecocentric conservation movement. The hour-long program, narrated by Traci Hickson, discusses the mission of The Wildlands Project. It begins with David Brower's vision of wilderness and offers a variety of perspectives including those of outdoors retailers, ordinary citizens, Christian spiritualists, indigenous peoples, and children. *A Vision for All* is available on cassette for \$3 from Dennis Hendricks at Web of Life Productions, RR #2, Box 370, Verona, ME 04416; 207-469-2552.

## Land Trust Alliance National Rally '96

The largest land conservation conference in the country will be held 17-20 October 1996 in Burlington, Vermont at the Sheraton Conference Center. Co-sponsored by the Vermont Land Trust and The Nature Conservancy of Vermont, the rally will offer more than 80 workshops on private land protection methods, organizational development, legal issues, land management, fundraising, public relations and more. Early registration for the rally is \$205 for qualified LTA members and \$305 for all others. For more information contact Andrea Freeman, Land Trust Alliance, 1319 F Street NW, Suite 501, Washington, DC 20004; phone 202-638-4725; fax 202-638-4730.

## Salvage Mania and the Forest Health Sham

An updated "Salvage Mania and the Forest Health Sham" publication will soon be available from Big Wild Advocates (formerly Greater Salmon-Selway Project). *Wild Earth* readers are encouraged to read and disseminate this information. At stake is the survival of our last intact native forests. For copies contact Big Wild Advocates, POB 318, Conner, MT 59827.

## People for the Wolves

Show your support for the Lobo with a great new bumpersticker from the Public Lands Action Network. The bumpersticker features a red background with bold white letters that read: *People for the Wolves!* Proceeds from the sale of the bumperstickers will help support Lobo reintroduction efforts in the Southwest. The cost is \$3 each or 2 for \$5. Send your check or money order to Public Lands Action Network, POB 9701, Santa Fe, NM 87504.

## The Nature of Nature, continued

In "The Sweet Smell of Success," chemical ecologist Thomas Eisner explores the reproductive system of the *Utetheisa* moth, which he discovers to be "a complex labyrinth of ducts and chambers." Eisner, who is also a widely published photographer, includes characteristically artful portraits of the insect. "The moth has introduced us to levels of complexity of insect life that we never imagined could exist. It taught us to ask questions, and it was generous with its answers."

Humility, sensitivity to beauty, attentiveness, relentless curiosity, methodical logic—these qualities are consistently apparent in the contributions of the more than 30 writers and visual artists who donated their work to this book. Hopefully this broad sampling will motivate the reader to learn more—to seek out the recent book of Endangered species portraits by Susan Middleton and David Liittschwager (*Witness*, Chronicle Books, 1994), for example, or to acquire the recently published collection of essays by *New York Times* science writer Natalie Angier (*The Beauty of the Beastly*, Houghton Mifflin, 1995). Used as a guide to further reading, *The Nature of Nature* will provide discovery and delight for years to come. ●

—Reviewed by Mary Troychak, editor of *Wings*, which is published by the Xerces Society (4828 SE Hawthorne Blvd., Portland, OR 97204), a leading invertebrate conservation group.



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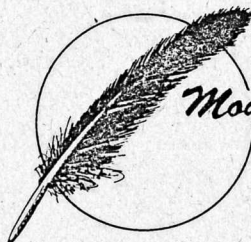
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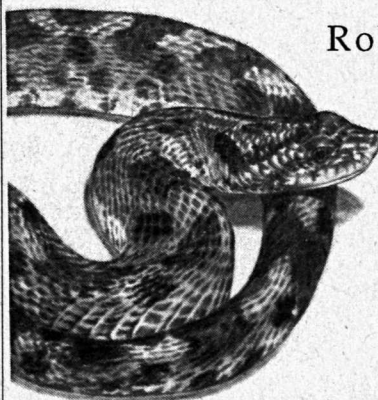
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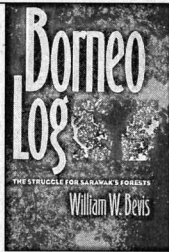


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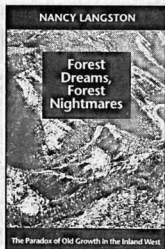
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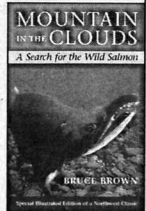
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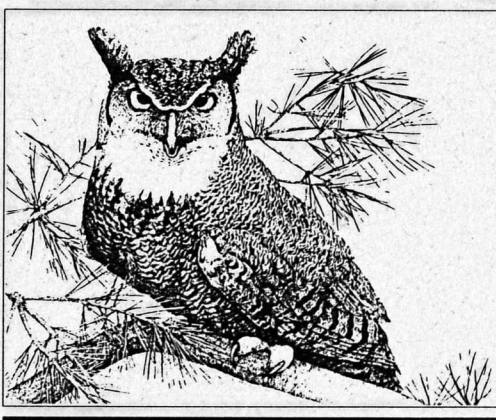
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## North American Porcupine illustration by Libby Davidson

Kingdom: Animalia  
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Order: Rodentia  
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Family: Erethizontidae  
Genus: Erethizon  
Species: *dorsatum*

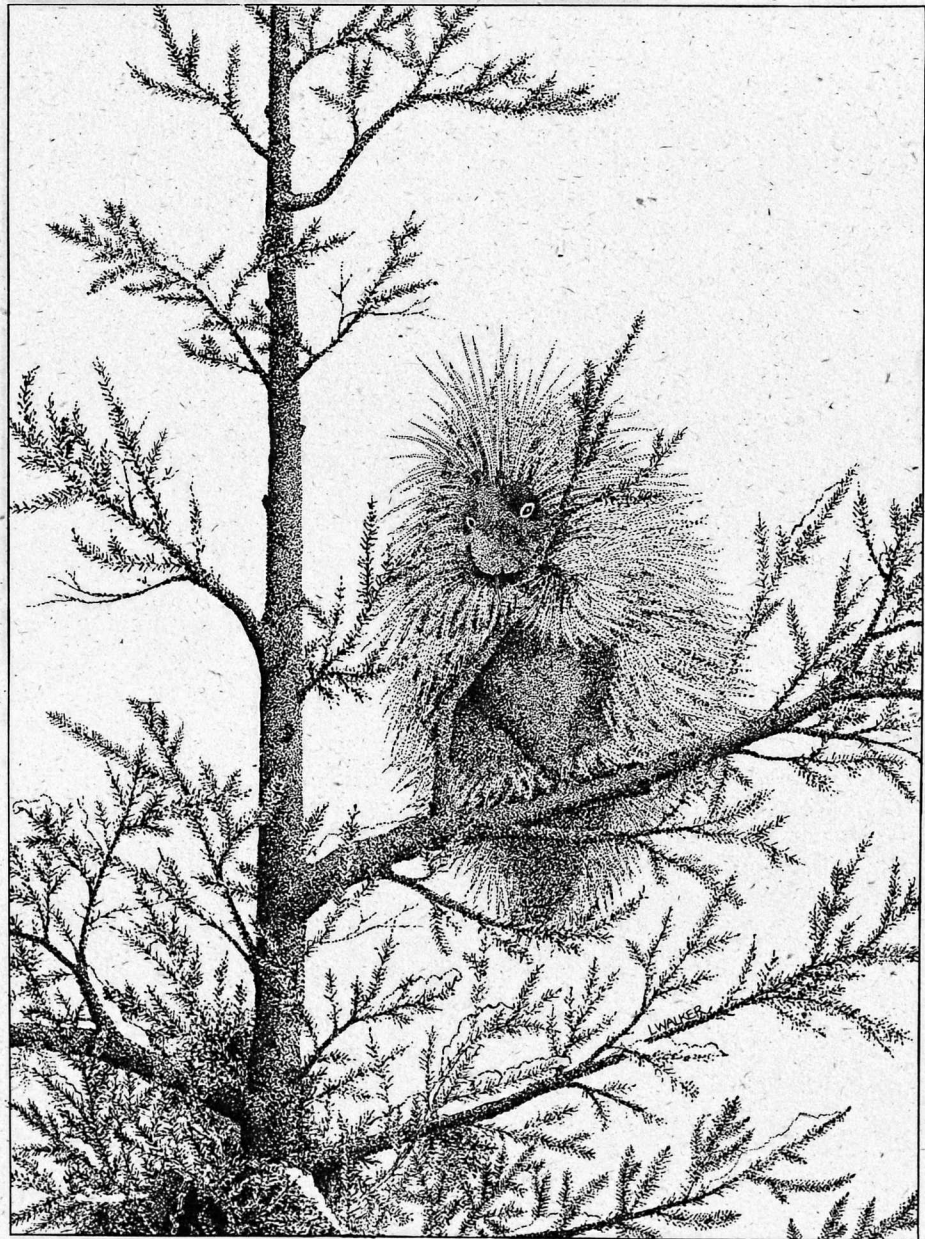
**A**RGUABLY North America's most easily embarrassed rodent, and unarguably its prickliest, our continent's representative of the New World porcupine family is so well armed with quills that it has grown wont to amble along toward its next arboreal meal (likely to be bark, roots, needles, or nuts) quite unconcernedly. Occasionally, though, it stumbles into a larger creature, whereupon it may gaze upward with a mixture of bemusement and trepidation.

*Erethizon dorsatum* is also one of North America's largest and most widely distributed rodents, weighing up to forty pounds and ranging across most of forested North America but avoiding Florida and southern California. At home on the ground, in rock piles, and in trees, the North American Porcupine lacks the prehensile tail sported by several of its more arboreal South American kin. Rather, its tail serves best as a weapon, housing many of the beast's 30,000 or so quills.

Porcupines den often in boulder fields or beneath overhanging cliffs, where hikers may happen upon their scat deposits. Porcupine droppings look like birch catkins. The discerning hiker, however, will quickly distinguish them from their vegetative semblables through olfaction. In winter, the observant skier will espy their subtly quill-streaked troughs in deep snow.

Several other porcupine propensities ought to be noted: They have big brains and keen memories but poor vision; they are nigh on invincible to predators excepting Fishers and Cougars, who will flip and eat them; and, yes, porcupine young are born complete with quills. —JD

Contributing artist Libby Walker Davidson (POB 1843, Burlington, VT 05402) works primarily in pen & ink, the medium in which she created illustrations for the book *Life in the Cold* and various publications for the Vermont Agency of Natural Resources. In association with the Keewaydin Environmental Education Center, she produced the *Wildlife in Winter* advent calendar and pocket-sized field identification cards. Currently, Libby is exploring a new medium—acrylics—as she paints a 35' long Wetland Diorama for the Birds of Vermont Museum in Huntington, Vermont.







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**W**orking to restore biological integrity by protecting predators and their habitats through five campaigns:

- 1) Forest Carnivore Protection (lynx, wolverine, fisher and marten);
- 2) Conservation of Prairie Dog/Grasslands Ecosystems;
- 3) Reforming the Federal Animal Damage Control Program;
- 4) Wolf and Grizzly Bear Recovery and Restoration;
- 5) Roads Scholar Project (field inventories of excessive road miles and ineffective road closures on National Forests).



For more information, or to join (\$15/year), contact: PREDATOR PROJECT  
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Fisher illustration by Martin Ring